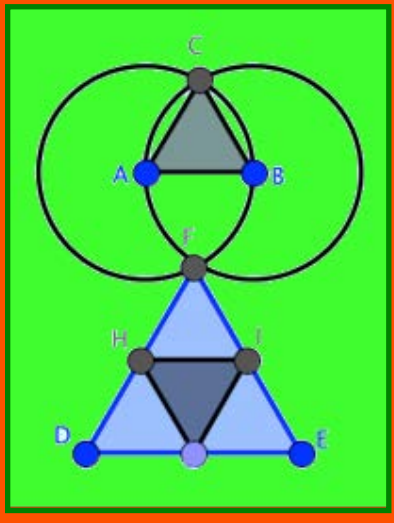
Gerry Stahl's assembled texts volume #18

Overview and Autobiographical Essays



Gerry Stahl

Gerry Stahl's Assembled Texts

1. *Marx and Heidegger*
2. *Tacit and Explicit Understanding in Computer Support*
3. *Group Cognition: Computer Support for Building Collaborative Knowledge*
4. *Studying Virtual Math Teams*
5. *Translating Euclid: Designing a Human-Centered Mathematics.*
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Overview and Autobiographical Essays

Gerry Stahl

2015 - 2025

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Contents

Part I: Introduction to My Life and Writings

Throughout my life I have pursued interests in **mathematics**, **physics**, **philosophy**, **computer science**, **community development**, **educational research** and **sculpture**—each of which I found intellectually challenging. These disciplines have run as threads through a series of interconnected careers across several decades, as summarized below and documented in my website and my eLibrary.

My **website** (at htpps://GerryStahl.net) grew mostly during the two decades when I was involved in academia as a computer scientist and educational researcher. It focuses primarily on my research in Computer-Supported Collaborative Learning (CSCL) Most of my CSCL publications discuss real instances of students learning math collaboratively in the Virtual Math Teams (VMT) research project which I directed at Drexel University and the Math Forum with a series of National Science Foundation grants. During this period, I founded and edited the *International Journal of CSCL* (*ijCSCL*).

My writings have been collected in a digital **eLibrary** (GerryStahl.net/eLibrary). The eLibrary includes my two doctoral dissertations and the five volumes reporting on my research published by commercial publishers: MIT Press, Springer, Morgan & Claypool Publishers and Cambridge University Press. The eLibrary also includes 14 additional volumes, which collect the best versions of my papers that were not included in the published books. I self-published these collections of essays in order to organize and make available my writings in convenient and accessible formats. The self-published volumes are available in PDF format for free from my website and available at cost in paperback versions from Lulu or Amazon; most are also available formatted for Kindle and iBook.

This volume includes autobiographical materials to provide context for the essays within the timeline of my life, work and thinking. The volume concludes with my academic Curriculum Vitae as of September 1, 2018. The rest of the volume was last updated in 2022.

1. Intro to My Life

Philosophy

I started reading philosophy while in high school—mostly philosophy of math and science. In college, I transitioned from majoring in math and physics to philosophy, especially continental philosophy, including Nietzsche, Marx, Heidegger and Merleau-Ponty. From 1970-75, I earned a PhD in philosophy, with three years of study in Germany and a dissertation on Marx and Heidegger. I taught a couple of courses and authored some papers, but soon returned to my computer science career. However, my subsequent careers were deeply influenced by my philosophy studies. For instance, my computer science dissertation was largely based on Heidegger's theory of interpretation; my community development writings were influenced by Marx' economic analysis; my educational research centered on an original philosophy of group cognition; my books are philosophical in tone; even my sculpture is driven by philosophic as well as aesthetic inquiry. My theory of group cognition is the result of my practicing philosophy within the context of scientific research.

*** eLibrary**: vol 1 *Marx & Heidegger*, vol 5 *Social Philosophy*, vol 11 *Essays in Philosophy of Group Cognition*, vol 19 *Theoretical Investigations*

Computer Science

Having taken a couple of computer courses at MIT, most of my early jobs were in computer programming. Before and after my graduate study in philosophy, I was a systems programmer at Temple U. and Northwestern U. in 1968-71 and 1973-76. When personal computers were first developed, I ran a computerization project for nonprofits in Philadelphia from 1985-89. I then earned a PhD in computer science at the University of Colorado from 1989-93. I worked on software development research until 2002, as a graduate research assistant, researcher at a start-up, post-doc, research professor and research scientist. A number of these projects were with NASA's astronaut program. I developed software systems and research prototypes in many programming languages. From 2003-2014, I taught at Drexel University's School of Informatics, where I earned tenure and retired as emeritus full professor.

*** Website**: Teaching, Research

*** eLibrary**: vol 2 *Tacit and Explicit Understanding in Computer Support*, vol 3 *Group Cognition: Computer Support for Building Collaborative Knowledge*, vol 8 *Essays in Personalizable Software*, vol 17 *Proposals for Research*

Community Development

While working at Temple, I helped organize a union for the computer-services workers. After being fired during a strike, I became a VISTA volunteer at the Philadelphia Council of Neighborhood Organizations, where I was a community organizer in impoverished areas of Philadelphia; I formed an effective block organization in my own West Philly neighborhood and wrote a grant proposal for a million dollars for energy conservation neighborhood projects. From 1979-84 I was neighborhood planner at the SW Germantown Community Development Corporation, where I raised city, state, federal, foundation and corporate grants for programs in home repair, weatherization and job training, as well as for a neighborhood credit union, business incubator and energy conservation organization. I next worked at a neighborhood development think tank providing technical support to nonprofits. I spun off my Community Computerization Project, which helped to computerize many nonprofits when personal computers became available. In retirement, I served as Treasurer and founding chair of the Salt Marsh Task Force on the Board of the Chatham Conservation Foundation, the oldest land trust on Cape Cod. I then joined the Energy and Climate Action Committee of Town government to work on climate change issues.

*** Website**: GerryStahl.net/SMTF
*** eLibrary**: vol 5 Social Philosophy, vol 17 Proposals for Research, vol 18 Overview and Autobiographical Essays.

Education Research

My computer science career evolved into educational research as I concentrated increasingly on the design of software to support learning and collaboration after graduate school. I became active in the CSCL (computer-supported collaborative learning) research field, attending all its conferences and organizing the one in 2002. At Drexel, my research was in collaboration with the Math Forum and concerned collaborative learning of mathematics, especially dynamic geometry. I directed the VMT (Virtual Math Teams) Project with National Science Foundation funding from 2003-2015 and founded the *International Journal of CSCL* (*ijCSCL*), serving as its editor-in-chief from 2006-2015. I travelled around the world to present at research centers, conferences and workshops. I published five books on my educational research at academic presses and was recognized as an international leader in CSCL. My website includes course descriptions of some of the courses I taught on information science, often using computer-supported collaborative learning pedagogies and technologies.

*** Website**: eLibrary, Publications, ijCSCL Journal, VMT Project, CSCL, Teaching, Research, CV
*** eLibrary**: vols 3-6, 9-16, 21
*** YouTube**: https://www.youtube.com/c/GerryStahl/videos -- playlists: academic presentations and research reports

Sculpture

For most of my adult life, I occasionally engaged in wood sculpture. Once I settled into retirement around 2018, I started to take pottery classes and to work in ceramic and wood sculpture as my primary activity. I do not sell my pieces but have exhibited at a couple of local art-center shows. I have produced a body of work that explores different historical sources of sculpture and tries to exemplify an approach to sculpture that is appropriate for the current stage of its history. A book cataloging my sculpture emphasizes my philosophy of "opening up" the material that is being worked (clay, wood, plaster) to produce expressive three-dimensional forms. Some of the material from the book is also available on the website Sculpture tab, including pictures of all the wood carvings. Several YouTube videos of sculptures rotating in 360 degrees are available from there as well.

*** Website**: Sculpture
*** eLibrary**: vol 20 *Works of 3-D Form*
*** YouTube**: https://www.youtube.com/c/GerryStahl/videos

Writing

Increasingly during my life, I documented my work in essays and other publications. These are collected in my eLibrary. This *Overview* volume contains many pointers to the stages, activities and documents related to my life and careers. The volumes in the eLibrary reflect the various interests which have pervaded my life and interpenetrated each other. Although I was late in learning to write fluently, working on my dissertations and grant proposals got me started and I eventually came to find writing central to my work. My writings on educational technology are prolific and highly cited. My developing philosophical perspective is frequently revealed in my writings. I also developed many grant proposals (funded for a total of over $11,000,000) and wrote introductions to each quarterly issue of the journal I edited.

*** Website**: eLibrary, Publications, CV

*** eLibrary**: vol 16 *Editorial Introductions to ijCSCL*, *vol 17 Proposals for Research*, vol 18 *Overview and Autobiographical Essays*.

Family

Throughout my evolving careers, family life has always played a significant role, if less documented in my professional writings and academic website. My parents were lifelong social activists in the labor movement and integrated housing, respectively. My brother, Alan, and I both followed circuitous paths to academia. I have lived in many places and homes. In 1967 I married Doris Whiteman and we lived in Heidelberg, Philadelphia, Chicago and Frankfurt. In 1989 I married Carol Bliss and we lived in Boulder, Philadelphia and Chatham. My son Zake is married to Kimlou,

and they have a daughter, Nastasja. My son Rusty is married to Sarah, and they have two daughters, Ruby and Ora.

I was a jogger from age 35 to 78, going 10k, including the Boulder Bolder. I loved hiking the desert and mountains. I now play pickleball and walk to the beaches.

*** Website**: Personal
*** eLibrary**: vol 18 *Overview and Autobiographical Essays*

2. Intro to My Research & Writings

Most of my writings—journal articles, conference papers, grant proposals, book chapters and workshop presentations—are related to the pedagogy, technology, analysis and theory of computer-supported collaborative learning (CSCL). My research on these topics formed the core of my academic career from about 1999 to 2021. My series of five published books reports on the development of my theory of group cognition, which I consider my central philosophic contribution.

My Philosophy of Group Cognition

This approach starts from the position of post-cognitive theory. By the late twentieth century, cognitive science oriented to mental representations of individuals was superseded by socio-cultural theory. This theory stresses the historical development of the human mind, cultural evolution of concepts, the dependence of individual cognition on social conditions and related considerations. A number of authors have elaborated a socio-cultural approach to learning, interaction, meaning making, mediation by artifacts, etc. However, these sources generally adhered to either a psychological or a sociological focus, that is, a focus on individual minds or else on broad cultures, although their analyses sometimes relied on assumptions about the working of small groups as mechanisms affecting individual or social cognition. Even when authors hypothesized important roles for small groups, the data they collected from case studies and the methods they applied to analyze this data were inappropriate or inadequate to support their claims.

My philosophy of group cognition is characterized by the following distinguishing features:

- A systematic focus on the *small-group level* of description of meaning making in CSCL settings.
- The *collection of data* representing the group interaction as conducted in realistic CSCL sessions of students.
- The *analysis of data* from paradigmatic case studies of CSCL to reveal cognitive processes at the group unit of analysis.

In writing my first book, *Group Cognition*, I realized that a philosophical foundation for CSCL should be oriented to the small-group level of description, because CSCL is conducted by groups of students learning together. Each of the concepts related to the nature of knowledge, learning or cognition should be re-defined—not only on the

traditional individual and the historical cultural levels, but also on the small-group level. For instance, methodologies for analyzing collaborative learning should focus on the group unit of analysis, rather than just on the utterances of individuals or the practices of societies. My subsequent writings developed group-level conceptualizations based on close analysis of transcribed interactions of small groups in CSCL settings. These key terms of a philosophy of group cognition included reconceptualization at the small-group level of learning, understanding, interpretation, shared knowledge, meaning making, intersubjectivity, common ground, intentionality, reference, agency, joint attention, being-in-the-world-together, perspectivity, experience, temporality, co-presence.

Documentation of the Theory

The essays collected in *Group Cognition* (vol 3 of my eLibrary) show that my early attempts to design collaboration technology was based on inadequate concepts of group meaning making and negotiation. Although CSCL researchers referred to the centrality of meaning making and negotiation, they never made these concepts detailed enough to be operationalized in designing technology to facilitate collaborative learning. I realized that I needed to develop collaboration theory further by generating and collecting examples of productive collaborative learning and by appropriately analyzing the knowledge-building interaction that was captured. That led to the start of the Virtual Math Teams (VMT) Project and of my development of the philosophy of group cognition. The term "group cognition" emerged during my drafting of vol 3 as a placeholder for the needed theory.

Part of the post-cognitive approach is developed in terms of *practice* and in terms of the use of *language*. In keeping with the linguistic turn and the practice turn that were prominent in the theory of the late-twentieth century, practices are still conceived as either tacit skills developed by individual actors or social practices such as "member methods," typically performed within linguistic communities. By contrast, my studies showed how small groups acquire their own "group practices" and build "group meanings" (embedded in local extensions of language or in constructed knowledge artifacts) that are negotiated and shared by the group as such.

The VMT Project (vol 4) was designed to generate and capture data from small-group CSCL interactions through an online collaboration environment for mathematical problem solving. The software was instrumented to capture all the interaction that took place within small groups of students using it. There was a replayer component of the software that allowed researchers to view in detail exactly what took place in the group interactions. I developed an analysis methodology based on adapting Conversation Analysis from informal face-to-face conversation by adults to online math problem solving by students in CSCL settings. The VMT Project thereby provided an integration of CSCL pedagogy, technology, analysis and theory (vol 5).

My most extended and detailed interaction analysis is presented in vol 6. Here, the chat interaction among three girls working together online in VMT for eight hour-long sessions is analyzed line-by-line. The analysis shows how this group negotiated over 60 group practices, which constituted their collaborative learning of dynamic geometry. It reveals how their meaning making took place in the group interaction and resulted in development of their group language about geometry. It provides a longitudinal analysis of how this group learned the fundamentals of engaging in dynamic geometry.

Vol 19 brings together articles by other authors published in *ijCSCL* that contributed to the post-cognitive approach with my own group-cognition analyses and VMT case studies. This completes the working out of the philosophy of group cognition, as presented in my series of five academic books on the VMT Project: vols 3, 4, 5, 6 and 19.

Development of the Theory

My theorizing about cognition runs throughout my writings. It begins with my philosophy dissertation, which reviews the philosophies of Heidegger and Marx (vol 1 of my eLibrary). Post-cognitive as an international movement of theory during my lifetime derives its emphasis on tacit practices from Heidegger and its orientation to social influences from Marx. In vol 2, my computer-science dissertation, I further expound Heidegger's theory of interpretation, in which tacit knowledge that breaks down in action is typically made explicit in order to respond to a problem. When the problem is resolved, the newly interpreted understanding returns to a revised form of tacit knowledge. While vol 2 dealt with the implications of this interplay between tacit and explicit knowledge for computer support of knowledge building by designers, in vol 6 I discover the same kind of process at work in collaborative learning by student groups. In vol 6 and vol 19, I analyze it on the level of group practices in data from my VMT project.

The chapters of *Group Cognition* (vol 3) lay the background for my CSCL research, up to the launching of the VMT Project. In the end, *Theoretical Investigations* (vol 19) gathers together my most relevant essays for the philosophy of group cognition. *Group Cognition* hypothesizes many of the features of the philosophy of group cognition and anticipates the kind of pedagogy, technology, analysis and theory that is worked out in detail in the VMT Project. The many case studies in my eLibrary document the power of CSCL to promote group cognition. At the same time, they illustrate the complexity of structuring the collaborative experience to effectively foster group meaning making, where the knowledge building is truly a group product. At its most successful, group cognition creates knowledge that none of the collaborating individuals could have constructed on their own. The shared group understanding can subsequently be appropriated into the skill set of the individuals or be assimilated by the broader community.

The books in my eLibrary are summarized toward the end of this volume. There are also comments on them from when I read through them in 2000. I apologize that there is no succinct and systematic presentation of the philosophy of group cognition, but that it is spread across thousands of pages. Perhaps that is the nature of philosophy, which requires of each person an extended effort to gradually shift one's thinking and to integrate diverse ideas and perspectives.

In introducing my life and writings in this section, I have focused on my philosophy of group cognition. That is what may be of most interest to my academic colleagues. Of course, the writings in my eLibrary touch on many other themes. If it is difficult to summarize a written corpus, it is much harder to adequately characterize a well-lived life. While the essays in this volume note a variety of events in my life, other occurrences and involvements are missing—in some cases even forgotten by me. Especially absent are the relationships with family and good friends. Great writers like Joyce and Woolf failed in their attempts to adequately detail even a single day of an imaginary life, so how can one represent in words a real life except through scattered anecdotes and fragmentary written artifacts?

Part II. Autobiographical Essays

3. **Catch.Up.Me**
4. **Union Organizing at Temple University**
5. **Community Development in Philadelphia**
6. **Rehabbing My First House**
7. **A Career in Informatics**
8. **Glimpses of My Years at Drexel University**
9. **Retirement Activities in Chatham**

This Part includes two autobiographical essays: "Catch.Up.Me" and "A Career in Informatics." These informal discussions were written to provide a glimpse of my life leading up to my professorship at Drexel University. The catch-up article was for friends and family, covering the early phases of my life. The discussion of my career was addressed to students in my courses on information science; it stresses the importance of life-long learning in a rapidly evolving society.

The other essays are brief accounts of specific activities in my life.

3. Catch.Up.Me (2009)

Introducing my life

In the digital age when one is supposed to tweet one's virtual associates with the least significant activities of one's last minute of mundane teenage activity, it becomes an anachronistic and strenuous job to reflect on the longer trajectory of one's life from a perspective of unfathomable decades. When I met a high school friend this week via Facebook after not having had contact with anyone from that era for exactly 40 years, it was a weird and difficult business to catch each other up on our now ripe lives and on the glimpses or more-than-faded memories of people with whom we had collectively endured our formative years.

So I thought—now that possible ties to long-gone friends seem to be popping up through social networking—why not try to reach out and catch up in at least a superficial way with some of the memorable (or remembered) people of the ancient past while they and I are still lucid.

A full-scale memoir would be overkill and would never get written. But I could, within an afternoon free of pressing tasks, gather together some lists and lots of digital photos (the many faces of Gerry) lying around on my computers and string them together with brief annotations.

Even before me

For the sake of completeness, I will start a full century ago. My grandparents were Eastern European Jews who immigrated to the US in the early 1900s. My father's parents came from somewhere in Romania and settled in Philadelphia, running a mom-and-pop furniture upholstery shop under the El in Kensington. My mother's parents came from the Bialystock region of Poland/Ukraine and shared a small carpet-cleaning factory with their relatives in Chicago. My parents were politically oriented and met in the socialist party. My father was a union organizer and my mother worked on integrated housing.

This is one of the few heirlooms I have from my grandparents. My grandfather, Nathan Miller, designed this and had someone create it on copper, 18" x 22". It is entitled "Karl Mark, Founder of Scientific Socialism." It lists 10 fundamentals of Marxism:

1. Workers of the world unite.
2. You have nothing to lose but your chains and a world to gain.
3. The liberation of the working class is the task of the workers.
4. The workers have a right to the wealth they created.
5. Capitalism is the root of war and other evils.
6. Only Socialism will abolish war and poverty.
7. Dialectical materialism is the foundation of Scientific Socialism.
8. Dictatorship of the proletariat is the first step toward Socialism.
9. To each the product of his toil -- the first stage: Socialism.
10. To each according to his needs -- final stage: Communism.

The heading references the date 1848, which was perhaps the most revolutionary moment in Europe, when people rose against monarchs across the continent, only to be crushed. Later, in the prelude to the 1905 revolution in Russia, my grandfather was distributing revolutionary flyers in Poland, when the Czar's soldiers chased after him. He then emigrated to Chicago.

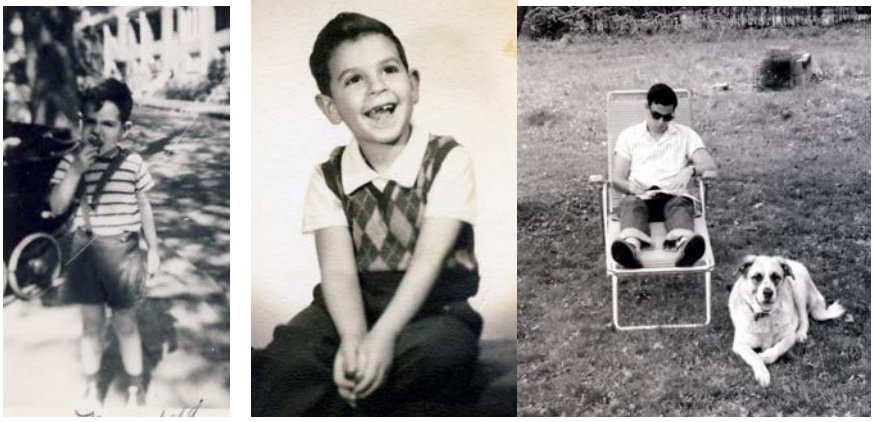
My father with me, supervised by Uncle Clarence with Nephew Paul and Zaddy "neu-Nathan." Playing with Bubby Minnie. Sitting on family car.

The early years

Because of my father's work and my mother's wanderlust, we traveled a good bit. A list of the places I called home over the years is included below. As the list documents, I have spent my life trying to get away from Philadelphia, with little long-term success (until retirement). ;-)

I grew up in Trevose, a working-class suburb of Philadelphia. I went to Trevose Elementary School for most of six years. In the middle, we lived in Ohio. When I

came back, my closest buddies had been held back a year, while I had survived inner-city schools that were both rougher and more academically advanced. My school was a six-room schoolhouse that I walked to from a mile away. I received a classic American education there, being the only non-Republican, non-Satan-fearing-Protestant. Among my earliest memories are crying at being left at school by my mother the first day of first grade. However, I also recall being taken by my second-grade teacher across the hall to the third-grade classroom so I could explain to them how multiplication was just an extended form of addition. I never thought that I was a good student before senior high school, but when it was time for me to graduate, apparently my first-grade teacher still remembered me and wondered with some expectation how I was doing.



Me growing up in Philly and Trevose, with Mickey.

Junior High School

Seventh grade threw me into a bigger world than I was prepared for. Grades 7 through 12 were all in one building. Before I could quite adjust, my family moved to Kentucky for the middle of the academic year. The building there was even larger, and I often got lost, physically and mentally. Fortunately, the library had a large science fiction section, which I read end to end to feel at last at home in the universe. After I returned to Bensalem High, they opened a modern junior high building, which by then seemed rinky-dink, with low ceilings and walls that closed in on you with their decorator colors.

Senior High School

Going back to the high school building in 10th grade was almost a liberating experience after that. By then, I knew my classmates and was involved in various school activities. Geometry class was the first course that clicked for me, despite the teacher, who was more interested in sports. I found the method of axiomatic proofs and demonstrations appealing. I had already been interested in science, but this was probably when I started to read about math on my own.

Bensalem was not an academically distinguished institution, but they did attempt to keep up with the times as best they could. One year, they tried to start teaching algebra earlier. Then, the next year they reversed this decision and we had to take Algebra I again. It turns out that this may have been quite helpful for me. Algebra is a major turning point in math education, where one moves from rote arithmetic to abstract understanding, if one is lucky. By taking it twice, I really nailed the subject. I could understand both the theory and the details of what was going on and could treat it as a game, in which I trained my skills. My mastery of algebra helped me significantly to score well on standardized tests, to get through several college courses and even now to understand what students are doing in my current research.

Another curriculum experiment was introducing modern physics the year after I took the classical physics course. The new curriculum was beyond the understanding of the physics teacher, but was just my cup of tea. I took the class as a repeat of physics and found it stimulating. The curriculum had been developed at MIT—and that was where I was heading after high school. Academically, I outgrew the high school curriculum and could not wait to move on to a challenging college experience.

During the summer before my sophomore year, my family embarked on a road trip through Canada. Before my junior year, we drove through Mexico. Before my senior

year, I attended a summer physics program at the University of Arizona in Tucson, loving the desert and going to the Seattle World's Fair on my way home. My horizons broadened considerably.

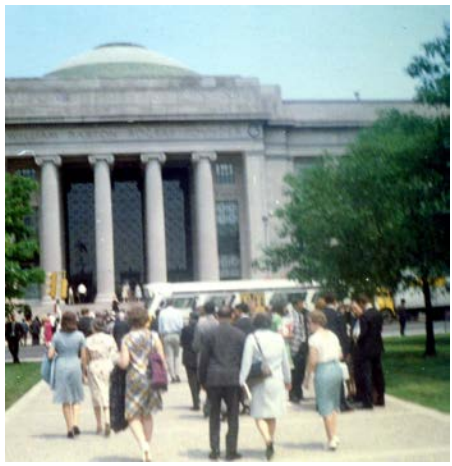
Of course, the important thing in high school is the social life. It is now clearer than ever that interacting with my high school classmates was my major formative social experience. It was the period in my life when I spent the most time with other people and had the largest set of friends. In later periods, I was either too busy studying, working or raising a family to socialize as much. In addition, because I moved about a lot in my life, I did not maintain contact with many people over extended periods.

Off to College

MIT was an intellectually exciting time for me. I took a broad variety of courses, especially philosophy, literature, math and physics. I took graduate courses that were way beyond my ability. I took computer and AI courses, as well as courses on social change. I took courses from Nobel laureates and world leaders of their fields.

It was also a politically charged time, with the Vietnam War ramping up. I was active in Students for a Democratic Society (SDS), becoming the chair of the MIT chapter. I pursued student issues within MIT as well as war issues. I met Doris, my first wife, on the bus to a demonstration in DC.

During the summer before my junior year, I helped an Indian graduate student analyze data on politicians in India, working in Penn's computer center across the street from the world's first digital computer. The next summer I worked at an electrical turbine factory in Baden, Switzerland, programming in Fortran.



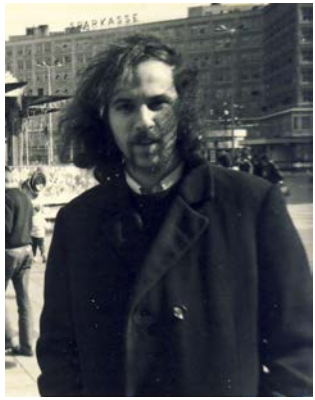
Scenes from college, including apartment in Boston and graduation day.

Starting a Family

Within days of graduation from MIT, I was married and studying German in a farm town in Bavaria, as the start of my exchange fellowship. Doris and I spent the academic year in Heidelberg. That was an exciting time for me. I took courses from Heidegger's assistant, Gadamer, and other German philosophers. I read lots of Hegel,

Marx, Heidegger and Habermas. During the semester break, we hitchhiked around Greece and visited Israel. The second semester, the university became a "free university," in solidarity with the general strike in France. This was the closest thing to a revolutionary period during my lifetime. It was exhilarating. I was involved with the German SDS then and read many political tracts.

Doris had been pregnant our whole time in Heidelberg. Zake was born while I was at a lecture on the birth of philosophy with the pre-Socratics. We had an apartment in the quaint town of Neckargemünd, outside of Heidelberg. My mother visited to be present for her first grandson. A week later, we took a boat back to the US, in time to watch the Chicago convention and Woodstock on tv. Driving through New Jersey after a year in Europe would have been culture shock enough without the political upheaval and repression.

Scenes in Europe.

I had outmaneuvered the draft board while in Germany, and then I took a job teaching remedial math at Bartram High in SW Philly to stay out of the military. That was such a repressive environment—with police in the halls—that I did not last until Christmas. I tried driving a taxi and volunteering in a progressive experimental school, but ended up caring for Zake while Doris worked as an art teacher. Eventually, I was hired as a system programmer at Temple University's computer center. I worked on CDC 6400 computers, the most complicated supercomputers in existence then. We lived in a block of Quaker coop housing in North Philly.


Chicago, with Doris and Zake.

Graduate School

I tired of programming after a while and itched to return to philosophy. I went to Northwestern, which had the only department in the US that offered continental philosophy. We lived in the northern-most section of Chicago, a low-income area where we participated in an active hippy community. I worked part-time at Northwestern's computer center, where a co-worker developed the world-champion chess program. I wrote a dissertation synthesizing what I considered the major contributions of Marx and Heidegger. To do the research, I returned to Germany.



This time we spent two years in Frankfurt, living at first in the village of Kronberg im Taunus and later in a married-student dorm. We had a VW bus and traveled throughout Europe. During the summer between the two years, we first went down to a nudist colony on the coast of Yugoslavia, so Zake could frolic in the sand and water. Then we drove up through Scandinavia, crossing Norway and Sweden in their beautifully desolate tundra interior.

Frankfurt had been home to the "Frankfurt School" of Western Marxism (Marcuse, Habermas, Adorno, Horkheimer). Although the original members were no longer there, I steeped myself in that tradition. Angela Davis had been the American visitor there a couple of years before me. I finally got the sense that I was not only starting to understand the philosophers I was reading, but also developing my own perspective on them.

Frankfurt, with Zake.

Back to Philadelphia

After earning a doctorate in a field that was anathema to American academia, I returned to my old position at Temple University. By the time I started to get bored with the programming, I became involved in organizing a union for the computer-center employees, one of the few groups at Temple not unionized. This turned into a major battle, climaxing in a strike. I was instrumental in starting the union, was an officer of it, produced a lot of its propaganda and was the deciding voice in calling the strike. We were all fired, but offered jobs with the anti-union subcontractor. A couple of years later, the subcontractor was exposed as incompetent and the union was ultimately recognized. It continues today as one of Philadelphia's most progressive unions.

While I was employed at Temple, we had our second son, Rusty. By then, I was in my early thirties and was feeling over the hill. The birth of Rusty rejuvenated me. He has always brought energy into my life.

Rusty joins us. Union comrades.

After the strike, I chose unemployment and even a little welfare, while I volunteered at the Philadelphia Unemployment Project and then as a VISTA Volunteer community organizer. I soon became a supervisor of community organizers and wrote my first grant proposal for a million-dollar neighborhood jobs project, including recycling and weatherization. I was assigned to work in the neighborhoods of West Philadelphia. I focused on Belmont Village, the little neighborhood where I lived, and created a classic block organization with political clout and an urban garden.

The community organizing led to a job as neighborhood planner at Philadelphia's most successful community development corporation, the Southwest Germantown CDC. As the grant writer, I brought in federal, state, city, foundation and corporate funding to move from a small sweat-equity program to more extensive housing rehab and economic development. We bought a small factory and several store fronts as incubators for new businesses. We grew the community credit union and started an energy conservation business.

For nine years, we lived on Newhall Street in the neighborhood I worked for, and we gradually rehabbed our Victorian three-story house from top to bottom. I learned how to do carpentry, electrical, plumbing, sheet rocking and a little roofing.

When the first personal computers appeared on the market, I began to explore their potentials. I taught Zake how to program little video games we invented, and he even gave a course on Logo to Rusty's first-grade buddies. I used my Atari 800 to do financial projections for a revolving loan fund that capitalized the credit union with federal grant funds. Later, I used my Amiga computer to produce animated fractal graphics for an art video.

I decided that personal computers could be useful for non-profit organizations and started a project to implement that idea at a center city think tank. After a couple of years, I spun the project off into my own non-profit consulting firm, the Community Computerization Project, which worked with a variety of non-profit organizations.

Venezuela. Switzerland. Working from home.

A new life out West

Just as my consulting business was starting up, Doris left. I took care of Zake and Rusty until they moved on—Zake to Penn State and Rusty to live with his mother. I enjoyed being a bachelor and dating for the first time in my life.

One of my consulting jobs was to develop software for head start agencies. While I was marketing this, I met Carol, who lived in Denver. She did not want to live in Philadelphia, so I sold my house and moved to Colorado with her, where we married. I was attracted to the University of Colorado and decided to enroll in computer science there in order to fill in my understanding of computers and artificial intelligence. We lived in an apartment in walking distance of campus and enjoyed the culture in Boulder.

Colorado. The Boulder glacier with Zake.

I earned a doctorate in computer science and then began developing software for a number of projects, including education-related and NASA space programs. While working on the software projects, we built a southwestern house outside of Boulder. We traveled a lot in the Colorado area, skiing, camping, hiking, biking, etc. I finally got to know the desert environs much better, especially in Utah. I ran the Boulder 10K most years and biked the 100K. Pawnee Pass was my favorite hike in the Rockies.

When funding dwindled, I returned to the university as a post-doc. I started to get my own funding and became a research professor. I pursued a research agenda in computer support for collaborative learning and taught occasional courses of my choosing.

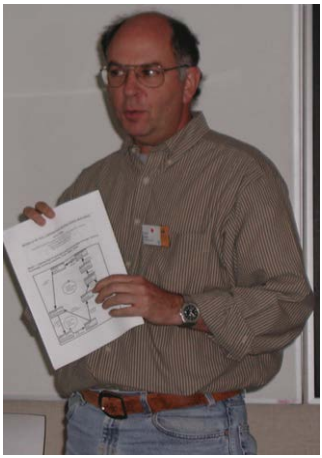
The Stahl family. Zake's wedding.

Back to Europe

I started traveling to academic conferences and finally got back to Europe for a speaking tour, after a 25-year absence. The lab where I spoke near Bonn offered me a position. When I read the proposal for the project they wanted me to staff, I could not resist accepting a year on the project. (As it turned out, the people who had proposed the project stole several ideas from my proposals and writings, which explains why the project struck me as so exciting.)

Meanwhile, my funding in Colorado ran out and a string of my proposals were turned down. Hearing of an opening at Drexel University in Philadelphia, I applied, interviewed and accepted the position. I postponed start-up for a year, while I went to work in the German research lab.

The year in Germany was important for my career. I attended numerous conferences and meetings across Europe and made many contacts there. My field of computer-supported collaborative learning (CSCL) is primarily established in Europe, so it was helpful for me to be seen as one of the few Americans who respected and worked with Europeans—and even bothered to learn their language. I also organized and chaired the major CSCL conference that year, which was held back in Boulder. In addition, I began to publish more than I had in the past. This year saw major growth in my international travel, see the list of my travels below.



Lecturing in Germany. Celebrating with Carol and Nastasja.

Philly again

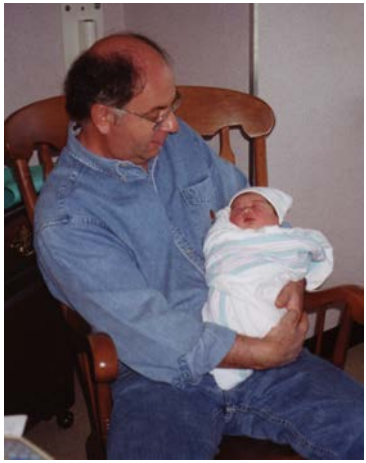
Now I am a professor at Drexel in the College of Information Science and Technology. I teach courses on how to design software that people will actually want

to use and be able to use without unnecessary frustration. After six years, I was granted tenure. I spend most of my time on my research. I have gathered an exciting group of people for the research team that I direct. I raised enough grant funds to buy myself out of half of my teaching load, to pay for travel to conferences, to hire four PhD students, to bring in visiting researchers and to keep the project going smoothly. Most of what I do is to write: conference papers, book chapters, journal articles, etc. I also edit an academic journal for the CSCL field.

Carol and I live in a modest, but comfortable home in a wooded area on the outskirts of Philadelphia. Zake lives outside of San Francisco and works in Silicon Valley. He and his wife, Kimlou, have an amazing eight-year-old daughter, Nastasja.

[Update in 2014: Rusty and his wife, Sarah, live in Brooklyn, where he directs an organization to build leadership in the non-profit field. My brother, Alan, and his husband, Bill, live in Ossining, NY, and Carol's family lives in New York state.]

[Update in 2022: Zake and Kimlou now have a house in the Bay Area and Nastasja is completing college there. Rusty and Sarah have a house in Beacon, NY, with daughters Ruby and Ora. So, we have three granddaughters!]



The future

Where we will all go from here on is quite unpredictable. Stay tuned.

Because I am an information scientist, I was an early adopter of the web homepage as a venue for sharing one's life. Although it is heavily oriented toward people in my academic field, it may supplement the description here: http://GerryStahl.net .

4. Union Organizing at Temple (1975-1977)

The following reports on the legal case for which I was the claimant and set a precedent in Pennsylvania labor law. As described, all the members of Temple University's computer center had joined a union to organize against the subcontracting of computer center management by SCT. My office mate and friend, Rich Feldman, led the organizing effort. At my father's suggestion, I encouraged us to organize as a chapter of AFSCME. When negotiations collapsed, I convinced Rich to call a strike at the start of Temple's registration period. We shut down the whole campus for over a week, with gates chained shut and the computer systems down.

When the strike ended by court injunction, everyone was fired from Temple and offered a job at SCT without a union. Rich and I declined. Most of the others felt they had little choice, but did not enjoy working for SCT, who turned out to be just as bad as we had predicted in our reports and cartoons during the organizing campaign. I was ineligible for unemployment insurance since Temple claimed I had a job offer from SCT. I went on welfare and volunteered at the Philadelphia Unemployment Project and later became a Vista volunteer at PCNO.

The legal case upheld my right to refuse the job at SCT (because it did not include a union) and still be eligible for unemployment compensation. I was awarded back UC payments by the court ruling. However, my welfare payments were deducted from the award, leaving nothing for the award.

The AFSCME local included other Temple employees outside the computer center. Under the leadership of Gary Kapanowski, the local won a contract and is still active today. After Temple got rid of SCT, the AFSCME local took in the computer center workers and finally won union representation of them.

From the *Local 1723 Temple AFSCME Reporter*, vol. V, no. 1, Feb 15, 1979:

Computer Workers Win Unemployment Compensation Battle with Temple

By Gerry Stahl, former VP of Temple/AFSCME

The actions of AFSCME members at the Temple Computer Activity who stuck to their principles in the summer of 1977 have at last been vindicated. On January 3, 1979, sixteen months after Temple fired the entire computer staff, the University's effort to deny the computer workers unemployment compensation finally met with a sharp rebuke from the State.

Back in August 1977, in the midst of negotiations for our first contract, Temple subcontracted its computer operations to a private firm, SCT, and fired all its computer employees with only a few hours' notice. The AFSCME computer workers unanimously refused to be transferred to SCT, who made clear its intention not to recognize or bargain with the union. A ten-day strike ensued, which ended only when Temple secured an injunction. When computer workers applied for unemployment compensation rather than work for SCT, the University moved to deny them benefits, claiming that suitable, albeit non-union, work was available with the private company.

Temple/AFSCME organizer and founding president, Rich Feldman (who was also terminated and has yet to receive over $1,000 in severance pay), understood the subcontracting of the computer center to be an attempt to bust the union. He predicted problems for computer employees who chose to stay on under SCT management. Unfortunately for all concerned, Feldman's prediction of life under SCT proved all too accurate. Nearly all of the former Temple computer staff left within the first year, although prior to SCT's takeover turnover had been low. Employees have been pressured to relocate to other cities and others have been fired without just cause. Many of SCT's new hires have quit before becoming productive in their new jobs, and morale is generally low. (There is hope on the horizon though: the National Labor Relations Board recently issued a complaint against SCT, charging that the company's refusal to recognize and bargain with AFSCME was illegal. Hearings on the complaint will soon be held.)

Now Feldman's analysis of Temple's union-busting motivation has been joined as well by the Pennsylvania Unemployment Compensation Board of Review, which in its January 3 ruling said of Temple's subcontracting to SCT:

"An obvious reason for the arrangement was to subvert the rights of collective bargaining of the Computer Activity Center employees by subcontracting their positions and functions to another employer who refused to recognize the union as the collective bargaining representative of all employees in the computer facility."

In making its decision, the Board *set an extremely important precedent*. The Unemployment Compensation law states that a person can refuse a job which denies the right of collective bargaining and still be eligible for benefits. However, this section of the law had never been tested before and there was doubt as to its applicability. The ruling in the Temple case sets a very clear precedent for the use of this clause in protecting Unemployment Compensation benefits in anti-union cases. This is an especially

important precedent for public employee unions, increasingly threatened by nonunion subcontracting arrangements.

The Board's concluding discussion is worth quoting in full:

"The General Assembly did not intend for work to be deemed suitable when a condition of the work is the denial of the right to collective bargaining under generally prevailing conditions. In the instant case, the claimant was clearly denied the right of collective bargaining. The claimant was an employee of a duly certified collective bargaining representative when Temple and his union commenced negotiations for a collective bargaining agreement in May 1977. SCT, which took over the operations at the Computer Activity Center, refused to recognize AFSCME as a collective bargaining representative. There can be little doubt that under these circumstances the employees, including the claimant, of the Computer Activity Center of Temple University were denied the right of collective bargaining under generally prevailing conditions as provided for in the unemployment compensation law. This denial leads us to conclude that the offered employment does not constitute suitable work within the meaning of the Act. Therefore, the claimant is eligible for unemployment compensation benefits."

The ruling will provide a total of over $10,000 in retroactive benefits for six former Temple employees who suffered periods of up to six months of unemployment. Fortunately, by the date of the last hearing in this case, on April 25, 1978, all of the claimants were happily settled in new jobs.

On behalf of George Zechman, Joanne Ullrich, Ray Zecca, Tony Devitt, Drussie Gifford and myself, I would like to thank Gary Kapanowski (Temple/AFSCME), Jay Kogan (DC 47), Ed Keller (DC 88), and Deborah Willig (attorney) for their persistence in fighting for our just benefits. I hope all my brothers and sisters who are or were in Temple/AFSCME will join in celebrating this victory.

5. Community Development in Philadelphia (1978-1985)

A brief history of the Southwest Germantown Community Development Corporation (SGCDC)

SGCDC was founded in 1976 in response to neighborhood deterioration in the southwest corner of Northwest Philadelphia. Philadelphia was still reeling from the movement of industry out of the city in the 1950s and the subsequent white flight to the suburbs. In particular, the Bethlehem steel plant in Southwest Germantown had closed, causing lasting unemployment in the area. Residents reacted to the abandonment and vandalism of the neighborhood's stock of aging single-family houses by forming SGCDC to support sweat-equity rehab, in cooperation with the City.

With a small foundation grant and access to abandoned houses, Shelley Joffe worked half-time to help families acquire and rehab houses in the neighborhood. She hired me in 1978 to be the economic development planner under a new grant. She then left on maternity leave and Bill Harrington was hired as the new Executive Director. He had a masters in nonprofit management from Wharton. Together, we built SGCDC from a volunteer organization into a multi-faceted neighborhood revitalization effort, with community control and staff expertise.

It was the era of Johnson's war on poverty and SGCDC became a conduit for governmental funding to reach an impoverished neighborhood. Jane Shull, Ed Schwarz and others helped to emphasize grassroots community self-help approaches, also starting a community credit union to address redlining of the neighborhood. Later, when I left SGCDC during the Reagan era, I went to work with Jane and Ed at their think tank.

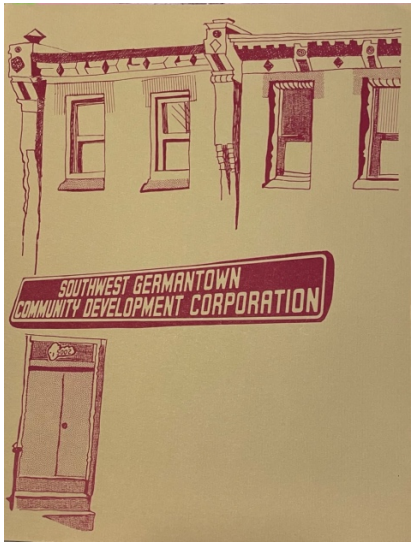
The SGCDC programs began with housing services. Staff provided pre-purchase counseling for acquiring abandoned houses, as well as delinquency counseling to prevent further abandonment. Home maintenance supports like workshops on repairs later expanded into an extensive home weatherization and energy conservation program, with the emphasis still on self-help. Youth employment counseling was soon added to address extreme youth unemployment. Finally, economic development was added, with a business developer on hand to assist local aspiring entrepreneurs. SGCDC acquired a number of storefronts on the local commercial strip as well as part of the old steel mill as an industrial incubator.

A major HUD grant expanded the credit union's self-help home-improvement loan fund for low-income residents. Other grants established GRACE (Germantown Residents Acting to Conserve Energy), which hired staff to weatherize houses, present workshops and promote recycling. Eventually, it ran City weatherization and low-income energy-assistance programs in the neighborhood.

My primary task was writing funding proposals for all these programs. That involved interviewing current program staff and others to design new and expanded services as well as drafting and submitting the grant applications. As neighborhood planner, I tracked changes in the neighborhood of about 19,000 residents. I also did financial planning for the organization, juggling funds to keep things going across funding gaps and to anticipate future financial needs. Financial support came from: 5 nonprofits, 12 corporations, various programs of 2 federal agencies, 2 state agencies, 6 city agencies (largely conduits for federal funding like HUD and CETA). Here is a breakdown of the grants awarded during my fundraising:

	1979	1980	1981	1982	1983	1984	1985
Federal	0	0	140,492	170,560	92,940	55,426	58,471
State	0	0	39,582	63,758	49,583	136,635	31,748
City	329,741	587,196	517,626	341,589	420,769	228,881	233,166
Foundations	39,670	21,565	84,300	20,246	110,530	116,600	207,430
Corporations	0	100,000	1,000	8,750	83,925	48,135	50,823
other	2,544	22,484	91	17,195	91,292	80,889	40,745
	371,955	**731,245**	**783,091**	**622,098**	**849,039**	**666,566**	**622,383**

Each year, I produced an annual report on SGCDC's accomplishments. Doris did the artwork for most of the reports. (See covers for 1981 and 1982.)



There were attempts in other neighborhoods and in many American cities to establish CDCs to revive neighborhoods under local democratic control, with community control of institutions. SGCDC was the leading CDC in Philadelphia and one of the most successful in the country. It demonstrated how neighborhood-based efforts could address local social problems with appropriate governmental support.

When I left SGCDC, I joined Jane and Ed's Center for the Study of Civic Values, to spread the lessons of community leadership. While there, I visited Mondragon, a world-class example of worker-controlled institutions (see my report in *Essays in Social Philosophy*). I worked on a spreadsheet model of the costs and trade-offs for building a new nuclear reactor, shortly after the Three Mile Island accident. I also started my Community Computerization Project, to help nonprofit organizations take advantage of the new personal computers. including helping computerize the SGA Credit Union. Later, I spun this off as an independent nonprofit and worked as Director of that until going to Colorado.

6. Rehabbing My First House (1980-1989)

I wrote the following letter to my Aunt Ruth after buying my first house for $16,000 cash in Southwest Germantown, where I was working for SGCDC. I spent the nine years living there doing and supervising rehab. My aunt sent us a housewarming check.

5108 Newhall Street

Philadelphia, PA 19144

(215) 842-0946

January 7, 1981

Dear Ruth,

Happy New Year! Looks like busy times ahead for us. The kids are growing and developing faster than we can keep up with, let alone keep you informed about. The new house seems like more work ahead every time we try to take a step forward, although we have recently achieved a sense of progress. The successes of my job in raising several grants will mean continued efforts to implement the various projects proposed. With the prospects for effective political action smothered under Reagan's reign, we have resolved to lead a more active social life. On top of all this, Doris intends to look for a job, Zake wants to buy a computer, and Rusty longs to learn how to fly like Superman.

A book gifted to us by Alan pinpoints our house as post-bellum Queen Anne style, and gives voluminous suggestions on preserving/restoring its historical character. We, of course, will seek to integrate some more modern design elements in the interior living space as well. At this point, such considerations seem rather remote, as we struggle to make the place marginally habitable. The house has not been maintained at all for literally decades. It deteriorated from a commune to a rooming house under the negligent ownership of a slob. Once we got the heater working, we were inundated with even worse soot that we had just finished scrubbing away. And so for virtually every system in the house. We have now had a new heater, new electrical system and new hot water heater installed. We cleaned out the attic and basement, set up a workshop, and hope to install our washer and dryer soon. We also bought a large new refrigerator and are contemplating kitchen designs. From here on in, most work will have to be done by us. We have quickly learned some electrical, plumbing and plastering skills and acquired tools for extensive carpentry work. After a rather

harrowing month, all members of the family have fairly well adjusted to our new environment and the house is gradually becoming a home. We are saving your gift for a major decorating item.

My last year of work writing proposals for the neighborhood in which we live has been stimulating and rewarding. I enjoy the writing and feel the programs I propose are important. I have helped raise about two million dollars for housing, youth, employment and training programs. In addition to basic CETA and HUD grants, we have been honored by federal agencies, corporations and foundations in several national competitions.

Let me close to get back to installing an overhead light by thanking you for your extraordinarily generous gift, which will go for a very special acquisition. Love, and best wishes for the new year.

Gerry & Doris & Zake & Rusty

7. A Career in Informatics (2009)

I grew up interested in science, math and philosophy. Perhaps the launching of Sputnik in 1957 contributed to this when I was 12 years old and finishing elementary school. I remember field trips of various kinds during my high school years, where I saw some of the US space rockets and the accelerator for training astronauts for high-g's during takeoff, as well as Univac where I saw the incredible wiring being put into new mainframe computers.

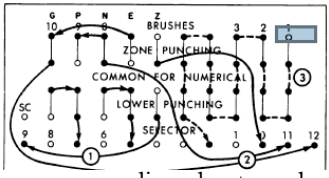
A friend of the family gave me a Brainiac kit to build my own computer when I was in junior high. By rotating pressboard circles with metal staples placed strategically, one could turn small light bulbs on and off, computing Boolean functions through simple wiring arrangements. I bought a second kit and added some more parts to program more complicated systems. The hardware was flakey, and it took me decades to get more reliable computer hardware. But the Brainiac gave me good practice in binary arithmetic and a sense of computer architecture. When I was in high school, I read about formal logic systems and became a fan of Bertrand Russell, who took positivism to an extreme position.

I went to MIT to study math and physics, but got sidetracked into philosophy. It was more challenging for me and seemed to address the issues of science that really attracted me, as well as seeming to be relevant to social issues. Social issues had become more urgent as the McCarthyism of my youth in a conservative suburb turned into the student movement of the Vietnam years when I got to college.

At MIT, I took Noam Chomsky's course on social change and Hubert Dreyfus' courses on continental philosophy. Although the culture at MIT was strongly oriented to logical positivism, I was moving to the critiques of this perspective. I also took

Marvin Minsky's introductory computer course and then his graduate course on artificial intelligence. Of course, there were no PCs in the early 1960's, but MIT had one of the first time-sharing mainframe computers. While Minsky lectured on neural networks, we students read the manual for an assembly language and a language like BASIC, punched programs on paper tape, submitted the tapes and got their output back the next day. For the AI course, I defined a term project of designing a program in LISP 1.5 to play Eleusis, a card game requiring inductive reasoning.

During the summer of 1965, I had my first computer job. I worked at a computer center at the U of Penn, across the street from where the first digital computer was built in the year of my birth. I helped a graduate student from India analyze his data on Indian politicians. He had a large stack of punched cards with his data. I programmed a card sorter, by arranging the wiring of the sorter (like an old-fashioned telephone operator connecting calls) and running successive sorts.



The next summer I spent in Baden, Switzerland, at a large electrical equipment factory. I wrote a program in Fortran to do successive approximations to a calculus formula for electric charge distribution across a non-standard (semi-circle) cable cross-section. The procedure there was to write the program on coding sheets and submit it for card punching and running over night. It would take several days just to fix the key punching errors, let along the programming syntax problems. By summer's end, I was able to submit a report with a solution.

After college, I married and went to Heidelberg, Germany, to study philosophy for a year. There I began to meet and understand many of the ideas that have subsequently become central to my recent writing on informatics theory.

Returning to Philadelphia, I tried teaching math in the public schools without much success. I then became a systems programmer at Temple University on their two CDC 6400 supercomputers. These were state-of-the-art. In addition to programming in two assembly languages and Fortran, I had to operate the computers by myself on the weekend night shift to debug system software. This involved programming the boot sequence by setting binary switches, spinning up the dishwasher-sized hard disks and mounting data and program tapes on the refrigerator-sized tape drives. For fun, I programmed a 3-D tic-tac-toe game and a statistical clustering program for my brother's dissertation data.

I never felt really at home with the CDC 6400 operating system, the largest software system in the world for some time. So, I went back to school at Northwestern and

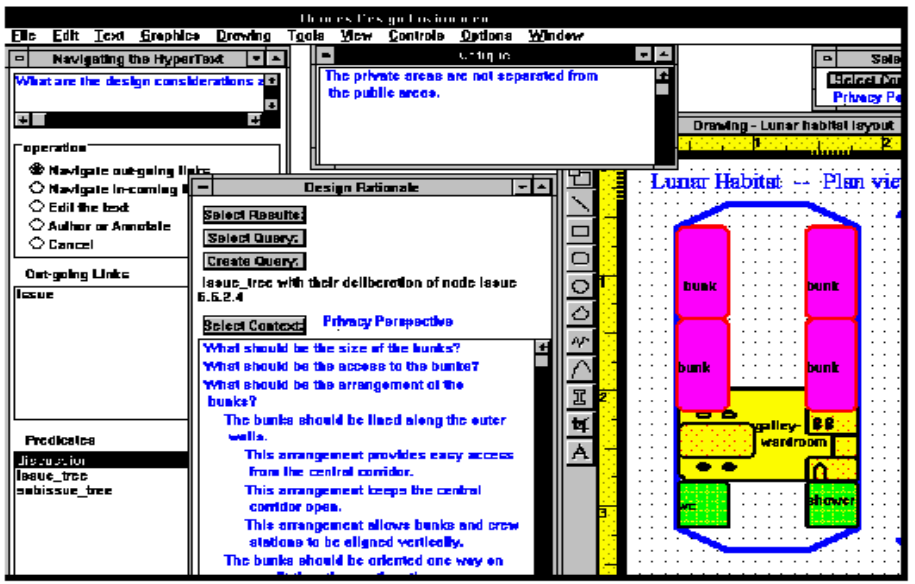
Frankfurt to complete my philosophy studies. My dissertation (eLibrary vol 1) brought together Marx and Heidegger, the two thinkers who most directed attention to the social and everyday world as the foundation for thought and human life. While at Northwestern, I worked part-time at their computer center, also with CDC 6400s, along with the programmer of the world champion chess program.

Returning to Philadelphia, I resumed my job at Temple. I later took to the streets, becoming a community organizer in the neighborhoods and eventually settling in the Germantown neighborhood, raising dozens of grants for community development. At this time, the first personal computers were becoming available. I bought an Atari 400 to teach my kids programming. I used it to project (inventing a crude form of spreadsheet) a revolving loan fund that capitalized the local neighborhood credit union. I later got an Amiga and taught myself C for doing computer graphics for an art video and some promo videos for my head-start software.

Shortly before the IBM PC with MS-DOS came out, I started a non-profit consulting service to computerize community organizations. From 1984-1989 I founded and ran the Community Computerization Project, serving dozens of community development corporations, neighborhood organizations, credit unions, energy conservation services, women's groups, university research institutes, and charitable organizations. I programmed custom database systems using dBase III and FoxPro on IBM PCs for client transaction tracking, fund accounting, and fund-raising; conducted organizational needs assessments for computerization and general management; installed hardware and custom or commercial software systems and trained personnel in their use. I designed, developed and marketed nationally software for Head Start reporting.

In 1989 I moved to Colorado and went to graduate school in computer science, concentrating in artificial intelligence and cognitive science. As a TA, I was the first to teach object-oriented programming to undergraduates there. I interned in US West's new research labs, programming interfaces in C++.

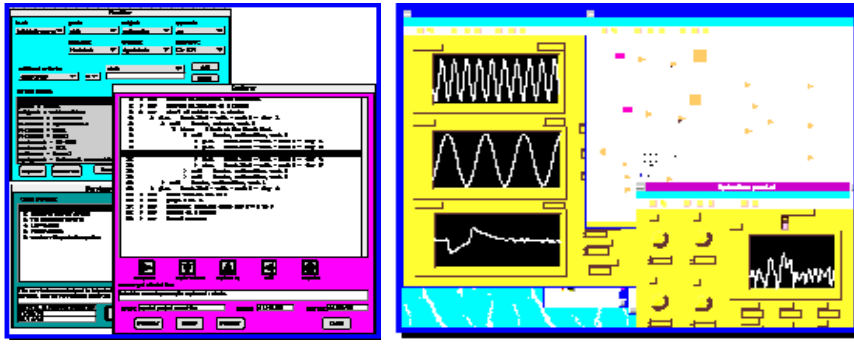
As an RA, I completely rewrote a prototype system for NASA design rationale, using object-oriented Pascal. This software evolved into both an online system for NASA's Manned Systems Manual and my own dissertation system, Hermes (eLibrary vol 2). The software included an intelligent hypermedia system, an innovative mechanism for personal perspectives, and an end-user programming language for design rationale navigation that included a sophisticated query language with inferencing (see vol 3 , ch. 4). The custom object-oriented database incorporated virtual copying for efficient inheritance of object versions. I interviewed and videotaped engineers at a NASA subcontractor and NASA astronauts, including the last man to walk on the moon, for domain knowledge about lunar habitat design.



Hermes interface for lunar habitat design.

Upon graduation, I joined a start-up lab as director of research and development, working on both educational software and contracts with NASA. Major projects were the Teacher's Curriculum Assistant in Java (see eLibrary vol 3, ch. 1), the CREW system to simulate teams on missions to Mars in FoxPro (vol 3, ch. 3), and the neural net Optonet holographic stabilizer in MatLab.

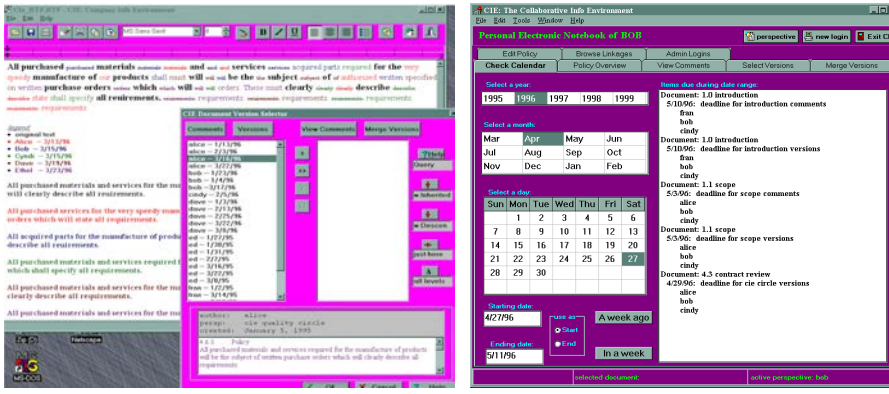
Meanwhile, I developed a prototype business application based on my dissertation perspectives technology, called the Corporate Information Environment, developed in Java. I worked with an entrepreneur, but we did not succeed in attracting venture capital for this prototype.



Teachers' Curriculum Assistant and Optonet.

When project funding ended at the lab, I returned to the University of Colorado as a post-doc and then as a research professor. As a post-doc, I developed a number of web-based domain-oriented design environments and sketched other applications. (See "My Research before Drexel at gerrystahl.net/research):

- WebNet: a design environment for a community of LAN managers (see vol 3, ch. 5).
- State the Essence: middle school application for text summarization using latent semantic analysis—in Perl (see vol 3, ch. 2).
- WebGuide: middle school application for threaded discussion with perspectives and modification of the threading structure—in Java (see vol 3, ch. 6).
- SimRocket: a simulation of rocket launches used to support collaborative learning by 6th graders about data analysis—in Agentsheets (see vol 3, ch. 12 and 13).

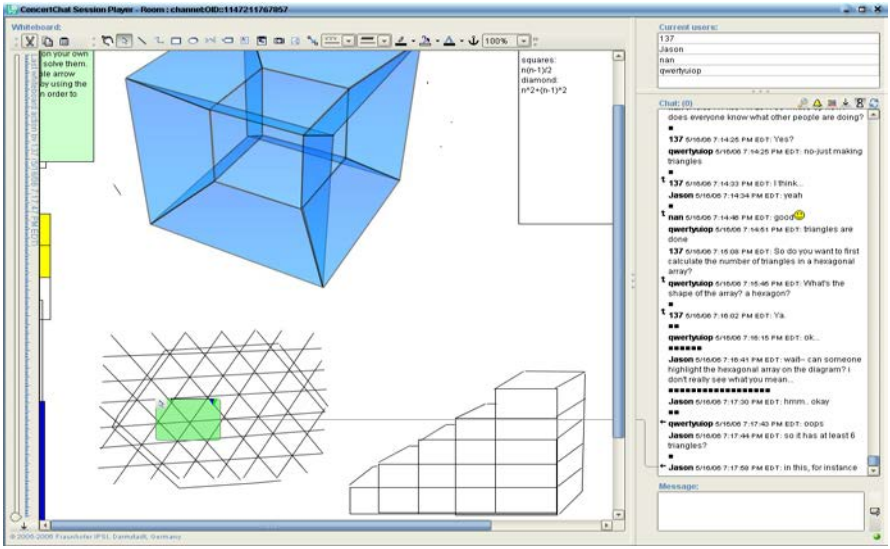


Corporate Information Environment.

- AstroQuest: mock-up of a game for exploring the solar system and constructing knowledge using the web—in Lisp.
- Locations: mock-up of an interface to an organizational memory of weather station locations around the world and their identification codes.
- MedGuide: mock-up of a version of WebGuide for problem-based collaborative learning (PBL) by medical students.
- North Rim/Lake Valley Trails Committee: organizational memory of a community campaign for well-conceived open space trails.
- WebInquiry: a threaded discussion on the question, "Does the Web Support Student Inquiry?"

I decided to move to Drexel University for a faculty position, but first went to the CSCW lab near Bonn, Germany, for a year to work on a European Union CSCL project. There I led the design and implementation of BSCL, a threaded discussion system for schools in Europe—in Python (see vol 3, ch. 7 and 8).

The Lobby of Virtual Math Teams.



The workspace of Virtual Math Teams.

At Drexel, I have directed the Virtual Math Teams (VMT) project (see vol 4). The VMT environment integrates a Java applet supporting text chat and a shared whiteboard with a social networking portal in Java and a wiki using WikiMedia. We are currently scaling up the VMT software to support its release as a regular service of the Math Forum. I will not discuss here what we have learned from this project because we have published thousands of pages about it.

* * *

During the roughly 50 years of my interest and career in informatics, things have changed enormously. The year I was born, the electronic digital computer was also born. As I grew up, large mainframe computers were only found in government office buildings—working on number crunching for the census, military or space race—in major research universities or in large corporations, like insurance companies. These computers were limited to numerical manipulations, had continuous hardware failures, required large staffs and had severely limited computational power by today's standards. Personal computers evolved slowly, frequently changing operating systems, programming languages, application areas, techniques and cultures. A novice can now accomplish computer tasks in minutes that used to take an expert weeks, if they were possible at all. Much of what visionaries once hoped for has been long since passed, and innovation now out-leads vision, with researchers falling far behind current realities. On the other hand, some expectations about intelligent behavior of computers and natural language understanding have advanced little in 50 years, except to realize how complex the issues involved really are. While one can now do

wonderful things with computers, networked information and mobile digital devices, computers are still frustratingly hard to set up, learn to use and maintain.

My use of computers has changed dramatically. I used to worry a lot about hardware aspects: holes in tape or cards, wiring in circuits or between peripherals, processor down-time, movement of data between memory locations. Now the computer and Internet connections are reasonably dependable. At first, I used computers for special tasks, like manipulating numerical data or programming a visual pattern for a video game or animation. Now I do most of my work and communication on my laptop. Throughout the day, I cycle through multiple applications to maintain my activity at Drexel, with friends and in the international research community. My productivity in preparing for teaching, conducting research, writing papers and running an international journal is many times greater than what it could have been without computers.

My computer usage changes rapidly with innovations in the field. When the Web started, I created one of the first personal websites, which now has thousands of pages. I also started websites for several organizations. I maintain a blog and a wiki related to my journal. I use websites, wikis, Blackboard and VMT technologies for my classes. I coordinate four laptops, an iPod and an iPhone to maintain access to my email and my digital music collection wherever I am. I am continually integrating new applications into my computer-supported life.

For at least the past 15 years, it has been clear to me that the interesting issues in informatics have less to do with the design of computer technology and software as such than with the ways in which groups of people can interact with each other *through* the technology. Increasingly. my research has therefore focused on analyzing how small groups of people communicate and work using networked computers. This raises the age-old issues of philosophy, but within an interesting new context, which sheds new light. Details of language usage in communication and shared understanding become explicit. Questions about knowledge, reality, cognition and society come to the fore.

In my career, I have been involved in many software development projects. It seems like each one required a whole new approach, new expertise and even a new language. Change in the informatics field has been increasing at a doubly exponential rate, which means that people starting careers in the field now will have to deal with even a drastically increased rate of change. Technical skills that freshmen learn now—even assuming they are leading-edge—will be out-of-date in a year or two and obsolete before they graduate. To get by after college, they will need to be constantly learning.

In contrast to technological details, what I learned long ago about how to think, learn, read, write and compute still serves me well. The philosophy I read as a young man guides my research now, and I often return to the musty volumes on my bookshelf to reflect on what was said there by Plato, Hegel, Marx or Heidegger. I was always a

self-motivated learner, and followed my interests, learning how to learn what I wanted to know about. I have spent many years in schooling, but I am equally engaged in learning outside of school. Always a good reader, I find myself writing more than I read now. Writing is hard work, but there is no way to learn how to do it well other than by doing it. Even my high school penchant for algebra and geometry comes in handy now as I interpret the work of students in the VMT project and try to solve their problems myself. Perhaps it is such a mix of persistent themes with the churn of innovation that allows a career in informatics to be a rewarding and ceaseless adventure.

8. Glimpses of My Years at Drexel (2002-2014)

My visit to Drexel the day before my job interview

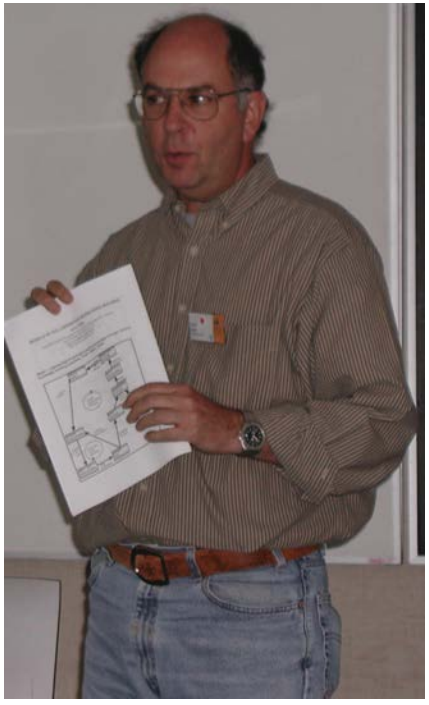
Moving into my office.

Hanging on the 4th floor social area.

Receiving President's award for over a million dollars in grants.

After publishing "*Group Cognition*" book, 2006.

At a conference on the Rhine in Germany, 2001.



At a European CSCW conference, 2001.

Delivering a keynote talk in China, 2009

With CSCL conference co-organizers in Hong Kong, 2011

Attending faculty awards dinner with colleagues

Receiving Emeritus Professor status from Provost

9. Retirement Activities in Chatham (2014-2021)

5. **Computer Pioneer Finds His Passion in Sculpture (2020)**

6. **The Wonders of Chatham's Salt Marshes (2021)**

7. **Assessing the Town Airport's Environment (2021)**

8. **Historic Coin Finds at the Nickerson Homestead (2020)**

9. **Historic Coin Finds – longer version (2021)**

Interview in the *Cape Cod Chronicle* newspaper

The Cape Cod Chronicle - 10/15/2020 Copy Reduced to 77% from original to fit letter page Page : 02

Computer Pioneer Finds His Passion In Sculpture

Sculptor Gerry Stahl. COURTESY PHOTO

by Debra Lawless

About five years ago, after Gerry Stahl of Chatham retired from his career in academia, his second career as a sculptor really took off.

"It's been an intense thing for me here working on the sculpture," he said during a Zoom interview last week. "I've learned a fantastic amount about sculpture."

He estimates that during the past three years he has created 130 sculptures, or an average of about one a week. While large sculptures in wood can take up to a month to complete, a small clay sculpture can take a day or two.

But don't look to buy one of Stahl's beautiful sculptures in wood or clay — "I've never sold any sculptures," he says. "I don't like to part with it." He has given pieces to his friends, his two sons and three granddaughters. He has also donated a bronze casting of a clay mask of Josiah Mayo to the Chatham Conservation Foundation, Inc. and a similarly made mask of William Nickerson, the founder of Chatham, to the Nickerson Family Association, Inc. Other examples of his work adorn his house.

By the time Stahl, 75, went to college, his family had lived in seven different states. Stahl earned his undergraduate degree in humanities and science at MIT in 1967. He eventually earned two Ph.D.s — the first at Northwestern University in philosophy and the second, at the University of Colorado, in computer science. (His brother, Alan Stahl, also went into academia. Alan is currently curator of numismatics at Princeton University.)

Stahl was a pioneer in computer programming when the field was in its infancy, and he taught at Drexel University's College of Computing and Informatics. Since September 2014 he has been a professor emeritus at that school.

Stahl's wife Carol Bliss's family visited the Cape in the summers back in the 1960s, and it so happened that her parents bought a piece of land in Chatham. That is where Stahl and Bliss decided to retire and, keeping with their custom, they co-designed their own house, their fourth. Stahl hired a local draftsman to draw up his custom plans, and then worked with a local contractor who was used to custom work.

"It worked out great," Stahl says. One of the house's outstanding features is Stahl's nod to Cape Cod — a two-story lighthouse that has been incorporated into the left front of the house. On the second floor of the lighthouse Stahl has his study.

"We didn't want it just a box — we wanted interesting massing," Stahl says. With his bent for sculpture, Stahl learned a great deal from the finish carpenter and designed and made many of the house's built-ins. During the Zoom session he sits in front of the 20-foot long mantelpiece that he created from a single piece of cherry wood. The mantel wraps the entire central chimney in four rooms.

Soon after the pair arrived in Chatham, a neighbor asked Stahl to look at the faded wood paneling in the 1820 Josiah Mayo House at 540 Main St.. He oiled the wood and "made it look like new" — and that was the start of his relationship with the Chatham Conservation Foundation, Inc. (CCF), which owns the Mayo House and uses it for its office. Stahl drew on his computer expertise to set up a donor tracking system for the non-profit and he now serves as the group's treasurer. He also leads its salt marsh task force, a vital group as about half of the property the CCF owns is salt marsh. Salt marsh grasses absorb carbon, an important function during a period of climate change. "They help prevent damage from sea surges and sea level rise," he says. "A healthy salt marsh can be a huge benefit."

But Stahl's passion remains sculpture, something that he works at every day. Particularly when he works in clay, he can't abandon a project for a time as it will dry out.

Stahl often works from live models, and has exhibited his work at the Creative Arts Center in Chatham. In his e-book "Works of 3-D Form" — he has written 21 e-books — he catalogues his wood sculptures dating from 1976 to the present, his clay sculptures and pottery from 1970 to the present, and follows that with chapters on his houses, organic forms from nature, thoughts on opening up space and sculpting 3-D forms in wood, and a chronological catalogue of all of his works. A 2014 work in wild cherry, "Spirit of Cape Cod," was "inspired by the Cape Cod seashore waves and creatures." "Sunbathing on Ridgevale Beach" features a young boy and a woman in clay fashioned from live models during a two-day pose at the Cotuit Center for the Arts. Many of his wooden pieces are sinuous and sensuous abstracts while others have South American and other influences. A 2018 piece called "Mrs. Mayo" was carved from the Bradford pear tree that once stood in front of the Mayo House.

He has also cast horseshoe crab shells in a mold. He calls them "Survivors of Extinction."

"That's what you're looking at," he says. "Horseshoe crabs and cockroaches may be all that's left with climate change."

To view Stahl's sculptures, visit gerrystahl.net.

Article in the Fall 2021 *Bulletin* of the Chatham Conservation Foundation

The Wonders of Chatham's Salt Marshes

by Gerry Stahl

Chair of CCF Salt Marsh Task Force

Gifts from salt marshes

Salt marshes are the lifeblood of Chatham. Much as your arteries bring salty blood to your body parts and flush away toxins, the salt marshes of Chatham allow vital services to flow in and out with the tides:

- Protecting coastal homes from storm impacts by dissipating surging wave action.
- Providing habitat for many species of fish, shellfish, migratory birds.

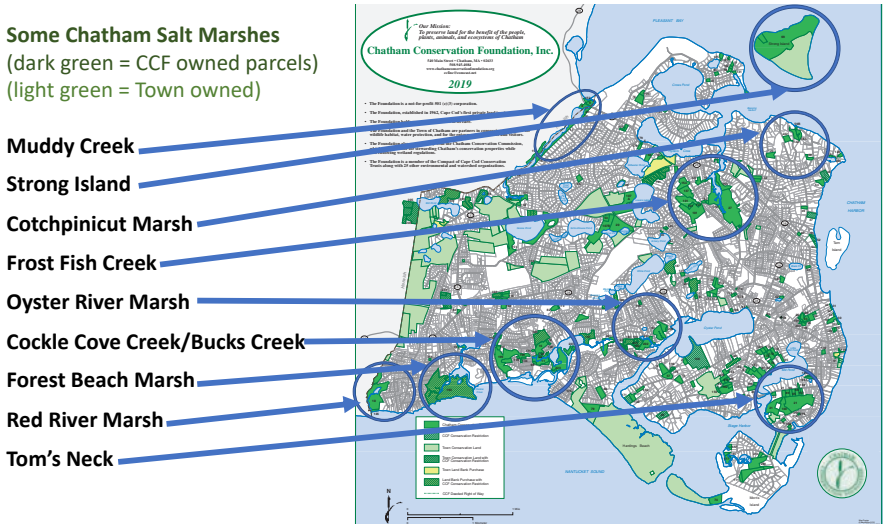


Figure 1. Some salt marshes in Chatham

- Filtering pollutants and other harsh chemicals from the watershed before they reach the ocean.
- Absorbing carbon dioxide and other greenhouse gases that fuel climate change.

- Responding to sea-level rise by building marsh elevation and migrating upland.

Preserving the land of the salt marsh

Chatham's marshes were frequented by the Wampanoag natives, who enjoyed the plentiful fish and shellfish there. Later European settlers adapted the marshes for boating and agriculture. Eventually, roads and housing cut off tidal flow and many marshes were filled in for farming. Most of Chatham's major salt marshes were converted to cranberry bogs in the 1800s.

Since 1962, the Chatham Conservation Foundation (CCF) has been acquiring properties in Chatham and protecting them from development and preserving their natural beauty. Many of the land donations are in and around salt marsh.

Figure 2. Researchers from CCF and APCC cataloging plant coverage in the marsh. Photo by Matthew Hamilton.

CCF has successfully protected and preserved important and beautiful marshes in Chatham. However, in the face of tidal restrictions, invasive weeds and climate

change, a more active approach is called for. So CCF formed a Salt Marsh Task Force and has begun to work with the Association to Preserve Cape Cod (APCC) and other non-profit and governmental agencies to monitor and restore salt marsh health, initially targeting Frost Fish Creek and Cockle Cove/Bucks Creek.

The flow of tides through the salt marsh

Tides roll into salt marshes every 13 hours. Their depth and penetration vary depending on the relative positions of the moon and sun, as well as weather and marsh conditions. They flush nutrients and small creatures into the marsh and then out to sea. This creates an active basis for the chain of life, particularly important to the fishing industry of Chatham.

Monitoring the health of a marsh begins with identifying tidal restrictions, such as damaged culverts, which constrain the eco-system processes which support flora and fauna that are adapted to periodic salt-water flushing.

Figure 3. A view of Cockle Cove marsh from Cockle Cove Road.

Salt-tolerant grasses of the marsh

The most visible feature of a salt marsh is its vegetation. Flora in marshes is determined by the saltwater tides: only specialized grasses and reeds can thrive in daily flooding and high salinity. Where marshes are well flushed by the tides, "saltmarsh

grass" (*spatina alterniflora*) dominates, creating flowing waves of green. Toward the higher ground around the edges, "salt meadow grass" (*spatina patens*) grows somewhat higher.

Where the tides are restricted or the salinity is reduced by mixing with fresh water from creeks, springs or runoff from roads and lawns, a non-native "common reed" (*phragmites australis*) can establish an invasive presence, which can out-compete native plants and be hard to control.

Other plants observed in healthy local marsh areas include: "spike grass" (*distichlis spicata*), "black grass" (*juncus gerardii*) and "cattails" (*typha angustifolia*). Areas with more brackish water have more diverse flora, including bordering shrubs that are not specialized for marshes.

Inhabitants of the salt marshes

Many birds frequent the marshes, some during migrations. Over 150 have been documented around Frost Fish Creek. At Cockle Cove marsh one can often see ducks, great blue heron, egrets or osprey soaring across the sky. Hidden in the brush, one can also find "saltmarsh sparrows"—an important reassurance of healthy salt marsh.

Tides pump nutrients in and out between the ocean and the marsh. This is the beginning of the food chain for shellfish, fish, birds and mammals. Micro-organisms nourish the smallest life forms, which in turn feed larger and larger creatures. Many fish, shellfish and other animals spend important stages of their lives in the marsh. The abundance of fish in the oceans is dependent upon the foundation of the food chain in the marshes along the shores.

Salt marsh eco-system evolution

The first step in actively preserving and restoring healthy marsh is to research the current functioning of the marsh as an ecosystem involving: (1) flowing water (mixing tidal salt water and fresh ground water), (2) vegetation (marsh grasses, native and invasive reeds, bushes) (3) animal life (birds, fish, shellfish, small mammals) (4) soil (sedimentation, carbon capture, water filtering).

These complex and interrelated factors determine the quality of the marsh and of the services it provides to the environment and to people. A disturbance in one factor may influence others and it may take years for the multiple factors to co-evolve to a stable state, making restoration of marsh health a complex, slow and costly process.

Discoveries in Cockle Cove

Fiddler crabs are popular salt marsh inhabitants—for instance around Ridgevale Beach. However, our marsh research project just discovered a rare relative, somewhat larger, with red markings on their joints and favoring lower salinity waters: "brackish water" or "red-jointed fiddler crab" (*minuca minax*). They live further upstream on Cockle Cove Creek and Bucks Creek. Although previously observed along Buzzards Bay, this is the first documented sighting on this part of the Cape.

Figure 4. Discovery of minuca minax crabs. Photo by Adrianne Lovuolo.

Another exciting discovery in Cockle Cove marsh is the presence of a relatively rare native strain of phragmites. This is a non-invasive version, known as "American reed" (*phragmites americanus*). It does not out-compete other native plants. It is rare outside of Massachusetts and is in danger of extinction.

Figure 5. Native phragmites in Cockle Cove marsh.

Chatham's future and its salt marshes

The Cockle Cove area is projected to undergo significant environmental change in the next decades, with sea-level rise and surge from increasingly harsh storms flooding the marshes, beaches and many roads and homes, unless the marshes can grow and migrate in response to the changes. We want to ensure that there are areas for the marsh to migrate to as the sea level rises, so we try to own and protect adjacent wetlands.

As stewards of the land, we need to track the marsh eco-systems over time. We want to monitor the presence of native plants, fish, birds and animals, so we know if they are continuing to thrive. We also want to optimize the growth of salt marsh grasses that sequester carbon.

Preserving healthy marshes is the most effective way to lower the carbon footprint of Chatham. Healthy salt marshes are key to Chatham's future economy, climate change resilience and natural beauty.

Newspaper Column on Airport

***Cape Cod Chronicle*, June 24, 2021**

Guest-It

Assessing the Town Airport's Environment

Gerry Stahl

Chatham land use and Airport expansion have been developing for many years without coordination, creating serious conflicts between residential development and increasing air traffic. The Airport Master Plan (AMPU) for the coming 20 years should have been an opportunity to finally adjust airport operation to its residential surroundings, which have become densely congested since the airport was a field in farmland long ago. Given the emergency of climate change, the AMPU should have also been taken as an opportunity to reduce the impact of the airport on the physical environment. Unfortunately, the Airport Commission (AC) is relentlessly pursuing a plan that does the opposite, and it has now tried to justify its plan with a so-called Environmental Assessment that obfuscates environmental and social stressors.

The AC has ignored the interests of residents and treated them as the enemy, rather than as the legal owners of the Airport. Instead of seeking a plan for the airport which preserves the charm, relaxing atmosphere and natural environment that homeowners and vacationers value, the AC pushes to further expand airport traffic, including larger, noisier commercial flights. It should pull back the RPZ "crash zones" away from the populated West Chatham Village and Great Hill. Noise should be reduced and confined to reasonable daytime hours.

The AMPU should adopt a "net-zero" option that reduces pollution and preserves trees and wetlands. Chatham residents and nonprofits are struggling to reduce their carbon footprint. The federal, state and local governments are mandating conservation and reduction of CO_2. Yet, the AC plan runs headlong in the opposite direction.

The recently released "Environmental Assessment" was conducted by Gale Associates, the AC consultant who proposed the Plan in the first place. It is not an objective scientific assessment of the AMPU's impacts, but a rationalization, justification or cover-up. It is the fox guarding the hen house. This Assessment was more a job application by Gale to the AC for renewal of Gale's contract (immediately granted upon submission of the assessment) as a loyal front man for the Airport Manager's personal financial interests.

The report does not assess the impact of all aspects of the AMPU, such as the jet-fuel increase, which would significantly increase carbon emissions. The jet fuel tank is excluded from the assessment on the grounds that it would not take place in the near

future, although the RFQ included in the same AC package lists the Jet "A" Fueling Facility as scheduled before the construction of the hangers, which are assessed.

The flippant environmental conclusion of the Assessment is: "While the project would ultimately result in a slight increase in aircraft traffic and associated GHG emission, it is anticipated that this increase would have a negligible impact on climate." Of course, no local action by itself is going to significantly impact the global climate, but it is such callous disregard for green-house gas (GHG) emissions at individual sources that has in sum caused climate change, and it is necessary for everyone to decrease emissions, not down-play planned but avoidable increases. Chatham should be setting an example of conservation, not flaunting the excessive exploitation of natural resources.

The AMPU assumption of slight increases in aircraft traffic is itself suspect, given the AC's repeated concern with "the viability of the Airport's role in the National Plan of Integrated Airport Systems." It is likely that this is an FAA dog whistle for significant commercial flights, serving the increasing number of post-pandemic wealthy Chatham and Orleans home buyers. The entire AMPU designed by Gale can now be seen as a restructuring of the airport for this purpose. It is interesting that the AC's public relations effort has recently been focused on justifying this increase in commercial flights.

Of course, the worst part of the Assessment is that it is still pushing for dozens of avigation easements. There is no mention of the social impact of this assault on the community, which it euphemistically refers to as "isolated portions of selective vegetation management."

My own assessment is that the AMPU has already caused significant social impacts, increasing tensions and divisions in Chatham. In addition, Gale's so-called Assessment is an affront to the many people and organizations concerned about the environment.

It is time to resolve the conflicts that have arisen by planning for an airport suited to the current and future development of the area and to climate change. The most damaging options of the AMPU will soon be pushed through by the AC, and the conflict between the Airport and the Town will be cast in concrete for the next 20 years unless the opportunity for a responsible forward-looking plan is taken advantage of immediately.

-- Gerry Stahl is a full-time resident of West Chatham.

Newspaper article on Nickerson Coins

***Cape Cod Chronicle*, December 10, 2020**

Historic Coin Finds at the Nickerson Homestead

Alan M. Stahl and Gerry Stahl

During the 400th anniversary of the Pilgrims landing on the Cape, it is timely to study the founding of Chatham a couple of decades later. Insight into life in historic times is often revealed by consideration of coinage surviving from then.

Four seventeenth-century coins were found in excavation at the William Nickerson Homesite in Chatham during the summers of 2018 and 2019. The excavation was carried out from 2016 to 2019 by Craig Chartier of the Plymouth Archaeological Rediscovery Project under the auspices of the Nickerson Family Association (NFA) on land owned by the Chatham Conservation Foundation (CCF).

The archaeological study of the William Nickerson homestead is arguably the most significant colonial excavation on Cape Cod. It unearthed the first Chatham homestead and produced hundreds of historic artifacts, which shed significant light on the life of Chatham's founding family. The property where the dig was conducted is now being restored to a public park by CCF, adjacent to the NFA's museum site. Both the dig and the restoration have been publicly supported by grants from Chatham's Community Preservation Fund.

The archaeological site was the home of William Nickerson and Anne Busby Nickerson, who immigrated to Massachusetts from England in 1637. They moved to Cape Cod in 1661 onto land they had acquired from the Mannamoiett Natives in 1656. Their land corresponds roughly to what is now the Town of Chatham.

Among the artifacts uncovered are four coins. The coins are rare finds:

- An oak-tree sixpence coin is the only silver coin minted in colonial Massachusetts that has been reported found on Cape Cod. As described below, it is one of several overstruck six-pence over one-shilling oak-tree coins. However, none of the five others was found in situ—i.e., the others are known only as pieces in modern collections, not associated with their historic contexts. Coins minted in Boston, like this one, were the only silver coins produced in the American colonies.

- An English half-groat coin is the only type of seventeenth-century English silver coin found in the American colonies—discovered at very few locations.
- An Irish copper half-penny coin is one of only three of its kind found in the American colonies.
- An English bronze farthing is further evidence of economic activity at the homestead.

The discovery of four coins on the Nickerson homestead suggests that there was probably considerable commerce taking place at the property, where the family engaged in many productive activities, including running the only forge known on colonial Cape Cod. The many historic artifacts of European and Native American origin recovered at the dig site also reflect lively commerce.

The coin revealing the most local history is a Massachusetts silver sixpence of the "oak tree" series, bearing the date 1652, but probably minted between 1660 and 1667. This is the only find of a colonial silver Massachusetts coin that has been reported for Cape Cod.

This coin reflects the history of the Massachusetts colony. In 1652 Massachusetts passed an act providing for the establishment of a mint in Boston. The Massachusetts series is the only silver coinage struck in the American colonies before Independence; its inception is due to the lack of royal power in England during the period 1649 to 1660. Before that, commerce in Massachusetts was conducted primarily through the barter system, causing various serious difficulties for the colonists involving trade locally and tax payments to England.

The coin found on the Nickerson site is an overstrike, made from sixpence dies struck on top of a cut-down silver shilling (12 pence). Several letters of the under-type show through on the existing coin. The coin was uncovered at the dig by a descendent of the Nickersons.

The choice of a tree as the main symbol on the Massachusetts silver coinage may also be seen as a conscious evocation of Native American symbolism and the earliest manifestation of an indigenous American numismatic iconography.

The second coin is a silver half groat (two-penny) piece of Charles I of England (1625-49) from the Tower (London) mint. Comparable finds of early English silver coins have been found in Plymouth, MA, as well as in Ferryland, Newfoundland, and in Jamestown, Virginia.

The third coin is an Irish copper halfpenny dated 1682. It was found within the brick work at the eastern end of the homestead's hearth. A coin of this type was found in an archaeological excavation carried out in Pemaquid, ME, and one carried out in Philadelphia, PA; it is otherwise unattested in American coin finds.

The fourth coin has been identified as an English Charles II bronze farthing.

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Alan M. Stahl is Curator of Numismatics, Princeton University.

Gerry Stahl is Treasurer, Chatham Conservation Foundation.

Full Article on Historic Coins

Historic Coin Finds at the Nickerson Homestead

Alan M. Stahl and Gerry Stahl

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The archaeological site was the home of William Nickerson and Anne Busby Nickerson, who immigrated to Massachusetts from England in 1637. They moved to Cape Cod in 1661 onto land they had acquired from the Mannamoiett Natives in 1656. The land corresponds roughly to what is now the Town of Chatham.

The excavated house appears to have had two rooms in an L-shaped configuration, measuring about 8 meters by 10 meters, with a surrounding wood palisade. Anne died in 1686 and William a few years later. There is no evidence that the house was occupied after that date, although their children settled in the area. Finds from the dig such as ceramics, clay tobacco pipes and bricks are consistent with occupation in that period.

Among the artifacts uncovered are four coins. The coins are rare finds:

- The oak-tree sixpence coin is the only silver Massachusetts coin that has been reported found on Cape Cod. As described below, it is one of several overstruck six-pence over one-shilling oak-tree coins. However, none of the five others was found in situ—i.e., the others are known only as pieces in modern collections, not associated with their historic contexts. Coins minted in Boston, like this one, were the only silver coins produced in the American colonies.
- The English half-groat coin is the only type of seventeenth-century English silver coin found in the American colonies—discovered at very few locations.
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- The English bronze farthing is further evidence of economic activity at the homestead.

The discovery of four coins on the Nickerson homestead suggest that there was probably considerable commerce taking place at the property, where the family engaged in many productive activities, including running a forge. Artifacts of European and Native American origin also reflect lively commerce. As indicated by the size and style of the homestead, the Nickersons were relatively well-to-do.

It appears from the Nickerson finds that in the seventeenth century, English settlers in Cape Cod had some limited access to silver and bronze coinage minted in the British Isles, as well as the silver denominations minted in Boston. The importation and circulation of coins from Spanish mints of the New World, which would come to dominate the circulation in Colonial North America, is not yet apparent in this context.

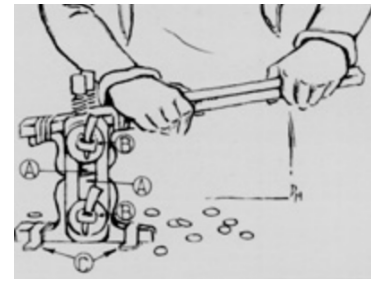
The dig site. Alan Stahl (left) and Craig Chartier standing where the Massachusetts coin was found.

Massachusetts Oak-Tree Silver Sixpence-over-shilling

The coin revealing the most local history is a Massachusetts silver sixpence of the "oak tree" series, bearing the date 1652, but probably minted between 1660 and 1667. Excavation finds of Massachusetts silver coins are rare. This is the only find of a silver Massachusetts coin that has been reported for Cape Cod.

The coin reflects the history of the Massachusetts colony. In 1652 Massachusetts passed an act providing for the establishment of a mint in Boston. The Massachusetts series is the only silver coinage struck in the American colonies before Independence; its inception is due to the lack of royal power in England during the period of the Commonwealth years from 1649 to 1660; the 1652 date of the inception of minting was immobilized on subsequent issues. Before that, commerce in Massachusetts was conducted primarily through the barter system, causing various serious difficulties for the colonists involving trade locally and tax payments to England.

Oak-tree coinage was produced using a rocker press, rather than simply using the traditional hammer striking method. When the lever is pulled, the upper and lower rockers press against each other with a rolling motion so that a blank metal planchet



placed between them is impressed with the design of the two dies. Evidence that this new technology was used in Boston is found in the curvature of the coins.

The coin found on the Nickerson site is an overstrike, made from sixpence dies struck on top of a cut-down silver shilling (12 pence) bearing the same date but possibly struck earlier. The visible letters on the sixpence obverse read **IN·MASATHV_ _ _ _ _.** The visible letters on the sixpence reverse read **NE _ _ _ NGLAND·ANO**. The centers on both sides—the tree and the date—are still clearly visible. The under-type is an oak-tree shilling of the "Spiny Tree" variety, with the obverse of the under-type beneath the reverse of the overtype. The letters **AND** of the under-type show through on the obverse from 2 to 4 o'clock. The letters **AT** of the under-type obverse show through at 10 o'clock of the reverse. (See photos below.)

The coin is bent in multiple directions, in a way that reflects curves produced by the rocker press on both the original striking and the overstriking. The coin is 21 mm. in diameter (about the size of a modern U.S. nickel). It was found 34 cm. below the surface on September 17, 2018, by a descendent of the Nickersons in the southwest yard of the Nickerson site, in a trench containing the wooden palisade fence surrounding the house.

The use of a tree as the obverse type for the Massachusetts silver issues was done to avoid either a royal effigy or some symbol of parliament—using an object representing a major aspect of the physical environment of the Bay Colony. Moreover, it had a special significance in the justification for the issue of coinage in 1652, as preserved in an anecdote from the period. When challenged on the usurpation of the regalian right to coinage, the colony's agent at court, Sir William Temple, used the tree on the coins as a defense. He tugged a pine-tree shilling from his pocket and showed it to the king, who asked what sort of tree it was. Temple explained it was "the Royal Oak which preserved your Majesty's life," a reference to the hollow tree in which the king had hidden after the battle of Worcester in 1651. That answer was said to have so pleased the king that he laughed heartily and called the New Englanders "a parcel of honest dogs," in effect allowing the minting of the coin in Massachusetts that year.

The choice of a tree as the main symbol on the Massachusetts silver coinage may also be seen as a conscious evocation of Native American symbolism and the earliest manifestation of an indigenous American numismatic iconography. The Massachusetts settlers were, from the start, in close contact with the native groups that would come to be identified as the Haudenosaunee, or Five Nations. By the time their traditions came to be written down, the Nations had as the primary symbol of their confederacy the Great White Pine, identified in a vision by their legendary

prophet Deganawidah as a symbol of humanity living within the principles governing relations among individuals. This native symbol of the pine tree would be taken up explicitly in the eighteenth century by the Sons of Liberty in their creation of the Liberty Tree, under which they conducted their daily exercises.

Following the pictures of the obverse and reverse of the excavated Nickerson sixpence coin are images of better-preserved sixpence and shilling coins struck from the same dies, as well as a model of the overstruck coin with the visible features enhanced.

English Charles Silver Half Groat

The second coin is a silver half groat (two-penny) piece of Charles I of England (1625-49) from the Tower (London) mint. The obverse is worn and poorly preserved; of the obverse legend only the king's name and the beginning of his titulature are legible: **CAROLVS·D.G. M**; on the reverse the shield is clear and most of the legend is present: **IVSTITIA THRONVM·FIRMAT** ('Justice consolidates the throne'). The reverse legend begins with a mint mark **(R)** which allows the coin's striking to be dated to 1644-45. The coin is 15 mm. in diameter (smaller than a modern dime). Comparable finds of early English silver coins have been found in Plymouth, MA, as well as in Ferryland, Newfoundland, and in Jamestown, Virginia.

Following are images of the excavated coin and of a better-preserved instance from the same dies:

Irish Copper Halfpenny

The third coin is an Irish copper halfpenny dated 1682. It was found within the brick work at the eastern end of the homestead's hearth; it is 26 mm. in diameter (slightly larger than a modern quarter). Though the coin is extremely worn, it is possible to make out the last digits of the date; in any case the issue lasted only from 1680 to 1684. Virtually none of the legend is visible other than the **O** of CAROLVA at 9 o'clock and the **D** of DEI at 1 o'clock on the obverse, and the numbers **82** of the date above the right of the harp on the reverse.

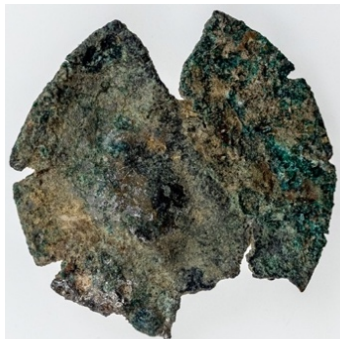
A coin of this type was found in an archaeological excavation carried out in Pemaquid, ME, and one carried out in Philadelphia, PA; it is otherwise unattested in American coin finds.

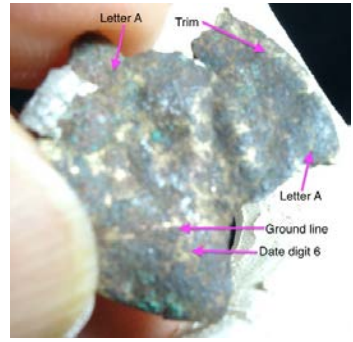
Following are images of the excavated coin and of a better-preserved instance from the same dies:

English Charles II Bronze Farthing

The fourth coin found is a highly oxidated notched disk 20 mm. in diameter (about the size of a modern nickel). It has been identified as an English Charles II bronze farthing. One side has a portrait bust with a prominent nose facing left. The letter **A** in front of the brow and the **C** above the back of the head are visible under magnification. On the reverse, the ground (exergue) line and the number **6** of the date below it as well as two letter **A**s are visible, as is some of the trim around the circumference.

Following are images of the excavated coin, of the same coin cleaned up and annotated, as well as of a better-preserved instance from the same dies:





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Alan M. Stahl is Curator of Numismatics, Princeton University. He published a report on the coins: Stahl, A. (2020). Coin Finds from the Nickerson Site, Chatham MA. *Journal of Early American Numismatics*. vol. *3*, 2 (December 2020).

Gerry Stahl is Treasurer, Chatham Conservation Foundation. He sculpted the bronze medallions of the Massachusetts silver sixpence coin.

Craig Chartier is archaeologist at the Plymouth Archaeological Rediscovery Project. See his "Report on the 2017 Excavations at the William Nickerson Homesite,

Chatham Massachusetts," https://www.plymoutharch.com/wp-content/uploads/2019/05/Nickerson-Final-report-part-1.pdf and "2018 Field Season at the William Nickerson Site," https://www.plymoutharch.com/2018-field-season-at-the-william-nickerson-site/.

Michael Karchmer of Harwich provided the photographs of the four excavated coins.

Coins and other artifacts from the Nickerson site are the property of the Chatham Conservation Foundation, Inc. The Nickerson Family Association plans to place them on public display.

Part III: Autobiographical Documentation

10. My Timeline

11. Homes Where I Have Lived

12. Travels Abroad

13. Academic Conferences and Presentations

14. Education

The timeline of my life is charted in this section, including some portraits and family trees.

After them are chronological lists of "Homes I have lived in," "My travels abroad," "My academic conferences and presentations" and "My education," which separate out the information contained in the combined timeline annual overview.

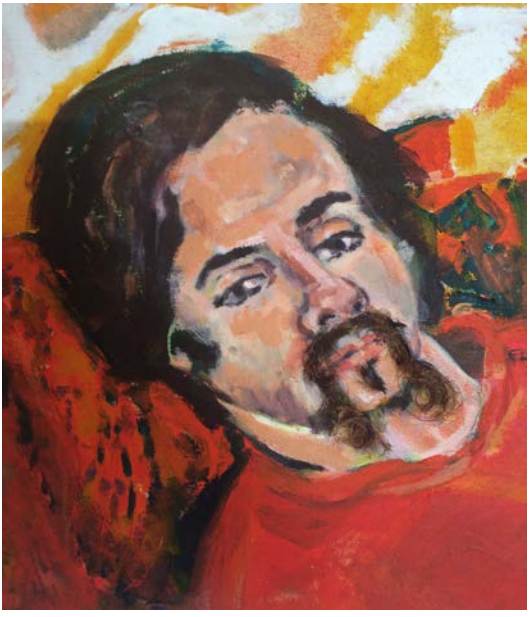
Additional lists of my employment and publications are to be found in my official Curriculum Vitae, which concludes this volume.

10. My Timeline

Portraits

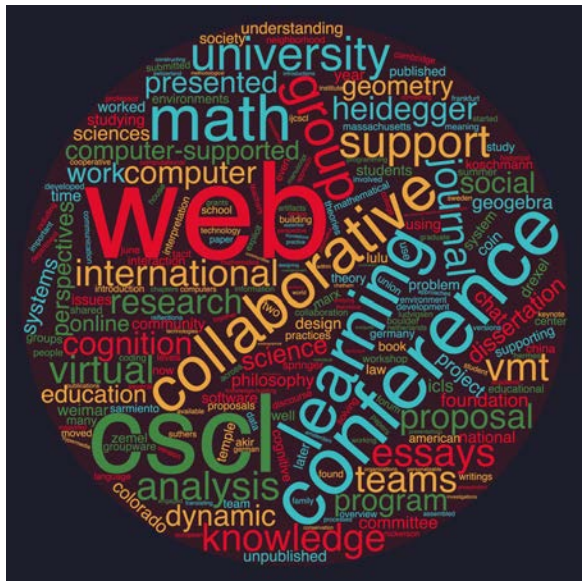
Painting by local artist, Florence Starr Taylor, 1945, less than a year old.

Painting by Doris Stahl, 1968, Heidelberg, Germany, studying philosophy, age 23.

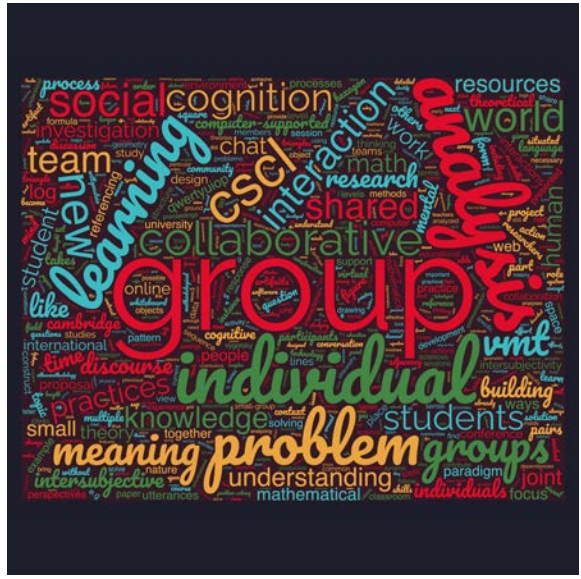


Painting by Doris Stahl, 1970, Chicago, studying philosophy at Northwestern, age 25.

Word clouds



A word cloud of this volume.



A word cloud of *Theoretical Investigations*.

Timeline

Annual Overview

	life events, homes	schools, jobs	travel, conferences
14,000,000,000 years ago	The universe exploded into existence		
4,500,000,000 years ago	Planet Earth formed around the Sun		
100,000,000 years ago	Life formed in the ocean		
65,000,000 years ago	Mammals began to dominate on the land		
5,000,000 years ago	Hominids evolved from apes in Africa		
300,000 years ago	Humans evolved in Africa		
70,000 years ago	Behaviorally modern humans developed language & collaboration skills		
55,000 years ago	My ancestors crossed the Red Sea to the Levant (Israel area)		
2,200 years ago	They migrated to Turkey along the Mediterranean		
1,900 years ago	They migrated from Turkey to Italy (the diaspora)		
650	They migrated from Rome to Frankfurt area		
1200	They migrated from Frankfurt to Bialystok region (Poland/Russia) and Romania	"The old country"	
1851	Chaim Levy (1816-1852) and Rachel (1820-1852) begat Yetta in Bialystok	My maternal great-great-grandparents	
1885	Mordecai Kaplan (1851-1898) and Yetta Levy (1851-1928) begat Minnie in Bialystok	My maternal great-grandparents	

1901	Isaac and Hannah Stahl emigrated from Romania to Philadelphia	My paternal grandparents	
1904	Nathan Miller (Millendovich) and Minnie Kaplan emigrated from Aradok (a village near Bialystok, Poland) to Chicago	My maternal grandparents	
1915	Isaac and Hannah Stahl begat Ben in Philadelphia	My father	
1920	Nathan Miller (1885-1965) and Minnie Kaplan (1885-1963) begat Evelyn in Chicago	My mother	
1943	Ben Stahl (1915-1998) and Evelyn Miller (1920-2001) married in Philadelphia (rebel attic)		
1945	Gerry born in Wilmington, DE; lived in Arden, DE	Me	
1946			
1947	Alan born in North Providence, RI	My brother	
1948	Moved to Philadelphia		
1949	Summer in Pewaukee, WI, for summer		
1950	Lived in Philly on Beaumont St.	Attended pre-school	
1951	Moved to Trevose, PA		
1952		Started at Trevose Elementary School	
1953	Learned arithmetic		
1954	Moved to Columbus, OH for half a year; summer in Camp Kinderland, South Haven, MI		
1955	Moved to Cleveland, OH for a year		
1956	Back to Trevose		
1957	Moved to Louisville, KT for half a year, where I read lots of science fiction	Graduated from Trevose Elementary School; started at Bensalem High School; Louisville HS for middle of year	

1958		Attended new middle school in Bensalem for a year	
1959		Took Algebra course for a second time due to scheduling change	Summer family car trip in Canada
1960	Read about math and science	Took Geometry course and enjoyed proofs	
1961	Played basketball, track, wrestling	Took classical physics course	Summer family car trip in Mexico
1962	Participated in math & science clubs	Took MIT version of HS physics	Summer physics program at U, Arizona; Seattle World's Fair
1963	Moved to Cambridge, MA; lived in dorm	Graduated from Bensalem High School; started at MIT	
1964		Summer job at Bell telephone company	Phone installation / removal
1965	Lived in apartment in Boston, MA	Summer job at U of Penn	Programmed statistical analyses
1966	Summer in Baden, Switzerland	Intern at Brown Bovari	Summer in Switzerland; travel through England, France, Germany, Austria
1967	Married Doris; summer at language institute in Achenmühle, Germany; moved to Heidelberg	Graduated from MIT; attended University of Heidelberg	Honeymoon in Switzerland; traveled to Austria, Hungary, Yugoslavia, Greece, Turkey, Israel, Italy; New years in Paris
1968	Moved to Neckargemund, Germany; Zake born; moved to Philadelphia	Flipped burgers at White Castle; taught at Bartram High in SW Philadelphia; drove at Yellow Cab	
1969		Worked at Temple University computer center	
1970	Moved to Chicago, Il	Attended Northwestern University	
1971	Moved to Kronberg, Germany	Attended University of Frankfurt	Traveled to Yugoslavia, Denmark, Sweden, Norway
1972	Moved to dorm in Frankfurt		Traveled to England; trip to Spain with Ben & Evelyn
1973	Moved to Chicago, IL		
1974	Moved to Pine Run, NJ	Worked at Temple University	
1975		Graduated from Northwestern	

1976	Rusty born; moved to West Philadelphia, PA	Worked at PUP, PCNO	
1977		Community organizing	
1978		VISTA supervisor at PNO	
1979	Moved to Southwest Germantown, Philadelphia, PA	Worked at SWG Community Development Corporation	
1980			
1981			
1982			
1983			
1984		Worked at Center for the Study of Civic Values	Tour of worker coops in Europe
1985		Worked at Community Computerization Project	
1986	divorce		Family vacation in Venezuela
1987	Bachelor with Zake & Rusty		
1988	Met Carol in Baltimore		
1989	Moved to Boulder, CO; remarried to Carol	Attended University of Colorado; worked as Teaching Assistant	Honeymoon in Vera Cruz and Oaxaca, Mexico
1990		Worked at US West phone company	
1991		Teaching assistant for computer programming	
1992		Worked as Graduate Research Assistant	
1993		Graduated from Colorado	Cognitive Science conference in Boulder; InterCHI conference in Amsterdam
1994	Built house in Niwot, CO	Worked at Owen Research	
1995			CSCL conference in Bloomington, IN
1996		Worked as Post-Doctoral Researcher	NASA in Houston
1997			CSCL conference in Toronto, Canada; Carol's birthday vacation in Belize and Guatemala

1998	Ben died		ICLS conference on Atlanta; CILT conference in San Jose; Caribbean cruise through Panama Canal with Evelyn and Carol
1999		Worked as Assistant Research Professor	CSCL conference at Stanford; AERA conference in Montreal with Rusty; GROUP conference in Phoenix; WebNet conference in Honolulu; speaking tour in Germany and visit to Basel
2000			ICLS conference in Ann Arbor; AERA conference in New Orleans; family vacation in Puerto Vallarta with Evelyn, Carol, Rusty, Zake, Kimlou
2001	Nastasja born in Philadelphia (my first granddaughter); moved to Bonn, Germany, for one year; Evelyn died	Worked at GMD-FIT as Visiting Research Scientist	CSCL conference in Mastricht, Netherlands; Ethnography in Education conference in Philadelphia; CRIWG conference in Darmstadt; GROUP conference in Boulder (with me as Local Arrangements Chair); travel to Finland, Spain and Luxembourg
2002	Moved to rental house in Chestnut Hill, Philadelphia, PA	Worked at Drexel University as Associate Professor; published *Proceedings of CSCL 2002*	CSCL conference in Boulder (with me as Program Chair); ICLS conference in Seattle; vacation with Carol in Austria, Italy, Switzerland; vacation with Kelly, Rusty, Carol in Netherlands, Belgium, France; CRIWG conference in La Serena, Chile; ISCRAT conference in Amsterdam; CSCW conference in New Orleans
2003	Bought house in Chestnut Hill, Philadelphia, PA		CSCL conference in Bergen; DeLFI conference in Munich (keynote); C&T conference in Amsterdam; HICCS conference in Oahu; Ethnography in Education conference in Philadelphia; GROUP conference in Sanibel Island; NSDL conference in Washington

2004		VMT workshop	ICLS 2004 conference in Santa Monica; Kaleidoscope conference in Lausanne, Switzerland; AERA conference in San Diego; NCTM conference in Philadelphia; IERI PI conference in DC; travel to Germany and Norway
2005			CSCL conference in Taiwan; EARLI conference in Nicosia, Cypress; CRIWG conference in Recife, Brazil (keynote); ICCE conference in Singapore (my best paper award); travel to Malaysia; NAIL workshop in Gothenburg, Sweden; ELOC workshop in Madison; Frode PhD defense in Bergen
2006	Heart stent	Published *Group Cognition;* published *CSCL: An historical perspective* with Tim & Dan; started the *International Journal of CSCL*	ICLS conference in Bloomington; KP-Labs and CMC book workshop in Oslo; Kaleidoscope conference in Bergen; AERA conference in San Francisco; HCIC consortium in Frasier, CO; ICS workshop in Boulder; ELOC workshops in Oahu, Bloomington and Boulder; tour on group cognition to Freiburg and Tubingen with Tim & Dan; IERI PI conference in DC
2007			CSCL conference in New Brunswick, NJ; AERA in Chicago; KMRC Beirat in Tubingen; Creativity conference in DC; GROUP conference in Sanibel Island; Open Learning Initiative in Pittsburgh
2008		Earned tenure at Drexel University	ICLS conference in Utrecht; OLI workshop in Pittsburgh; HCIS conference in Frasier, CO; KMRC Beirat in Tubingen;
2009		Published *Studying VMT*	CSCL conference in Rhodes; GROUP conference in Sanibel Island; ICCE conference in Hong Kong (keynote)
2010			ICLS conference in Chicago; GeoGebra conference in Ithaca; Communication Analysis workshop in Tempe, AZ; ONR workshop in Orlando, FL; NCA conference in San

			Francisco; cruise to Greek Islands for 65th birthday
2011			CSCL conference in Hong Kong, Guangzhou, Shanghai, Beijing; Alpine Rendezvous in La Clusaz in the French Alps; LRDC workshop in Pittsburgh; ECSCW in Aarhus, DN; iConference in Seattle; CTS conference in Philadelphia
2012		Became Research Full Professor at Drexel University	ICLS conference Sydney; ICME conference in Seoul; GeoGebra conference in Seoul; EIDWT conference in Bucharest; GROUP conference in Sanibel Island; NSF DR K-12 workshop in DC; talk at Rutgers, New Brunswick; travel to Weyher, Tubingen, Wolfratshausen
2013		Published *Translating Euclid*	CSCL conference in Madison, WI; GeoGebra conference in Oxford, OH; NAIL workshop in Gothenburg; travel to Paris; travel to Machu Picchu & Galapagos; Crina PhD defense in Oslo & talks in Gothenburg & Oslo
2014		Retired from Drexel; became Professor Emeritus	ICLS conference in Boulder; GeoGebra conference in Toronto; travel through Guatemala
2015		Designed house in Chatham; published collected writings	CSCL conference in Gothenburg; workshop in Umea; travel to Weyher, Germany
2016	Built house; moved to Chatham, MA; Ruby born in Beacon, NY (my second granddaughter)	Published *Constructing Dynamic Triangles Together*; set up studio/workshop and created furniture (mantle, bookcases, ship's ladder, tables) for house	Had 31 house guests
2017		Landscaped house; joined Board of Chatham Conservation Foundation (CCF) and converted their membership and accounting to online	Symposium on Quality of Life in Hannover; vacation in Vidanta, Nuevo Vallarta; tour through Scotland & Ireland; had 26 house guests

		systems as Treasurer. Started pottery classes.	
2018		Created pottery, ceramic sculpture and wood sculpture. Published *Works of 3-D Form*	March in Sarasota, Florida; December in Tucson, Sedona, San Francisco
2019	Ora born in Beacon, NY (my third granddaughter)	Created pre-Columbian reproductions, ceramic sculpture, plaster & urethane resin casts; started Salt Marsh Task Force at CCF	March in Sarasota, Florida
2020	Covid pandemic	Created large wood sculptures	Spring in Venice, Florida
2021		Wrote "Heidegger & e-music," published *Theoretical Investigations* and essays	Stayed on Cape Cod during pandemic
2022		Joined Town of Chatham's Energy & Climate Action Committee. Continued ceramic and wood sculpture	Spring in Venice, Florida

My father's family tree

Stahl Family Tree

Descendents of Issac Stahl and Hannah

children	grandchildren	great-grandchildren	great-great-grandkids
Lipman Stahl			
& Rose			
	Regina Stahl		
	& Sidney Steckel		
		Irene Steckel	
		& Ken Tollinger	
			Karen Siond
		Morris Steckel	
			Heather Steckel
		Anna Steckel	
		Joshua Steckel	
	Meyer Stahl		
	& Judy		
		Lance Stahl	
		Heather Stahl	
	Fred Stahl		
	& Virginia		
		Sherri Troppello	
		Jennifer	
		& Thomas Finocchio	
			Brittany Finocchio
			Angelo Finocchio
		Frederick Stahl	
		Leonard Stahl	
		Daniel Stahl	
		Joseph Stahl	
		Regina Stahl	
	Edith Stahl		
	& Arthur Maust		
		David Maust	
		Shirley Menear	
			Jeremiah Menear

			Jeremiah Meneal
Samuel Stahl			
& Rebecca Rosenblum			
	Mollie Stahl		
	&. Lipschutz		
		Lois Lipschutz	
		& Dawn Turpin	
	Meyer Stahl		
	&Claire		
		Stephen Stahl	
		& Cornell	
			Meredith Stahl
		Ira Stahl	
		Mitchell Stahl	
	Frances Elfant		
		Sharon Elfant	
		Lorrie Elfant	
		Jeffrey	
	Sylvia Romano		

Tillie Stahl			
& Julius Sacks			
	Sue		
	& Herschler		
		Janet	
		& Ken Millian	
			Grace Millian
			Andrew Millian
		Judy	
		& Bobby Stimmel	
		Nancy	
		& Gary Meola	
			Matthew Meola
			Lily Meola
	Harvey Sacks		
	& Barbara		
	Gerald Sacks		
		Larry Sacks	
		& Vicky	
			Jeffrey Sacks
			Caleb Sacks
			Jacob Sacks
		Cheryl Sacks	
		Norman Sacks	
		& Wendy	
			Samuel Sacks
			Benjamin Sacks
			Erika Sacks
		Serena	
		& Mitch Frank	
	Stephen Sacks		
	Linda		
		Karen Sacks	

		Karen Sacks	
Mary Stahl			
& Samuel Fagan			
	Joseph Fagan		
	& Myra		
		Jason Fagan	
	& Sheila		
	Lynne		
	& Abba Weiner		
		Michael Weiner	
		& Gail	
			Errick Weiner
			Kevin Weiner
			Jacob Weiner
		Sheryl	
		& Ken Goldberg	
		Leon Weiner	
	Rita		
	& Bernard Grossman		
		Bernice	
		& Donald Gibe	
			Justin Stein
			Trisha Stein
		Linda	
		& Robert Armanini	
			James Armanini
			Tammy Armanini
			& Carl Coombs
	Rochelle		
	& Zachary Rubin		
		Michael Gordon	
		Brian Gordon	
Ethel Stahl			

Ethel Stahl			
	Florine Junker		
		Marian	
		& David Maskowitz	
			Amy Moskowitz
			Jeffrey Moskowitz
		Helene	
		& Ronnie Muffett	
			Brandon Muffett
			Jaime Muffett
		Robin	
		& James Young	
			Heather Young
			Briana Young
			Zachary Young
Reba Stahl			
& Einhorn			
& Max Kattler			
	David Einhorn		
		Richard Einhorn	
		Susan Einhorn	
Ben Stahl			
& Evelyn Miller			
	Gerry Stahl		
	& Doris Whiteman		
	& Carol Bliss		
		Zake Stahl	
		& Kimlou Conigliaro	
			Nastasja Stahl
		Rusty Stahl	
		& Sarah From	
			Ruby Stahl
			Ora Stahl
	Alan Stahl		
	& Bill Hanauer		
		Hardik	
		Pratap	
		& Cynthia	

1/5/21 spreadsheet version by Gerry Stahl based on mailing list by Ben Stahl as of 7/1/1998.
Isaac in 1902 and Hannah (Anna) with Lip and Sam in 1903 went from Romania to Philadelphia.

My mother's family tree

Miller Family Tree

Descendents of Nathan Miller & Minnie

children	grandchil	great-	great-great-grandchildren
Chaim Levy (1816-1852) Bialystok			
& Rachel (1820-1852) Bialystok			
? Levy (1850-?) Bialystok-London (3 children, 5 grandkids)			
Hannah Levy (1848-1933) Bialystok-London			
& David Yellin (?-1898) Bialystok-London (4 children incl. Mark Yellen, 5 grandkids)			
Yetta Levy (1851-1928) Bialystok-Chicago			
& Mordecai Kaplan (1851-1898) Bialystok (possibly 2 more daughters in Bialystok)			
Morris Kaplan (1881-1848) Bialystok-Chicago			
& Sarah Mazur (1884-1959) Bialystok-Chicago			
Samuel Kaplan (1877-1954) Bialystok-Chicago			
& Esther Barash (1868-1951) Bialystok-Chicago			
Rose Kaplan (1900-1988) Bialystok-Chicago (2 children, 2 grandkids)			
& Mark Yellen 1890-1982) Bialystok-Chicago (see Yellen above)			
Bea Kaplan (1902-?) Bialystok-Chicago (3 children, 5 grandkids)			
& William Lerner (1898-1977) Russia-Chicago			
Hy Kaplan (1906-1989) Chicago-Chicago			
& Gert Colt (1907-?) Russia-Chicago (2 children, 6 grandkids)			
Ben Kaplan (1908-1974) Chicago-Washington			
& Gladys Scholnick (1910-?) (2 children, 3 grandkids)			
Minnie Kaplan (1885-1963) Bialystok-Miami Beach			
& Nathan Miller (1885-1965) Bialystok-Miami Beach			
Ruth Miller (1911-2005) Chicago-California			
& Clarence Senior (1903-1976) Clinton, MI-San Juan, PR			
Paul Senior (1935) Chicago			
& Luz Reyes (1933) San Juan, PR			
Janet Miller (1915-1955) Chicago-Chicago			
& Martin Myers (1915-1965) Chicago-Chicago			
Evelyn Miller (1920-2001) Chicago-Philadelphia			
& Ben Stahl (1915-1998) Philadelphia-Philadelphia			
Gerry Stahl (1945) Wilmington			
& Carol Bliss (1946) Troy			
& Doris Whiteman (1944) Philadlephia			
Zake Stahl (1968) Heidelberg			
& Kimlou Conigliaro (1966) Manilla, Philippines			
Nastasja Stahl (2001) Philadelphia			
Rusty Stahl (1976) Philadelphia			
& Sarah From (1979) Washington, DC			
Ruby Stahl (2016) Beacon			
Ora Stahl (2018) Beacon			
Alan Stahl (1947) Providence			
& Bill Hanauer (1946) New York City			
Hardik			
Pratap			
& Cynthia			

1/5/21 spreadsheet version by Gerry Stahl based on "The Stoop" by Ruth Senior as of 1991.
(See fold-out family tree in "The Stoop" for details on the Levys, Yellins and Kaplans.)
Yetta Levy went from Aradok, Bialystok, Poland to Chicago in 1904 with Morris, Sam, Minnie, Rose and Bea.

11. Homes Where I Have Lived

March 1945	Wilmington, Delaware		Born in hospital
1945-47	Arden, Delaware		
1947	N. Providence, Rhode Island		
Summer 1949	Pewaukee, Wisconsin		
1949 - 51	Philadelphia, PA	Beaumont Street	Nursery school
1951 - 63	Trevose, Pennsylvania	Tremont Avenue	Trevose Elementary Bensalem High School
1954	Columbus, Ohio		4th grade
Summer 1954	South Haven, Michigan	Camp Kinderland	
1955	Cleveland, Ohio		5th grade
1957	Louisville, Kentucky		7th grade
1963 - 65	Cambridge, MA	dorm	MIT
1965 - 67	Boston, MA	382 Common-wealth Avenue	MIT
Summer 66	Baden, Switzerland		Brown Boveri
Summer 1967	Achenmühle, Germany		Goethe Language Institute
1967	Heidelberg, Germany		Uni Heidelberg
1968	Neckargemund, Germany		Uni Heidelberg
1968 - 69	Philadelphia, Pennsylvania	Friend's Coop	Temple University

1970 - 71	Chicago, Illinois	Howard Street	Northwestern U.
1971 - 72	Kronberg im Taunus, Germany		Uni Frankfurt
1972 - 73	Frankfurt am Main, Germany	University dorm	Uni Frankfurt
1973 - 74	Chicago, Illinois	Juneway Terrace	Northwestern U.
1974 - 76	Pine Run, New Jersey		Temple University
1976 - 80	Philadelphia, PA	46th Street	Temple University
1980 - 88	Philadelphia, PA	Newhall Street	SGCDC
1989 - 1994	Boulder, Colorado	Spruce Street	U. of Colorado
1994 - 2002	Niwot, Colorado	3900 Pebble Beach Drive	U. of Colorado
2001-2002	Bonn, Germany	Kirsch Strasse 6	GMD/ Fraunhofer
2002 - 2003	Philadelphia, Pennsylvania	365 Springfield Avenue	Drexel University
2003 - 2016	Philadelphia, Pennsylvania	194 Lynnebrook Lane	Drexel University
2016 - present	Chatham, Massachusetts	100 George Ryder Road So	Retired

194 Lynnebrook Lane, Philadelphia

100 George Ryder Road South, Chatham

12. Travels Abroad

1960	summer	Canada	Family trip
1962	summer	Mexico	Family trip
1966	summer	Basel, Switzerland	Summer job
1967	1 year	Heidelberg, Germany	Grad school
1971	2 years	Frankfurt, Germany	Grad school
1984	2 weeks	Spain, UK, France & Switzerland	Worker coops tour
1986	December	Venezuela	Family trip
1989	December	Vera Cruz, Mexico	Honeymoon
1997	April	Belize & Guatemala	Carol's birthday
1997	September	Toronto	CSCL '97
1998	December	Caribbean cruise through Panama Canal	With Evelyn
1999	April	Montreal	AERA '99, Rusty
1999	June	Dortmund, Germany & Basel, Switzerland	Speaking tour
2000	May	Puerto Vallarta, Mexico	Evelyn's birthday
2001	March	Dortmund, Germany & Mastricht, NL	CSCL '01
2001	June	Bonn, Germany	GMD-FIT
2001	June	Helsinki, Turku, Tempere, Finland	ITCOLE & Ed-Media '01
2001	August	Germany	Return from conf. planning
2001	October	Germany & Spain	Return from Group '01
2001	November	Germany	Return from Evelyn

2001	January	Luxemburg & Germany	Return from CSCL '02; EU
2002	February	Germany	Return from Carol surgery
2002	March	Germany	Return from visit home
2002	May	Austria, Italy & Switzerland	With Carol
2002	May	Netherlands, Belgium & France	With Kelly, Rusty, Carol
2002	June	Amsterdam, NL	C&T '02
2002	September	La Serena, Chile	CRIWG '02
2003	June	Bergen & Oslo, Norway	CSCL '03
2003	September	Munich, Germany & Amsterdam, Netherlands	DeLFI '03, ISCRAT '03
2004	October	Germany, Switzerland & Norway	Kaleidoscope '04 & tour
2005	June	Taipei, Taiwan	CSCL '05
2005	August	Nicosia, Cypress & Athens, Greece	EARLI '05
2005	September	Recife, Brazil	CRIWG '05
2005	November	Singapore & Malaysia	ICCE '05, NIE, Alena
2005	December	Germany, Norway & Sweden	Concert, ijCSCL, Frode, NAIL '05
2006	May	Norway	KP-Labs, Kaleidoscope
2006	September	Norway	CMC book, KP-Labs
2006	October	Freiburg & Tübingen, Germany	Group cognition
2007	September	Tübingen, Germany	KMRC Beirat
2008	June	Utrecht, Netherlands	ICLS 2008
2009	June	Rhodes, Greece	CSCL 2009

2010	May	Greek Islands	65th birthday
2011	March	Switzerland & France	Alpine Rendezvous 2011
2011	July	China: Hong Kong, Guangzhou, Shanghai, Beijing	CSCL 2011
2012	July	Australia & South Korea	ICLS 2012 & ICME 2012
2012	September	Germany: Weyher, Tübingen, Wolfratshausen & Romania: Bucharest	EIDWT 2012
2013	April	Paris, France	Tom & Betty
2013	May	Peru and Ecuador	Machu Picchu & Galapagos
2013	October	Sweden and Norway	Gothenburg talks & Oslo Damsa dissertation
2014	March	Guatemala	Dave & Connie
2015	June	Sweden and Germany	Umea workshop, CSCL 2015, Weyher in der Pfalz
2017	January	Puerto Vallerta, Mexico	With Brian & Ricki at Vidanta
2017	September	Scotland & Ireland	With Jim & Donna on Ipswitch tours
2017	October	Hannover, Germany	Symposium on quality of life

13. Academic Conferences and Presentations

1993	Cognitive Science	Boulder
1993	INTERChi	Amsterdam
1995	CSCL	Bloomington
1996	NASA	Houston
1997	CSCL	Toronto
1998	ICLS	Atlanta
1998	CILT	San Jose
1999	GROUP	Phoenix
1999	AERA	Montreal
1999	CSCL	Palo Alto
1999	WebNet	Honolulu
1999	CILT	San Jose
2000	AERA	New Orleans
2000	ICLS	Ann Arbor
2001	Ethnography in Ed	Philadelphia
2001	CSCL	Maastricht
2001	CRIWG	Darmstadt
2001	GROUP	Boulder
2002	ISCRAT	Amsterdam
2002	CSCL	Boulder
2002	CRIWG	La Serena
2002	ICLS	Seattle

2002	CSCW	New Orleans
2003	HICCS	Hawaii
2003	Ethnog in Ed	Philadelphia
2003	CSCL	Norway
2003	DeLFI	Germany
2003	C&T	Netherlands
2003	NSDL	DC
2003	GROUP	Sanibel Island
2004	AERA	San Diego
2004	NCTM	Philadelphia
2004	VMT	Philadelphia
2004	ICLS	Santa Monica
2004	IERI PIs	DC
2004	Kaleidoscope	Lausanne
2005	CSCL	Taiwan
2005	EARLI	Cyprus
2005	CRIWG	Brazil
2005	ELOC	Madison
2005	ICCE	Singapore
2005	NIE LSL	Singapore
2005	ConcertChat	Darmstadt
2005	ijCSCL	Tübingen
2005	Frode Grobe	Bergen
2005	NAIL	Sweden
2006	ELOC	Hawaii
2006	AERA	San Francisco

2006	K-P Labs	Oslo
2006	Kaleidoscope	Bergen
2006	ICLS	Bloomington
2006	ELOC	Bloomington
2006	ELOC	Boulder
2006	ICS	Boulder
2006	CMC book	Oslo
2006	KP-Lab	Oslo
2006	Group Cognition tour	Freiburg
2006	Group Cognition tour	Tübingen
2006	NSF IERI PIs	DC
2007	Creativity	DC
2007	CSCL	New Brunswick
2007	KMRC Beirat	Tübingen
2007	GROUP	Sanibel Island
2007	OLI	Pittsburgh
2008	HCIC	Fraser
2008	OLI	Pittsburgh
2008	KMRC Beirat	Tübingen
2008	ICLS	Utrecht
2009	CSCL	Rhodes
2009	GROUP	Sanibel Island
2009	ICCE	Hong Kong
2010	ICLS	Chicago
2010	GeoGebra	Ithaca
2010	Communication Analysis	Tempe

2010	ONR	Orlando
2010	NCA	San Francisco
2011	CSCL	Hong Kong
2011	CSCL China tour	Guangzhou
2011	CSCL China tour	Shanghai
2011	CSCL China tour	Beijing
2011	Alpine Rendezvous	La Clusaz
2011	LRDC	Pittsburgh
2011	ECSCW	Aarhus
2011	iConference	Seattle
2011	CTS	Philadelphia
2012	ICLS	Sydney
2012	GeoGebra	Seoul
2012	ICME	Seoul
2012	Rutgers	New Brunswick
2012	GROUP	Sanibel Island
2012	EIDWT	Bucharest
2012	NSF DR K-12	DC
2013	CSCL	Madison
2013	GeoGebra	Oxford
2013	NAIL	Gothenburg
2013	InterMedia	Oslo
2014	AERA	Philadelphia
2014	ICLS	Boulder
2015	CSCL	Gothenburg
2017	Workshop Quality of Life	Hannover

14. Education

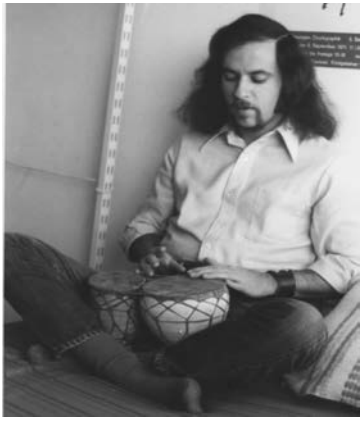
Massachusetts Institute of Technology (MIT)

1967 B.S. in Mathematics and Humanities.

Studied physics, mathematics, literature and philosophy.

Professors included Marvin Minsky (programming, AI), Noam Chomsky (social change), Sam Todes and Hubert Dreyfus (philosophy).

* * *



University of Heidelberg (Germany)

1967/68 Research in twentieth century German philosophy.

Professors included Hans-Georg Gadamer, Otto Poggeler, Karl-Otto Apel.

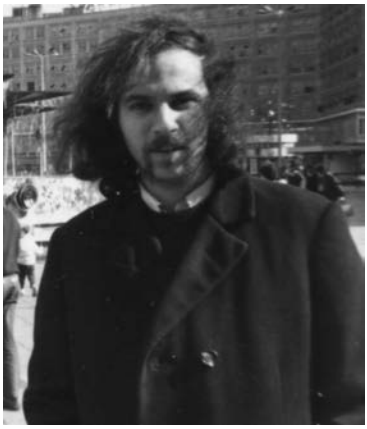
* * *

University of Frankfurt (Germany)

1971/72 Research in twentieth century German philosophy.

Professors included students of Theodor Adorno and Jurgen Habermas.

* * *



Northwestern University

1971 M.A. in Philosophy

1975 Ph.D. in Philosophy

* * *

University of Colorado

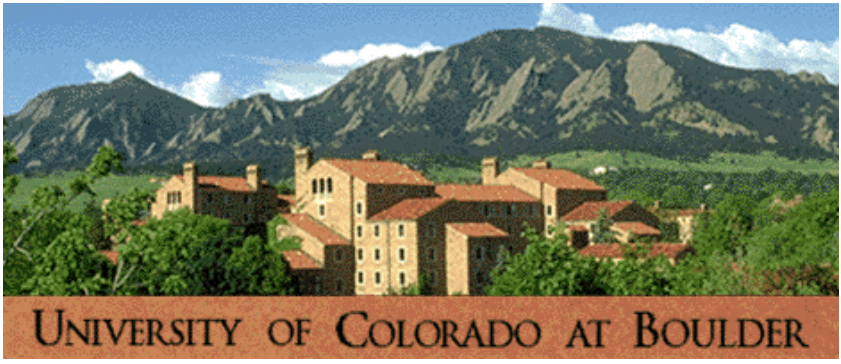
1990 M.S. in Computer Science

Comprehensive exams in AI, Theory, Databases, Programming Languages

Cognitive Science Certification

1993 Ph.D. in Computer Science

Dissertation committee: Gerhard Fischer, Ray McCall, Clayton Lewis, Mark Gross, Mike Eisenberg, Wayne Citron.



Part IV: Overview of My E-Library

15. E-Library Volumes

Gerry Stahl's eLibrary

vol	file name	*title of volume*	from	To	pages
1	**marx**	*Marx and Heidegger*	1967	1975	203
2	**tacit**	*Tacit and Explicit Understanding in Computer Support*	1989	1993	366
3	**gc**	*Group Cognition*	1993	2006	499
4	**svmt**	*Studying Virtual Math Teams*	2006	2009	706
5	**euclid**	*Translating Euclid*	2009	2013	267
6	**analysis**	*Constructing Dynamic Triangles Together*	2013	2015	273
7	**philosophy**	*Essays in Social Philosophy*	1967	1998	234
8	**software**	*Essays in Personalizable Software*	1991	2005	303
9	**cscl**	*Essays in Computer-Supported Collaborative Learning*	2005	2011	196
10	**science**	*Essays in Group-Cognitive Science*	2010	2013	258
11	**theory**	*Essays in Philosophy of Group Cognition*	2005	2021	396
12	**math**	*Essays in Online Mathematics Interaction*	2006	2010	191
13	**dynamic**	*Essays in Collaborative Dynamic Geometry*	2010	2015	134
14	**topics**	*Adventures in Dynamic Geometry*	2012	2015	334
15	**global**	*Global Introduction to CSCL*	2006	2006	177
16	**ijcscl**	*Editorial Introductions to ijCSCL*	2006	2015	327
17	**proposals**	*Proposals for Research*	1993	2021	382
18	**overview**	*Overview and Autobiographical Essays*	2015	2022	255

19	**investigations**	*Theoretical Investigations*	2015	2018	428
20	**form**	*Works of 3-D Form*	2017	2021	437
21	**game**	*Dynamic Geometry Game for Pods*	2020	2021	120

The page counts above are for the 2022 versions of the pdf versions. For the commercially published volumes, the page counts above are for the 2022 versions of the pdfs of the pre-publication versions.

1 Marx & Heidegger

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vol. 1, ch. 2, Stahl, G. (2021a). *The working of sonic being in e-music*. Unpublished manuscript. Web: http://GerryStahl.net/pub/emusic.pdf.

2 Tacit and explicit understanding in computer support

Stahl, G. (2010b). *Tacit and explicit understanding in computer support*. Philadelphia, PA: Gerry Stahl at Lulu. Web: http://GerryStahl.net/elibrary/tacit.

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vol. 2, ch. 2, Stahl, G. (1996a). *Supporting interpretation in design* (No. CU-CS-598-92). Boulder, CO: Department of Computer Science, University of Colorado. Web: http://GerryStahl.net/publications/techreports/design/Design.tr.html.

3 Group cognition: Computer support for building collaborative knowledge

Stahl, G. (2006a). *Group cognition: Computer support for building collaborative knowledge*. Cambridge, MA: MIT Press. Web: http://GerryStahl.net/elibrary/gc. Doi: http://mitpress.mit.edu/books/group-cognition.

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vol. 3, ch. 5, Stahl, G. (2000b). Collaborative information environments to support knowledge construction by communities. *AI & Society. 14*, 1-27. Web: http://GerryStahl.net/cscl/papers/ch04.pdf.

vol. 3, ch. 6, Stahl, G. (1999a). WebGuide: Guiding collaborative learning on the Web with perspectives. In the proceedings of the Annual Conference of the American Educational Research Association (AERA '99). Montreal, Canada. ERIC database. Web: http://GerryStahl.net/publications/conferences/1999/aera99/.

vol. 3, ch. 6, Stahl, G. (2001). WebGuide: Guiding collaborative learning on the Web with perspectives. Journal of Interactive Media in Education. 2001(1). Web:

http://www-jime.open.ac.uk/2001/1 and http://GerryStahl.net/cscl/papers/ch10.pdf.

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4 Studying virtual math teams

Stahl, G. (2009a). *Studying virtual math teams*. New York, NY: Springer. Web: http://GerryStahl.net/elibrary/svmt. Doi: http://dx.doi.org/10.1007/978-1-4419-0228-3.

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vol. 9. ch. 0. (2015). G. Stahl. *Essays in Computer-Supported Collaborative Learning*.

vol. 10. ch. 0. (2015). G. Stahl. *Essays in Group-Cognitive Science*.

vol. 12. ch. 0. (2015). G. Stahl. *Essays in Online Mathematics Interaction*.

vol. 11. ch. 0. (2015). G. Stahl. *Essays in Philosophy of Group Cognition*.

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vol. 11. ch. 10. (2017). G. Stahl. *Group practices: A new way of viewing CSCL*.

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vol. 21. ch. 0. (2020). G. Stahl. *Dynamic Geometry Game for Pods*.

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vol. 19. ch. 22. (2021). G. Stahl. *Investigation 22. Supporting Group Cognition with a Cognitive Tool*.

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17. Summaries of the Volumes

My CV at the end of this volume lists 360 publications and presentations, including books, dissertations, journal articles, book chapters, conference presentations, invited talks and informal writings. There are overlaps of ideas and formulations as my thinking developed over the 50 years from college to retirement. In an effort to organize this material, I published five books, which contain my most important ideas related to my recent academic specialty, computer-supported collaborative learning (CSCL). In addition, I edited 16 collections of papers, which I self-published. These collected the best versions of the most important essays that were not already included in the five books. The essays are organized thematically and largely chronologically. Altogether, in the self-publishing paperback/pdf format, the eLibrary contains more than 200 essays in over 5,600 pages. I hope that the following summaries will provide an initial guide through this jungle of words. The style of the individual chapters and essays varies widely—some will undoubtedly appeal to a particular reader more than others. Browse around. You can also conduct searches for key concepts from my website.

1 Marx & Heidegger (1975)

This was my doctoral dissertation in philosophy at Northwestern University. The dissertation was defended on May 8, 1975. The original typewritten version was scanned, and an electronic version was created on the 25th anniversary of the document. Changes were limited to minor stylistic improvements and the graphics. Additional graphics were added for the 35th anniversary edition. Digital copies are available in html and pdf format at: http://GerryStahl.net/publications/dissertations/philosophy.

The dissertation considers the two most important philosophers of the past century. For each philosopher, I selected the early, mid-career and late publication that I considered most important. I analyzed them to see what Marx and Heidegger could learn from each other. I thereby developed an interpretation of each philosophy and a synthesis of their views, as I interpreted them for our times.

When I was there, Northwestern had the only American department of philosophy that encouraged the study of European philosophy. I also conducted my research during three years in Germany: at Heidelberg, where Heidegger's work was continued, and at Frankfurt, where critical theory extended Marx' thinking.

After completing the dissertation, I published two journal articles related to the dissertation:

> Stahl, G. (1975). The jargon of authenticity: An introduction to a Marxist critique of Heidegger. *Boundary 2. III*(2), 489-498. Web: http://GerryStahl.net/publications/interpretations/jargon.htm.

> Stahl, G. (1976). Attuned to Being: Heideggerian music in technological society. *Boundary 2. IV*(2), 637-664. Web: http://GerryStahl.net/publications/interpretations/attuned.pdf.

In 2021, during my retirement, I returned to the themes of these articles and wrote a new presentation of my views:

> Stahl, G. (2021). The working of aural being in electronic music. In C. Rentmeester & J. R. Warren (Eds.), *Heidegger and music*. Rowman & Littlefield Publishers. Web: http://GerryStahl.net/pub/music.pdf.

I have appended this new discussion to my original dissertation because it shows strikingly how the ideas have persisted in my thinking over a period of almost fifty years, as well as how they have matured. This new presentation may be my clearest expression of the ideas of my philosophic views from the 1970s.

During my intervening academic career, I applied conceptual and methodological perspectives from Marx and Heidegger to the theory of CSCL (computer-supported collaborative learning), developing a theory of "group cognition." In particular, Marx countered the ideology of individualism by analyzing social structures and interpersonal interactions at different units of analysis than the individual person. Heidegger also questioned the traditional ontology of natural objects with innate attributes by proposing dynamic interactive processes of beings in their ecological context.

Today, the philosophies of Marx and Heidegger are still extremely relevant—provided one adapts them to the current socio-historical context and adjusts each to the implicit criticisms of the other—as I tried to indicate in my dissertation.

2 Tacit & Explicit Understanding in Computer (1993)

This was my doctoral dissertation in computer science at the University of Colorado. It was entitled: "*Interpretation in Design: The Problem of Tacit and Explicit Understanding in Computer Support of Cooperative Design*" and was defended on August 5, 1993.

The dissertation explored the implications of the theory of tacit knowledge for the problem of computer capture of design rationale. The theory drew heavily on Heidegger's hermeneutic philosophy of interpretation. It discussed a software system for design by teams of NASA designers. The computer environment captured design ideas in a flexible system of professional perspectives. This research led to explorations after graduation in prototyping collaboration software incorporating mechanisms to support perspectives and negotiation.

3 Group Cognition (2006)

My first book reported on a number of attempts to provide computer support for cooperative work (CSCW) and collaborative learning (CSCL). Critical consideration of the problems exposed by these efforts led to the formulation of the concept of group cognition as a view at the group unit of analysis. The dead-ends of these software design efforts provide an implicit critique of AI, even when construed as "augmented intelligence" supporting human intelligence rather than claiming to duplicate or replace it. Mechanisms to support people and groups in sharing perspectives and negotiation of meaning were seen to be insufficient without new insights to how successful collaborative learning takes place, as gleaned through detailed analysis of dialog and interaction.

The flow of the book suggested starting the Virtual Math Teams Project to study how group interaction can achieve cognitive accomplishments. Analysis of small groups of students in a face-to-face setting and using AOL chat provided examples of how to study textual interaction, pioneering a method specifically designed for CSCL research and leading to my next decade of research.

Subsequent research analyzed how groups established and maintained intersubjectivity and shared understanding by adopting group practices of interaction and of technology use—thereby extending and refining the theory of group cognition and verifying the hypotheses of this book.

4 Studying Virtual Math Teams (2009)

By the time the VMT Project had been running for five years, considerable interaction data had been collected by the instrumented software environment. A number of international researchers joined the project team in analyzing some of the most robust data. This edited volume contains the results of such analyses, as well as discussions of the VMT research agenda, technology design, instructional pedagogy, analytic

methodology and philosophic theory. In particular, visiting researchers explored rigorous coding, statistical analysis, conversation analysis and ethnomethodology approaches to CSCL research. Theoretical considerations of group interaction as a meaning-making process led the project in the direction of interaction analysis based on adaptation of conversation analysis to the online context.

5 Translating Euclid (2013)

This book documents all the major aspects of the VMT Project at what was perhaps its apex. It treats the project as design-based research, in which technology, pedagogy, analysis and theory co-evolve through rapid cycles of realistic usage, analysis and re-design. During this phase, the VMT Project focused on the domain of computer-supported dynamic geometry. It trained math teachers in the use of VMT as a collaborative-learning tool and supported the teachers to use the VMT software and associated curriculum with their students. The multi-dimensional presentation provides a paradigmatic example of CSCL research.

6 Constructing Dynamic Triangles Together: The Development of Mathematical Group Cognition (2015)

In this fourth published volume on the VMT Project, the focus is exclusively on a single eight-hour-long case study of a specific team of four girls as they begin to learn geometry. The entire eight-session experience in which these students first encounter geometry and begin to explore and master it through the VMT support for multi-user dynamic geometry is longitudinally captured in detail. The book reports every chat-text posting of the team interaction and most of the team's geometric actions. It provides a detailed analysis of how the team successively adopts more than sixty group practices, which allow them to engage in challenging, open-ended, creative problem solving. The presentation displays perhaps the most detailed example of the analysis of a case of group cognition—in a prototypical CSCL setting.

A final fifth volume documenting the VMT Project was published in 2021—see eLibrary volume 19 below.

7 Essays in Social Philosophy (1967-1998)

Here is a diverse collection of writings, starting with my undergraduate thesis on Nietzsche. As an undergraduate, I realized that I did not know how to write, and I began by experimenting with assembling quotes from the materials I was discussing. After studying German philosophy from Hegel and Marx to Heidegger and Adorno, my writing became excessively complex, trying to capture the syntax of German philosophical reflection in English sentences. Then, during my community organizing and grant writing days, I learned to write more clearly. This volume reflects those stylistic changes as well as playing with some ideas that are later woven into more academic presentations. The volume includes a wide-ranging diversity of writings on philosophy, aesthetics, politics, technology and history.

8 Essays in Personalizable Software (1991-2005)

The idea of personalizable software is fashionable today. I explored it in a number of software prototypes a decade or two earlier. The perspectives mechanism in Hermes, my dissertation software system, was an initial major initiative in this direction, allowing NASA specialists to personalize their views of designs and associated design rationale. WebNet was a follow-up system to integrate the perspective mechanism into discussion-forum collaboration software. Subsequent systems explored personalization mechanisms in systems for work and for learning, including TCA for teachers developing and sharing curriculum and systems for automated critics in design systems or reviewers of journal articles. In each case, the mechanisms were intended to support users to view and discuss materials from their personal perspectives and to share those views with others to encourage building group perspectives. The volume is organized in terms of essays on (a) structured hypermedia, (b) personalizable software, (c) software perspectives and (d) applications to health care, education and publishing.

9 Essays in Computer-Supported Collaborative Learning (2005-2011)

These essays are some of the most important papers co-written with my colleagues that supplement the discussion of CSCL research in my published books. These chapters take the discussion in specific directions. They begin with my general reflections on the importance of CSCL as a research field, situating my work on the

VMT Project and my theory of group cognition within the field of CSCL. They describe the VMT research project, including its research approach, technology, pedagogy and analysis methods. Mostly, they discuss in some detail the findings that have emerged from the VMT Project about the nature of online interaction in that type of CSCL setting. The volume concludes with reports of work in the project and future directions that were underway.

10 Essays in Group-Cognitive Science (2010-2013)

These essays argue for methodological approaches based on group-cognition theory as a scientifically sound basis for CSCL research. They take different approaches to describing a science and/or theory of group cognition as an approach to CSCL research. The book includes detailed coding schemes, which take into account the sequentiality of group interaction as formulated in conversation analysis. They also illustrate and discuss different methodological approaches I have explored. Part A of the volume consists of two introductions to group-cognitive science as a critique of traditional cognitive science; Part B includes discussions of the theory of group cognition from different perspectives; Part C presents concrete case studies, and it documents coding schemes that were developed within the VMT Project.

11 Essays in Philosophy of Group Cognition (2005-2021)

The philosophy of group cognition is presented as founding a paradigm of CSCL research, which contrasts with traditional educational psychology. It addresses and builds upon concepts of intersubjectivity, common ground, shared knowledge, etc. This volume brings together a number of papers that explore this in theoretical terms. Some chapters are written for a broad audience, others are oriented more toward readers familiar with philosophic discourse. The history of the concept of intersubjectivity is traced historically and the constitution of group cognition is described in some detail, with illustrations from case studies of VMT usage by student groups.

The volume includes essays that attempt to address the philosophical issues raised in the broader publications on the VMT Project. In particular, the discussion of philosophy of group cognition tackles the following questions:

a. What is the nature of group cognition?

b. What conditions make group cognition possible?

Question (a) seeks a definition or description of group cognition: What are its characteristics and how does it differ from (or relate to) other forms of cognition, such as individual cognition and social cognition? Question (b) inquires about what the necessary preconditions are that allow for group cognition to take place, such as shared understanding among the group members.

This volume contains my most important philosophical papers that are not included in volume 19. This includes the last essays I published.

12 Essays in Online Mathematics Interaction (2006-2010)

This collection of case studies from VMT data includes teams working on problems of combinatorics. In particular, two teams that interacted on the same problems during 2006 provide a variety of insights into the nature of CSCL. These papers were written with close colleagues.

13 Essays in Collaborative Dynamic Geometry (2010-2015)

This collection of case studies from VMT data includes teams working on problems of dynamic geometry. This volume includes papers that introduced the transition of the VMT Project to its focus on collaborative learning of dynamic geometry, as well as papers—written from various theoretical perspectives with colleagues—that reflected on details of the data from this final period of the project.

14 Adventures in Dynamic Geometry (2012-2015)

This volume reproduces the successive versions of the VMT curriculum in dynamic geometry. In consecutive years, the curriculum focused more tightly on introducing teacher teams and student teams to the concept of invariant *dependencies*, which is central to the theory and implementation of dynamic geometry. The collection of

versions shows how the curriculum evolved in response to observations of how teachers and students were responding to it.

The VMT Project developed a collaboration environment and integrated a powerful dynamic-mathematics application into it, namely the open-source GeoGebra, which integrates geometry, algebra and other forms of math in a dynamic computational environment. The project made the incorporated GeoGebra multi-user, so that small groups of students can share their mathematical explorations and co-construct geometric figures online. In support of teacher and student use of this collaboration environment, it developed several versions of a set of activities to systematically introduce people to dynamic geometry, adhering to guiding concepts from Euclid, standard geometry textbooks and the US Common Core Standards for Geometry.

The topics for VMT with GeoGebra are available for free download in several versions. They all include GeoGebra tasks to work on collaboratively and tutorials on the use of VMT and GeoGebra software. The best version is the active GeoGebraBook version at http://ggbtu.be/b140867. Here, you can try out all the activities yourself. (Future version of VMT-mobile or of GeoGebra may allow you to do those same activities collaboratively with chat in persistent rooms.) Several versions of the curriculum are included here in reverse chronological order.

15 Global Introduction to CSCL (2006)

This defining introduction to CSCL by Gerry Stahl, Tim Koschmann and Dan Suthers is the most cited paper in the CSCL field. Here is the 2022 version from the *Cambridge Handbook of the Learning Sciences* (third edition). In addition, the original 2006 first version is included; accompanying it are translations into Spanish, Portuguese, Chinese (traditional and simplified), Romanian and German.

16 Editorial Introductions to ijCSCL (2006-2015)

As Editor-in-Chief of the *International Journal of Computer-Supported Collaborative Learning* from its founding in 2006 to my retirement from that position at the end of 2015, I drafted an editorial introduction to each quarterly issue. This provided a venue for me to comment on the importance of each published article (from my perspective) and sometimes to offer my ideas or reflections on the field of CSCL or one of its central issues. The 39 introductions included here provide a glimpse into the evolution of the CSCL field during a key decade of its history, as it became internationally established with conferences around the world and with this journal.

17 Proposals for Research (1993-2021)

My career has usually been funded by grants. Here are some of the proposals I wrote at the University of Colorado and at Drexel University. Successful grant proposals are tricky to write. The ones reproduced here might provide helpful examples. They may also provide explicit statements of some of the goals of my research over the years. Also included are proposals I wrote during my retirement for the Chatham Conservation Foundation to restore and preserve the local environment on Cape Cod.

18 Overview & Autobiographical Essays

This volume is intended to provide an overview of my writings and guide to the eLibrary. It also offers some documentation of my life as the author of these texts, including anecdotes and lists offering general autobiographical information.

19 Theoretical Investigations

This collection of essays investigating group cognition is the culmination of my research on CSCL in the VMT Project. A dozen theoretical papers originally published by international authors in *ijCSCL* are re-published here and commented on. As journal editor, I solicited and edited these articles. They are supplemented by eleven philosophical essays of mine, representing my most important theoretical statements. Introducing the volume are two new essays reflecting on the accomplishments of CSCL theory—articulating a vision of CSCL as a research field and sketching the philosophical foundations of group cognition.

The volume stresses a "post-cognitive" philosophic perspective (as defined in Investigation 15) as the context for a theory of group cognition appropriate for guiding CSCL research and practice. Investigation 1 summarizes the arguments for a post-cognitivist vision of CSCL as presented in the *ijCSCL* reprints, Investigations 3 to 14. Investigation 2 then discusses aspects of the theory of group cognition, building on a selection of editorial introductions to the *ijCSCL* issues that those articles came from.

Investigations 15 to 22 explore foundational issues, such as the unit of analysis, the nature of group practices, intersubjectivity, the co-experienced world, shared understanding and the role of artifacts in cognition at every level. The final three Investigations consider how longer sequences of interaction than typically analyzed

by conversation analysis can lead to meaning making and mathematical problem solving in CSCL settings through pedagogical and analytic structuring of the interaction. The philosophic foundations of group cognition involve conceptualizations and analysis at many levels of time, assemblage, referential structure and theorizing.

20 Works of 3-D Form

My work in sculpture is documented with a catalog of all my works in clay, wood and plaster. Other works of 3-D design are also included, as are reflections on my artwork. This book provides an overview of the chronological development of my work in sculpture, including several studies of sculptural traditions and influential sculptors. My techniques for carving wood are illustrated. Theoretical reflections discuss my focus on "opening up" the materials to define the forms and spaces.

I try to keep the PDF version of vol. #20 up to date when I complete a new sculpture. I also create a video of the sculpture turning slowly around so it can be seen in 3-D.

21 Dynamic Geometry Game for Pods

This brief volume is a print version of the online GeoGebra interactive game for students in small pods or home-schooling to experience dynamic geometry in a hands-on, stimulating, collaborative approach. Also included is a journal article on adapting the approach of VMT to school conditions during the Corona virus pandemic.

Other Documents and Sources

My website provides additional resources, including, for instance, PowerPoint presentations associated with conference papers and YouTube videos of presentations:

* Videos of some of my talks on my YouTube channel:
http://www.youtube.com/user/GerryStahl

* Videos of many of my sculptures in 3-D (revolving) on my YouTube channel:
http://www.youtube.com/user/GerryStahl

* My print-on-demand books at Lulu: http://www.lulu.com/spotlight/GerryStahl

* My e-books for iPad, Kindle, etc. at Smashwords:
http://www.smashwords.com/profile/view/GerryStahl

* My books at Amazon:
http://www.amazon.com/s/ref=ntt_at_ep_srch?ie=UTF8&search-alias=books&field-author=Gerry+Stahl

* Books on CSCL at Amazon:
http://www.amazon.com/lm/R2OYK7US8LYVPN/ref=cm_pdp_lm_all_itms

* A chronological list of my publications, with links to PDF versions:
http://gerrystahl.net/pub

* A list of my publications by category, with links to PDF versions:
http://gerrystahl.net/publications

18. Reflections on the Volumes

Having reviewed and published the first 18 volumes of my e-library in late 2015, I started to go through them and read them sequentially in 2016 to get a coherent sense of what I had written. In the following, I collect my notes about my impressions of the volumes.

At first, I wondered if a set of books (or PDF digital versions of books) was the best format for organizing my publications. After all, many of them are highly interrelated and reference each other extensively. Would not a large hyper-media edition with direct links make more sense? To just reproduce the original publications with their reference lists would make it difficult for readers to follow references to papers that might be in the same or another volume—or even only in a version published under another title. However, hypermedia tends to be too distracting (as we see with social media); one rapidly loses the train of presentation and gets lost in hyperspace. It is hard to get an overview of the structure or even return to an earlier page.

When I started organizing the e-Library it seemed that Kindle and its various competitors might be transforming the way we read, so I started to make versions specially formatted for Kindle or iBooks, as well as PDFs and Lulu paperback print-on-demand. However, having spent some time re-reading my essays in these various formats, I now believe that printed books and PDFs are the best. The Kindle format is designed for easy-reading novels without graphics; it does not support layout of figures, charts, tables or page references. By contrast, a PDF preserves page layout and can correspond exactly to a printed version. To assist the reader in finding a referenced paper in the e-Library, this Overview volume lists the contents of each volume with the original references to its chapters, and also lists all my publications with pointers to where they appear in e-Library volumes.

I organized my publications from conferences, journals, edited chapters and academic books in a series of volumes that arranged them in logical order. I eliminated most redundancies, selected the best versions and formatted it all consistently.

To review the development of my thinking across 50 years of writings, I proceeded through the volumes in the following thematic, roughly chronological order:

#1. Marx and Heidegger

#7. Essays in Social Philosophy

#2. Tacit and Explicit Knowledge

#8. Essays in Personalizable Software

#3. Group Cognition

#15. Global Introduction to CSCL

#9. Essays in Computer-Supported Collaborative Learning

#17. Proposals for Research

#4. Studying Virtual Math Teams

#12. Essays in Online Mathematics Interaction

#10. Essays in Group-Cognitive Science

#5. Translating Euclid

#13. Essays in Collaborative Dynamic Geometry

#14. Adventures in Dynamic Geometry

#6. Development of Mathematical Group Cognition

#16. Editorial Introductions to ijCSCL

#11. Essays in Philosophy of Group Cognition

#18. Overview and Autobiographical Essays

My overall impression of the contents of the e-Library is one of continuity and growth. The early philosophical discussions are incorporated into the computer-science studies, which then lead into the CSCL analyses. The early CSCL writings, in turn, start by calling for the kind of research that was carried out in the VMT project and the last writings draw the conclusions that were anticipated early on. The VMT project was informed by the philosophic perspectives, and it illustrated a response to the computer-science issues.

In 2022 I added notes on volumes #19, #20 and #21.

#1. Marx and Heidegger

My dissertation from the 1970s provoked the most reflections when looked back on in 2017. I was interested in how my thinking 40 years ago then influenced my later work and how it stood up in the present historical context.

Central theme

Both Marx and Heidegger develop historically based approaches—to the methodology of a critical theory of society or to a hermeneutic of Being, respectively.

Marx traces how core concepts of his theory emerged historically through the developments leading to capitalism: for instance, commodity production, free labor and the form of value as labor time. Heidegger discusses the changing epochs of ontological categories and being, but attributes this to "the *Ereignis*," without showing concretely how one epoch emerges from the dynamic of the previous epoch and the current relationships. For both writers, understanding social or ontological transformation requires historically situated interpretation. I conclude that we need a synthesis of Heidegger's hermeneutic methodology and his dynamic ontology with Marx's transformational historical praxis. While Heidegger developed an innovative and profound philosophy for our times, his writings lack the kind of concrete historical analysis that Marx offered in the opening to *Capital*: an explanation of the major social transformation to the capitalist epoch in terms of the dynamics of commodity production, as they developed out of feudal conditions. An interest in contemporary philosophy motivates a critical reflection on the writings of Marx and Heidegger.

My study of philosophy and its effects in my later work

When I went to college, I was already interested in philosophy and even discussed this interest in my college application to MIT. During high school, I was particularly enamored of Bertrand Russell and his logical atomism, as well as logic, positivism and philosophy of science more generally. This changed radically in college, as I found contemporary Anglo-American philosophy to be disappointing. I turned to continental philosophy, studying Camus, Nietzsche, Sartre, Merleau-Ponty and Heidegger, as well as Wittgenstein. My focus on philosophy lasted from 1963 to 1973, as I studied at MIT, Heidelberg, Frankfurt and Northwestern. Even after earning my PhD, I took individual philosophy courses at Temple University while I worked there—and I continued to enjoy philosophy for the rest of my life.

When I taught philosophy as a graduate student, I would use readings of Marx, Heidegger and Wittgenstein to represent what I considered the three mainstreams of contemporary philosophy. Each of the schools based on these philosophers had run into serious problems historically:

- Marx was misinterpreted in a mechanistic way, already starting with Engels and then Lenin. Eventually it was corrupted into the ideology of Stalinist USSR.
- Heidegger was misinterpreted in an individualistic existential way, with Heidegger himself even becoming a Nazi collaborator.
- Wittgenstein was misinterpreted in terms of ordinary-language analysis, depriving his reflections of their critical thrust.

My PhD dissertation on Marx and Heidegger was an attempt to understand and reverse the first two of these problems by arguing that Marx should be understood as

following a hermeneutic approach similar to that proposed by Heidegger, and that Heidegger should incorporate a more social analysis similar to that worked out by Marx.

Both Marx and Heidegger were deeply indebted to Hegel, and misinterpretations of their philosophies could largely be attributed to the prevailing idealist interpretation of Hegel. Hegel's greatness consisted of his processual, dialectical approach, which incorporated at the core of its method a holistic social and historical perspective. Opposing the Soviet (Leninist and Stalinist) and prevailing Anglo-American interpretations of Hegel, critical theorists like Adorno, Lukacs, Marcuse and Habermas proposed an alternative reading of Hegel, and consequently of Marx.

After being exposed to continental philosophy at MIT, studying with Dreyfus and Todes, I went to Heidelberg for a year to study Heidegger. I took all of Gadamer's courses; he had been Heidegger's assistant and had developed a philosophic hermeneutics based on Heidegger. Midway through my year there in 1968, the university was transformed into a "free university" by the student left in sympathy with the national workers strike in France. This increased my opportunities to study Marx in a highly politicized context. I became familiar with critical theory, which was widely debated in the German student movement. When I returned to Germany for two years as part of my doctoral studies at Northwestern, I went to the Institute for Social Research at the University of Frankfurt, where Adorno, Habermas and other critical theorists had taught. My reading of Hegel, Marx and Heidegger was strongly influenced by them. Hegelian/Marxist concepts like mediation, externalization and reification were central to that perspective.

When I became involved in research on educational technology many years later (as a post-doc and research professor at Colorado in 1996 and a professor at Drexel in 2003), my background in philosophy was an important influence. When I read learning theorists Vygotsky, Lave and Engeström, for instance, I was immediately struck by how much they were grounded in a dialectical reading of Hegel and Marx. Even Vygotsky, who worked in Stalinist Russia, avoided the prevailing distortions of Marx and foregrounded the underlying historical principles of Hegel and Marx to propose theories of development that are still important and under-valued.

In my writings on CSCL, I have repeatedly presented a chart that traces the main theories in the current learning sciences back to Hegel and the three philosophic traditions of the twentieth century. In particular, I have emphasized that Hegel provides the turning point away from individualistic and ahistorical views. Remnants of positivism and behaviorism that persist harken back to the rationalist and empiricist predecessors of Hegel; they have been fundamentally critiqued by Marx, Heidegger, Wittgenstein and their followers, especially critical social theory.

My appraisal of the field of CSCL is a philosophic one, based in my study of philosophy, including my dissertation on Marx and Heidegger. I argue that research in CSCL should not be exclusively or even primarily conducted at the individual unit

of analysis. The psychological hypothesis of dominant cognitive science—that meaning is represented in individual minds—is based on a conceptualization that has been rejected by leading philosophers since Kant. My dissertation tried to highlight some key themes in this critique and to thereby reinstate the relevance of Marx and Heidegger's contributions to our understanding.

My theory of group cognition is deeply indebted to Marx, Heidegger and Wittgenstein—as well as subsequent theorists of human-computer interaction, situated learning, ethnomethodology, socio-cultural theory, activity theory, actor-network theory and so on. In particular, I reject the traditional ontology of individuals as the only agents of meaning making and adopt an interactional framework. In my dissertation's presentation of Marx, I emphasized that for him the analytic cell is the interaction between people in the processes of commodity production and exchange. Then I explored Heidegger's processual ontology in his later writings (e.g., the work of art or the bridge as agent of meaning making). Thus, I motivate my rejection of methodological individualism with the approaches of Marx and Heidegger.

In terms of Wittgenstein and his followers, I have noted his view of meaning as use. This is an alternative to meaning as mental representation of an individual. For instance, Searle's speech acts locate agency in the social force of utterances, rather than in the mind of the utterer. Conversation analysis then extends this to locate meaning in the interaction within adjacency pairs of utterances by multiple participants. I call such analysis at the group unit "group cognition."

In particular, my theory of group cognition proposes that understanding, problem solving, learning and other cognitive achievements involve a subtle interplay of individual, small-group and socio-cultural processes. As Marx put it in his 6th thesis on Feuerbach, "the essence of man is no abstraction inhering in each single individual. In its actuality it is the ensemble of social relationships." Later, in his *Grundrisse*, Marx documented how the ideology of individualism arose as a socially necessary illusion resulting from the separation of most people from their means of production. Heidegger characterized human being as Being-in-the-world-with-others, although as Adorno noted, Heidegger blunted this approach with his jargon of authenticity, which cuts short his presentation of Being-together.

The interpretational context

In the politically charged late 1960s and early 1970s, it was clear to me that Marx and Heidegger had important contributions to make to thinking critically about our world. However, it was equally clear that their most profound offerings were obscured by inadequate or misguided interpretations, largely motivated by conservative political ideologies prevailing in contemporary America. Marx had transformed philosophy into social science in a way that maintained much of the depth and critical edge of philosophy while tying analysis to concrete investigation. Heidegger had gone even further in opening up innovative ways of thinking about ontology. However, it was

difficult to sort out ambiguities and alternative readings of Marx' and Heidegger's writings and their trajectories of thinking.

Especially in the USA, Marx stood in disrepute. His name was associated primarily with the communism of the Soviet Union, which was seen as a ruthless dictatorship and the archenemy of American democracy. Heidegger was rejected by Anglo-American philosophy as irrational and unreadable, while Europeans accused him of being reactionary and a Nazi sympathizer. During my research in the library stacks in Frankfurt, I discovered his *Rectoratsrede*. This was the public speech he gave when he accepted the role of Rector of the University of Freiburg for a year after Hitler first gained power. In this speech, Heidegger adapted his vocabulary to the Nazi rhetoric. Although this speech was known, it was rarely mentioned. Other than Adorno's brief *Jargon*, my dissertation was one of the first analyses of the relation of Heidegger's politics to his philosophy. Much later, in 2014, Heidegger's notes (*Schwarze Hefte*) from 1931-1941 were published, revealing the depth of his relationship with Nazism. Subsequent discussions of the relation of Heidegger's philosophy to his politics have been generally consistent with the analysis in my dissertation.

In the late 1960s and early 1970s, Adorno's work and that of other critical theorists including Marcuse and Habermas seemed to draw upon Marx and Heidegger in ways that appeared to be relevant to the contemporary scene—both in terms of their critiques of modern society and their visions that appealed to the student movement of the time. Yet, due to the prevailing cold-war intellectual atmosphere, it was hard to pin down the writings of these critical theorists. More generally, references to both Marx and Heidegger were indirect, given the pressures to avoid being labeled as either a Marxist or a Heideggerian (in the senses that these philosophies were broadly assigned then).

I had already realized in working on my undergraduate thesis on Nietzsche that one can only interpret a philosophic text with some understanding of the author's entire corpus, as well as a familiarity with the tradition of previous thinkers who provided the historical context of the text being read. For historically influential texts, it is also important to take into account the history of the text's reception. Therefore, it was necessary in my dissertation to review the life's work of Marx and of Heidegger to determine what was central to their approaches and relevant to my concerns. This had to be done with an awareness of the social and political contexts in which each of them had worked and in which their legacy had been interpreted. An initial perspective for undertaking this was offered by Adorno, although specifying his viewpoint involved a systematic review of his life's work as well.

The Marx interpretation

I interpreted Marx as conducting a philosophical immanent critique of capitalist social structure. An immanent critique (as defined by Kant, Hegel and critical theory) involves starting from the assumptions of the object being critiqued and drawing out

of those assumptions their contradictions. Hegel called this "dialectics." Marx took the assumptions of capitalism—such as the exchange of commodities based on labor time—and showed that this form of so-called equal exchange actually led to negative consequences, such as impoverishment of workers and monopolization of capital.

Marx' major writing, *Capital*, had originally been interpreted in terms of his popular writings on class warfare. Later, when his early writings on alienation were discovered, published and translated, his work was reinterpreted. When I researched my dissertation, Marx's extensive notes had recently been published in German as the *Grundrisse*. This is where he worked out his methodology for analysis of society. I focused on this and on the opening section of the first edition of *Das Kapital*, where he presented the foundational dialectic of commodity exchange as the starting point of his analysis. (After the first edition, this section was removed because it was too abstract for most readers.) This provided the cell-form of capitalism, from which the rest could be worked out. It was from the interaction of two commodities being exchanged that the character of the social system emerged—and then influenced everything that took place in that form of society. Thus, the ontological character of things in our world was determined by the nature of concrete interactions that took place characteristically and ubiquitously in our society.

The Heidegger interpretation

Heidegger's work opens up innovative understandings of how things (beings) get to be the way they are (their Being). It is not a matter of some essence imposed from outside them, but rather a dynamic in which they work out how they will exist. My paradigm example is Heidegger's analysis of the work of art. He shows how in a work of art, the artwork works out some truth about the world that is opened up by the working of the work. In his later writings, Heidegger provides more examples of objects (bridges over rivers joining the banks, temples bringing together the holy and the mortal, wine jugs gathering the fruit of the earth and the life of man) working out their manner of functioning in the world.

Unfortunately, Heidegger always seems to stop short of drawing the innovative consequences he seemed to be heading toward. Already in his early *Being and Time*, he was arguing extensively against an individualistic view of man. Rather than talking about traditional isolatable "man," Heidegger talked about "Dasein" as a being-there-with-others and a being involved with meaningful artifacts in the world. However, just as he started describing the social belonging-togetherness of people, Heidegger denigrated the shared understanding of human culture as mere gossip and turned to emphasizing an "authentic" stance of an individual to his own finitude. Similarly, just as he described how beings like artworks actively open up a world, he insisted that the character of that world (its Being) was "sent" mysteriously from a world-historical event (*Ereignis*).

The scope of Heidegger's work—beyond what I discussed in my dissertation—included a rather comprehensive critical reception of the history of Western philosophy, from the Pre-Socratics and Plato through Descartes, Kant, Hegel and Husserl. He hinted at least at a synthetic response to this critique. His position gradually emerged as the dominant contemporary philosophy, as articulated by many people more than by Heidegger himself. This includes, for instance, Sartre, Merleau-Ponty, Latour, Derrida, other French thinkers, the Frankfurt School and so on. In drawing out the consequences of his critique, Heidegger was not always his own best interpreter. His essays tended to be obscure and launch into mysticism when they should have presented their main innovation. In fact, Heidegger's right-wing and Nazi jargon can probably be viewed as a major misinterpretation (which he calls his great risk and danger). My sense is that the positive, innovative elaboration of his position has barely scratched the surface so far, and that much more is possible. I tried to make a modest effort in this direction in my essays on electronic music and in my theoretical discussions related to educational technology in my later career.

Despite the limitations of his path of investigation, Heidegger provided important methodological insights based on phenomenology and hermeneutics. The phenomenological tradition insisted on a focus on analysis of concrete phenomena, and hermeneutics provided a rigorous approach to interpretation. Understanding Marx as working out a hermeneutics of capitalist society may save his theory from prevalent misunderstanding of his theory. Adopting some of Heidegger's processual ontology, suggests stimulating re-conceptualizations of the mechanisms of historical transformations.

The implication of the comparison

The methodological recommendations of Heidegger provide some guidance for my reading of Marx' approach and offer some justification for it as a modern form of Marxian theorizing. It is likely that Heidegger's case studies of ontology (like the artwork) could be used to elaborate concrete examples of capitalist artifacts within an extended Marxian framework.

However, the implications of Marx for Heidegger are even stronger. Moreover, Heidegger seems to have completely overlooked the methodological or ontological aspects of Marx, even on the rare occasions when Heidegger conceded that Marx could be seen to play a pivotal role in Western philosophy. The dissertation concludes by arguing that a Marxian corrective to Heidegger's analysis can provide a dialectical analysis of how concrete beings and world-historical Being can mutually determine each other in an interaction that Giddens calls "structuration."

For Heidegger, the developmental process whereby Being, which determines the form of presence of beings, is itself determined takes place solely within the realm of Being-itself (the *Ereignis*). In Marx's theory, on the contrary, the history of Being is the consequence of concrete human history, and its apparent autonomy from human

control is an illusion resulting from the complexity of historical mediations within an antagonistically structured society.

That Heidegger can now describe beings as present in the form of calculable stock, abstracted from their unique context and physical characteristics, is, according to Marx, primarily a result of their being present in relations of exchange. It is these concrete relations of beings to beings as they have developed in social, economic, material history, which equate the forces used in the production of each commodity with all other forces of production. They equate each being with every other commodity, equate the human activity involved in any task with labor as such, and thereby abstract from the mortality and situatedness of people.

Consequently, a consideration of Marx and Heidegger together can provide a firm methodological framework for Marx's analyses and indicate a way of filling Heidegger's analyses with concrete socio-historical content. The dissertation was designed to document the central analyses by Marx and Heidegger that can contribute to a methodological synthesis of their perspectives.

In my writings after defending my dissertation, I occasionally wrote papers that built upon my understanding of Marx and Heidegger. My *Essays in Social Philosophy* (vol. #7) includes some of these papers as well as my translation of Heidegger's *Time and Being*, the last of his works discussed in the dissertation. It also includes my application of a Heideggerian perspective to electronic music. Much later, my writings on educational technology became more philosophical, especially those collected in *Essays in Philosophy of Group Cognition* (vol. #11) and *Theoretical Investigations* (vol. #19). Perhaps the greatest influence of the dissertation on my research in the 21st century was my commitment to grounding my theoretical claims about education in concrete data of student interactions. I thereby tried to conduct phenomenology of collaborative learning in ways that integrated abstract theorizing with attention to the details of dialog as the observable, trans-individual site of thinking.

#7. Essays in Social Philosophy

This volume supplements my dissertation on Marx and Heidegger. It starts with my undergraduate thesis on Nietzsche, my first attempt to present core ideas of a philosopher. In a sense, Nietzsche was trying to come to grips with the changing times, in which "God is dead" and the old ways of thinking are being questioned. Like Marx and Heidegger, Nietzsche (along with Freud and Darwin) built upon and critiqued Hegel. He started to draw the consequences of an open-ended, historical and political world, in which the old, imposed rules were becoming unhinged and people could start to creatively define their own ways in a complex world.

The announcement of the death of God by Nietzsche implied more than just a new theory of truth. My thesis advisor kept asking me what it meant in general. I now think that it meant that there is no God's-eye view of truth: that naïve realism is dead, and reality is open to interpretation from one's perspective. This realization even later crept into math and science—often assumed to be the prime exemplars of objective truth—with truth in math being relative to the relevant axiomatic system and space-time and mass-energy being relative to one's frame of reference and one's observational interventions.

In educational theory, this means that learning is not some objectively measurable state of mind that can be uniquely assessed (whether through interviews of subjects to discover what they "really thought" or by identifying their neural states). What people say in response to others is a matter of endless ambiguity and interpretation—for researchers, for the other discussants and even for the speakers themselves. This Nietzschean view of truth influenced my later research to focus on the interpretation of student discourse as a matter of open-ended negotiation of meaning, as opposed to data that could be classified objectively from a researcher's all-knowing viewpoint. Combined with a social aspect that was already present in Hegel and Nietzsche, this anti-positivism grew into what I eventually called post-cognitivist theory. But before going into educational research, I engaged in a variety of other domains.

The next four essays in volume #7 grew out of my dissertation. They start with my first journal article, which was also incorporated in the dissertation. The next three apply the concerns of the dissertation to the phenomenon of electronic music, a hobby of mine at the time. The article, "*Attuned to being*," was published in the same journal as my "*Jargon*" article, and the other two were written in the context of philosophy courses I taught at Northwestern's evening school as a graduate student. The perspective on music was based on Walter Benjamin's "*The work of art in the era of its technical reproducibility*," a Marxian analysis that could well be contrasted to Heidegger's "*Origin of the work of art*." Benjamin argued that art, through its mediation by the means of production, could point to social potentials. My essays tried to show the relation of technical details of electronic music to contemporary society. The influence of Adorno's writings on my thinking is explicit in these articles.

After my graduate studies of philosophy, I worked in Philadelphia and was politically engaged there. I was a computer systems programmer at Temple University, where I helped to form a union for those who were not already in unions at the university, including the computer center. After being fired for my union activity, I volunteered at the Philadelphia Unemployment Project and researched the economic causes of unemployment. I was active in the Democratic Socialist Organizing Committee, where I taught some informal courses on Marx and democratic socialism. I became a VISTA Volunteer community organizer with the Philadelphia Council of Neighborhood Organizations, and later a researcher at the Institute for the Study of Civic Values. From there, I became the neighborhood planner and fundraiser for the Southwest Germantown Community Development Corporation, where I was

involved in housing rehab, economic development, a credit union and energy conservation service. I also moved to that neighborhood and rehabbed my own Victorian (Queen Anne) house. In the writings from this period, the political influence of my Marx studies shows clearly.

While involved with many neighborhood organizations in Philadelphia, I started the Community Computerization Project, helping dozens of non-profit organizations to computerize their record keeping and accounting on the first generation of microcomputers. I also served on the Boards or as Treasurer of several of these organizations. With my practical experience programming super-computers and microcomputers, I decided to go to graduate school to study the theory of computer science. The final essays in volume #7 come from my years at the University of Colorado in Boulder, culminating in my second dissertation. Some of them reflect my tendency to bring philosophic reflections to issues of computer science.

The essays on social philosophy are examples of my movement from the pure theory of theoretical physics, abstract math and traditional philosophy in my college years to a more engaged and grounded form of philosophical praxis. My philosophical inclinations became immersed in my political activity, then in my computer science, and eventually in my educational research—as will become evident in later volumes of my essays. I still recall a talk at the only philosophy conference I attended, where the speaker used Nietzsche's career to argue against academic philosophy and for a more engaged philosophic crafting of one's life—taking philosophy to the streets. Combining this with the observation that philosophy from Marx onward transformed itself into a reflective form of empirical science, I generally attempted throughout my career to argue based on trying things out and analyzing observational data. However, I always strove to draw out the consequences in order to address fundamental issues and implications, rather than ending with just objective statistical findings and correlations.

#2. Tacit and Explicit Knowledge

As I read this volume at the close of 2016, after the election of Donald Trump, social media were being criticized for encouraging simplistic thinking and even rude interaction. The proposals for achieving the potential of networked computers by visionary pioneers (e.g., Bush, 1945; Engelbart, 1962; Halasz, 1988; Nelson, 1981; Nelson, 1995) have been undercut by the design of current technologies, which treat computer users as consumers of information (and customers of Apple, Microsoft, Amazon, Facebook, Google, …) rather than as collaborative producers of knowledge. Bush envisioned support for navigating the world's knowledge, constructing innovative paths through there and sharing the paths with other people. Engelbart developed human-computer interaction techniques (the desktop metaphor, the

mouse, etc.) for managing complexity of shared information. Halasz and Nelson proposed hypermedia structures to link information together in flexible ways. The WorldWideWeb, Wikipedia, the Well and online salons were intended to build and share new knowledge and thoughtful ideas. However, such approaches to collaboration software have been replaced by simple, restricted apps that only allow users to select from limited options, often with commercial charges. Users are treated as individual consumers with personal opinions that can be expressed by pushing "like" icons. They are not treated as learners trying to develop new knowledge in collaboration with other people.

My dissertation on tacit and explicit understanding in computer support (vol. #2) was part of the earlier effort; it explored how computers could be used to support knowledge building. The software prototype it described, Hermes, was the first of several systems I designed to promote the shared construction of innovative knowledge. Systems like the WebGuide discussion medium and the Virtual Math Teams learning environment are discussed in the volumes of my later work.

Building on my study of Heidegger for my philosophy dissertation (vol. #1), my computer science dissertation expounded a detailed philosophy of human understanding based on the interplay of tacit and explicit knowledge in processes of interpretation, particularly within design efforts. The distinction between tacit and explicit is key to a theory of computer support for knowledge building because human understanding is founded in tacit practices and grounded in tacit human being-in-the-world, whereas computer systems are restricted to manipulating representations of explicit knowledge. By analyzing how tacit knowledge can be transformed into explicit knowledge through interpretation processes, a connection can be found between human and computer information, so that computers can support human knowledge building. Heidegger was the first to analyze the fundamental role of tacit knowledge in making all human knowledge possible and meaningful. My dissertation provides perhaps the most extensive exposition of Heidegger's theory of interpretation (at least in English), specifically applying it to the realm of design.

The dissertation reviews the theories of design of three prominent writers on this topic: Alexander, Rittel and Schön. From this, it proposes that computer support for design should be situated, perspectival and linguistic. Accordingly, the Hermes system is described in terms of three central aspects: (1) it provides facilities for representing the design situation within the software; (2) it allows users to define multiple perspectives for viewing information; and (3) it offers users an end-user-programmable scripting language for controlling all components of the system.

The design features and architecture of Hermes are derived from the philosophy of interpretation through a finely argued discussion, focused on the three aspects: (1) The Hermes system defines a substrate for users to instantiate domain-oriented design environments corresponding to particular design domains, such as kitchen layout or lunar-habitat design. The dissertation adopts the example domain of lunar-habitat

design, drawing its examples of design discourse from this domain as well as its application designs. The situation support consists of a graphics area for drawing habitat layouts. (2) The perspectives mechanism includes perspectives for technical fields (electrical, plumbing, HVAC, psychological, low gravity, etc.), for sequential and alternative versions of designs, as well as for individual designers and teams. (3) The scripting language can be used to define technical terms, display lists, search queries and analytic critics.

Displays were generated at run time through a system of recursive methods, allowing for arbitrarily deep inheritance trees (actually, acyclical directed graphs) of perspectives, virtual copies, content links and graphical links.

The dissertation not only provides an elaborated theory to motivate the design of software to support design, but also documents some of the technical details of the hypermedia, perspectives and language of Hermes. There is enough to guide one in implementing these subsystems. In addition, a copy of this annotated source code is available at: http://GerryStahl.net/pub/hermes.pdf. The full object-oriented Pascal source code for Hermes ©1994 is also filed at the Library of Congress under my name.

A limitation of the Hermes system was that it was not fully multi-user. While multiple people could use it sequentially, defining perspectives for their personal views, the architecture did not provide for simultaneous use by groups of people, sharing views of information, sketches and ideas. There was not even a communication facility to support group work, except through modifying and annotating design elements. Collaborating users were expected to contribute to the hypermedia IBIS discussion of issues. (My advisor, Ray McCall was committed to the IBIS approach.) Addressing this limitation of Hermes led me to my subsequent work on a discussion forum with perspectives in WebGuide and a collaborative problem-solving environment in VMT. Each of these (and other) later systems featured both group and personal perspectives on information and knowledge through less formally structured typed discourse.

A major issue related to the Hermes system is the management of complexity. The Hermes prototype demonstrated that the software could be written for the computer to manage a high level of complexity. The combination of dynamic hypermedia, perspectives hierarchies and the end-user scripting query language meant that rather complicated computations took place at run-time to create the interface displays. The user-interface screens for specifying the corresponding selections and displays were not extensively developed in the prototype or tested with users. The question of how well both end-users and application developers could understand and make use of features of Hermes remained to be explored in future systems. The claim of the dissertation was that the appearance of these features could be made to be quite natural looking to support relatively tacit usage. (This claim was tested in the dissertation through a "walk-through" facilitated by Clayton Lewis and Tammy Sumner).

In addition, it was assumed that design environments built upon the Hermes substrate would be intended for professionals, who could devote time to learning and mastering a complex system. The history of software development in the interim shows that simplistic apps with narrow capabilities, drastically limited options and obvious interfaces have been overwhelmingly successful. This has raised the question of whether digital technology as popularly and ubiquitously used in 2016 encourages superficial opinion expression to the detriment of more complex knowledge building.

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#8. Essays in Personalizable Software

At this point in my review of my publications, I am impressed at the quality of the writing and the thoroughness of the analyses. I did not remember my undergraduate thesis, my philosophy dissertation and my computer science dissertation as being as solid as they now appear to me or as having influenced my future work so heavily. Perhaps I retained some of my old feelings (when I wrote these) that I was not fully up to the task and my sense back then of certain weaknesses in the documents. Although in each case, my presentations may have disappointed my advisors in one way of another—it was certainly never what they would have written—it seems to me the texts conveyed—often in-between the sentences of their formal structures—a sense of the underlying topic.

The review of Nietzsche's attacks on prevailing theories of truth allowed a guiding sense about Nietzsche's philosophical system as a whole to shine through. This was the first time I had developed an overview of a philosopher's system, and although I was not able to articulate it in the thesis, it is clearly at work in my interpretations of Nietzsche's texts there. One might expect the analysis of Marx and Heidegger to answer the question about how Heidegger's philosophy led to his disastrous politics. However, that is probably not possible and no one else has come closer to answering it than the suggestions in Adorno's *Jargon*, which my dissertation enunciated. Rather, my dissertation considered core motives in Marx and Heidegger's respective systems and argued for a dialectical synthesis of them. Not only are these two systems complex

and obscure, but they have been ruthlessly obfuscated by the histories of their interpretations. In my rereading of my philosophy dissertation, the analysis of these philosophers seems to have well stood the test of the intervening 40 years. When it came to my computer-science dissertation, the Marxian influence was sublimated in the attempt to design collaboration software to empower people by adapting the current leading means of knowledge production. The Heideggerian influence was explicit in my presentation of his hermeneutic theory of interpretation. I was surprised in rereading this at the depth of this presentation as well as its fit to the dissertation's topic. In addition, it was fun for me to read the descriptions of the software prototype and to recall the sophistication of the programming that went into the Hermes prototype.

The essays in volume #8 come from the period of my second dissertation, when I was a graduate student in computer science and then a researcher in Boulder, Colorado. They cover some of the ideas about hypermedia that went into Hermes and present drafts of parts of the dissertation that were presented to various audiences. The ideas for personalizing software to the needs and circumstances of different users—especially through variations on the Hermes perspectives mechanism—were central to a number of software prototypes and systems that I subsequently developed. Some of these efforts were reported in my most popular publication, volume #3. Others are documented in volume #8.

My general impression of the "*Essays in Personalizable Software*" is surprise at the number of software systems I explored with mechanisms to support complex knowledge building. The Hermes prototype in my computer science dissertation featured: dynamic hypertext, a perspectives mechanism and a scripting language. While Hermes was intended to support collaborative design, it was technically a single-user system. So, my later efforts focused on supporting communication within groups of students or professionals. Part I of volume #8 documents ideas that led to the mechanisms in Hermes. Part II proposes the concept of "personalizable software." This is a concept that has been discussed from time to time in the computer-science literature. The writings here proposed computational mechanisms to support this in a deeper sense and with more end-user control than usually included—particularly the perspectives mechanism of virtual copying throughout a tree of defined inheritance.

In Part III, perspectives are applied to the automated critics, which were central to the research lab in which I worked during my dissertation research. It was also applied to a sequence of systems after graduation. The most important of those later systems was WebGuide. During development of WebGuide, I collaborated with Thomas Herrmann of Dortmund, Germany, on combining perspectives with negotiation, as synergistic supports for building effective groups and reaching group consensus in collaborative knowledge-building efforts.

Part IV reflects some of the breadth of exploration that I was engaged in during my later years in Colorado as a research professor. WebGuide and the subsequent support for perspectives and negotiation in BSCL (during my year in Bonn, Germany) are presented in volume #3 (*Group Cognition*). That volume can be read in terms of a line of investigation of group formation, perspective sharing, and knowledge negotiation as supports for collaborative knowledge building. The essays in volume #8 anticipate and motivate that focus. They also supplement the major papers included in volume #3 with related descriptions (e.g., of Hermes, TCA, LSA, WebGuide, BSCL, and other prototypes developed in parallel with those).

#3. Group Cognition

This is a self-contained volume published by MIT Press in the Acting with Technology series. It includes essays related to computer support for collaborative learning (CSCL) from my computer-science dissertation through the start of the VMT Project.

Looking back at this publication 15 years later, I am surprised how thoroughly it presented my conception of group cognition, which was a new term essentially invented in the writing of the book. The introduction presents a careful description of the core idea that I would be hard put to articulate better now. The concept is even well illustrated by analysis of empirical interactions—despite the fact that my systematic investigations with students had not yet begun. The theoretical and philosophical aspects are well covered, particularly by a couple of key essays. The proposal for follow-up research nicely anticipates and calls for precisely the kinds of studies that took place in the subsequent VMT Project (which was just announced in *Group Cognition*) and that was extensively documented in my later books.

This was certainly my most popular book. The printing of 1,000 hard bound copies was sold out and many digital copies circulated. As of 2021, its Google citation count was 1,885. This far surpasses all my other publications except the chapter on CSCL co-authored with Tim and Dan (2,677), which is perhaps the defining statement of the field. The next two most cited documents are both chapters in *Group Cognition*, and the next most cited book is *SVMT* at a mere 353 citations. My total citation count is about 12,500—with an h-index of 45.

The chapters of the book are of varied quality, and I still feel uneasy about some of their weaknesses as stand-alone presentations. However, they are well integrated into a coherent argument about group cognition by the hierarchy of introductions to the book, to its three sections and to the individual chapters. While it is possible that certain readers would be critical of aspects of specific chapters, the larger problem is simply the volume and complexity of the manuscript and the demands it makes of

the reader in terms of concentration and background knowledge. Various chapters assume facility with diverse domains of computer science, cognitive science, mathematics and philosophy. Of course, the synthesis of these domains underlies the power and focus of the presentation, which requires such a multiplicity of sources.

In a sense, the concrete software examples in *Group Cognition* illustrate the difficulties of CSCL more than the potential, which is argued for mostly in theoretical terms. From a 2019 view back, the difficulties are akin to the conundrum of social media as purveyor of fake news. That is, the CSCL prototypes tended to be used as media for exchange of opinions, just like social media are now designed to do. The goal of collaborative knowledge building should be explicitly contrasted to this.

A repeated conclusion in *Group Cognition* was the need to develop empirical examples of collaborative knowledge building and to analyze in detail how they work. This was seen as a prerequisite for further significant progress in groupware system design, in CSCL pedagogy and in group-cognition theory. That nicely set the stage for my later published books, focused on the work of the VMT Project. *Studying Virtual Math Teams* described the VMT Project. *Translating Euclid* described many aspects of the associated design-based research of the project. *Constructing Dynamic Triangles Together* provided a detailed analysis of successful group cognition, chat posting-by-posting and geometry action-by-action. *Theoretical Investigations* presents a set of papers on theoretical aspects of the theory of group cognition and the VMT explorations. This series of subsequent volumes confirms the central hypothesis proposed by *Group Cognition*.

A copy of the Java source code for versions of WebGuide from 2000 is available at: http://GerryStahl.net/pub/webguide.zip .

#15. Global Introduction to CSCL

This volume contains my most popular article. It is highly cited in the published literature on educational technology and CSCL. It is widely considered the definitive definition of the field of CSCL. I co-authored the original version with Timothy Koschmann and Daniel Suthers at the suggestion of Keith Sawyer, the editor of the comprehensive *Handbook of the Learning Sciences*. In 2015, I made very slight changes to up-date it for the revised version of the *Handbook*. For the third edition, in 2021, Tim, Dan and I reviewed the presentation carefully and tweaked it to clarify the theoretical framework we were promoting.

In order to make the article more readily available to readers globally, I had it translated into several major languages. The original and third English versions are included in volume #15, along with the translations of the original version. This way,

readers of a translation can conveniently compare the wording with the original English.

As the field of CSCL spreads around the world to new areas in Asia, the Middle East, Africa and South America, it is important that newcomers to the field are informed about the major characteristics of CSCL that differentiate it from traditional educational psychology and generic distance education.

If one reads the article carefully, the emphasis on the group as the focal unit of analysis becomes clear. Methodologically, this can involve an ethnomethodological or conversation-analytic approach, in place of the statistical techniques of coding and counting. Thus, the introduction to CSCL aligns closely with themes from my theory of group cognition in volumes #3, #9 and subsequent writings. It even mentions focusing on the interactive constitution of intersubjectivity and on the adoption of practices, as discussed extensively in my last writings (volume #11, #19).

#9. Essays in Computer-Supported Collaborative Learning

This volume supplements the compilations of articles about the VMT project in volumes #3 and #4. It shows the understanding of online collaborative knowledge building gained through the research in the early years of the VMT Project, prior to the incorporation of multi-user GeoGebra. For instance, the central essay on "Sustaining Interaction in a CSCL Environment" presents a number of insights into how collaborative problem solving is accomplished in this context.

I am surprised in re-reading these essays at how broad an understanding of the processes of group cognition are described, despite the focused nature of most research reports. The unique nature of VMT chats seems to be quite consistent across multiple studies, events and analyses.

In particular, I did not realize how many "group practices" or "member methods" are identified in these early studies. It is not until volume #6 (2015) that I focused on the *adoption* of group practices. There I explored how groups interactionally adopt new group practices. In previous analyses, we identified practices that were used by groups to accomplish their group cognition. However, we did not explicitly inquire how the groups adopted these practices. Similarly, ethnomethodology researches the tacit methods that group members use in their interactions, without necessarily identifying the ways in which these methods are introduced into the group interaction and adopted by the group in their interactions. This is because most ethnomethodology studies assume that the practices being analyzed are already well established and

widely adopted within the broad linguistic culture, whereas VMT is concerned with learning, as the adoption of practices that are new for the group of learners.

One could now look back over transcripts from the early VMT excerpts to see how the group practices that are found there arose through a process of tacit activity encountering a breakdown in shared understanding, solutions to the breakdown being made explicit in the interaction, new group practices being adopted by the group, and the practices becoming tacit member methods. This process could parallel at the group unit of analysis the hermeneutic dialectic of human-computer interaction proposed in my dissertation on tacit and explicit knowledge (vol. #2, 1994), based on my analysis of Heidegger's philosophy (vol. #1, 1974): i.e., tacit to explicit and then back to tacit (but now shared).

#17. Proposals for Research

The purpose of this volume was to share the academic grant proposals that I have made for research, including first of all those that have been funded and that allowed me to engage in an active research agenda, both at the University of Colorado in Boulder as a Research Professor and at Drexel University in Philadelphia as an Associate Professor and Full Research Professor.

I have also included a number of proposals that I felt should have been funded; these document ideas that I was working on at the time they were written, but ultimately represent roads not taken. They were modest (more or less) proposals for promising, but unfulfilled, research potentials. Perhaps they document stages in the development of my thinking not otherwise visible; perhaps they will inspire a reader to pursue an otherwise forgotten trail of inquiry.

Writing effective, competitive grant proposals is a delicate business. First, one has to conceive of a program of research that one would like to undertake and that is reasonable to attempt under the proposed conditions. Then, one must convince the funding source and their reviewers that the funding proposal should be accepted. This must be accomplished with a written document of restricted form, content and length.

Preparing a proposal is a challenging writing task, requiring project planning, persuasive presentation and organized narrative. In many ways it is like writing a professional research report for a journal, such as one would compose near the end of the prospective funded project, but it needs to include more than just the concept, theory, literature review and analysis. It also needs to demonstrate why the person or group proposing is the right one to do the job and detail how the work is expected to be accomplished with the requested resources. In this publication, I only include the Proposal Summary, Proposal Description and Proposal References. The details of

personnel and budget are too specific to be of interest to the reader. (Although putting together an effective and convincing budget is itself an art.)

I attribute my success in grantsmanship to a number of stages in my life. Most likely, I honed my natural argumentation tendencies through a decade of study of philosophy (Stahl, 2010a; 2010b). But this left my writing style too abstruse for the practical world of grant funding. Once I had completed my doctoral study of philosophy, I returned to the streets of Philadelphia as a community organizer in the 1970s of the Great Society era of federal funding. My first proposal was awarded a million-dollar grant to the Philadelphia Council of Neighborhood Organizations (PCNO) to train unemployed residents in poor neighborhoods to start energy conservation, recycling and home repair/weatherization projects. I later joined the Southwest Germantown Community Development Corporation (SGCDC) as community planner and brought in dozens of federal, state, city and foundation grants over several years to grow the organization from a small home rehab group to include a local credit union, an energy conservation organization and neighborhood projects in youth employment, housing rehab and economic development. This taught me not only proposal writing, but project management, especially non-profit fund accounting and budgeting. Next, I provided technical assistance to non-profit organizations throughout Philadelphia on the staff of the Institute for the Study of Civic Values and started a computerization service for them when the first personal computers came along, developing custom accounting and service tracking software. Eventually, I spun off my own non-profit, the Community Computerization Project, helping dozens of organizations in Philadelphia.

In 1989, I moved out West and studied computer science, artificial intelligence and cognitive science in Boulder (Stahl, 2010c). I helped writing proposals for Ray McCall's architectural design lab I was in (which paid my RA salary). I drafted the proposal from the Cognitive Science Institute that paid for my post-doc position.

After graduation, I worked with Bob Owens' small research start-up, drafting SBIR (federal small-business innovative research program) proposals for research in collaboration with firms and government agencies. I worked as VP for R&D, doing the programming for grants that were funded. The projects were in collaboration with the Boulder Department of Education and with the astronaut psychology group in NASA. Some of this research is reported in *Group Cognition* (vol. #3).

I eventually became a Research Professor at the Institute of Cognitive Science and the Department of Computer Science. This meant that I had to raise my entire salary from grants, so I began writing proposals intensively (documented in vol. #17). While I was awarded some relatively small grants, I never succeeded in the almost impossible job of supporting myself as a research professor.

I went to work at a CSCW lab in Germany for a year and then joined the faculty of the College of Information Science and Technology (the iSchool) at Drexel

University. There, I met the people at the Math Forum at Drexel and developed collaborations that resulted in successful grant proposals and productive research. My grants raised over six million dollars to support the VMT Project from 2003-2016. The proposals are included in vol. #17.

During my retirement on Cape Cod, I served on the Board of the Chatham Conservation Foundation as Treasurer and started the Salt Marsh Task Force. Successful proposals for land and marsh restoration are included in volume #17.

#4. Studying Virtual Math Teams

This is a self-contained book published by Springer in the Computer-Supported Collaborative Learning series #11. Including chapters authored by international colleagues, it documents the initial years of the VMT Project at Drexel University and the Math Forum.

The styles of the chapters vary considerably, partially as a result of the different perspectives of the authors. Even my own chapters take quite different approaches. The volume opens and closes with nice presentations at a higher level of overview than most of the other chapters. The introductory "chat" or "interview" format provides an informal view of the general undertaking of the VMT research effort, and the concluding chapter looks beyond the state of the project to an envisioned science of group cognition. This vision arranges many of the preceding chapters into a systematic framework and foresees much of the future work of the project, including even the identification of "group practices"—which turned out to be the final focus of the project (volume #6).

The diverse authorship of the chapters reflects the collaborative spirit of the VMT Project. The list of Authors and Collaborators at the start of the book and the Notes at the end document many of the people and groups involved. The project was always primarily a collaboration between the Information School and the Math Forum, both at Drexel. Steve Weimar and the staff of the Math Forum provided the practical support: programmers, educational analysts and connections with teachers and students. A shifting collection of people from the I-School joined me and my four PhD students. Researchers from around the world joined the group for periods of months. Everyone contributed from their own perspective and expertise.

Several of the chapter authors participated in the four-day VMT Project kick-off workshop in June 2003. The workshop was held at Drexel University's Peck Center on the 8th, 9th and 10th; at the Inn at Penn on the 11th; and at my home on the 12th. All hotel, travel, food and entertainment costs of the participants were paid for out of the grant. Out-of-town participants were given an honorarium of $600 each. The following people participated in the workshop: Bob Aiken (Temple), Wolfgang

Appelt (Germany), Gerardo Ayala (Mexico), Chip Bruce (U of Ill.), Santi Caballé (Spain), Murat Cakir (RA), Annie Fetter (Math Forum), Hugo Fuks (Argentina), Geri Gay (Cornell), Ricki Goldman (NJIT), Jörg Haake (Germany), Thomas Herrmann (Germany), Jim Hewitt (Canada), Cindy Hmelo-Silver (Rutgers), Chris Hoadley (Penn State), Victor Kaptelinin (Sweden), Tim Koschmann (S. Ill. U), Kristina Lasher (Math Forum), Lisa Lavelle (Lewis & Clark), Sten Ludvigsen Norway), Ana Marjanovic-Shane (Philadelphia), Eugene Matusov (Delaware), Pete Miller (UW Madison), Tracey Perzan (Math Forum), Johann Sarmiento (RA), Wes Shumar (Drexel), Gerry Stahl (Drexel), Jan-Willem Strijbos (Netherlands), Ramon Toledo (RA), Stefan Trausan-Matu (Romania), Ian Underwood (Math Forum), Steve Weimar (Math Forum), Martin Wessner (Germany), Fatos Xhafa (Spain), Alan Zemel (post-doc), Nan Zhou (RA).

While *SVMT* documents many aspects of the project, there is further detailed documentation in other volumes of my eLibrary, such as coding schemes, versions of dynamic-geometry curriculum and software documentation that came after *SVMT* was published.

The Java source code for VMT is freely available as open source at SourceForge, the open-source repository. There are versions of VMT for desktop/laptop computers, for mobile/tablet and for the VMT Replayer: https://sourceforge.net/directory/os:mac/?q=VMT.

After I retired, Steve Weimar took the VMT software with him to new organizations, where it was reprogrammed; see vmt.mathematicalthinking.org; send inquiries to vmt@21pstem.org or SWeimar@21pstem.org.

#12. Essays in Online Mathematics Interaction

What is immediately striking in re-reading these essays from the 2006 VMT trials is the wealth of detailed analysis of the group practices adopted by student teams in conducting mathematical problem solving. Specifically, these essays analyze how student interactions apply referential and representational methods to direct teammates' attention and to represent (graphically, symbolically or linguistically) mathematical relationships.

These methods may be generally accepted social practices, established mathematical practices or locally adopted group practices. These alternatives are not differentiated in these essays, but we could go back now after having focused on the adoption of group practices in volume #6 to observe how the VMT teams adopt the various practices.

In the essays of this volume, members of the VMT research team present important observations: Murat Cakir presents graphical methods of sequential drawing as contributing to the intersubjective meaning making in coordination with the chat. Johann Sarmiento explores in innovative ways the temporal structure of the small-group interactions, especially across multiple chat sessions. These essays complement Alan Zemel's analysis of chat interaction as "reading's work" and Nan Zhou's analysis of the key role of questioning in team interaction. Together, these analyses provide a foundation for a description of group practices that are foundational for mathematical group cognition. Cakir, Sarmiento and Zhou were the graduate research assistants on the VMT Project and wrote their groundbreaking dissertations on these themes. Zemel was the post-doc on the project and trained us all on the ethnomethodological perspective on communication. Stefan Trausan-Matu was a visiting researcher at the VMT Project for six months; he developed a perspective based on Bakhtin. Stephen Weimar and others at the Math Forum helped us to understand the mathematics from a pedagogical perspective.

The second essay, originally published in *ijCSCL*, could be considered the central paper in this volume. It concludes with a summary of the accomplishment of the VMT project generally:

> The coordination of visual and textual realizations of the mathematical objects co-constructed by the students provides a grounding of the algebraic formulas the students jointly derive using the line drawings that they inspect visually together. As the students individualize this experience of group cognition, they can develop the deep understanding of mathematical phenomena that comes from seeing the connections among multiple realizations. Our case study does not by any means predict that all students can accomplish comparable results under specific conditions, but merely demonstrates that such group cognition is possible within a synchronous CSCL setting and that a fine-grained sequential analysis of interaction can study how it is collaboratively accomplished.

The project was able to describe in considerable detail the group interactions conducted in the graphical and textual media of the VMT environment. This was a unique achievement in the field of CSCL. Based on such analysis, the project was able to argue for a view of grounding that differed from the widely accepted theory of Clark, centered on "contributions" from individual minds. One could argue that grounding in mathematics provides a useful example. It is sometimes argued (e.g., by Sfard) that deep understanding of mathematical phenomena consists of the adoption of multiple practices or routines associated with a given mathematical object. However, one can say it is also important for grounding one's understanding of a mathematical abstraction in an embodied sense of the object (e.g., Wittgenstein insists on practices that guide the application of rules and Lakoff describes bodily metaphors underlying mathematical relationships, while Merleau-Ponty would stress our bodily

movement and manipulation). Mathematicians typically rely upon sketches on paper (or, derivative of that, in their imaginations). The analysis in this essay illustrates repeatedly interactional moves that ground textual references to mathematical terms and objects in visual perceptions of graphical displays and animations. This grounding—which makes use of the whiteboard and the persistent chat stream—is carried out at the group level, in the interaction. Strikingly, it can still be observed there in the VMT data a decade later. We can ground our understanding of the student drawings, animations, postings, terminology and formulas by looking at the graphics in the VMT Replayer or even the figures in the paper and the sequences of chat postings. The grounding and meaning making is still there in the interaction traces. We do not need to question the students about what they were thinking because they already posed to each other in the chat the most important questions for interpreting what was said, and we can read the responses. The group cognition and its grounding are captured in the essay.

#10. Essays in Group-Cognitive Science

Taken together, the essays in this volume illustrate a method of conducting analysis of CSCL interactions. This method is suggested at several points in my writings, but never spelled out. In this volume, one can see it worked out.

The method is based on two principles: coding adjacency pairs rather than individual utterances and coding the hierarchical structure of a session.

The hierarchical structure is presented in two of the essays (Chapters 3 and 4). A set of codes for the two parts of typical adjacency pairs is presented in the chart of Chapter 7. Here, codes are also listed for the other hierarchical levels.

These codes have been worked out in a spreadsheet that is available at www.gerrystahl.net/pub/coded4b.xls for hands-on usage. I developed the codes through detailed consideration of the postings, their interactional roles, their meaning making and their timing. As I worked on one column of codes, it affected codes in other columns (and even changed the threading)—in a dialectic of whole and part that is typical of interpretation.

Standard measures of inter-rater reliability cannot be used directly in this multi-dimensional analysis because raters would have to do one level at a time and agree before doing the next level to avoid unacceptably large divergences. However, the levels of codes are interdependent. Rather than using multiple raters, I asked Carolyn Rose to look at the excerpt. She is an expert in coding but comes from a quite different methodological perspective from me. She independently analyzed the adjacency-pair structure—which is probably the most important dimension—using her own

approach. She generally confirmed my analysis of what were the major adjacency pairs in the excerpt.

A multi-level coding using the approach specified in this chapter—including the reasoning supporting it—constitutes a rather thorough analysis of the interaction. If a research team agrees on such a coding, this can form a useful basis for further analysis, such as the identification of patterns of academically productive discourse or the adoption of group practices. The coding of adjacency pairs and higher-level processes at the group unit of analysis may overcome the tension in CSCL between quantitative and qualitative methodologies. This tension was already explicitly discussed in Chapter 2 from 2012 in terms of group practices.

I always wanted to analyze the whole sequence of sessions of Team B and Team C in VMT Spring Fest 2006. The VMT research team spent months discussing these sessions in its weekly project meetings, going over every line of chat. It would be interested to complete the coding of all this chat using the system presented in this volume. It would also be interesting to identify the adoption of group practices in these chats, as done in vol. #6. Some of this was done by Richard Medina in his dissertation and in his *ijCSCL* article (reproduced in vol. #19).

#5. Translating Euclid

This is a self-contained volume. It was written to document multiple aspects of the VMT Project as a prototypical example of CSCL research. It was published by Morgan and Claypool, in the Synthesis Lectures on Human-Centered Informatics series #17.

This book presents perhaps the most comprehensive documentation of a CSCL research agenda ever published:

- The VMT research was conducted over a period of a dozen years, from 2003-2015, of which the last couple of years are focused on in this book.
- The book includes several examples of empirical analysis and references many more from the related VMT research.
- Included are all the major relevant perspectives and historical context: history of the subject domain, theory of geometry as a human-centered undertaking, technological considerations, theory of interactional resources, analysis of usage by researchers, teachers and students, ….
- A geometry teacher could gather a systematic approach to collaborative dynamic geometry and come to understand the basics of an introductory

curriculum for the subject from the examples of GeoGebra resources in the chapter on Practice.

- A software designer could learn important considerations for the technological support of collaborative dynamic geometry.
- The chapter on theory of resources provides an important contribution to the philosophy of group cognition.

While reading *Translating Euclid* during a winter 2019 vacation in Florida, I was impressed by the analysis of interactional resources. Relating it to other theories I had discussed—such as those involving artifacts, perspectives, practices—it struck me that I have penned many attempts to understand the relationship between the levels of individual, small group and community/society:

- My philosophy dissertation (Stahl, 1975) considers Marx' analysis of group interaction of two people in the core interaction of commodity exchange, bridging the individual, pair and social levels. It also considers Heidegger's theory of the history of Being and the working of things, tying the nature of individual objects to world history. It takes as problematic the relations among these different units of analysis in the two philosophies.
- My computer science dissertation (Stahl, 1993) discusses computer support for group work, presenting a theory of tacit and explicit understanding in computer mediation of collaborative knowledge building, relating collaborative understanding to individual modes of knowing.
- My work on software perspectives, such as individual, group and classroom perspectives in WebGuide (Stahl, 1999) proposes support for student participants to connect and move between these levels.
- My model of collaborative knowledge building (Stahl, 2000) pictures the interaction of these levels during knowledge building.
- My discussion of "shared" understanding (Stahl, 2003a) considers potential relationships among knowledge considered as personal, group or community.
- My analysis of (social) meaning and (individual) interpretation (Stahl, 2003b) takes a hermeneutic approach to understanding the interplay here.
- My first attempt at a theory of collaborative learning, emphasizes the role of artifacts (Stahl, 2004) and brings together many existing theories.
- My first book, *Group Cognition* (Stahl, 2006), especially the chapter on "Thinking at the small-group unit of analysis," gathers together my various explorations at the time and coins the term "group cognition."

- My *ijCSCL* editorials on "CSCL and its flash themes" (Stahl, 2007) and "The strength of the lone wolf" (Stahl, 2008) explore the alternatives of individual and group conceptualizations.
- My second book, *Studying Virtual Math Teams* (Stahl, 2009b), explores the interplay of levels, especially in the chapter on "Meaning making in VMT."
- My keynote, "How I view learning and thinking in CSCL groups" (Stahl, 2009a) discusses the levels of discourse analysis.
- My chapter on "Social practices of group cognition in virtual math teams" (Stahl, 2011b) focuses on social practices.
- My coding scheme for sequential discourse (Stahl, 2011a) coordinates coding at diverse levels.
- My *ijCSCL* editorials on "Traversing planes of learning" (Stahl, 2012b), "Cognizing mediating" (Stahl, 2012a), "Learning across levels" (Stahl, 2013a) and "Conceptualizing the intersubjective group" (Stahl, 2015) propose the importance of connecting the levels and points out how little this has been done in theory (see Stahl, 2019b, Inv.2).
- My third book, *Translating Euclid* (Stahl, 2013b), develops a theory of connected levels using the notion of interactional resources, especially in the chapters on "Philosophy: The obfuscation of geometry" and "Theory: Resources for geometry."
- My fourth book, *Constructing dynamic triangles together: The development of mathematical group cognition* (Stahl, 2016), provides an analysis of group practices as the mediator between levels.
- My fifth book, *Theoretical investigations: Philosophical foundations of group cognition* (Stahl, 2019b), addresses the philosophy of group cognition in its many theoretical essays, summarized in "Investigation 2. A theory of group cognition in CSCL" (Stahl, 2019a).
- My chapters in the CSCL Handbook, "Theories of CSCL" (Stahl & Hakkarainen, 2020) and "Analysis of Group Practices" (Medina & Stahl, 2020) summarize and present theories and methods relevant to group cognition.

One might conclude from this list—spanning my entire adult life and publishing career—that the relationship and interplay between the individual and the group or the personal and the social has been an abiding and consuming theme. In reviewing my recent contributions on this thematic complex, I was pleased that I had come so far in responding to the central issues and in forging a distinctive path. My only regret is that the evolution of these ideas is only visible to someone who reads many of my

publications, amounting to thousands of pages. Furthermore, many of these publications are demanding for any reader not well steeped in philosophy, computer science, learning science, cognitive science, etc. I have tried to consolidate my presentations in my e-library to avoid excessive duplication and have summarized some of the presentations in more popularized writings. But the attempt to overview the sequence of theories and to contrast them to each other would still be daunting. The complex of theories is more than can be kept in memory and requires being committed to the texts, where it was worked out.

#13. Essays in Collaborative Dynamic Geometry

The most advanced period of the VMT Project involved *dynamic geometry*. The project devoted considerable effort to developing the first (and still only) multi-user version of dynamic geometry and integrating it into the VMT software environment. We wanted to provide more direct support for math in the environment. The Math Forum had been involved in the invention of dynamic geometry, resulting in the commercial product, Geometer's Sketchpad. The math professor at Swarthmore who started the Math Forum also started the development of Geometer's Sketchpad. Steve Weimar and Annie Fetter were both involved in supporting teachers working with Sketchpad throughout the history of the Math Forum, and both were part of the VMT team throughout its existence. By the time of the VMT effort, GeoGebra had come into existence as a free, open-source alternative to Sketchpad. We hired a sequence of three full-time programmers to convert GeoGebra to a multi-user version, in coordination with the GeoGebra developers.

The research involving dynamic geometry is extensively documented in *Translating Euclid* and *Constructing Dynamic Triangles Together*. In addition, the curriculum associated with this effort is republished in volume #14. That leaves little else to publish from that period in this volume #13. Consequently, the volume consists primarily of conference and workshop presentations that presented aspects of the research.

However, the collection of mostly brief papers in this volume sheds interesting light on the mature VMT project, not necessarily visible in the single-author more comprehensive monographs. The first essays are to some extent taken from funding proposals arguing for the unique contributions and potentials of the VMT Project. They were also used to introduce the project to the wider mathematics-education community, for instance in an international conference in Korea or in GeoGebra workshops. The later essays by Oner, Cakir, Khoo and the VMT team generally provide diverse perspectives on significant issues such as how to analyze/evaluate VMT sessions and how to envision future directions for VMT with GeoGebra.

A whole other research stream, not well represented in the eLibrary, is the work of Arthur Powell and his students. While I focused on the students in VMT sessions, Arthur focused on their teachers. A major part of the VMT Project involved teacher training. The project held courses for local teachers through Drexel and Rutgers, to prepare them to use VMT with GeoGebra in the classrooms. This was a central concern of Arthur, Jason, Steve and Annie. I was not much involved in that aspect, except to help coordinate it within the overall project and to raise funding to support it.

I was more involved in presenting the VMT research at international conferences, such as ICLS and CSCL. For instance, we held a workshop on the Cereal Team data (from vol. #6) at the ICLS 2014 conference in Boulder, Colorado. Presenters included Stahl, Weimar, Oner, Cakir and Khoo. Participants included Sfard, Koschmann, Schwarz and Alterman. The data for the workshop data sessions is still available at http://gerrystahl.net/vmt/icls2014. There are videos there from the presentations. I was also invited to give presentations on VMT in Sweden and Norway, which are available as YouTube videos. These presentations led to the monographs and to the papers in this volume.

In particular, at the time of the workshop in Boulder, Diler Oner was a visiting researcher at VMT from Turkey. She had done her doctoral dissertation at Wisconsin on dynamic-geometry environments. She presented the data from Session 3. Oner and I later presented our analysis of that session at a workshop at CSCL 2015 in Gothenburg and then submitted an extended version to a math journal. When that journal did not respond with a review after about a year, we withdrew the article, extensively revised it, and submitted it to *ijCSCL*, where it was published. The *ijCSCL* version is republished here. It differs considerably—although does not contradict—the analysis of Session 3 in *Constructing Dynamic Triangles Together*. It reflects Oner's analytic approach, just as certain essays reflect Cakir's or Khoo's, which all fed into the VMT team's group cognition.

#14. Adventures in Dynamic Geometry

This volume reproduces four versions of VMT curriculum for introducing collaborative dynamic geometry using multi-user GeoGebra in the VMT collaboration environment. This includes the curriculum that was used by teams of students and by teams of teachers in the VMT project—as reported in the other volumes.

The curriculum reproduced here includes a wealth of activities for exploring geometry at beginner and intermediate levels. It also includes descriptions of the VMT and

GeoGebra software interfaces as well as guidance for working collaboratively online. Many of the activities are open-ended, inquiry-oriented and constructionist.

In this volume, four versions of VMT dynamic-geometry curriculum are reproduced, with the most recent first:

1. *The construction crew game*. This is a first version of a video-game-based style. It was subsequently modified for use during the corona virus pandemic, as presented in volume #21.
2. *Explore dynamic geometry together*. This version was based on the analysis and recommendations in *Translating Euclid* and in *Constructing Dynamic Triangles Together*. It is a revised version of the curriculum used in the sessions reported in those volumes. It shows a response to the issues raised in those analyses.
3. *Topics in dynamic geometry for virtual math teams*. This version had several advanced topics. It included tutorials as an appendix, which has been eliminated from this volume to save space.
4. *Dynamic-geometry activities with GeoGebra for virtual math teams*. This was the first major curriculum version for dynamic geometry in VMT. It was used in WinterFest 2013. It included tutorials in VMT and GeoGebra, interspersed with the activities.

This volume includes the most detailed descriptions of the VMT technology, particularly in its oldest curriculum presentation with tutorials on how to use the features of the VMT environment. The technology evolved significantly from year to year, but most of its changing features are described here.

#6. Constructing Dynamic Triangles Together: Development of Mathematical Group Cognition

This is a self-contained volume published by Cambridge University Press in the Learning in Doing: Social, Cognitive and Computational Perspectives series. It is a detailed report on a case study of collaborative learning using VMT with dynamic geometry.

The analysis of the student interaction not only follows the work and learning of the group step-by-step, but it also reflects on the nature of collaborative mathematical work. There is a rich discussion of many aspects of the CSCL interaction illustrated by the details in the transcript. The reflections on what is involved in learning to use GeoGebra is closely interwoven with the analysis of the team adopting group practices.

It is amazing how the team articulates in the chat each step of their collaborative learning of dynamic geometry. The analysis of their chat leads one naturally through each step in a logical, well-motivated way, richly supported by chat logs and screenshots.

While the analysis generally focuses on how chat postings respond to and elicit each other or display questions, proposals and agreements, sometimes they illustrate one student's perspective or role and then discuss how this fits into the group process.

It is striking how much the group advances in its ability to conduct dynamic-geometry problem solving from one session to the next. It is obvious that deep mathematical learning is taking place—at the group level. The group advances from naive visual thinking to numeric, conceptual and construction forms of thinking and discourse. The analysis of each chapter demonstrates clearly how progress is made by the group as a unit, with each participant contributing, maintaining shared attention and being jointly involved.

The analysis of collaborative learning takes place over multiple sessions. The traditional CA approach of looking at brief and isolated interchanges has to be extended to a hierarchy of response pairs, interchanges, topics, sessions and sequences of sessions.

The focus on the adoption of group practices is maintained consistently throughout the analysis. The analysis shows that dramatic learning can take place through this kind of CSCL approach. At the same time that the analysis provides impressive results, it also reveals the fragility and difficulty of such learning. The teacher's decision to suddenly move into a unit on transformations led to a setback for the group. In addition, certain other units were inadequately presented. So, the analysis shows the need for continuing redesign and adaptation of the curriculum to different settings and audiences.

The VMT curriculum of GeoGebra sessions was revised in response to the analysis in this volume. In addition to the PDF versions of updated curricula, two GeoGebra-book versions are available:

- Construct Dynamic Geometry Together: https://www.geogebra.org/m/gDNv2VCV
- The Construction Crew Game: https://www.geogebra.org/m/uegN2fXQ

For related details and discussion, see volumes #14 and #21.

#16. Editorial Introductions to *ijCSCL*

I was the founding Editor-in-Chief of the *International Journal of Computer-Supported Collaborative Learning* (*ijCSCL*) for ten years. Hans Spada and Friedrich Hesse first

suggested I take on this role following a contentious debate about the inclusion of CSCL within ISLS during CSCL 2003 in Bergen. I discussed the possibility with international colleagues during a workshop I hosted in Philadelphia during the start of the VMT Project. My Dean at Drexel agreed to provide a half-time editorial assistant to help me with the journal.

Looking back at the editorial introductions I wrote for each quarterly issue, I recall the process of soliciting promising manuscripts, guiding them through the peer-review process and then analyzing them for my intros. For each published paper, I tried to summarize its potential contribution to the CSCL research field—and often to hint at questions I would raise about their argument. Most quarters, I would try to bring out a theme of theoretical, methodological or practical centrality for CSCL, which unified that issue's papers.

In later years, I used the introductions as occasions to present some of my own views about the theory of CSCL, particularly as they related to the articles being published. As co-Editor, Friedrich Hesse always reviewed the introductions and prevented me from ignoring or offending alternative viewpoints. After he stepped back, the introductions were reviewed by and often co-written by the Executive Editors.

Looking over ten years of introductions to 40 issues and about 180 journal articles, I see the continuous focus on theory and on alternative methods of analysis. This later motivated the compilation of vol. #19. This reproduced twelve of my favorite ijCSCL articles. It also included two newly written overview chapters, which drew heavily from my editorial introductions.

Through the years, important themes from within the CSCL community are showcased and trends are documented in my intros to the quarterly journal issues. "Flash themes" of scripting, argumentation, tabletop interfaces, etc. were featured with introductory overview articles and sets of findings. In particular, the growing internationalization of the research community was emphasized with CSCL conferences in Asia and articles reporting on Asian research.

The "agonistic" nature of scientific fields—in which methodological controversies are negotiated through argumentation—is particularly clear. My own emphasis on the group unit of analysis and preference for conversation-analytic approaches was balanced by the views of my colleagues on the Editorial Board and by many of the articles we published representing contrasting perspectives.

#11. Essays in Philosophy of Group Cognition

This is where my abiding interest in philosophy explicitly meets my empirical study of group cognition in the VMT project. The volume has been updated to feature my

2021 publications, including the introductory essays of *Theoretical Investigations* and contributions to the *International Handbook of CSCL*.

It also includes my 2017 submission to *ijCSCL*, a "squib" or brief controversial statement. Since I was no longer the Editor-in-Chief of *ijCSCL*, I felt I could publish there and that the journal could reach the largest audience interested in my research. This article highlighted the concept of "group practices" as a focus for my research, particularly in my last book, *Constructing Dynamic Triangles Together*. I argued that the analysis of the adoption of group practices by student teams in VMT could provide a key focus for a new methodology of CSCL. That is, that collaborative learning could largely be viewed as the successive adoption of group practices. While others and I had previously discussed the use of social practices by small groups, the practices had not been viewed as often being defined at the small-group unit of analysis. It was generally implicitly assumed that the groups were simply using practices (e.g., linguistic or mathematical) that were broadly accepted in a larger community (e.g., English speakers or mathematicians). While *group practices* may often correspond or even be derived from social practices, it is crucial that they be proposed, negotiated, accepted and adopted at the group level. Furthermore, a focus on what group practices are or are not adopted by a group in a specific CSCL environment could be central to assessing and redesigning that environment.

This volume includes most of my papers that develop philosophical themes related to group cognition—except for the chapters included in volume #19. Although there is no systematic presentation of a philosophy of group cognition, central concepts of such a theory are not only explicated, but they are documented with analysis of interaction data from VMT sessions with small groups of students.

#18. Overview and Autobiographical Essays

The present volume provides personal background to my writings and these reflections from 2017-2021 on various aspects of the books or essays. My life and writings are documented with lists and timelines to help the reader follow the chronology of my activities and thinking in historical context.

The life and accomplishments projected by this collection of documents does not have the seamless flow of a traditional Bildungsroman, in which one grows into a well-defined success. However, it does seem to capture in some sense the interweaving of experiential paths that have contributed to who I have been.

#19. Theoretical Investigations

This is a self-contained book published by Springer in the Computer-Supported Collaborative Learning series #19. A number of theoretical papers originally published in *ijCSCL* by international CSCL researchers and labs are re-published here and commented on. They are supplemented by philosophical essays of mine and two new essays reflecting on the accomplishments of CSCL theory. This book includes key statements of my views on the philosophic foundations of group cognition, written during the last stages of the VMT Project.

In re-reading the compilation of essays, I am struck by how clearly they argue for a post-cognitive philosophy, rejecting many assumptions of earlier research focused on individual minds and mental representations. They also point to many dimensions of an approach to CSCL that differs from traditional educational research. The elements of a systematic philosophic foundation for group cognition seem to be present, although they are not necessarily presented as a rigid system. In some senses, the theory is post-modern as well as post-cognitive; the key factors and concepts are dialectically intertwined and subject to interpretation from situated perspectives.

#20 Works of 3-D Form

Taken as a whole, the volume indicates an approach to sculpture during my lifetime as I attempted to define a style appropriate to my position in history. My exploration of sculpture went back to prehistoric examples—from the earliest known figures to Greek, African and Latin American cultures. In addition, I studied the modern masters of sculpture: Rodin, Brancusi, Giacometti, Degas, Moore. Although my specialty was always wood carving, I also tried realistic modeling, ceramic sculpture, plaster and bronze cold casting with plastics. My carvings gradually evolved, becoming more complex and increasingly opening up the original log.

Volume #20 includes reflections on my philosophy of sculpture, tied to my own works and explorations.

When I returned home from two months away in Spring 2020, I was delighted to be back with my sculptures and amazed at how many I had created during my retirement. My recent wood carvings are arrayed in front of me in the living room and I was struck how different they are from one another. As I roamed through the house, I encountered more sculptures—wood, ceramic and cast. I enjoy living with my sculptures, as do most sculptors probably. I especially like to spend time sitting in front of my latest creation to better understand it.

#21 Dynamic Geometry Game for Pods

Volume #21 translates the learning of traditional Euclidean geometry into an engaging, stimulating and collaborative experience for online pods of students or for individual home-schooled students. The Game consists of several levels of play, each with a set of Challenges to do together online. Working through the challenges introduces students to dynamic geometry using the GeoGebra app.

The curriculum presented in this volume is a revision of the GeoGebra tasks used in the final field trials of VMT, as reported for instance in Volume 6. The analysis detailed in "*Constructing Dynamic Geometry Together*" suggested the approach, sequence of tasks and wording included in this Game.

At the end of this volume is an academic article that discusses how this game can be a model of curriculum for "blended learning," which combines teacher-led classroom instruction and student-centered collaborative learning.

Volume #21 was the final product of the VMT effort, motivated by the corona virus pandemic, which made computer-supported learning an urgent requirement for schooling around the world.

Part V. Detailed CV

Gerry Stahl

Professor Emeritus

College of Computing & Informatics

Drexel University

Philadelphia, PA, USA

Gerry@GerryStahl.net **(email)**

http://GerryStahl.net **(web)**

Education

	University of Colorado	
1996-99	Postdoctoral Research Fellow	educational technology; educational psychology
1993	Ph.D. in Computer Science	dissertation: "Interpretation in Design" certificate in cognitive science
1990	M.Sc. in Computer Science	exams in artificial intelligence (AI), theory of computation, programming languages
	Northwestern University	
1975	Ph.D. in Philosophy	dissertation: "Heidegger and Marx"
1971	M.A. in Philosophy	
	University of Frankfurt	
1973	Graduate study	critical social theory
	University of Heidelberg	

1968	Graduate study	continental philosophy
	Massachusetts Institute of Technology (MIT)	
1967	B.S. in Humanities & Science	mathematics & philosophy

Professional Experience

	Professor Emeritus
Sept. 2014-	College of Computing & Informatics, Drexel University, Philadelphia, PA
	Research Full Professor
2012-2014	College of Computing & Informatics, Drexel University, Philadelphia, PA
	Associate Professor with tenure
2008-2012	The iSchool, Drexel University, Philadelphia, PA
	Associate Professor
2002-2008	College of Information Science & Technology, Drexel University, Philadelphia, PA
	Visiting Research Scientist
2001-2002	BSCW Development Team, CSCW Department, GMD & Fraunhofer Institute Bonn, Germany
	Assistant Research Professor
1999-2001	Department of Computer Science and Institute of Cognitive Science, Boulder, CO
	Post-Doctoral Research Fellow
1996-1999	Center for LifeLong Learning & Design, Boulder, CO
	Director of Software R&D
1993-1996	Owen Research Inc., Boulder, CO
	Graduate Research Assistant
1991-1993	College of Environmental Design, Boulder, CO
	Intern Interface Developer

1990-1991	US West Advanced Technology, Denver & Boulder, CO
	Computer Science Instructor & Teaching Assistant
1989-1990	University of Colorado, Boulder, CO
	Executive Director
1985-1988	Community Computerization Project, Philadelphia, PA
	Researcher
1983-1985	Institute for the Study of Civic Values, Philadelphia, PA
	Neighborhood Development Planner
1979-1983	Southwest Germantown Community Development Corporation, Philadelphia, PA
	Community Organizer & VISTA Supervisor
1978-1979	Philadelphia Council of Neighborhood Organizations, Philadelphia, PA
	Volunteer Researcher
1977-1978	Philadelphia Unemployment Project, Philadelphia, PA
	Computer Systems Programmer/Analyst
1974-1977	Temple University, Philadelphia, PA
1970-1974	Northwestern University, Evanston, IL
1969-1970	Temple University, Philadelphia, PA
	Mathematics Teacher
1968	Bartram High School, Philadelphia, PA
	Research Intern
Summer 1966	Brown Bovari Cie, Baden, Switzerland
	Programmer Consultant
Summer 1965	Computer Center, University of Pennsylvania, Philadelphia, PA
	Installer
Summer 1964	Bell Telephone, Philadelphia, PA

Funded Research at Drexel

"DR K-12: Computer-Supported Math Discourse Among Teachers and Students." Supplemental award for participant support from the National Science Foundation Discovery Research K-12 (DR K-12) Program for $120,000 over 3 years starting September 1, 2013. PI: Gerry Stahl; with Arthur Powell (Rutgers-Newark), Stephen Weimar (Math Forum). Proposal: http://GerryStahl.net/publications/proposals/dr2013.pdf.

"DR K-12: Computer-Supported Math Discourse Among Teachers and Students." Award DRL-1118773 from the National Science Foundation Discovery Research K-12 (DR K-12) Program for $1,800,000 over 5 years starting September 1, 2011. PI: Gerry Stahl; with Arthur Powell (Rutgers-Newark), Stephen Weimar (Math Forum), Jason Silverman (School of Education), Mick Khoo, Sean Goggins, Andrea Forte, Jennifer Rode. Proposal: http://GerryStahl.net/publications/proposals/dr2011.pdf.

"Towards Optimization of Macrocognitive Processes: Automating Analysis of the Emergence of Leadership in Ad Hoc Teams." Award N000141110221 from the Office of Naval Research Collaboration and Knowledge Interoperability (CKI) Program for $909,029 over 3 years on May 17, 2011. PI: Carolyn Rosé (CMU); co-PIs: Gerry Stahl, Sean Goggins, Emily Patterson (Ohio State), Marcela Borge (Penn State), John Carroll (Penn State), Andrew Duchon (Aptima). Proposal: http://GerryStahl.net/publications/proposals/onr2011.pdf.

"Theories and Models of Group Cognition." Award N00014-10-1-0277 from the Office of Naval Research Collaboration and Knowledge Interoperability (CKI) Program for $675,000 over 3 years starting November 12, 2009. PI: Gerry Stahl; co-PIs: Sean Goggins, Stephen Weimar and Carolyn Rosé (CMU). Project description: http://GerryStahl.net/publications/proposals/onr2009.pdf.

"Dynamic Support for Virtual Math Teams." Award DRL-0835383. Funded by the National Science Foundation Advanced Learning Technologies (ALT) Program for $306,355 over 3 years starting August 1, 2009. PI: Gerry Stahl; co-PI: Stephen Weimar; Collaborative proposal with Carolyn Rosé (CMU). Project description: http://GerryStahl.net/publications/proposals/alt2008.pdf.

"Exploring Adaptive Support for Virtual Math Teams." Award DRL-0723580. Funded by the National Science Foundation Research and Evaluation on Education in Science and Engineering (REESE) Program for $50,000 over 1 year on August 1, 2007. PI: Carolyn Rosé (CMU); consultant: Gerry Stahl. Project description: http://GerryStahl.net/publications/proposals/reese2007c.pdf.

"Engaged Learning in Online Communities." Award SBE-0518477. Funded by the National Science Foundation Science of Learning Center Catalyst Program for $180,762 over 3 years on October 1, 2005. PI: Gerry Stahl; co-PIs: Sharon J Derry (Wisconsin); K. Ann Renninger (Swarthmore); Mary R Marlino (UCAR); Daniel D Suthers (Hawaii). Project description: http://GerryStahl.net/publications/proposals/slc2005.

"IERI: Catalyzing & Nurturing Online Workgroups to Power Virtual Learning Communities." Award IERI-0325447. Funded by the National Science Foundation IERI Program for $2,300,00 over 5 years on September 1, 2003. PI: Gerry Stahl; co-PIs: Stephen Weimar and Wesley Shumar. Project description: http://GerryStahl.net/publications/proposals/itr2003.

"Collaboration Services for the Math Forum Digital Library." Award DUE-0333493. Funded by the National Science Foundation NSDL Services Program for $450,000 over 3 years on August 15, 2003. PI: Gerry Stahl; co-PIs: Stephen Weimar and Wesley Shumar. Project description and proposal reviews: http://GerryStahl.net/publications/proposals/nsdl2003.

Grant Proposals at Drexel

"DR K-12: Computer-Supported Math Discourse Among Teachers and Students." Proposal for supplemental award for participant support to the National Science Foundation Discovery Research K-12 (DR K-12) Program for $120,000 over 3 years starting September 1, 2013. PI: Gerry Stahl; with Arthur Powell (Rutgers-Newark), Stephen Weimar (Math Forum). Proposal: http://GerryStahl.net/publications/proposals/dr2013.pdf.

"Towards Optimization of Macrocognitive Processes: Automating Analysis of the Emergence of Leadership in Ad Hoc Teams." Proposal to the Office of Naval Research Collaboration and Knowledge Interoperability (CKI) Program for $909,029 over 3 years on February 10, 2011. PI: Carolyn Rosé (CMU); co-PIs: Gerry Stahl, Sean Goggins, Emily Patterson (Ohio State), Marcela Borge (Penn State), John Carroll (Penn State), Andrew Duchon (Aptima). Proposal: http://GerryStahl.net/publications/proposals/onr2011.pdf.

"DR K-12: Computer-Supported Math Discourse Among Teachers and Students." Proposal DRL-1118773 to the National Science Foundation Discovery Research K-12 (DR K-12) Program for $3,500,000 over 5 years on January 6, 2011. PI: Gerry Stahl; co-PIs: Stephen Weimar, Jason Silverman, Mick Khoo, Sean Goggins; collaborative proposal with Rutgers, PI: Arthur Powell. http://GerryStahl.net/publications/proposals/dr2011.pdf.

"DR K-12: Computer-Supported Math Discourse Among Teachers and Students." Proposal DRL-1019723 to the National Science Foundation Discovery Research K-12 (DR K-12) Program for $2,924,147 over 5 years on January 6, 2010. PI: Gerry Stahl; co-PIs: Stephen Weimar, Jason Silverman, Mick Khoo, Sean Goggins; collaborative proposal with Rutgers, PI: Arthur Powell. Proposal: http://GerryStahl.net/publications/proposals/dr2010.pdf.

"DR K-12: Computer-Supported Math Cognition Through Shared Visualizations and Collaborative Discourse." Pre-Proposal DRL-6952834 to the National Science Foundation Discovery Research K-12 (DR K-12) Program for $2,924,147 over 5 years on October 5, 2009. PI: Gerry Stahl; co-PIs: Stephen Weimar, Jason Silverman, Mick Khoo, Sean Goggins; collaborative proposal with Rutgers, PI: Arthur Powell. Proposal: http://GerryStahl.net/publications/proposals/dr2009.pdf.

"Theories and Models of Group Cognition." Proposal to the Office of Naval Research Collaboration and Knowledge Interoperability (CKI) Program for $675,000 over 3 years on October 1, 2009. PI: Gerry Stahl; co-PIs: Sean Goggins, Stephen Weimar and Carolyn Rosé (CMU). Proposal: http://GerryStahl.net/publications/proposals/onr2009.pdf.

"Collaborative Knowledge Work in Social-Computational Systems." Proposal 6952103 to the National Science Foundation SES – Science, Technology and Society (SES) Program for $747,599 over 3 years on September 21, 2009. PI: Michael Khoo; co-PIs: Gerry Stahl, Eileen Abels, Sean Goggins, Jiexun Li. Proposal: http://GerryStahl.net/publications/proposals/ses2009.pdf.

"Multidisciplinary Curriculum Improvement and Innovation Using Software Defined Radio." Proposal to the National Science Foundation Course, Curriculum, and Laboratory Improvement (CCLI) Program (Phase I — Exploratory). Submitted for $200,000 over 2 years on May 21, 2009. PI: Kapil Dandekar (Drexel ECE); co-PI: Gerry Stahl (Drexel).

"Cyber-math: Developing mathematical reasoning through diverse collaborations." Proposal to the National Science Foundation Research and Evaluation on Education in Science and Engineering (REESE) Program. Submitted for $995,571 over 3 years on November 21, 2008. PI: Arthur Powell (Rutgers, Newark); co-PI: Gerry Stahl (Drexel). Proposal: http://GerryStahl.net/publications/proposals/cybermathREESE2008.pdf.

"Dynamic Support for Virtual Math Teams." Proposal 0835426 to the National Science Foundation Advanced Learning Technologies (ALT) Program for $306,355 over 3 years on April 25, 2008. PI: Gerry Stahl; co-PI: Stephen Weimar; Collaborative proposal with Carolyn Rosé (CMU). Proposal: http://GerryStahl.net/publications/proposals/alt2008.pdf.

"CDI-Type II: Social Computing and Data Mining in Support of Inquiry-based STEM Learning." Preliminary proposal to the National Science Foundation Cyber-Enabled Discovery and Innovation (CDI) Program. Submitted for $2,500,931 for 4 years on Jan. 1, 2008. PI: Xiaohua Hu; co-PIs: Gerry Stahl, Eileen Abels, Yuan An, Stephen Weimar.

"CDI-Type I: Building a world of math discourse using a mix of platforms." Preliminary proposal to the National Science Foundation Cyber-Enabled Discovery and Innovation (CDI) Program. Submitted for $797,303 over 3 years on Jan.8, 2008. PI: Werner Krandick (Department of Computer Science, Drexel University); co-PI: Gerry Stahl (IST, Drexel).

"DR-K12 R&D: STEM Inquiry Learning in the Internet Public Library and the Math Forum Model." Proposal to the National Science Foundation Discovery Research K-12 (DR K12) Program. Submitted for $2,160,260 for 5 years on Jan. 28, 2008. PI: Deliah Neuman; co-PIs: Gerry Stahl, Tony Hu, Michael Khoo, Yuan An.

"Increasing Helping Behavior in Collaborative Problem Solving in the Virtual Math Teams Environment." Proposal 735571 to the National Science Foundation Advanced Learning Technologies (ALT) Program. Submitted for $606,669 over 3 years on April 23, 2007. PI: Carolyn Rosé (CMU); co-PI: Gerry Stahl (Drexel) and co-PI: Stephen Weimar (Math Forum). Proposal: http://GerryStahl.net/publications/proposals/alt2007.pdf.

"Collaborative Research: Representations for Analyzing Collaborative Knowledge Construction in Technology-mediated Learning Environments." Proposal 723505 to the National Science Foundation Research and Evaluation on Education in Science and Engineering (REESE) Program. Submitted for $249,062 over 3 years on January 29, 2007. PI: Gerry Stahl; co-PI: Stephen Weimar (Math Forum) and Alan Zemel (Culture & Communication). Collaborative proposal with Daniel Suthers (Hawaii) for

$450,999 and Cindy Hmelo-Silver (Rutgers New Brunswick). Proposal: http://GerryStahl.net/publications/proposals/reese2007a.pdf.

"eMath: Diverse High School Students Developing Mathematical Reasoning through Online Collaboration." Proposal 723605 to the National Science Foundation Research and Evaluation on Education in Science and Engineering (REESE) Program. Submitted for $995,145 over 3 years on January 29, 2007. PI: Arthur Powell (Rutgers, Newark); co-PI: Gerry Stahl (Drexel) and Carolyn Maher (Rutgers). Proposal: http://GerryStahl.net/publications/proposals/reese2007b.pdf.

"Exploring Adaptive Support for Virtual Math Teams." SGER Proposal to the National Science Foundation Research and Evaluation on Education in Science and Engineering (REESE) Program. Submitted for $50,000 over 1 year on January 29, 2007. PI: Carolyn Rosé (CMU); consultants: Gerry Stahl and the Math Forum. Proposal: http://GerryStahl.net/publications/proposals/reese2007c.pdf.

"Optimizing Feedback for Eliciting Pedagogically Valuable Explanation in Collaborative Problem Solving." Proposal to the National Science Foundation Advanced Learning Technologies Program. Submitted for 2 years on May 15, 2006. PI: Carolyn Rosé (CMU); co-PIs: Stephen Weimar and Gerry Stahl. Proposal: http://GerryStahl.net/publications/proposals/alt2006.pdf.

"Engaged Learning in Online Communities." Proposal to the National Science Foundation Science of Learning Center Catalyst Program. Submitted for $180,762 over 1.5 years on January 14, 2005. Proposal 0518477. PI: Gerry Stahl; co-PIs: Sharon J Derry (Wisconsin); K. Ann Renninger (Swarthmore); Mary R Marlino (UCAR); Daniel D Suthers (Hawaii). Proposal: http://GerryStahl.net/publications/proposals/engaged/description.pdf.

"Interaction Math: An Informal Online Learning Collaboratory Led by the Math Forum @ Drexel." Proposal to the National Science Foundation Informal Science Education Program. Submitted for $2,933,126 over 5 years on January 6, 2005. PI: Gene Klotz (Math Forum); co-PIs: Gerry Stahl and Stephen Weimar. Proposal 0515544: Proposal: http://GerryStahl.net/publications/proposals/informal/description.pdf.

"Studying Online Collaborative Learning at the Math Forum." Proposal 337162 to the National Science Foundation ROLE Program. PI: Gerry Stahl; co-PIs: Scott Robertson and Wesley Shumar. Submitted for $1,790,931 over 3 years on June 1, 2003. Proposal: http://GerryStahl.net/publications/proposals/role2003.

"Collaboration Services for the Math Forum Digital Library." Proposal 333493 to the National Science Foundation NSDL Services Program. PI: Gerry Stahl; co-PIs: Stephen Weimar and Wesley Shumar. Submitted for $494,953 over 2 years on April 21, 2003. Proposal: http://GerryStahl.net/publications/proposals/nsdl2003.

"Group Knowledge Construction in Digital Library Communities." Proposal to the National Science Foundation NSDL Targeted Research Program. Submitted for $498,748 over 2 years on April 21, 2003. PI: Scott Robertson; co-PIs: Gerry Stahl and Susan Weidenbeck. Proposal 0333471: http://GerryStahl.net/publications/proposals/nsdl2003b.

"ITR: Catalyzing & Nurturing Online Workgroups to Power Virtual Learning Communities." Proposal to the National Science Foundation ITR Program. PI: Gerry Stahl; co-PIs: Stephen Weimar and Wesley Shumar. Submitted for $3,374,472 over 5 years on February 12, 2003. Proposal 0325447: http://GerryStahl.net/publications/proposals/itr2003.

"Educational Online Communities for At-Risk Youth." Proposal to foundations. Written for $88,000 over 1 year in December 2002. Proposal: http://GerryStahl.net/publications/proposals/nursing2003/nursing.doc.

Funded Research at Colorado (1997-2001)

Following are my grants as a post-doc and Research Professor from 1997-2001. Prior to that, I was involved with proposing, implementing and managing many city, state, federal & foundation grants from 1978-1984, and industry, state & federal grants from 1990-1996.

2001-2002: "Enhancing collaborative learning among researchers, practitioners, and students at CSCL 2002" (co-PI with Gerhard Fischer & Hal Eden) $49,860; 10/1/01-9/30/02. Sponsor: NSF. Proposal 124010.

2000-2001: "New Media to Support Collaborative Knowledge-Building: Beyond Consumption and Chat" (Principal Investigator) $19,752; Sponsor: Lab for New Media Strategy and Design. Proposal: http://GerryStahl.net/publications/proposals/media/media.pdf. Results: http://www-jime.open.ac.uk/00/stahl/

1999-2000: "Interoperability among Knowledge Building Environments" (Principal Investigator) $9,124; Sponsor: Center for Innovative Learning Technology / SRI. Proposal: http://GerryStahl.net/publications/proposals/cilt99/proposal.pdf. Results: http://GerryStahl.net/xml.

1998-1999: "Collaborative Web-Based Tools for Learning to Integrate Scientific Results into Social Policy" (co-PI with Ray Habermann at NOAA) $89,338; Sponsor: NSF. Results: http://GerryStahl.net/publications/conferences/1999/group99/.

1997-2000: "Conceptual Frameworks and Computational Support for Organizational Memories and Organizational Learning" (co-PI with Gerhard Fischer and Jonathan Ostwald) $725,000; Sponsor: NSF, Computation and Social Systems program. Proposal: http://GerryStahl.net/publications/proposals/omol. Results: http://GerryStahl.net/publications/journals/ai&society/AI&Soc.pdf.

1997-2000: "Allowing Learners to be Articulate: Incorporating Automated Text Evaluation into Collaborative Software Environments" (primary author and primary software developer; PIs: Gerhard Fischer, Walter Kintsch and Thomas Landauer) $678,239; Sponsor: James S. McDonnell Foundation, Cognitive Science in Education Program. Proposal: http://GerryStahl.net/publications/proposals/mcdonnell. Results: http://GerryStahl.net/publications/journals/ile2000/ile.pdf.

Grant Proposals at Colorado (1997-2001)

"Enhancing collaborative learning among researchers, practitioners, and students at CSCL 2002" (co-PI with Gerhard Fischer & Hal Eden) $49,860; Sponsor: NSF. Proposal 124010:

"New Media to Support Collaborative Knowledge-Building: Beyond Consumption and Chat" (Principal Investigator) Proposal to the Lab for New Media Strategy and Design. Submitted for $19,752 over 4 months on September 1, 2000. Proposal: http://GerryStahl.net/publications/proposals/media/media.pdf.

"Interoperability among Knowledge Building Environments" (Principal Investigator) $9,124; Sponsor: Center for Innovative Learning Technology / SRI. Proposal: http://GerryStahl.net/publications/proposals/cilt99/proposal.pdf.

"Collaborative Web-Based Tools for Learning to Integrate Scientific Results into Social Policy" (co-PI with Ray Habermann at NOAA) $89,338; Sponsor: NSF.

"Conceptual Frameworks and Computational Support for Organizational Memories and Organizational Learning" (co-PI with Gerhard Fischer and Jonathan Ostwald) $725,000; Sponsor: NSF, Computation and Social Systems program. Proposal: http://GerryStahl.net/publications/proposals/omol.

"Allowing Learners to be Articulate: Incorporating Automated Text Evaluation into Collaborative Software Environments" (primary proposal author and post-doc; PIs: Gerhard Fischer, Walter Kintsch and Thomas Landauer) $678,239; Sponsor: James S. McDonnell Foundation, Cognitive Science in Education Program. Proposal: http://GerryStahl.net/publications/proposals/mcdonnell.

"CSS: Perspectives on Collaboration: A Micro-ethnographic Study of Computational Perspectives in Computer Support for Collaborative Knowledge-Building at a Virtual Biology Laboratory." (Principal Investigator) Proposal 117630 to the National Science Foundation CSS Program. Submitted for $307,718 over 3 years on February 15, 2001. Proposal: http://GerryStahl.net/publications/proposals/css2001/css2001.pdf.

"ITR/PE (EHR): Information Technology for Distributed Collaborative Learning in a Virtual Biology Lab." (Principal Investigator) Proposal 112397 to the National Science Foundation ITR Program. Submitted for $472,610 over 3 years on January 18, 2001. Proposal: http://GerryStahl.net/publications/proposals/itr2001/proposal.pdf.

"ROLE proposal: The Role of Computational Cognitive Artifacts in Collaborative Learning and Education" (Principal Investigator) Proposal 106950 to the National Science Foundation ROLE Program. Submitted for $970,971 over 3 years on December 1, 2000. Proposal: http://GerryStahl.net/publications/proposals/role/role.pdf.

"ROLE Pre-proposal: The Role of Computational Cognitive Artifacts in Collaborative Learning and Education" (Principal Investigator) Proposal 96877 to the National Science Foundation ROLE Program. Submitted for $750,000 over 3 years on September 1, 2000. Encouraged full submission. Proposal: http://GerryStahl.net/publications/proposals/role/role2pre.pdf.

"ROLE Pre-proposal: Research on Collaboration in Learning and on Collaboration Technology in Education" (Principal Investigator) Proposal 83440 to the National Science Foundation ROLE Program. Submitted for $720,000 over 3 years on February 29, 2000. Encouraged full submission. Proposal: http://GerryStahl.net/publications/proposals/role/role1pre.pdf.

"ITR/IM: Perspectives on Collaborative Knowledge-Building" Proposal 82829 to the National Science Foundation ITR Program. (Principal Investigator) Submitted for $489,560 over 3 years on February 17, 2000. Proposal: http://GerryStahl.net/publications/proposals/itr_kbe/itr-kbe.pdf.

"IT Support for Knowledge-Building in Workgroups" (Principal Investigator) Proposal 82263 to the National Science Foundation CSS Program. Submitted for $399,190 over

3 years on February 15, 2000. Proposal: http://GerryStahl.net/publications/proposals/omol2000/OMOL.2000.pdf.

"Collaborative Research on Knowledge-Building Environments: Growing a National and International Research Community for Distance Learning Information Technology" (Principal Investigator) Proposal 77095 to the National Science Foundation. Pre-proposal submitted for $2,700,000 over 5 years on January 5, 2000. Proposal: http://GerryStahl.net/publications/proposals/collab/collab.pdf.

"Models for Organizing Collaboration: Ways of Supporting Distributed Learning" Proposal to Lotus Corporation. (Principal Investigator) Submitted for $68,000 over 1 year on January 18, 2000. Proposal: http://GerryStahl.net/publications/proposals/lotus/lotus.pdf.

"POW! Perspectives on the Web" (Principal Investigator) Proposal to the Colorado Advanced Software Institute (CASI). Submitted for $40,000 over 1 year on November 30, 1999. Proposal: http://GerryStahl.net/publications/proposals/casi.

"POW! Perspectives on the Web" (Principal Investigator) Proposal to Intel Corporation. Submitted for $190,000 over 3 years on October 18, 1999. Proposal: http://GerryStahl.net/publications/proposals/intel.

"**Research CyberStudio**" (Principal Investigator) Internal research concept paper. Proposal: http://GerryStahl.net/publications/proposals/cyberstudio.

Other Funded Grants

Philadelphia Council of Neighborhood Associations (1978-1979)

CETA grant for over $1,000,000 to establish training and neighborhood projects in energy conservation, recycling and weatherization.

Southwest Germantown Community Development Corporation (1979-1983)

Grants from 3 federal agencies, 2 state agencies, 7 city agencies, 7 corporations and 18 foundations—growing public support from $42,000 to $850,000 per year.

College of Environmental Design (1991-1993)

Colorado grants for **Phidias** and **Hermes.**

Owen Research (1993-1995)

NSF SBIR grants for **TCA**, **OptoNet** and **Crew** software projects.

(Lifetime grants funded approximately $14,000,000.)

Software Development Projects (1990-2015)

These are some of the systems I implemented in the past decade, either at the Fraunhofer Institute, the University of Colorado or as a consultant. Except where indicated, I was the primary developer and they resulted in working prototypes. Theoretical frameworks for most of them are presented in my book, *Group Cognition*. In some cases (e.g., **BSCL, Hermes, State the Essence** and **WebGuide**) they are being used in on-going field studies. **VMT** and **VMT-with-GeoGebra** are currently used in classrooms in the US, Turkey and Singapore as research prototypes.

VMT-with-GeoGebra (2011-2015): Extension of Virtual Math Teams software with multi-user version of GeoGebra to support collaborative problem solving of dynamic geometry by middle school and high school students. See: http://mathforum.org/vmt.

VMT (2003-2011): Virtual Math Teams is software to support collaborative problem solving of school mathematics by middle school and high school students who visit The Math Forum and join virtual math teams to discuss mathematics together. See: http://mathforum.org/vmt.

BSCL (2001-2003): Basic System for Collaborative Learning is a knowledge-building environment with personal and group perspectives based on BSCW, a web-based shared workspace. Funded by the European Union ITCOLE Project, it is being used in schools in several European countries. See: http://GerryStahl.net/publications/conferences/2002/criwg/Stahl_CRIWG_Paper.doc.

WebGuide (1998-2001): a knowledge-building environment with personal and group perspectives to facilitate collaboration and management of shared information spaces. Tried out in a middle school course and two graduate seminars. Supported by grants listed above. http://www-jime.open.ac.uk/00/stahl/.

InterOp (1999-2000): XML-based software to export data from incompatible knowledge-building environments in a standard format for display using XSL. Also used for client-server connection in WebGuide. Supported by CILT/SRI. http://GerryStahl.net/xml.

State the Essence (1997-1999): educational software using latent semantic analysis (LSA) to provide feedback to students summarizing a text. Used in middle school classrooms for three years and subjected to rigorous controlled experiments showing positive results, particularly for students having trouble understanding the given text. Supported by McDonnell Foundation. http://GerryStahl.net/publications/journals/ile2000/ile.pdf.

SimRocket (1998): a model-rocket simulation used with a middle school project team to analyze the effects of different rocket features. http://GerryStahl.net/publications/conferences/2001/ethnography2001/ethnography.pdf.

WebNet (1996-1997): a Web-based design environment for LAN design and management. Integrated a number of components for collecting, displaying, up-dating and discussing

domain knowledge and local knowledge about LAN configuration. Supported by ARPA. http://GerryStahl.net/publications/journals/ai&society/AI&Soc.PDF

CIE (1995-1996): a workplace documentation support system for ISO 9000 certification, using computational perspectives to support bottom-up documentation processes. Prototyped for a local software startup.

Tracker (1995-1996): an information management system for the Baltimore public schools to track services to students on welfare. I worked on interface components to an Access database as a consultant.

OptoNet (1994-1995): a software feedback system in LabView with real-time analog-to-digital data acquisition to stabilize holographic equipment during space flight. This software was tested on NASA zero-g simulation flights. Developed under a NASA SBIR II grant.

TCA (1994-1995): a digital library for teachers to exchange, discuss, and adapt curricular materials for constructivist classrooms. The Teachers' Curriculum Assistant anticipated approaches now being implemented years later. Prototyped under an NSF SBIR I grant. http://GerryStahl.net/publications/journals/c&e/C&E.PDF

Crew (1993-1995): a case-based reasoning system to model long-term astronaut missions, developed under contract with NASA in cooperation with psychologists at Houston astronaut support. Extends and integrates several AI techniques. Developed under a NASA SBIR II grant and delivered to NASA. http://GerryStahl.net/publications/journals/crew/crew.PDF

Hermes (1992-1993): a hypermedia substrate for design environments, including computational perspectives, persistent versions of drawings, user-programmable critic agents, extensible scripting language. This was my dissertation system to implement an environment for lunar habitat design. NASA subsequently used it for their *Space Station Freedom Man-Systems Integration Standards* design guidelines for spacecraft. Supported by CASI and Johnson Engineering. http://GerryStahl.net/publications/conferences/1990-1997/cogsci93/COGSC_TR.PDF

Phidias2 (1990-1992): an object-oriented rewrite of a hypermedia substrate for design rationale using contexts. This was an early version of Hermes. Supported by CASI and IBM.

InterView (1990-1991): an information management system for US West service providers to access data in multiple legacy database systems. I worked on C++ interface components to an object-oriented database management system as an intern.

Writings

Doctoral Dissertations

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http://GerryStahl.net/publications/dissertations/computer or http://GerryStahl.net/elibrary/tacit.

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Books

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Stahl, G. (2013). *Translating Euclid: Designing a human-centered mathematics*. San Rafael, CA: Morgan & Claypool Publishers. Synthesis lectures on human-centered informatics series #17. 221 pages. Web: http://GerryStahl.net/elibrary/euclid. Doi: http://dx.doi.org/10.2200/S00492ED1V01Y201303HCI017.

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Stahl, G. (2015). *Essays in computer-supported collaborative learning*. Philadelphia, PA: Gerry Stahl at Lulu. Gerry Stahl's assembled texts #9. 200 pages. Web: http://GerryStahl.net/elibrary/cscl.

Stahl, G. (2015). *Essays in group-cognitive science*. Philadelphia, PA: Gerry Stahl at Lulu. Gerry Stahl's assembled texts #10. Web: http://GerryStahl.net/elibrary/science.

Stahl, G. (2015). *Essays in philosophy of group cognition*. Philadelphia, PA: Gerry Stahl at Lulu. Gerry Stahl's assembled texts #11. Web: http://GerryStahl.net/elibrary/theory.

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Publication Statistics

H-number (the number of publications, *h*, with more than *h* Google Scholar citations)

5/6/07	15
9/9/07	16
2/25/08	17
6/25/08	19
9/25/08	22
5/23/09	23
10/20/09	24
1/29/10	25
3/19/10	26
8/1/10	27
6/16/11	28
10/25/12	30
4/1/14	31
2/1/15	32
6/15/15	33
7/8/16	35
3/31/17	36
6/20/17	37
10/27/17	38
3/4/18	38
8/25/18	38
3/16/20	40
4/3/21	42
9/29/21	44
12/31/21	45

Number of publications per year

1976-1993	22
1994	0
1995	3
1996	5
1997	3
1998	12
1999	7

2000	6
2001	3
2002	10
2003	10
2004	11
2005	17
2006	30
2007	24
2008	19
2009	36
2010	26
2011	30
2012	22
2013	28
2014	14
2015	19
2016	5
2017	5
2018	4
2019	1
2020	4
2021	9
total	385

Academic Community Service

International Journal of Computer-Supported Collaborative Learning (ijCSCL)
Executive Editor 2016 – present
Founding Editor-in-Chief 2004 – 2015
International Society of the Learning Sciences (ISLS)
Board of Directors, ex officio, 2003-2015
Web & Communications Committee Chair 2002-2005
Founding Board 2002-2003
Founding Committee 2002
The CSCL Community of ISLS
Executive Board member, 2003-2014
Founding Steering Committee member, 2002
Journal of Computers in Education (JCE)
Journal of the Global Chinese Society for Computers in Education
Editorial Board 2014 - 2015

Journal of the Brazilian Computer Society (JBCS)
Editorial Board 2007 - 2015
European Journal of School Psychology (EJSP)
Advisory Board 2001 - 2015
Journal of Interactive Media in Education (JIME)
Editorial Board 2000 - 2007
International Conference of the Learning Sciences (ICLS '16), Singapore, June 2016
Scientific Program Committee
Computer Support for Collaborative Learning (CSCL'15), Gothenburg, Sweden, June 2015
Program Committee
Steering Committee
Co-Chair for Special Events
International Conference of the Learning Sciences (ICLS '14), Boulder, Colorado, June 2014
Scientific Program Committee
Computer Support for Collaborative Learning (CSCL'13), Madison, WI, USA, June 2013
Program Committee
Steering Committee
European Computer Support for Cooperative Work (ECSCW 2011), Aarhus, Denmark, September 2011
Program Committee
Computer Support for Collaborative Learning (CSCL'11), Hong Kong, China, June 2011
Program Co-Chair
Program Committee
Steering Committee
IEEE, ACM, IFIP International Conference on Collaboration Technologies and Systems (CTS 2011), May 2011
Doctoral Dissertation Colloquium Co-Chair
Organizing Committee
Computer Support for Collaborative Learning (CSCL'09), Rhodes, Greece, June 2009
Program Committee
Workshops Chair
ACM Conference on Groupware (GROUP 2009), Sanibel Island, FL, May 2009
Program Committee
International Conference on Computers in Education (ICCE '08), Taipei, Taiwan, Nov 2008
Program Committee
Keynote Speaker
International Conference of the Learning Sciences (ICLS '08), Utrecht, Netherlands, June 2008

Scientific Program Committee

International Conference on Computers in Education (ICCE '07), Hiroshima, Japan, Nov 2007

Program Committee

Computer Support for Collaborative Learning (CSCL'07), New Brunswick, NJ, June 2007

Program Committee

Steering Committee

Workshops Chair

International Conference on Computers in Education (ICCE '06), Beijing, China, Nov 2006

Program Committee

Workshops Co-Chair

International Conference on Computers in Education (ICCE '05), Singapore, Nov 28-Dec 2, 2005

Program Committee

Doctoral Consortium Faculty

Conference on Learning in Communities, State College, PA, Aug 15-17, 2005

Program Committee

Computer Support for Collaborative Learning (CSCL '05), Taipei, Taiwan, June 2005

Program Committee

Steering Committee

Workshops Chair

International Workshop on Groupware (CRIWG '04), San Jose, Costa Rico, September 2004

Program Committee

International Conference of the Learning Sciences (ICLS '04), Santa Monica, California, June 2004

Program Committee

Communities & Technology Conference (C&T '03), Amsterdam, Netherlands, August 2003

Program Committee

Computer Support for Collaborative Learning (CSCL '03), Bergen, Norway, June 2003

Program Committee

Steering Committee

Workshops Co-chair

International Conference of the Learning Sciences (ICLS '02), Seattle, Washington, October 2002

Program Committee

International Workshop on Groupware (CRIWG '02), La Serena, Chile, September 2002

Program Committee

Doctoral Consortium Faculty

Computer Support for Collaborative Learning (CSCL '02), Boulder, Colorado, January 2002

Program Chair
Program Committee
Steering Committee
Proceedings Editor

International Conference on Groupware (Group '01), Boulder, Colorado, October 2001

Local Arrangements Chair

International Workshop on Groupware (CRIWG '01), Darmstadt, Germany, September 2001

Doctoral Consortium Faculty

Service at IST/Drexel

Representative to Faculty Senate (2007/08, 2008/09, 2011/12)
Faculty Search committee (2008/09, 2010/11)
Faculty Research Leadership Committee (2010/11)
Faculty committee on Admissions and Financial Aid (2007/08)
Faculty committee on College Strategic Futures (2004/05, 2006/07, 2007/08, 2008/09, 2010/11, 2011/12)
Faculty committee on Curriculum (2005/06 & 2006/07)
Organizer of the Research & Teaching lecture series (2003/04)
Faculty committee on the Doctoral Program (2002/03, 2010/11)

Honors

Keynote Talk at CSCL 2011 in Shanghai: Stahl, G. (2011). Keynote: Past, present and future of CSCL. Presented at the Knowledge Building Summer Institute 2011 and CSCL2011 post-conference at the South China Normal University, Guangzhou, China. Web: http://GerryStahl.net/pub/cscl2011guangzhou.pdf , http://GerryStahl.net/pub/cscl2011guangzhou.ppt.pdf , http://youtu.be/SLC8Ew8J9Hg , http://youtu.be/nrGfYnLRPgg , http://youtu.be/0rh-3FnjLp4 .

Keynote Talk at CSCL 2011 in Beijing: Stahl, G. (2011). Keynote: CSCL research: Two case studies. Presented at the CSCL 2011 post-conference at the Beijing China Normal School, Beijing, China. Web: http://GerryStahl.net/pub/cscl2011.pdf , http://GerryStahl.net/pub/cscl2011stahl.pdf , http://GerryStahl.net/pub/cscl2011beijing_keynote.ppt.pdf .

Invited Talk at CSCL 2011 in Shanghai. Stahl, G. (2011). Invited talk: China and the future of CSCL. Presented at the CSCL 2011 post-conference at the East China Normal University, Shanghai, China. Web: http://youtu.be/zyQaN3c4c4g .

Invited Talk at CTS 2011: Stahl, G. (2011). *A view of computer-supported collaborative learning research today*. Invited talk presented at the international conference on Collaboration Technologies and Systems (CTS 2011). Philadelphia, PA. Web: http://GerryStahl.net/pub/cts2011.pdf.

Opening Keynote at ICCE 2009: Stahl, G. (2009). *How I view learning and thinking in CSCL groups*. Keynote talk presented at the International Conference on Computers and Education (ICCE 2009). Hong Kong, China. Web: http://GerryStahl.net/pub/icce2009keynote.pdf.

Best Paper at ICCE 2005: Stahl, G. (2005). *Sustaining online collaborative problem solving with math proposals*. Paper presented at the International Conference on Computers and Education (ICCE 2005). Singapore, Singapore. Proceedings pp. 436-443. Web: http://GerryStahl.net/pub/icce2005.pdf & http://GerryStahl.net/pub/icce2005ppt.pdf.

Opening Keynote at CRIWG 2005: Stahl, G. (2005). *Groups, group cognition & groupware*. Keynote talk presented at the Groupware: Design, Implementation, and Use, 11th International Workshop, CRIWG 2005, Porto de Galinhas, Brazil. Racife, Brazil. Proceedings pp. 1-16. Springer. Web: http://GerryStahl.net/pub/criwg2005.pdf & http://GerryStahl.net/pub/criwg2005ppt.pdf. Doi: http://dx.doi.org/10.1007/11560296_1.

Opening Keynote at DeLFI 2003: Stahl, G. (2003). *The future of computer support for learning: An American/German delfic vision*. Keynote talk presented at the First Conference on e-Learning of the German Computer Science Society (DeLFI 2003). Munich, Germany. Proceedings pp. 13-16. Web: http://GerryStahl.net/publications/presentations/delfi.

Million Dollar Club at Drexel University 2003: Grantsmanship award for NSF NSDL and IERI grants totaling $2,750,000 awarded in first year at Drexel. Only Million Dollar Club recipient in iSchool history.

First Prize at Drexel/IST Research Day 2005 and 2006 and 2007: Set of four posters on VMT Project each year.

Scientific Advisory Committees

NSF cyber-learning grant: Connecting Idea Threads Across Communities for Sustained Knowledge Building, SUNY Albany, New York: Scientific Advisory Board Consultant (2016 – 2018)

Knowledge Practices Lab (K-P Lab), Centre for Networked Learning and Knowledge Building, University of Helsinki, Finland: International Advisory Board Scientific Consultant (February 2006 – 2011)

Knowledge Media Research Centre (KMRC), Tübingen, Germany: Scientific Advisory Board Consultant (March 2006 – 2010)

Learning Sciences Lab, National Institute of Education (NIE), Nanyang Technological University, Singapore: International Advisory Board (December 2005)

Cyber-Enabled Design Research to Enhance Teachers' Critical Thinking Using a Major Video Collection on Children's Mathematical Reasoning, University of Wisconsin at Madison (October 2008 – 2012)

Collaborative Cardiac Surgery Research Project, Hospital of the University of Cincinnati, Cincinnati, OH: Interdisciplinary Research Team (February 2004 – 2006)

Visiting Researchers

Bogazici Universitesi (Istanbul, Turkey): Diler Öner (February 1, 2014 – June 30, 2014)

University of Windsor (Windsor, Canada): Dragana Martinovic (December 1, 2012 – December 31, 2013)

Developer: Anthony Mantoan (April 1, 2010 – August 31, 2014)

Post-Doc: Murat Cakir (June 1, 2009 – October 1, 2009)

Post-Doc: Baba Kofi A. Weusijana (April 1, 2009 – March 31, 2010)

Developer: Jimmy Xiantong Ou (May 14, 2009 – October 1, 2009)

Post-Doc: Alan Zemel (October 1, 2004 – October 1, 2007)

National Central University (Taipei, Taiwan): Fei-Ching Chen (August 1, 2008 – June 30, 2009)

University of Bergen (Bergen, Norway): Weiqin Chen (February 1, 2007 – December 31, 2007)

Royal Institute of Technology (Stockholm, Sweden): Henry Rodriguez (October 1, 2006 – June 1, 2008)

Dawson College (Montreal, Canada): Elizabeth Charles (October 1, 2005 – March 1, 2006)

Fraunhofer Gesellschaft IPSI (Darmstadt, Germany): Martin Mühlpfordt (June 1 – September 1, 2006)

Fraunhofer Gesellschaft IPSI (Darmstadt, Germany): Martin Wessner (June 15 – September 15, 2005)

Politechnica University (Bucharest, Romania): Stefan Trausan-Matu (February 1 - August 1, 2005)

Open University of Catalonia (Barcelona, Spain): Fatos Xhafa (September 1, 2004 – February 27, 2005)

Open University of the Netherlands (Heerlen, Netherlands): Jan-Willem Strijbos (February 1 – June 30, 2004)

PhD Students

Drexel University (Philadelphia, PA): Murat Cakir (chair), Johann Sarmiento (chair), Nan Zhou (chair), Ramon Toledo (chair), Joel Eden (committee), Ilene Litz Goldman (committee), James Waters (committee), Yolanda Jones (committee), Nora McDonald (committee), Trish Grieb-Neff, Wanda Kunkle, Deb LaBelle, Debra McGrath, Peter Miller, Craig Nelson, Eric Poole, Alan Black

University of Sydney (Australia): Roberto Martinez-Maldonada (external reviewer)

University of Oslo (Norway): Crina Damsa (external reviewer opponent)

University of Hong Kong (China): ZHAO Ke Coco (external reviewer)

Nanyang University (Singapore): WEE Juan (external reviewer)

Fraunhofer Gesellschaft IPSI (Germany): Martin Mühlpfordt (committee)

University of Bergen (Norway): Frode Guribye (external reviewer opponent)

Open University of the Netherlands (Netherlands): Jan-Willem Strijbos

University of Chile (Chile): Cesar Alberto Collazos (committee)

University of Dortmund (Germany): Andrea Kienle

University of Colorado (Boulder, CO): Rogerio dePaula, Elizabeth Lenell, Alena Sanusi, David Steinhart (committee)

Courses Taught

INFO 782 **Topics in Informatics**, online (Fall 2011, Fall 2010)

INFO 782 **Topics in Informatics**, graduate level (Spring 2009, Fall 2011)

INFO 780 **Computer-Supported Collaborative Learning**, graduate level (Spring 2004/05, Spring 2003/04)

INFO 616 **Social and Collaborative Computing**, online (Spring 2012)

INFO 611 **Design of Interactive Systems**, online (Winter 2011, Winter 2012)

INFO 610 **Analysis of Interactive Systems**, online (Spring 2011)

INFO 610 **Analysis of Interactive Systems**, graduate level (Winter 2003/04)

INFO 608 **Human-Computer Interaction**, graduate level (Winter 2007/08, Winter 2004/05, Spring 2002/03)

INFO 608 **Human-Computer Interaction**, online (Spring 2008, Spring 2006/07, Winter 2002/03, Fall 2002/03)

INFO 405 **Computer-Supported Cooperative Work**, online (Winter 2011)

INFO 405 **Social and Collaborative Computing**, junior/senior level (Winter 2012)

INFO 310 **Human-Computer Interaction**, junior/senior level (Winter 2008/09, Winter 2006/07, Spring 2005/06, Winter 2004/05, Winter 2003/04, Spring 2002/03)

INFO 110 **Human-Computer Interaction**, freshman/sophomore level (Spring 2008, Winter 2005/06)

INFO 105 **Information Users**, freshman/sophomore level (Spring 2009)

Data Analysis Seminar, 20 quarters

Independent Study, 36 student-quarters

Research Experience, 70 student-quarters

Topics in CSCL, Fall 2000, University of Colorado

Research in CSCL, Fall 1999, University of Colorado

Readings in CSCL, Spring 1999, University of Colorado

Non-Academic Community Service in Philadelphia

Germantown Residents Acting to Conserve Energy (Chairman)
Belmont Village Community Association (Founder and Board 1978/80)
Network for New Music (Treasurer)
SGA Federal Credit Union (Treasurer)
Jewish Children's Folkshul (Treasurer)
SGCDC Economic Development Advisory Committee (Secretary)
Neighborhood Employment and Economic Development Skills Program (Board 1979/81)
ABC Child Development Center (Board 1981/82)
Philadelphia Clearinghouse for Funding Resources (Board)

Community Women's Education Project (Advisory Board)
Fractal Arts Project (Computer Artist)
Philadelphia Area Computer Society (Member)
Colorado Progressive Coalition

PHILADELPHIA AREA CLIENTS OF COMMUNITY COMPUTERIZATION:

Center for Social Policy, Temple University
Women Organized against Rape
Bucks County Housing Group
Aid For Friends -- Meals on Wheels
Opportunities Industrialization Center of Philadelphia
Neighborhood Development Center
Women's Way -- foundation for women's groups
Gray Panthers
Nutritional Development Services, Archdiocese of Philadelphia
SGA Federal Credit Union
West Philadelphia Federal Credit Union
Community Accountants
Philadelphia Council of Agencies
Utility Emergency Service Fund
Nationalities Service Center
CHOICE
Southwest Germantown CDC
Philadelphia Jobs in Energy Project
Nonprofit Energy Management Center
United Communities of Southeast Philadelphia
Genesis II -- drug rehab home
Philadelphia Energy Conservation Agency
Philadelphia Department of Welfare
LaSalle University Center for Social Issues
Jewish Children's Folkshul
VoiceOver House -- sound studio
Shalom Center
ASPIRA
1199C Hospital Workers Union
Philadelphia Unemployment Project
Institute for the Study of Civic Values
Schuylkill County Head Start
Germantown Head Start

Providence Head Start
Centro Clavier Community Center

An electronic version of this Resume with live links is available at:

http://GerryStahl.net/home/resume.html and in pdf format for printing at:

http://GerryStahl.net/home/resume.pdf.

Last revision: September 1, 2018.

Notes & Comments