AETS Newsletter

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President's Message

The Psychology of Subject Matter

AETS as an organization has entered into a collaboration with the Annenberg/CPB Channel in the design and production of a video series to present science content for elementary teachers. The membership will soon receive a mailing announcing the details of this project and how members can get involved. This is the first time that the Annenberg/CPB Math and Science Project has established a collaboration with an entire organization.

There are two major tasks for AETS. The first is to decide what should be the science content of the eight, one-hour video presentations. Second is to select content consultants and on-camera participants. The first task is the most challenging and the topic of this message.

It is noteworthy that AETS as an organization is participating in other collaborations that are national in scope and target the expertise of AETS members. The Certification and Accreditation in Science Education (CASE) Project under the leadership of Steve Gilbert is a collaboration with NSTA for writing standards for science teacher education. AETS is also collaborating with AAAS in proposing a national professional development program for science teacher educators and scientists for the purpose of producing scientifically literate teachers. This project is led by John Staver.

Each of these national projects is looking to AETS members to address the critical question: What is the scope and character of knowledge that science teachers should have and be able to act upon in their classrooms?

This problem is related to but distinct from the question of, What discipline-based science knowledge should teachers know? To answer this question, college science faculties select knowledge that supports understanding of the relevant science disciplines. Science teacher educators select science knowledge both in terms of its importance to the disciplines and its appropriateness to the psychology of the learner.

This selection process is cognizant of the difference between the psychological order of knowledge and the logical order of knowledge. Synthesis of knowledge across domains as well as across different aspects of schooling is characteristic of expert knowledge in teaching. Lee Shulman (1986) has coined the term "pedagogical content knowledge" to stand for a synthesis of knowledge where teachers blend knowledge of psychology, subject matter, curriculum and schooling. Pedagogical content knowledge results in the selection of appropriate science content and teaching strategies to promote student learning. (Julie Gess-Newsome and Norm Lederman have edited a forthcoming AETS monograph on the topic of pedagogical content knowledge.)

One of the major conceptual tasks of science teacher educators in helping teachers develop pedagogical content knowledge is to describe the type of discipline-based science knowledge that teachers should know. This is not a straight forward task. Should teachers be strictly taught selected segments of academic disciplines? Or maybe it is more important to focus on the science knowledge of ordinary people in

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everyday life? As Shulman and Quinlan (1996) put it "who is the better model for mathematical understanding, a professor of mathematics or a gambler estimating the odds on a football game?" (p. 400). Science teacher educators are challenged to describe teacher learning in science that will transfer to classroom instruction.

The science knowledge of the literate citizen as outlined by AAAS in *Science for All Americans* is an important first step. However, the scope and character of science knowledge used by teachers of 16 year-olds in departmentalized classrooms will not be the same science knowledge as those who teach all subjects to eight year-olds. Further, the Standards and Benchmarks have focused attention on the critical importance of understanding scientific inquiry and the history and nature of science to the science literate citizen. When and in what contexts do teachers learn about science as an historical and distinctly human enterprise? (Bill McComas has edited the newly published AETS monograph on this topic titled *The Nature of Science*.)

Although AETS members face the question of what is appropriate science content at every level of teacher education, the collaboration with The Annenberg/CPB Channel focuses attention squarely on elementary teacher education in science. More than other levels, the scope and character of elementary teacher science knowledge has been difficult to define and for that reason as well as others it has been difficult to sustain delivery as part of their college education. Shulman and Quinlan (1996) have labeled the general problem of identifying appropriate subject matter content as the "comparative psychology of school subjects." Elementary teachers are an important, special case of this more general problem.

Elementary teachers are an "important" case because, like the ordinary citizen in everyday life, science forms a part of a general background of knowledge upon which they act. So the problem of what science knowledge they should know must recognize that for much of their work (like the citizen's everyday life) science plays a tangential or supporting role in interpreting events and deciding on appropriate courses of action. For instance, what is the character of science knowledge that aids in the teaching of reading or composition?

Elementary teachers are a "special" case because they are positioned at an early stage in children's education in scientific understandings. The scientific understandings held by elementary teachers must interact with a pedagogical content knowledge heavily influenced by developmental characteristics of children. Over used and poorly understood descriptive metaphors such as "watering down" or "moving from simple to complex" do not elucidate the content knowledge needed for elementary science teaching. Science teacher educators must think in terms of a psychology of subject matter that supports conceptually-based science instruction led by a teacher with broad, general education.

As a guide to the type of content that elementary teachers should know and be able to act upon in their teaching, I have turned to the work of Mary Budd Rowe (1973) in her classic book *Teaching Science as Continuous Inquiry*. She poses six categories for guiding teacher questioning to support inquiry (p. 353-354). I propose that any science knowledge that does not support teacher discourse with children in one or more of these categories is not relevant to elementary teacher education. The categories are:

Problem identification: Students actively examine a situation for problems to investigate or evaluate what constitutes a scientific problem.

Information; facts; observations; data: Students discuss, organize, or evaluate relevant previous knowledge (both personal constructions and conventional science knowledge); observations and data made while investigating a situation.

Procedures; skills; design: Students describe, demonstrate, or evaluate a sequence of procedures or the design used during an investigation.

Inference; empirical relations: Students use evidence as the basis for stating relationships between variables or for evaluating whether a stated relationship can be deduced from evidence.

Interpretation; explanation: Students link at least two ideas in sequence in order to explain how a system works or to compare two systems based on data. Students evaluate an explanation based on the ideas used.

Application: Students interpret new experiences using concepts they already have and concepts developed through inquiry-based instruction. Students generate new examples for a concept or evaluate the application of a concept to a new situation.

Science teacher educators are at the center of a complex process of selecting and modifying scientific knowledge that is informed by the psychology of teaching and the psychology of learning. The expertise of AETS members is a valuable resource in science education in this important task.

Rowe, M. B. (1973). *Teaching science as continuous Inquiry*. New York: McGraw-Hill.

Shulman, L. S., & Quinlan, K. M. (1996). *The comparative psychology of school subjects. In D. C. Berliner & R. C. Calfee (Eds.). Handbook of educational psychology.* New York: Simon & Schuster Macmillan.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*, 4-14.

Elections (Ballot is on page 9)

The following are the biographies of the candidates for the elections of President-Elect, Directors at Large, and members of the Election Committee.

President-Elect Candidates

Ron Bonnstetter

In recent years AETS has grown from several extremely active regional organizations and a perceived subsidiary of NSTA, to a dynamic and powerful national voice with its own convention, journals and greatly expanded presence on national policy boards. We should reflect and take pride on these accomplishments, for only a few years ago we were asking "If we have our own convention, who will come?" "Will members pay for yet another journal?" "Should the journal price be part of our dues?" "What will NSTA think?" The results of these decisions have been exciting. For many of us, the AETS conferences are the most stimulating and pertinent annual meetings we attend. Every time block offers something relevant to our professional lives and that the journals generate new ideas and program changes with each new issue.

Even though our organization has formed a solid foundation, AETS is entering an even more challenging era. In order to meet these emerging challenges, AETS leadership must be visionary, forge new partnerships, and gain professional and political voice in new areas if we hope to continue to grow and expand our influence. For example, the U.S. Department of Education predicts that in less than ten years we will need to replace over two million classroom teachers representing over one-half of our present K-12 staff.

AETS must be proactive with emerging certification standards, maintain and strengthen our intrastate connections to address new State licenser rules, rethink teacher education delivery, and expand our membership so more preservice and inservice faculty can learn from the wealth of knowledge collectively possessed by AETS members. While working on these fronts, we must also be open to share and to learn from our international teacher education counterparts.

Background: Ron Bonnstetter has been a science educator at the University of Nebraska since 1984. He completed his doctorate at the University of Iowa after teaching eighth grade science for three years and serving as a community college instructor for seven. Ron has twice been nominated for the AETS "Outstanding Science Educator of the Year" award and his teacher education program was selected as the national exemplar in the NSTA Search for Excellence in Science Education. Organizational service has included: AETS regional and national boards, NSTA teacher education director, publications committee, publications Chair during the creation of our journal, various other standing committees as well as numerous AETS ad hoc committees including the recent Standards committee. These are in addition to regula convention presentations and regular electronic idea sha ing through our list-server.

Examples of other organizational service has include Journal Editor of *Science Education International*, execu tive board member for NSTA, board of directors for Ne braska Association of Science Teachers, manuscript re viewer, and publications committee member or chair for fiv different science education organizations. In addition, Ro has provided inservice programs on teaching strategies t over 5,000 teachers during the last ten years representin workshops in over 40 states and five countries. He has als served as personal escort to over 400 University of Ne braska preservice science teachers as they experienc their first professional national, regional or state conver tion. Many of these trips have included opportunities fo these preservice teachers to not only attend their firs convention, but to actively contribute as a presenter.

Julie Gess-Newsome

Julie Gess-Newsome is an Associate Professor o Science Education at the University of Utah where sh teaches elementary and secondary science method courses and is the Director of Teacher Certification. . graduate of Oregon State University, Julie taught secon ary science in Wyoming and South Dakota for eight yea prior to completing her PhD. Dr. Newsome's researc interests involve the role of science teacher's knowledge as developed through academic course work and teachin experience, on classroom practice.

Within the state she has worked extensively wit curriculum development and implementation based on th National Science Education Standards. A member of AET for over 10 years, Julie has served on the board for fiv years including 4 years as a board member. Contributior to AETS included Chairing the Awards Committee, Interna tional Committee, Ad Hoc Committee to Review the Na tional Standards, and western regional conference; Edit of the Science Teacher Education section of *Science Edu cation*; and serving on various committees. She is current the co-editor of the AETS publication related to Pedagogica Content Knowledge. Other National Service: NARST *JRST* Awards, Finance. Awards: NARST and AERA Div sion K Dissertation of the Year, Spencer Dissertation-Yea Fellowship, NABT Outstanding Biology Teacher of th Year, NASA Teacher in Space Finalist. Publications: *JSTE JRST*, *Science Education, The Science Teacher.* Nation Presentations: AETS, NSTA, NARST, AERA.

Goals: I see AETS as a vital forum for encouragin professional collaboration among all the individuals in volved with and concerned about science teacher prepara tion: university science and education faculty, science su pervisors, and public school teachers and administrators My goal is to further the leadership position of AETS b increasing the level of representation and communicatio among these groups in order to systematically improv science education at all levels, K-16.

Directors At Large Candidates

Barbara Crawford

I began my appointment as Assistant Professor in the Department of Science and Mathematics Education at Oregon State University in 1995. My faculty responsibilities include teaching and advising students in the Master in Arts in Teaching Program (MAT) at the secondary level and masters and doctoral students in science education. My teaching focuses on incorporating current theories of learning and national standards for science education. Two important goals are to help students understand the key aspects of inquiry-based instruction and appropriate uses of technology to facilitate students learning. Our OSU Science and Mathematics Dept. is currently revising our teacher preparation program to include scientific research experiences for our preservice teachers as well as more extensive and integrated field work.

I have a varied background which I believe provides me with a unique understanding of both science classrooms and scientific research. My educational background includes a B.S. in Microbiology from The University of Michigan, secondary teaching certification at Michigan State University, an M.S. in Biology from The University of Michigan, and a Ph.D. from The University of Michigan School of Education. My professional experience includes work as a microbiologist in the R&D Dept. of Mallinckrodt Chemical Works, as a process chemical engineer at the 3M Company, and over 17 years of classroom teaching experience in grades 7-12. In 1994, I researched my own teaching in middle school, a rewarding as well as humbling experience! I learned much about professional development of teachers while working with over 100 teachers in the State of Michigan in a Projects-based Science NSF Grant.

My research interests are twofold: first, to investigate teachers' and students' understandings of scientific inquiry, and second, to investigate viable ways teachers can translate the vision of national science education reforms to the reality of their classrooms. My research draws from two related areas of the literature; first, inquiry-based learning and second, collaboration. An important outcome of this line of research is to define new roles for teachers in carrying out inquiry/projects-based instruction, and the enhancement of students' understandings of scientific models and integrated scientific processes —how the scientific community solves problems and gains an understanding of the natural world.

My passion for involving students in long term authentic projects has resulted in my collaboration with Dr. Robson Bonnichsen, Archaeologist and Director of the Center for Study of the First Americans. We are currently working on a multidisciplinary project that uses a community-based, archaeological excavation as a venue for enhancing teachers understandings of the nature of scientific inquiry.

I have been an active participant in AETS, NSTA, NARST, AERA, and School Science and Mathematics. I have presented numerous papers at national conferences, and served on review boards and committees. I plan to continue publishing in *The Elementary School Journal, Science Scope,* and *Science Education*.

This year I was appointed Chair of the AETS Ad Hoc Committee for the Education of Middle Level Teachers of Science AETS. This committee is an excellent example of the strength of our membership. Each member provides a needed expertise as this committee strives to build connections between NSTA, AETS and NARST. I believe that AETS has a unique opportunity to meld theory and practice. My goals for AETS include using the expertise of professional classroom teachers, teacher educators, and educational researchers to improve science teacher preparation programs.

Elizabeth (Beth) Shiner Klein

I am pleased to be nominated for the position of Board of Director-at-Large. I have been an active member of AETS since the 1993 conference in Charleston, SC. I have attended each conference since and have presented a number of papers, demonstrations, and panel sessions. These presentations demonstrate my areas of scholarship and include such topics as science teacher inservice education models, electronic portfolios, alternative assessments, Constructivist learning theory, and environmental education. I currently serve AETS as a member of the Dissemination of National Science Education Standards Committee, the Finance Committee, and Women in Science Education (WISE). As a graduate student at the University of Virginia, I was chosen to serve on the AETS Mission Committee in 1993. As a member of that committee I worked with distinguished colleagues to determine the future direction of AETS. As a board member I would like to continue to implement the goals of that mission and update it as we enter the 21st Century.

Before obtaining my doctorate in Science Education from the University of Virginia, I taught elementary primary and intermediate grades, and also taught middle school environmental science. I hold a B.S. in Environmental Education and Elementary Education from Slippery Rock University and a Master of Education from East Stroudsburg University. While teaching elementary school in Virginia, I was active in the NSTA state affiliate and co-founded a regional science association (PRESTO).

I was recently awarded tenure in the teacher education program at St. Norbert College in DePere, Wisconsin. I teach classes in integrated math/science methods, environmental education, and instructional technology. My classes involve significant connections between the preservice students and practicing teachers. For example, preservice students in my instructional technology course are partnered with local elementary teachers to develop Internet-based projects on science-related topics.

Currently, I am Co-Principal Investigator for the COAST-Ocean Voyagers Program, a $2.1 Million grant from the US Navy to conduct teachers-to-sea programs, create an interactive web site, and improve preservice and inservice integrated science/math/technology teaching. I have also been Co-Principal Investigator on several other grants. These other projects included integrating technology into the St. Norbert College preservice education program and into local school classrooms. In addition, I have worked on grant funded projects with local environmental education centers to integrate environmental education into the school curriculum. Finally, I participated in projects utilizing advanced telecommunications technologies to foster collaborative environmental science student projects at local environmental education facilities.

Lawrence [Larry] C. Scharmann

Larry Scharmann is a Professor of Science Education, Chair of the Department of Secondary Education, and faculty affiliate of the Center for Science Education at Kansas State University. He received baccalaureates in Biology and Biology Education from the University of Nebraska-Lincoln, a M.Ed. degree from the University of Nebraska-Lincoln, and holds a Ph.D. in Science and Environmental Education from Indiana University-Bloomington. Prior to joining the faculty at Kansas State University, Scharmann was an Assistant Professor of Biology at Indiana University of Pennsylvania.

The specific focus of research performed by Scharmann concerns evolution education. Evolutionary theory has and continues to be the most prominent feature of a general effort, to which he also contributes, concerned with enhancing an understanding of the nature of scientific knowledge among practicing public school teachers, undergraduate science teacher education majors, and undergraduate general biology students. With respect to evolution education, Scharmann has: (a) published one book chapter, eight peer reviewed manuscripts, and four abstracts; (b) had one manuscript cited by AETS as the 1994 Award for best paper on *Implications of Research for Instructional Practice* (also won the 1996 AETS Implications Award for best paper); (c) been an invited panelist to a national evolution education research conference held at LSU; (d) been an invited speaker at the 2nd Intl. History and Philosophy of Science in Science Teaching Conference held in Kingston (Ontario, Canada); (e) directed the study of two recent doctoral dissertations concerned with public school issues related to the teaching of evolutionary theory; (f) conducted an NSF grant entitled *The Nature of Science and the Instructional Role of Scientific Theories*; and (g) co-authored a recent NSTA Position Statement on the Teaching of Evolution (with Gerald Skoog, Eugenie Scott, et al.). His scholarly work in evolution education and other topics has been published in journals such as the *America Biology Teacher, Electronic Journal of Science Educatio International Reading Association, Journal of Research Science Teaching, Journal of Science Teacher Educatio Science Education, School Science and Mathematics,* an *The Master Teacher*.

The NSTA Position Statement appeared in the Oct ber (1997) issues of the *Journal of College Science Teac ing, Science and Children, Science Scope*, and *Scienc Teacher*. Scharmann, in addition to AETS, is a member several professional organizations including AAAS, NAB NARST, NSTA, PDK, Sigma Xi Scientific Research Soc ety, and SSMA. Service to AETS includes serving as reviewer for the *Journal of Science Teacher Educatio* presenting at AETS Conferences, and chairing the Pr gram Committee to select AETS sponsored sessions at th 1993 NSTA Annual Meeting (Kansas City, MO).

Molly Weinburgh

Molly Weinburgh, Assistant Professor at Georgia Stat University, earned her BA in Biology from Agnes Sco College, her MAT in biology/science education from Emo University, and her Ph.D. in science education from Emo University. After 18 years teaching high school biology, sh joined the faculty of Georgia State University where sh teachers graduate and undergraduate science metho courses and science concepts courses.

Molly is an active member of AETS, SAETS, NARS AERA, and GERA. She has served as President of SAET and is current the Director from the Southeastern regio She is the chair of the Membership and Communicatio Committee and is an informal member of the Committee f Inclusive Science Education. She serves NARST as member of the Equity Committee. Much of Molly's schola ship addresses student attitudes toward science and equi issues in science and science education. She has pu lished in the *Journal of Research in Science Teachin Journal of Science Teacher Education, Current Issues Middle Level Education, TechTrends, The Georgia Scienc Teacher*, and *School Science and Mathematics*.

She is a reviewer for the *Journal of Science f Persons with Disabilities*, the *Journal of Elementary Sc ence Education*, and the *Georgia Educational Researche* In addition, Molly has received external, competitive fun ing totaling nearly $6,000,000 from the Eisenhower Fun National Science Foundation, SouthEastern Regional V sion for Education, and Coca Cola Foundation. Thes grants have been for the improvement of science teachin Projects include a Local Systemic Initiative for improving K 5 science in the Atlanta Public School System, a gende equity project focusing on the teaching of science and ma at the college level, and establishing technology rich educa tional environments in science. Molly believes that AET focus on science teacher education gives it a unique pos tion among the professional organizations. Because of i concern with the way that teachers learn to teach scienc AETS has been and will continue to be a powerful force i

the standards-based reform at the K-16 levels. Among the standards is the expressed idea of "science for all". AETS has been a leader in bringing to the public attention that science education opportunities must be available to all people and that strategies for inclusion must be taught in science education courses. Being elected to the Board, Molly will continue to work for reform in science teacher education that ensures that there will be an open door to science for all.

Elections Committee Candidates

Elizabeth C. Doster

Elizabeth C. Doster completed the Ph.D. in science education at the University of Georgia in 1996. She is currently an Assistant Professor in the Department of Science Education at East Carolina University where she teaches undergraduate and graduate courses in biological methods, environmental education, and elementary methods. In 1996, Liz received an outstanding teaching award at the University of Georgia. She has been instrumental in the development and implementation of a statewide environmental education curriculum in the State of North Carolina and was recently appointed to the regional Environmental Advisory Commission.

Liz has published 13 manuscripts, including articles in the *Journal of Research in Science Teaching, Teacher Education Quarterly, American Biology Teacher, Science Scope*, and the *Journal of Science Education and Technology*, and has served as a manuscript reviewer for three scholarly journals. She received the *JRST* Award in 1996 with David Jackson and Lee Meadows and was invited to speak at a special meeting of North Carolina State Legislators on the teaching of evolution in the public schools. She has written six chapters in books and textbooks and has presented over 30 manuscripts at national and international conferences, including the Association for the Education of Teachers in Science.

Her research interests include promoting equity in classroom practice, teaching to diverse populations, establishing "connected" curriculum, and using models and analogies in science teaching. Liz is currently involved in a multifaceted project with the Partnership for the Americas where she is working to develop a regionally relevant science education curriculum for the public school system in Pernambuco, Brazil. Liz was also a U.S. delegate to the International Symposium on Children's Views of Science in Hiroshima, Japan and is currently working with a multinational group to conduct a cross cultural study of children's views of science in the U.S. China, Japan, Philippines, and Australia.

Liz has been an active member of the AETS, NARST, and NSTA since 1992. Her activities include presenting manuscripts, serving as discussant and presider at national meetings, and reviewing proposals for the national annual meeting. Liz will be serving as co-editor of the AETS newsletter for the 1999-2004 term. If elected to the AETS Elections Committee, she will actively work to continue to strengthen the membership and leadership of the organization by seeking out and nominating visionary, dedicated members of the AETS to stand for office.

Hedy Moscovici

Hedy Moscovici Ph.D. Science Education, The Florida State University M.Sc. in Microbiology, Hebrew University in Jerusalem, Israel B. Sc. in Natural Sciences; Major: Biology, Hebrew University in Jerusalem, Israel. Current Position: Science Education Consultant in Bellingham, WA.

It is my pleasure to be nominated for the Election Committee of the AETS. As I have been a student and a teacher in three different cultures, I learned to appreciate the importance an organization such as AETS whose role is to facilitate communication and reflective practices among professionals involved in science education. We are so lucky to have a forum where we can be teachers and learners at the same time!

My goal is to ensure that AETS will continue to provide leadership for the science education community in the future, while reaching more educators every year. I belong to many organizations such as NARST, AERA and Sigma Xi, and serve on various committees in NARST. I served on the Presidential Award Committee for science, and learned a lot about the meaning of good science teaching at various levels. I served as reviewer for a college Biology text, and taught science at K-16 level. I also teach a workshop on inquiry science for teachers K-12 through a local ESD, and model inquiry science in classrooms.

My research interests focus on two topics which are, in my mind, inter-related. First one is the meaning and implementation of inquiry science as described in the National Science Education Standards (NRC, 1996). Second topic relates to the meaning and characteristics of a pluralistic society. I believe that we all are different and that these differences are the foundation of our cultural and intellectual growth. I always give the example of sitting around a table and having a discussion with ... 12 copies of yourself!!! I hope to have the opportunity to bring my strengths and experience to a leadership role with AETS.

Julie A. Thomas

Julie A. Thomas, Election Committee Julie Thomas is an Assistant Professor in the College of Education at Texas Tech University. She completed 16 years of elementary classroom teaching prior to receiving her Ph.D. from the University of Nebraska-Lincoln with the completion of a critical ethnographic study of resistance to reform in elementary science teacher education. Current regular teaching responsibilities include undergraduate and graduate courses in elementary science education and integrated mathematics and science. In her third year at Texas Tech, Julie has received two early career teaching awards, the college-wide Texas Tech Ex-Students Association New Faculty Award

and the university-wide Hemphill-Wells New Professor Award. Julie's research focuses on the role of a university professor in supporting the professional development of elementary teachers in science – aligning her research and teaching so that one "informs" the other. Julie views her courses in elementary science teaching methods as an "intervention" opportunity and continues to explore indications of students' science teaching self-efficacy.

Julie and colleagues have newly developed the Draw-A-Science-Teacher-Test Checklist (DASTT-C). This modification of Draw-A-Scientist measures students' beliefs and ideas about science teaching and shows great potential for defining the ways in which preservice students develop and hold-on to stereotypical beliefs. Conference presentations include AERA, SERA, NARST, AETS, and SSMA. Publications include Elementary Teachers Do Science: Guidelines for Teacher Preparation Programs, "Inquiry — a Mindset" in Creative Childhood Experiences: Integrating Science and Math Through Projects, Activities, and Centers, and "Issues in Elementary Science Teacher Preparation: A Comparison of Programs at Haccettepe University (Turkey) and Texas Tech University (USA)."

Julie has served as the Co-Chair (and now Chair) of the Texas Statewide Systemic Initiative (SSI) Preservice Elementary Science Preparation (PESP) Action Team. This group of science education leaders has completed Texas-based research regarding the science preparation of elementary teachers and has developed a nationally reviewed document entitled the Texas Guidelines for the Science Preparation of Prospective Elementary Teachers. This year Julie has been collecting data from seven SSI-funded sites and will produce an educational CD-ROM to inform other science educators about collaborative innovations to enhance science teaching and learning for prospective elementary teachers.

Leadership experience includes policy and finance advisory committees for the School Science and Mathematics Association; editorial boards for *The Electronic Journal of Science Education and the Journal of Elementary Science Education*; award committees for National Association of Research in Science Teaching; and Panhandle Area Director of the Texas Council of Elementary Science.

Gary F. Varrella

Gary F. Varrella, Assistant Professor, George Mason University, Virginia: I left the high school classroom in 1981 to return to my Alma mater, the University of California, Davis, to earn an M.Ed. My intention was to return to high school teaching, however, as a graduate student I became involved in and committed to teacher preparation and inservice. Since then I have been a supervisor of teacher education (1983-90) at UCD and the project coordinator for the Iowa SS&C (1992-97). Because the broad responsibilities of this latte position I was introduced to and became active in scienc education nationally. During that time I completed m M.Ed. at Davis and earned a Ph.D. at the University of Iowa

I accepted a tenure-line position at Ohio University i 1997 and most recently (August 1998) have become member of the faculty of the Graduate School of Educatio at George Mason. My teaching responsibilities includ teacher preparation (K-12), inservice, and curriculum an instruction at the undergraduate and graduate levels. M external activities have revolved around program develop ment, evaluation, and school reform. Most recently completed an elementary school case study as a part of consortium of universities studying outstanding schools the state of Ohio. Currently I am working with the Virgini Department of Transportation with a program called TRA (TRansportation And Civil engineering) for middle and hig school level students.

I am also the 1998-2000 Vice President of the Nationa Association for Science, Technology, and Society (NASTS and am an active member of NSTA and NARST. M research and scholarship revolves around school reform expertise in teaching, teacher beliefs, and the developmer and promotion of student-centered and standards-base instruction. I have over 40 state and national level referee presentations, have published in monographs and referee publications, and have articles under review for national recognized journals. It will be an honor to serve on th elections committee and I am committed to work diligent and to complete all related duties. I consider this positio critical to AETS as we seek out capable and committe candidates who will further the AETS agenda of responsive practical, and standards-and research-based science teach ing for all students. I welcome this opportunity to becom more active in AETS in the coming year.

Jeff Weld

It is an honor to be a nominee for the Election Committee of the Association for the Education of Teacher in Science. My interest is fueled by a continuous motivatio to impact the quality of science education for kids in wha ever way I can. I completed a Ph.D. in science education a the University of Iowa in May of 1998, and have assumed position as assistant professor of science education a Oklahoma State University.

My interests here are to nurture the seed of researc planted by my dissertation—motivational factors that influ ence science teacher excellence, as well as to establish high quality science teacher preparation program and gradu ate studies program in science education. I'll call heavi upon experiences gleaned from eleven years of high scho life science instruction as well as from graduate study a Iowa to help my vision yield fruit.

My teaching background is serendipitously filled wit rich experience. After three years at Mission high school o the Rio Grand, I honed the craft for three more years a

Kirkwood high school in St. Louis county. I rounded out my high school teaching career with four years at Pella high school in Iowa, while also teaching as an adjunct at Central College and at Des Moines Area Community College.

I was honored to be recognized for so much hard work as a teacher with a Genentech Access Excellence fellowship, an American Cyanamid Science Teaching Award, a Pella Corporation Excellence in Science Teaching Award, a few minor chamber of commerce sorts of things, a couple of nominations for the Presidential, and most cherished, the respect and lifelong friendship of many of my former students and colleagues!

While in residence at Iowa, I conducted research on crustacean hormone metabolism, collaborated with the instructors of undergraduate Ecology and Animal Behavior to restructure the lab aspect of those courses toward inquiry, assisted with grant programs like Dr. Bob Yager's Iowa SS&C and Dr. John Penick's Biology: A Community Context, taught the science methods courses, edited tests for the Iowa Test of Educational Development, and edited the National Association for Science/Technology/Society newsletter STS Today. While a graduate student, I was elected to serve as President of the Graduate Students in Science Education, and was honored to receive the Howard R. Jones Achievement Award for noteworthy contribution of research to the field of education. I have been fortunate to make presentations every year since 1993 at regional or national NSTA and NABT conventions, and presented my first of surely many papers at AETS last winter.

My publication record includes over thirty articles in such journals as the *Journal of College Science Teaching*, the *Journal of Experimental Zoology*, *The Science Teacher*, *the American Biology Teacher, Educational Leadership, Phi Delta Kappan, Educational Horizons, the School Administrator, Education Week*, and *Iowa Biotech Educator.* I continue to serve as a book reviewer for Educational Leadership and for AAAS's Science Books and Films. I maintain a close working relationship with high school science educators by hosting workshops on biotechnology techniques and inquiry teaching through Iowa's area education agencies. I look forward to serving the Association for the Education of Teachers in Science.

New Editors for the *Journal of Science Teacher Education*

Larry Enochs and Craig Berg, University of Wisconsin--Milwaukee, were selected as the new editors of *JSTE* at the January, 1998 AETS Board Meeting. Please send manuscripts to: **Larry Enochs and Craig Berg, Editors, *Journal of Science Teacher Education,* 413 Enderis Hall, University of Wisconsin--Milwaukee, Milwaukee, WI 53201.**

Membership Committee

The Membership and Communications committee, consisting of Molly Weinburgh (chair), Erica Browstein, Penny Gilmer, Peter Veronesi, Karen Dawkins, Patricia Nason, Harold McKenna, and Judith Sweeney, has been busy since the 1998 Conference. In April, 282 letters were sent to people who had not yet renewed for this year. The response was very good.

During the first week in May, the committee members e-mailed a note to first time presenters and to new members. These notes indicated that we hope they will continue to participate as members and presenters. Letters have been sent to all Texas institutions with Colleges of Education introducing AETS and suggesting that someone from the science department come the conference in Austin.

In addition, letters have been sent to all zoos and to selected other informal science education institutions introducing AETS. During the last month, letters have been sent to international members of NARST who are not members of AETS inviting them to join.

New AETS Internet Director and Server

The AETS server and listserv has been successfully moved to the University of Nevada, Reno. The WWW address for the new server is

http://aets.unr.edu.

The features of the AETS web page are largely the same, with new features being added in the near future. The 1999 Annual Meeting Advance Registration Form is online at the site. The membership database has been revised. Please take a moment to review your record in the database.

The AETS listserv has also been moved to UNR. Subscribers of the "old " listserv, operated out of the University of West Florida with Joe Peters, are asked to resubscribe to the new listserv at UNR.

To do this, please send an e-mail to:

Majordomo@unr.edu.

No subject is needed in the message. The message text should read "subscribe aets-l". Please do not include any signature file or electronic signature at the bottom of the message.

If you encouter any problems with any "electronic communications" aspect of the AETS, please send an e-mail to its new Director of Electronic Services:

Dr. John Cannon, University of Nevada, Reno, at jcannon@unr.edu or call him at 702-784-4961, Ext. 2001.

President Elect (vote for 1)

- ☐ Ron Bonnstetter
- ☐ Julie Gess-Newsome

Directors - At - Large (vote for 2)

- ☐ Barbara Crawford
- ☐ Elizabeth Shiner-Klein
- ☐ Lawrence Sharmann
- ☐ Molly Weinburgh

fold here, tape closed, and mail

Elections Committee Candidates (vote for 3)

- ☐ Elizabeth Doster
- ☐ Hedy Moscovici
- ☐ Julie Thomas
- ☐ Gary Varrella
- ☐ Jeff Weld

Signature_____

Printed Name _____

_____
_____
_____

Affix
Postage
Here

Joseph Peters
AETS Executive Secretary
Attn: Elections Ballot
The Univeristy of West Florida
11000 University Parkway
Pensacola, FL3 2514

Association for the Education of Teachers in Science
Elections Ballot

Reg. Form p. 1

Reg. Form p. 2

AWARDS

AETS makes available three awards trecognize the personal achievements and contributions of its members. For each award, a nomination must be made by an AETS member who is cognizant of the qualifications of the nominee. The nominee should be informed of the nomination. Responsibility for the preparation of documentary evidence rests with the nominator. Five copies of all documentary evidence should be mailed to the Chair of the Awards Committee by June 1 of each year in order for the nomination to be considered. The purpose of each award, the recognition provided, and details of eligibility and scoring criteria are highlighted below. For each of the awards selection is based on an overall and categorical point system. Copies of the judging criteria can be obtained from the Chair of the Awards Committee or from the AETS WWW (http://AETS. unr.edu).

Award I - Outstanding Science Teacher Educator of the Year

The purpose of this award is to broaden awareness of individual contributions and to encourage continued leadership activity of individuals in their first ten years as science teacher educators. Award I consists of a plaque, $1000 cash from Carolina Biological Supply and a tribute in the awards issue of the *Journal of Science Teacher Education*.

Documentation may include, but is not limited to, the following types of information: competency in teaching, development of science teacher education programs, research activities, science curricula development, leadership in science education, leadership outside of science education.

Award II: Outstanding Mentor Award

This award honors and encourages AETS members who support and encourage new science teacher educators entering our profession and seeks to recognize the valuable contributions of mentors to the profession of science teacher education. Recognition comes in the form of a plaque, a one-year paid membership to AETS, and a tribute in the awards issue of the *Journal of Science Teacher Education.*

Outstanding mentor's efforts to contribute to the professional development of new science teacher educators are evidenced by: encouraging participation in professional associations related to science teacher education, including AETS; encouraging contributions to the knowledge base of science teacher educators; and providing opportunities for professional growth. Recommended documentation includes, but is not limited to: a) letters of support from mentees, b) evidence of demonstrated initiatives in working with schools, c) conference participation (e.g., co-presenting with new inductees), d) letters of support from colleagues.

Award III - Honorary Emeritus Membership

Election as an Honorary Emeritus Member is the highest recognition within the power of AETS to confer. Any science educator who has demonstrated a distinguished career in teaching, research, or service to and in the area of education of teachers in science is eligible for this award.

Nominations for Honorary Emeritus Membership shall be proposed in writing by at least ten active AETS members ar be supported by appropriate biographical information. The cha of the Awards Committee, upon recommendation of the Award Committee, shall forward the list of nominees to the Board Directors. Nominees, upon receiving endorsement of three fourths of the Board of Directors voting, shall be declared electe No more than five individuals will be elected to Honorary Emeritu status in a single year. In recognition of this honor, the dues Honorary Emeritus members shall be waived, all rights an privileges of an active member shall be maintained, a plaque w be presented at the Annual AETS Meeting, and a tribute will b printed in the awards issue of the *Journal of Science Teache Education*.

AETS offers two awards to recognize excellence in pape presented at the previous AETS Annual Meeting. Members ar invited to submit papers of no more than 15 double-spaced page in length. Papers previously published are not eligible for th award. The winning paper will be published in the AETS *Journa of Science Teacher Education*, pending review, and the author(s will receive a plaque and cash award. It is recommended tha prospective authors look at articles that have appeared in th *Journal of Science Teacher Education* for models.

Submit five blind copies of the complete paper to the AET Awards Committee Chair. Author(s) should not be identified b name in the document. One copy should be accompanied by cover page that includes the following information about eac author: name, institutional affiliation, address, home phone, an business phone. Nominations must be received by June 1 of eac year in order for the nomination to be considered. The purpose each award, the recognition provided, and details of eligibility ar scoring criteria are highlighted below. For each of the awards selection is based on an overall and categorical point systen Copies of the judging criteria can be obtained from the Chair of th Awards Committee or from the AETS WWW.

Award IV: Innovation in Teaching Science Teachers

This award seeks to encourage the development an dissemination of new designs for courses and curricula, ne instructional methods or approaches, and other types of innova tions in the pre- or in-service education of teachers of scienc Papers may deal with practices for the preparation of elementar middle school, or secondary teachers. A cash award of $1000 made possible by Delta Education.

Papers will be judged on: evidence of effectiveness, re search/theory base, possibility for replication/expansion, clarity communication, and response to recognized weaknesses.

Award V - Implications of Research for Educationa Practice

Papers submitted for this award should identify a persiste and recurring problem in the practice of science teacher educa tion. The paper should develop strategies to resolve the proble based upon a comprehensive synthesis of relevant research an interpret theory and research for practice. A cash award of $50 is made possible by Carolina Biological Supply.

Papers will be judged on the: problem, rationale, docume tation, synthesis, implications, and quality of writing. **The ne deadline is June 1, 1999. For awards to be presented at th 2000 AETS Annual meeting in Akron, Ohio. Send complete packets to: Dr. Deborah Tippins, Science Education, Unive sity of Georgia, 212 Aderhold Hall, Athens, GA 30602, phone 706-542-1763, fax: 706-542-1212.**

1999 AETS Preconference Workshops

A preconference workshop will be held at 8:30 a.m. on January 14, 1999. Achieving Inclusion in K-12 Science Classes: Adapting Instruction for students with Learning and Other Disabilities. Presenters are Richard Villa, Jacqueline Thousand, and Pat Kurts. Fee of $25.00 includes book and handouts.

With inclusion we now have students of all ability and functionality levels represented in science classes, yet many teachers do not have the knowledge and experience to address the learning needs of the diverse student body that is now in public education. What do science educators need to know and be able to do in order to teacher preservice and inservice teachers how to teach science in inclusive classrooms? During this session, participants will first explore practices that foster inclusive science education: cot-teaching models, cooperative group learning, and multiple intelligence theory. Next, participants will be guided through simulations that apply the Parnes-Osborrne Creative Problem Solving Model to develop and refine adaptations in curriculum instruction, and assessment to successfully include students with disabilities in science classes. Various options for student participation in science classrooms will be examined, including same, multi-level, curriculum overlapping, and alternative participation. The session will close with participants conducting a self-assessment and setting goals for expanding their repertoire of strategies for including all students in science education.

Applications of the Internet to Connect Communities of learners to Improve he quality of Science Teacher Educators On the University of Texas at Austin Campus. Presenters are Kenneth Tobin and Nancy Davis. Fee of $10.00.

Participants will be involved in a hands-on use of an Internet application called connecting communities of Learners. During the workshop we will show participants how to operate Connecting Communities of Learners at three levels: system administrator; instructor, and student. Each participant will be provided an electronic user manual that describes the functionality of the CCL and each function will be examined in detail. We will review research undertaken with prospective and practicing science teachers, provide details for potential users on how to initiate uses of the CCL, and explore applications of the CCl to research in science teacher education.

Designing Professional Development for Teachers of Science: An Interactive Forum. Presenters are Susan Loucks-Horsley and Paul Kuerbis. Fee of $30.00 includes book.

This interactive workshop is based on work of the National Institute of Science Education's (NISE) Professional Development Project and its recently published book, *Designing Professional Development of Teachers of Science and Mathematics*. The centerpiece of the book is a design framework that assists professional developers to construct sustained, research-based professional development programs that are uniquely tailored to a particular set of learning goals and school/community context. The NISE project would like to examine how this frameworks can be used by pre-service teacher educators (who may also work in inservice settings). Participants in this interactive forum will engage in a series of activities to understand components of the framework (including the knowledge base, critical issues, and 15 teacher learning strategies) and an ongoing discussion of the question: How can I use this in my work: Participants who are interested will explore how to continue working with the NISE project over the next year.

Developing Physical Science concepts pets in the Primary Grades-the OPPS Approach. Presenters are M. Janice French, Tim Cooney, a and Karen Ostlund. Fee of $15.00 includes materials.

The purpose of the Operation Primary Physical Science (OPPS) Preconference workshop is to share with science educators a new NSF project that is directed toward enhancing science content knowledge and science inquiry strategies for teachers in primary grades K-3. Operation Primary Physical Science workshops use a constructivist approach with a modified learning cycle and models inquiry as a party of the nature of science. This preconference session will include a brief discussion of the philosophy and format of OPPS, as well as its alignment with ten National Science Standards. Participants will view videotapes of young children interviewed about selected physical science phenomena, and subsequent group discussion will center on generating new approaches to teaching young children science. Participants will be provided with selected OPPS materials to explore and become part of an interactive discussion on how the models may be used within elementary science methods courses as well as within inservice teachers.

Forms Follows Function: Web Page Architecture for Educational Telecomputing Projects. On the University of Texas at Austin Campus. Presenter is Judi Harris. Fee of $30.00 includes book *Virtual Architecture: Designing and Directing Curriculum-Based Telecomputing* (ISTE, 1998)

Currently, Web page design focuses upon form and content. For educational telecomputing projects, page Functions may be more important. Come and explore ten different page functions, using current K-12 project examples. Participants will individually and cooperatively analyze, compare and evaluate page designs in terms of their educational functions, and as they relate to curriculum-based projects' goals, steps, a and audiences. You will also plan new or redesign existing project pages, offering and receiving constructive criticism form colleagues.

Participant Prerequisites: Experience with both curriculum-based online projects for students and Web page design. Those just beginning in both of these areas are

welcome, also, but comfort and competence with Web use with students, an at least initial familiarity with Web page creation will be assumed.

On-Line Access supporting Quality Searches for Science Materials. At the Southwest Education Development Laboratory, Austin. Presenters are Tom Gadsden, Stephen Marble, and Donna Berlin. Fee of $10.00

In this interactive, hands-on session presented by the Eisenhower National Clearinghouse (ENC) and the Eisenhower southwest Consortium of for the Improvement of Mathematics and Science Teaching (SCIUMAST), participants will explore strategies for helping teacher use on-line resources to improve curriculum, instruction, and assessment. Participants will share ideas about supporting teachers' competencies for using on-line resources, construct a search protocol for locating quality on-line resources, and apply the protocol in on-line searches. Participants will also receive materials that allow them to access resources available from the ENC and from the ten regional Eisenhower mathematics and science consortia.

Preparation and Classroom Applications of Virtual Field Trips for Use in Elementary, Middle School, and Secondary Education. Presenters are Robert L. Hartshorn, J. Preston Prather, Kueh Chin Yap, Reo Prulett, Janet J. Woerner, Terry Cook, Betsy Jones, and Roger L. Davis. Fee of $10.00

Virtual field trips (VFT's) can reduce time and costs and enhance field-based instruction. Examples of custom-made VFTs will be reviewed. One, developed by 2nd and 3rd grade classes, is useful for overcoming problems of site novelty prior to actual trips. Another, made by teachers for grades 7-12 used inner-city architectural, historical and natural features to relate science to mathematics, social studies, and arts. Presenters will make a simple VFT and explain how to help teachers learn to: a) evaluate existing VFTs for classroom use; b) plan, develop, and use custom-made VFTs; and c) help students make VFTs as class projects.

Making Science Multicultural: A Workshop for K-12 Science Teacher Educators. Presenters are Leslie Jones, Will Letts, Alberto Rodriguez, and Aldrin Sweeney. Fee of $10.00. (Description not available).

AETS Regions

The following indicates which areas make up the regions for AETS. AETS members may cross regional boundaries as appropriate.

Northwest: Washington, Montana, Wyoming, Idaho, Oregon, Alaska
Far West: California, Nevada, Hawaii
Southwest: Utah, Colorado, Kansas, Arizona, New Mexico, Oklahoma, Texas
North Central: North Dakota, South Dakota, Nebraska, Minnesota, Wisconsin, Illinois, Indiana Ohio, Iowa, Michigan, Missouri
Northeast:: New York, Pennsylvania, Maine, New Hampshire, Vermont, Massachusetts, Connecticut Rhode Island, New Jersey
Mid-Atlantic: West Virginia, Virginia, Maryland, Washington DC, Delaware, North Carolina
Southeast: Kentucky, Tennessee, Arkansas, Louisiana, Mississippi, Alabama, Georgia, South Carolina Florida

Check the AETS Web for curent information.

News from the Regions

The North Central AETS Regional Meeting

The North Central AETS Regional meeting will be held in Hammond, Indiana at Purdue University Calumet Hammond, IN, Oct. 1 through Oct. 3. Contact Dr. J. Russet russett@NWI.calumet.purdue.edu for local information a the change of web servers has deleted the previous information about the great events planned for the fall gathering Attached is the meeting proposal form (RTF format). Paper copies are in the mail to all NC members currently on the mailing list. Spread the word- invite a colleague!
-Bob Hollon, Regional Program Organizer

North East AETS Regional Meeting

This is a reminder about the AETS-NE meeting to be held at Syracuse University, Thursday and Friday, October 15-16, 1998. Registration fee is $60, Graduate students fee is $25. The fee includes two breakfasts, one lunch, cocktail party, and ongoing refreshments. If you will attend and do not wish to make a presentation, just let us know.

We have extended the deadline for proposals to FRIDAY, AUGUST 28. We simply need the title of the presentation, a time request of 15 or 30 minutes, and a brief abstract (25-word maximum). Please respond as soon as possible to: Marvin Druger, 103 Lyman Hall, Syracuse University, Syracuse, NY 13244; (phone: 315-443-3820 (Fax: 315-443-1142; (e-mail: Druger@sued.syr.edu). We hope you will join us for stimulating discussions, friendship scenic beauty and fun, guaranteed. Marvin Druger, Larry Schafer, John Tillotson, and Janice Koch

Southeastern Region AETS Conference

President-Elect Dr. Ed Lucy (Georgia State University) has planned a wonderful conference for the southeastern region. It will be held Friday, October 30 through Saturday, October 31 at the Timber Ridge Conference Center in Mableton, Georgia. Timber Ridge is located 2 minutes west of Atlanta. The conference registration is $40.00 and covers a reception on Friday, breakfast and luncheon on Saturday and coffee breaks. The room rate $55.00 for a single. Deadline for presentation proposals is September 22, 1998. For more information contact Dr. Lucy at 404-651-2510 or e-mail at mstecl@panther.gsu.edu

Science Teaching Book Available

The International Council of Associations for Science Education (ICASE) announces the publication of*Supplementary Teaching Materials: Promoting Scientific and Technological Literacy*, co-edited by Jack Holbrook and Miia Rannikmae. This book includes a collection of exemplary teaching materials specifically designed to promote Scientific and Technological Literacy (STL). The publication is part of ICASE and UNESCO's Project 2000+ initiative, an international project created to meet the challenges facing science and technology educationin the 21st Century.

The materials are not intended to be a standalone curriculum, but supplement existing programs. The book begins with the philosophy behind the STL teaching approach including social values, scientific method, personal skills, and science concepts. Section 2 of the book includes activities developed by teachers from countries such as Estonia, Czech Republic, Latvia, Lithuania, Poland, Russia, Slovakia, and the Ukraine. Sample activities include maintaining a metal bridge, can vegetable oils be used as a fuel, discovering old settlement sites, wood - a potential fuel for tomorrow, is oremulsion suitable as an alternative fuel, saving cultural monuments from corrosion, which medicine is better - black or white, how to avoid bicycle accidents, radon in our homes - is the risk acceptable, and an astronomical clock.

Supplementary Teaching Materials: Promoting Scientific and Technological Literacy is available for $20.00 (US) from:

Miia Rannikmae, ICASE European Representative
Department of Science Didactics
University of Tartu,
Lai 40, Tartu EE2400,
Estonia

-Joe Peters, ICASE North American Representative
jpeters@uwf.edu

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Winter	Feb. 1
Spring	May 1
Summer	Aug. 1

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