



KSTF Knowles Science Teaching Foundation

Improving Science & Mathematics Teaching www.kstf.org

The Vision

Since our inception in the late 90's, our vision for the Knowles Science Teaching Foundation (KSTF) has been to improve the number and quality of science and mathematics teachers in the nation's high schools. This goal is important to the nation's future and it is becoming universally recognized by President Bush, the National Academies, and many others: the teaching of science and mathematics is critical. We believe that we are succeeding in that goal and that the successes that KSTF is making can guide many other efforts focused on improving high school science and mathematics teaching.

Summary Programs

Over the past 6 years Dr. Collins and the KSTF staff have established the Teaching Fellowship Program, the core program of the foundation that provides us assurance of quality in four areas.

Selection: KSTF has a proven process for the selection of superior candidates who become KSTF Teaching Fellows and science and mathematics teachers.

Mentoring: We have several mentoring processes that prepare the fellows for careers in the real world of high school teaching.

Retention: KSTF support results in an improved retention of teachers; the reported national drop out rate is between 18 to 20% while the KSTF rate is about 7%.

Effectiveness: Where our KSTF Fellows teach, there are indicators we are watching that student participation and achievement increase. Other indicators of effectiveness include KSTF Fellows increased leadership roles in their schools and districts.

Since 2002, we have inducted nearly 125 teaching fellows. During the 2006-07 academic year over 10,000 students were taught by KSTF Teaching Fellows. Our immediate goal is add about 40 new fellows each year.

In addition to the core program, that is, the development of our Teaching Fellows, we have two supporting programs: research on how to improve science and mathematics teaching, and a biennial conference series that provides for leaders in science and mathematics education to interact, discuss, and publish efforts on improving science and mathematics teaching.

Conclusion

Since KSTF is endowed, the KSTF staff does not need to divert their attention from the support of teaching fellows to raising money. We are confident that KSTF is making a difference in the landscape of high school

science and mathematics and with additional research and evaluation we are adding numerical evidence to the anecdotal evidence of our success. From this evidence we are beginning to develop principles for the preparation and support of high school science and mathematics teaching that can have influence far beyond KSTF.





C. Harry Knowles

ande

Janet Knowles

putton

KSTF remains focused on three major programs: the Teaching Fellowship, the Young Scholars Research Fellowship and the Conference Series. In this report you will read about the Teaching Fellows who began their fellowship in June, 2007 as well as activities and achievements of some of the Teaching Fellows who began the fellowship from 2003 to 2006. In addition, you will learn about the research being conducted by the Young Scholars. Since 2007 was the in-between year for the conference, the KSTF Conference focus was on publishing the proceedings of the previous conference and planning for the next.

While these three programs synergistically reinforce one another, there were other events that influence the efforts of KSTF to increase the number of high quality high school science and mathematics teachers in the United States. In anticipation of conducting a program evaluation in the near future, throughout 2007, experts in program evaluation including Evan Leach from the University of Pennsylvania, Frances Lawrenz from the University of Minnesota and Mark St. John from Inverness Research, Inc., visited with KSTF staff to share their knowledge and experience. During the summer of 2007, we held a joint meeting of the Science Advisory Committee and the Mathematics Advisory Committee as well as representatives from the Young Scholars proposal review panel and participants from the first conference. It was decided to disband the multiple advisory groups and create a new KSTF Advisory Committee. KSTF is deeply indebted to the individuals who served on these committees.

As we continue to grow, so does the KSTF staff. In 2007, Gene Fiorini joined us as a Mathematics Program officer, Kelly O'Donnell joined us to assist with Technology and Data Management and June Belinky joined us to provide administrative support to the Mathematics Teaching Fellowship. However, Midge Cozzens and Jeff Kralik both moved on to other endeavors.

And as we continue to grow, we need additional space. In June, we moved into the addition of the building at 1000 N. Church Street in Moorestown.

Also significant was the decision at a meeting of the Board of Trustees in late fall that we changed the KSTF fiscal year to correspond more closely to our teaching fellowship year, so beginning in 2008, the KSTF fiscal year will be June 1 to May 31.

It is exciting to see KSTF grow from an idea to a reality, with programs that are focused and are making a difference. Everyone associated with KSTF is grateful to Janet and Harry for their vision and generosity.



Ingelo Caller

Angelo Collins, Ph.D.

"To me, being a KSTF fellow means being part of a learning community of educators that are as passionate and dedicated as I am about providing a meaningful education to the next generation of learners."

- Mele Sato, 2007 Math Fellow

The Teaching Fellowship Program is the cornerstone and heart of KSTF. KSTF begins with the assumption that teaching high school science and mathematics is a profession. As professionals, KSTF Teaching Fellows develop theoretical frameworks that inform their decisions as teachers, complement this theory with the wisdom that comes from practical experience and reflection on that practice and commit that theory and wisdom to the service of student understanding. Such teaching is complex and intellectually demanding. Because KSTF believes that it takes a lifetime to develop as a professional, the fellowship is renewable for up to five years, with the intention of getting young teachers started on the path to excellence.

One of the keys to the success of the KSTF Teaching Fellowship Program is the selection process. Applicants initially submit essays, transcripts and letters of recommendation. Selection consists of a rigorous review of written applications, telephone interviews and a weekend of events including interviews by a team consisting of a teacher, scientist or mathematician, and science or mathematics educator.

The Teaching Fellowship is awarded and renewed based on four criteria:

- 1. Exceptional understanding of content. While courses, grades and experiences are indicators of content understanding, teaching fellows are able to discuss their content with experts and generalists alike.
- 2. Commitment to teaching. Teaching fellows understand that teaching requires continuous improvement and are committed to that improvement on good days and bad. They also understanding that adolescents have learning needs different from both children and adults.
- 3. Ability to teach. Whether teaching or in other activities, fellows demonstrate abilities in each of the four acts of teaching: planning, instruction, assessment and reflection.
- 4. Potential for leadership. Leadership takes many forms and teaching fellows demonstrate that they have and continue to influence the lives of others while holding themselves to the highest standards of integrity.

There is a frequently quoted statistic that 50% of all teachers leave the profession within the first three years of teaching. The benefits of the KSTF Teaching Fellowship are intentionally designed to counter what these individuals report are the reasons they leave. One reason people report they leave is isolation. KSTF strives to create a collegial community of like-minded teachers. Regular meetings of fellows, online discussions, funding for site-based mentors and program officers with experience in teaching are elements of this community. KSTF also provides opportunities to meet other dedicated teachers beyond KSTF through membership in a subject-specific professional teaching association with the opportunity to attend that association's annual meetings and during summer professional development opportunities.

In 2007, 27 new teaching fellows joined the more than 50 current teaching fellows.



2007 Cohort of Mathematics Teaching Fellows



Cli ord Cheng was six years old when his family moved to the United States from Hong Kong. Acutely aware of the educational opportunities given him, Cliff wants to give

back to the community. Cliff earned a Bachelor of Science in Applied Mathematics from the University of California at Berkeley and recently completed his Master of Arts in Education through Stanford University's Teacher Education Program. He is currently teaching at his alma mater, San Lorenzo High School in San Lorenzo, California.



Timothy Converse left Utica, New York, to earn a Bachelor's degree in mathematics from the University of Pittsburgh. His interest in mathematics applications was why he earned

a master's degree in oceanography from the Scripps Institute of Oceanography in La Jolla, California. That experience along with tutoring high school students convinced him that teaching mathematics was a good choice. He has since returned to Pittsburgh where he is working on his secondary certification at Duquesne University.



Chris Davis is from a small town in Washington state where he participated in the Running Start Program. At the University of Washington, he was convinced to change

his career plans from engineering to teaching mathematics. Immediately after earning a Bachelor's of Arts in Mathematics he enrolled in UW's graduate education program. This spring he will earn a master's degree in Secondary Certification and is now teaching at Sammimish High School in Mountlake Terrace, WA.



Kimberly Conner was influenced by a middle school teacher whose love of mathematics inspired her. Her interests continued to develop through three years of home

schooling and as an elementary school aid in her home state of Georgia. It wasn't until enrolling at Mercer University that she discovered the rewards of teaching as a supplemental instructor in precalculus and calculus. She is now enrolled in Vanderbilt University's secondary education program and working toward her high school certification.



Carmen Davis grew up in Memphis, Tennessee in a home where education was important. Carmen's interest in mathematics was influenced by her parents. She majored in

mathematics at Hampton University with the intention of eventually earning a PhD. As a Math Lab tutor she was inspired to "make a commitment" at the high school level. She is currently at Boston College pursuing certification as part of a M.Ed. in secondary mathematics education through the Donovan Urban Teaching Scholars Program.



Nina Gilberte has been passionate about mathematics since her childhood in her native Madagascar. She immigrated to the United States as an adult where, while

raising her family, she earned a bachelor's degree in mathematics at Occidental College in Eagle Rock, California. Having subsequently earned a Master's of Teaching at Occidental College, she is applying her life-experience to teaching high school mathematics at Eagle Rock High School using an applications-based approach.



Zachary Herrmann's commitment to teaching is rooted in his belief that we "have a stake in the future of our society" and that future is the country's young people.

From his native Illinois he earned a bachelor's degree in mathematics from the University of Illinois, Urbana-Champaign. He then enrolled in Stanford University's Teacher Education Program earning a master's degree and secondary certification. He is now empowering his students at Fremont High School in Sunnyvale, California.

"KSTF supports the intellectual and emotional growth of new educators by working together on shared goals and through consistent communication."

- Chris Davis, 2007 Math Fellow



Lindsay Konell excelled in mathematics at Council Rock High School in Holland, Pennsylvania. In middle school she was one of four girls chosen to participate in an event

sponsored by Penn State University, Abington celebrating young women excelling in mathematics. This was one experience that convinced Lindsay that her future was in teaching mathematics. With a bachelor's degree from Penn State University and a master's degree from the University of Delaware, she will begin teaching in fall 2008.



Andrew McNeice's interest in mathematics and physics emerged in high school where he excelled in both AP Calculus and AP Physics. At the University of South Carolina

he earned a bachelor's degree in mathematics and a Master's of Teaching in Secondary Education. While an undergraduate at USC he developed motion formulas and three-dimensional models as a research assistant for the Virtual Test Bed Project. He now uses these skills to teach high school at Dutch Fork High School in Irmo, SC.



Jera Mendenhall has fond memories of Davidson High School in Lexington, NC. She had wonderful teachers who made mathematics interesting by incorporating extracurricular

activities into their lessons. With undergraduate and graduate degrees in mathematics and statistics from North Carolina State University, Jera realized she enjoyed teaching her NCSU students. She will be teaching this spring as a newly certified teacher with a second master's degree in NCSU's Math Education & Licensure Program.



Mele Sato was born and raised in Honolulu, Hawaii where she attended Punahou High School. Her work at the Keck Observatory on Mauna Kea drew her to mathematics.

Harvey Mudd College in Claremont, California was a logical choice to earn a bachelor's degree in mathematics with a concentration in music. An interest in autism and social equity led her to the Kayne Eras Center and the University of California, Santa Barbara where she is enrolled in the graduate Education and Certification program.



Julianne Wenger has fond childhood memories of her interest in learning. As a native Ohioan there was no question she would attend Ohio State University. Majoring in

material science and engineering, she realized her first love was teaching after completing an internship at the end of her sophomore year at the Wright Patterson Air Force Base. Changing her major she graduated with a degree in mathematics and is now enrolled in Ashland University's graduate teacher licensure program.



Jessica Uy's parents stressed the importance of a good education, even moving the family to Irvine, California to take advantage of a better school district. Majoring in

both mathematics and American studies at the University of California, Davis placed Jessica in a unique position to teach mathematics from a social perspective. Having earned a master's degree from Stanford University's Teacher Education Program she is now teaching at Fremont High School in Sunnyvale, California.

"For me, KSTF has proven to be my greatest resource as a first year teacher, not only for academic and financial reasons, but for the support each cohort o ers. By sharing personal experiences, advice and resources, this group of fellows constantly reminds me why I am in this profession in the first place, and why I should stay."

- Cathy Tempest, 2006 Science Fellow

2007 Cohort of Science Teaching Fellows



Angela Bice was born in Arcata, California. Having traveled widely in the Army, Angie hopes that she can share her knowledge and broaden her students' horizons. Angie

earned her bachelor's degree in geology from the University of Wyoming. In 2007, she received her master's degree in environmental engineering at Oregon State University where she is currently pursuing her teaching credential.



Ayan Chatterjee was born in Ottawa, Canada, and earned his bachelor's degree in molecular biology from Princeton University. Ayan understands that all students

do not have equal access to educational opportunities and is committed to helping improve the quality of urban education. He is teaching at Bartram High School in Philadelphia, Pennsylvania, and is working on his teaching credential and master's degree through the University of Pennsylvania and Teach for America.



Erica Helfer was raised in Raleigh, North Carolina, and received her bachelor's degree in chemistry at Duke University. She is currently working on her Master of Arts

in Teaching at Duke. Erica's inspiration to teach science came from both her father and a high school teacher who showed her how engaging and interesting science can be.



Erin McCamish was raised in Three Oaks, Michigan, and received her bachelor's degree in interdisciplinary physics from the University of Michigan. She participated in

the Teaching Opportunities in Physical Sciences (TOPS) program in Boston where she worked with high school students teaching energy and heat concepts. She is currently enrolled in Syracuse University's teacher education program.



Heather Myers grew up in Kingwood, Texas, and received her bachelor's degree in oceanography from the United States Naval Academy. While in the navy, Heather

participated in the Partnership for Excellence program that provided her with an opportunity to serve as a mentor in elementary schools. Heather began her teaching credential at the University of California, San Diego, where she is earning a Master of Education and a single subject credential in geosciences.



Kate McCann grew up in rural Maine, and received her bachelor's degree in biomedical physics from Northeastern University in Boston. While at Northeastern, Kate worked

with inner-city high school students which strengthened her desire to become a teacher. She is working on her Master of Science in Teaching at the University of Maine where she is preparing a thesis on developing a model that characterizes the "a-ha" moments in math and physics learning.



Katherine Rosok grew up outside Minneapolis, Minnesota, and earned her bachelor's degree in geology from Colorado College. In December, Kate completed

her licensure program through the University of St. Thomas in Minneapolis, Minnesota. Kate's passions involve environmental service, teaching English language learners and the industrial and community applications of earth science.



Kathleen Markiewicz grew up in Grand Haven, Michigan. She earned bachelor's degrees in chemistry and physics from Kalamazoo College. Kate began her teaching credential

through the Boston Teacher Residency program and earned her master's from the University of Massachusetts, Boston. She is a first year physics and chemistry teacher at Boston Latin School in Boston, Massachusetts. In 2007, Kate was awarded a NSTA Amgen Associate Fellowship.



Michelle Karp grew up in an Air Force family and lived in the Netherlands, southern California, and England before moving to Ohio when she was 12. She received her bachelor's

degree in chemistry from Miami University in Oxford, Ohio. Michelle is currently pursuing a master's degree in secondary education at Boston College where she is working on a science curriculum that helps urban students relate science to what they know about science in their communities.



Patricia Schaefer is a native of Medford, Wisconsin. She attended Marquette University where she earned honors degrees in chemistry and mathematics. She received her

master's in chemistry from the University of Wisconsin and a teaching credential from Concordia University. Patti was selected as a K-Through-Infinity Fellow while in graduate school, which enabled her to work with students and strengthen her commitment to teaching. She is a first year teacher at Mineral Point High School in Mineral Point, Wisconsin.



Nimisha Ghosh Roy was raised in Bellevue, Washington, and earned her bachelor's degree in earth and space science with a minor in physics from the University of

Washington. Growing up, Nimisha was exposed to a variety of school settings which caused her to recognize the difference in available education opportunities for students in her home state. Her desire now is to change that through teaching. She is currently working on her teaching credential and a master's degree in teaching at Seattle Pacific University.



Rosalind Echols grew up in Seattle, Washington. She received her bachelor's degree in mechanical engineering from Princeton University where she recognized and was

disheartened by disparities in resources and opportunities available to students. Rosalind is enrolled in a master's and teaching credential program through Teach for America and the University of Pennsylvania and is teaching her second year at University City High School in Philadelphia, Pennsylvania.



Tafaya Ransom earned her bachelor's degree in chemical engineering at Hampton University. While at Hampton, Tafaya became involved with the National Society of Black

Engineers. Through this program, she was able to work with high school students in the areas of math and physics. She received a master's degree in chemical engineering from the University of Michigan. Tafaya worked for Merck before enrolling in the Master of Arts in Teaching program at the University of Michigan.



Victor Chen was raised in Appleton, Wisconsin, and earned bachelor's degrees in chemical engineering and chemistry at the University of Wisconsin, Madison. His

interest in science was peaked by winning the state Science Olympiad in the 9th grade. He went on to earn his doctorate in biomedical engineering at the University of Michigan, at which time he also recognized his desire to teach while coaching a local Science Olympiad team. He is a first year teacher at Thurston High School in Redford, Michigan.

Cohort Meetings

Each Cohort of teaching fellows meets twice a year, in spring and fall. Teaching Fellows Meetings are opportunities for fellows to meet with experts in science and mathematics teaching and to study their own teaching. The meetings always include some social event. Cohort meetings contribute to building the community of professional teachers that is envisioned by KSTF. In 2007 the following meetings were held.







- □ March: The 2006 Math Cohort met with Fran Arbaugh in St. Louis, MO to consider how students learn and the use of mathematical tasks.
- □ March: The 2005 Math Cohort met with Henry Kepner in Charleston, SC to discuss diverse learners using the book .
- □ March: The 2006 Science Cohort met with Randy Bell in Arlington, VA to consider the nature of science with implications for teaching.
- □ March: The 2005 Science Cohort met with Cathy Stokes and Damon Jansen in San Francisco, CA to consider writing to assess student understanding.
- □ April: The 2003 and 2004 Science Cohorts met together with Tristan de Frondeville in St. Louis, MO to study Project Based Learning.
- □ April: The 2002 Science Cohort met with the KSTF staff in Tyringham, MA to discuss their experiences during the entire teaching fellowship and proposals for continued activities as alumni.
- □ October: The 2006 Math Cohort met with Bob Moses and his staff in Miami, FL, to discuss beliefs about mathematics, education and equity.
- □ October: The 2005 Math Cohort met with Tom Evitts in San Francisco, CA to discuss differentiated instruction.
- □ October: The 2007 Science Cohort met with Randy Bell and Cathy Cabe Trundle in Arlington, VA to discuss the nature of science in order to deepen their understanding of science.
- □ October: The 2006 Science Cohort met with Larry Dukerich and Kelli Gamez Warble in Tempe, AZ to explore the Modeling Curriculum developed at the University of Arizona.
- □ October: The 2005 Science Cohort met with Page Keely in Boston, MA to discuss formative assessment.
- □ November: The 2004 Science Cohort met with Amy Germundson in Arlington, VA to discuss differentiated instruction.
- □ November: The 2003 Cohort met with Emily van Zee in Portland, OR to discuss the role of teacher as researcher.

Summer Meeting

One of the highlights of the year for KSTF is the summer meeting, held each year at the end of July. In 2007, this three-day meeting was held in Chicago. All teaching fellows from every cohort attend, as well all the young scholars. Each morning, the teaching fellows meet in their cohort groups to discuss an activity KSTF calls lesson study. Modeled on the Japanese practice, during KSTF lesson study, fellows plan instruction, review videos and student work samples and redesign the lesson. Afternoons are spent in working sessions conducted by the fellows. Some of these work sessions are on topics related to teaching, such as assessment practices; some are on KSTF benefits, such as how to write a good grant for teaching materials; others are on topics that promote leadership such as how to write an article for publication. Also in the afternoons, the young scholars present workshops for the teaching fellows. In 2007, KSTF was pleased to welcome George "Pinky" Nelson, who spoke with passion and humor on his experiences in space and the need for excellent teachers.

"The existence of KSTF and its fellows not only show that we acknowledge that math and science education needs to change and become a top priority for our society but also show that we are actively doing something about it."

- Andrew Lee, 2005 Math Fellow



Cohort Highlights

Although phrased in different ways, KSTF is regularly asked how we know we are making a difference. We can provide some numbers, such as a retention rate under 10%, or over 10,000 students being taught by KSTF Teaching Fellows in any given year. Instead, we want to highlight the accomplishments of some current teaching fellows. Choosing one teacher from each cohort allows us to provide some detail on their accomplishments, but making the decision of which fellow to highlight was a difficult choice.

Bradford Hill

2003 Science Teaching Fellow

Southridge High School, Beaverton, OR

At the end of his second year teaching, Bradford was invited to be part of the Oregon Teacher Scholars, a partnership between school districts and universities in the Portland area that provides professional development opportunities and supports teacher researchers. The program is supporting Bradford in an EdD program at Portland State University, which reinforces his ongoing efforts to investigate research questions in his own classroom. Also through the Oregon Teacher Scholars, Bradford joined a focus group of teachers who are helping to revise the Oregon Science Standards. The new standards will clearly articulate grade-level expectations for student participation in science as a process, add an engineering design component, and unite the K-12 science curriculum via overarching themes such as "function and design." Bradford believes that he and the other teachers made significant contributions to this development process, which he attributes in part to his familiarity with the \boxtimes \boxtimes \boxtimes and the sets of standards that KSTF emphasizes. After the new standards receive public feedback, Bradford hopes that members of the focus group will be able to contribute to the final draft.



Heather Buskirk

2004 Science Teaching Fellow

Johnstown High School, Johnstown, New York

Heather teaches four levels of physics at Johnstown High School, including NY Regents Physics and Advanced Placement Physics for seniors, all of which engage students in scientific inquiry. Her commitment to inquiry teaching has inspired other science teachers at her school, who now work collaboratively to engage students in inquiry in multiple science courses. In the fall of 2007, she and another teacher from the JHS Science Department led a workshop for the Hamilton/Fulton/Montgomery Counties Superintendent's Conference Day on teaching science with inquiry, focusing on how to turn a traditional laboratory activity into an inquiry-based investigation. In the spring of 2007, during Heather's second year of teaching, she was asked to design a new physical science course for underprepared freshman. This physical science course, which Heather began teaching in the fall of 2007, is designed to build students' reasoning skills and confidence with the process of science and prepare them for science and mathematics courses required by New York state. Heather even manages to engage students who aren't enrolled in physics with projects like a cardboard canoe competition that the entire school attends and student-built model roller coasters displayed in the school hallways.

"I am constantly challenged to improve my practice by the other fellows in KSTF, because no one here is satisfied with the status quo"

- Zach Ronneberg, 2004 Science Teaching Fellow



Charley Sabatier

2005 KSTF Science Teaching Fellow

Mount Vernon High School, Alexandria, Virginia

Charley's background in physics and his commitment to reform-based teaching practices have helped him create classes which give priority to scientific evidence. Charley encourages his students to use data that they collect, together with their prior knowledge, to discuss and develop scientifically accurate understandings. He believes that "students learn science by doing science" and that "whoever does the talking does the learning." Many of the teaching strategies Charley uses he learned when he attended a five-week workshop on Physics by Inquiry conducted by the Physics Education Group at the University of Washington during the summer of 2007. In addition to the work that he does in his classes, Charley routinely brings what he has learned at KSTF Fellows' meetings back to his school to share with his colleagues because he feels the weight of responsibility to share his growing knowledge with other teachers. During 2007, he mentored a first-year physics teacher, served as the science representative for the Faculty Advisory Committee, became the head of the physics department, and presented work at a professional meeting. Additionally, Charley initiated the District of Columbia-Maryland Fellows (DCMF) group for KSTF Teaching Fellows living in and around Washington, DC.



DeVita Lane

2005 KSTF Mathematics Teaching Fellow Richland Northeast High School, Columbia, South Carolina

DeVita has created a mathematical environment in her classroom that stimulates students' critical thinking skills. Through the use of mathematical manipulatives DeVita orchestrates lively class discussions using an inquiry-based approach that leads students to discover the concepts that lie at the heart of solving mathematical problems. Together with another RNHS mathematics teacher, DeVita is pioneering a team-teaching approach to test a new curriculum that is being implemented at her school. Teams of students work through applications-based activities while DeVita and her co-instructor move about the room directing and guiding the students through the process. Their success has influenced the school's administration to expand the new approach beyond this one class.



Matt Randall

2006 Science Teaching Fellow Lindbergh High School, Renton, WA

Matt Randall attended a three-week workshop in June 2007 at Arizona State University to learn about the modeling curriculum for high school physics, and then returned to ASU with the rest of the 2006 science cohort for a two-day workshop in October that focused on teaching energy. A first-year physics teacher at Lindbergh High School in Renton, WA, Matt has been implementing the modeling curriculum into his physics and physical science classes since the beginning of the school year. Matt's department has worked together this year in a professional learning community, focusing on ways to teach energy coherently and consistently throughout various science courses. After attending the October KSTF workshop at ASU, Matt facilitated two workshops for his department this fall. In these workshops, Matt introduced his colleagues to the modeling curriculum, polishing their own understanding of the content, familiarizing themselves with instructional strategies like whiteboarding, and adapting some of the modeling materials to match vocabulary on Washington's state science assessment. They also compiled a guidebook on energy for use in Earth science, biology, chemistry and physics classes.



Nicole Pack

2006 Mathematics Teaching Fellow

High Tech High International, San Diego, California

Nicole teaches at High Tech High International, a project-based charter school located in Point Loma in San Diego, CA. She teaches Math 3, an integrated course that spans topics from Algebra II through Pre-Calculus while incorporating project work. She works closely with a biology teacher and two humanities teachers that also serve the same group of 95 students. Nicole continually seeks ways to engage her students in thinking and reasoning about mathematics. Nicole is beginning to take on a variety of leadership positions. She attended the KSTF orientation meeting to help new fellows become familiar with the fellowship. At her school, she co-led an immersion trip to Japan with one other teacher and 25 students as part of the school's desire to create a community of global citizens. Nicole is committed to growing as a professional teacher. She has sought out many opportunities that extend her thinking and understanding of mathematics, students, and teaching, such as attending the National Council of Teachers of Mathematics Annual Meeting.

Young Scholars Research Fellowship Program

The KSTF Young Scholars Research Fellowships are intended to support pre-tenure faculty, or those with doctoral degrees in similar positions outside a university, as they begin a career studying topics related to the recruitment, preparation, induction, mentoring and retention of high school science and mathematics teachers. Young Scholars come from a variety of disciplinary backgrounds and bring research interests in theory, practice and policy. The two-year fellowship awards are \$110,000 each plus participation in three meetings. Young Scholars also present their work to the teaching fellows during the summer meeting.

Young Scholar 2007-2009

Image: Scho



Ravit Duncan, Ph.D. Assistant Professor Graduate School of Education Rutgers University

Based on the assumption that teachers' knowledge for teaching a specific discipline - their pedagogical content knowledge (PCK) - is essential for teaching, Dr. Duncan's research focuses on how PCK develops over time during teacher preparation and how the various elements of such a preparation program contribute to the development of PCK. She is developing and studying a learning progression of the PCK that deals with using evidence for building scientific models of phenomena and developing argumentation skills. She will focus on the developing PCK of teachers in a two-year master's level program and the effects of five separate courses and field experiences. Her research will provide insights about the influence of various activities and experiences in teacher preparation on the development of teacher knowledge and practice as well as reveal patterns in the development of PCK.

Young Sch	nolar 20	07-2	2009							
<i>f</i> ⊠		\boxtimes				\boxtimes	XX Th	ff and	\boxtimes	\boxtimes
R		E	rin Furta	k, Ph.D.						
		A	ssistant F	Professor						
		Sc U	chool of I niversity	Education of Color	n ado, Boulder					

Based on the assumptions that evolution, although frequently not taught or taught well, is the unifying idea of biology, Dr. Furtak's research focuses on teacher and student understanding of evolution. The study has three phases: 1) the development of a continuum of ideas about evolution from naïve to scientifically accepted, with pre- and post-tests used to assess both student placement on this continuum and teachers pedagogical content knowledge of these ideas; 2) a pilot test of student and teacher knowledge when a curriculum derived from the continuum of understanding evolution is used; and 3) a control-group experimental study to determine the effects of the continuum on teachers' pedagogical content knowledge. The study will inform both teachers' understanding of evolution and the development of pedagogical content knowledge for beginning science teachers.



Young Scholar 2007-2009 ⊠ ⊠ ⊠ ⊠ ⊠ ⊠ ⊠ ⊠ ⊠ ⊠



April Luehmann, Ph.D. Assistant Professor Margaret Warner Graduate School of Education and Human Development University of Rochester

Based on the assumption that participation in a teacher preparation program that was intentionally designed to enable teachers to teach for science literacy should have an impact on their teaching practices, Dr. Luehmann's research is intended to demonstrate the effectiveness (and limitations) of a such a program, Get Real! The study focuses on using multiple sources to create extended profiles of graduates of the program, including the extent of their commitment to teaching for science literacy and ways in which their instructional practices do and do not align with those taught in the program. This rigorous empirical study will help researchers understand what kinds of challenges are encountered by novice science teachers and what teacher preparation programs and support systems can be put in place to support their growth into effective science teachers.

"The KSTF fellowship gave me a much needed jump start to what I hope to be a very promising career. This opportunity has contributed to my work as a scholar in so many ways: through time and resources, insight and direction, inspiration and commitment – all of which contribute to my becoming the type of productive and passionate scholar I hope to become."

- April Luehmann 2007 Young Scholar

Young Scholar 2006-2008 \boxtimes \boxtimes



Laurie Rubel, PhD

Assistant Professor of Education (recently promoted to Associate Professor) Brooklyn College of the City University of New York

Based on the assumption that students' motivation and learning will increase if the students see the role of mathematics in events in their lives beyond school, Dr. Rubel's research focuses on the question of how mathematics teachers can be prepared for such teaching. She is meeting with a group of teachers during a summer institute and the academic year as these teachers implement instructional practices intentionally designed to enable urban students from a variety of cultural and/or linguistic backgrounds to understand mathematics. She is coming to understand the processes of teacher learning about teaching high school mathematics in urban settings and the effects of a professional community-of-learners model on beginning secondary mathematics teachers.

Young Scholar 2005-2007 \boxtimes \boxtimes



Mark R. Olson, PhD

Assistant Professor of Education

Neag School of Education University of Connecticut

Based on the assumption that high quality science teaching requires a deep understanding of subject matter, Dr. Olson's research focuses on identifying just how much content knowledge is needed and what the nature of that knowledge is. He has approached this question through three concurrent and interacting lines of investigation. The first investigation is about the representations of science that teachers use during instruction. This investigation allows him to better understand the relationship between instructional representations and the subject matter knowledge of teachers. The second investigation focuses on developing open-ended assessment items to investigate the subject matter knowledge for teaching. From these two activities, he is building a framework to further examine teachers' subject matter knowledge.

Board of Trustees



C. Harry Knowles Founder & President



Janet H. Knowles Founder & Treasurer



Scott McVay Member

Program Sta



Angelo Collins, Ph.D. Executive Director



Rachel Foster, Ph.D. Program Officer, Science



Nicole Gillespie, Ph.D. Senior Program Officer, Science



Roseanne Rostock Program Officer, Science



Eugene Fiorini, Ph.D. Program Officer, Mathematics

Jennifer Mossgrove, Ed.D. Program Officer, Mathematics



Je Kralik Research Associate

Administrative Sta



Donna A. Ansell Administrative Assistant



Kelly O'Donnell Data/Media Technology Manager



June Belinky Administrative Assistant



Lisa Rosenberg-Howard Bookkeeper



Beth DiGesare Administrative Assistant



Laraine Venuto Executive Assistant

Janet H. & C. Harry Knowles Foundation, Inc.

Statement of Revenue and Expenses January 1, 2007-December 31, 2007 — Modified Cash Basis

Revenue

Contributions	-
Interest comein	1,686,299
Net realized gains on sales of investments	-
Net unrealized appreciation on sales of investments	<u>4,804,670</u>
Total revenue	6,490,969

Functional Expenses	2004	2005	2006	2007	
Program services	951,257	1,346,641			
Teaching Fellowships			1,699,307 245,994 116,939 291,100 12,260		2,248,933 301,517 55,960 293,008 37,968
Research					
Conference					
Supporting services	54,270	110,759			
Trustees' expenses	6,000	2,054			
Taxes					<u>1,652,137</u>
Total functional expenses	962,677	1,459,454	2,365,6	00	<u>4589,523</u>
Increase in unrestricted net assets					1,901,446
Unrestricted net assets as of the beginning of year					
Net unrestricted assets as of the end of			82,867,031		

Statement of Assets, Liabilities and Net Assets - Modified Cash Basis December 31, 2006

Assets

Current assets

Cash and cash equivalents	\$ 13,721,102
Investments	67,973,876
Prepaid federal excise tax	107,863
Property and equipment, net of accumulated depreciation	843,710
Deposits	220,480
Total assets	\$ <u>82,867,031</u>

Liabilities and net assetsCommitments and ContingenciesTotal liabilities and net assets\$ 82,867,031

Prepared by Pressman, Ciocca, & Smaith | Certified Public Accountants

"The single greatest thing that KSTF has done to keep me in this profession has been to treat me like a professional. When others view me as a professional, I view myself as a professional, and the quality of work that goes on inside my classroom increases.

I have seen improvements in my classroom. I am able to point to data that show my students are wrestling with scientific thought. I often hear from former students who assure me they are prepared for college.

I hear from parents who are amazed that their child voluntarily speaks about chemistry over the dinner table. I don't know how to quantify the emotional impact that being valued has had upon my teaching, but I can guarantee that feeling like a professional has resulted in my students learning more science."

- Ben Buehler KSTF Teaching Fellow Alumnus

Knowles Science Teaching Foundation 1000 N. Church St. Moorestown, New Jersey 08057 856.608.0001 | www.kstf.org

