

MRS to Compile Database on Advanced Materials Research

The Materials Research Society (MRS) and Synergistic Technologies, Inc. (STI) will collaborate on a project to catalog key materials scientists, their laboratories, and their research in a one-of-its-kind database. The Advanced Engineering Materials Research Profile will focus primarily on researchers in the North American university laboratory, national laboratory, and federally funded laboratory communities. It will be released in Spring 1994 and will be available in both book (directory) and computer database formats.

The project was conceived and developed by MRS in partnership with STI, Research Triangle Park, North Carolina. STI has been involved in cataloguing academic research in a variety of scientific disciplines, working with such groups as Semiconductor Research Corp., Air & Waste Management Association, and Carolina Biotechnology Center.

The purpose of the profile is to provide an information system that will make it possible for the resources of university and national laboratories to be fully utilized. "Advances in materials and pro-

cessing are vital for our country," said Tom Picraux, president of the Materials Research Society. "Through this database, we will bring together—for the first time—information on materials researchers in the key sectors of university and federal laboratories. This will enable us to assist directly in the important task of pulling the myriad materials R&D activities into a more coherent and accessible format."

Picraux further explained that, because of limits on financial resources, and due to the fact that in most industries R&D must focus on short-term goals, it is now particularly important that university and national laboratory resources be utilized for long-term progress.

"We also believe that the profile will have a significant impact on furthering MRS's longtime goal of improving communication and coordination between industry, academia, and government," he said. "The directory represents one positive step the Society can take in this direction. We anticipate that, as technology transfer becomes increasingly important, the profile's data will be valuable to

our members, to government funding agencies, and to industrial users."

Picraux noted that MRS has always sought to address important interdisciplinary problems and to provide quality information in the area of materials, as exemplified by the MRS meetings. "The database will be a natural extension of that philosophy," he said. "Just as scientists and engineers turn to MRS meetings for new perspectives and unmatched interaction, they will now be able to turn also to the profile for a degree of detail, at the individual researcher level, available nowhere else."

Those who are materials researchers in North American universities, national laboratories, or federally funded laboratories, and who have not yet received a questionnaire form for the Advanced Engineering Materials Research Profile, should fax Synergistic Technologies, Inc. at (919) 676-0542, or send name and address to AEMRP, c/o STI, 6070-L Six Forks Road, Raleigh, NC 27609.

The deadline for receipt of completed questionnaires is **December 1, 1993**.

EDUCATION EXCHANGE

Enhancing K-12 Science Education—An Update

What's the status of the national movement to reform precollege science education? Where is it headed? What role, if any, should MRS play? And what's happening in the MRS Grass Roots Education initiative? The purpose of this article is to provide a brief response to these questions.

The current move for education reform received much of its impetus from the Governors' Education Conference in 1989, which was co-chaired by then Arkansas governor Bill Clinton. Subsequent interactions between the governors and President Bush resulted in the 1990 adoption of the following set of National Education Goals:

By the year 2000:

1. All children in America will start school ready to learn.

2. The high school graduation rate will increase to at least 90%.

3. American students will leave grades 4, 8, and 12 having demonstrated competency in challenging subject matter, including English, mathematics, science, history, and geography; every school in America will ensure that all students learn to use their minds well, so that they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

4. U.S. students will be first in the world in science and mathematics achievement.

5. Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and to exercise the rights and responsibilities of citizenship.

6. Every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

In 1991, President Bush implemented a four-part national education strategy:

1. For today's students, we must radically improve schools by making all 110,000 of them better and more accountable for results.

2. For tomorrow's students, we must invent new schools to meet the demands of a new century with a "new generation of American schools," bringing at least 535 such schools into existence by 1996, and increasing that number to several thousand by the end of the decade.

3. Those of us already out of school and in the workforce must keep learning if we are to live and work successfully in

today's world. A "Nation at Risk" must become a "Nation of Students."

4. For schools to succeed, we must look beyond our classrooms to our communities and families; schools will never be much better than the commitment of our communities. Each of our communities must become a place where learning can take place.

Few of us would deny that these are ambitious goals. While some might argue that they are too idealistic or that the timetable is unrealistic, most of us would agree that they provide an appropriate direction which is worth pursuing.

The Federal Coordinating Council for Science, Engineering, and Technology, or FCCSET (commonly pronounced "fix-it"), was formed to flesh out this plan in the area of science and its technological applications. The group published its report, "Pathways to Excellence," in January 1993. (See April 1993 *MRS Bulletin*, p. 18.) This plan, which may be obtained through the NASA Education Division, 300 E Street, SW, Washington, DC 20546, calls for a three-tiered approach:

- Tier I includes reforming the nation's elementary and secondary science education system, revitalizing lower-division undergraduate science education, and evaluating all federal agency science, math, engineering, and technology education programs.

- Tier II calls for increasing the participation by individuals from groups which are underrepresented in science and engineering fields, identifying exemplary education programs and promoting their increased adoption, and broadening the use of effective educational technologies.

- Tier III promotes increasing public understanding of science, and strengthening technology programs at two-year colleges.

The centerpiece effort to reform elementary and secondary science and math education is currently being pressed on several complementary fronts. The American Association for the Advancement of Science (AAAS) has for several years been engaged in Project 2061, a highly respected program to restructure and improve K-12 science education by the return of Halley's comet in the year 2061. The National Science Foundation has also provided funding to a number of states for the systemic reform of their science education approaches. A math education reform effort was initiated by the teaching community several years ago, and schools are currently being encouraged to adopt their recommendations. The science teachers have pro-

posed a similar initiative. Most recently, the National Research Council (NRC) was given the task to follow up on the FCCSET recommendations and develop standards for several aspects of science education. These include standards for curriculum, teaching, and assessment. The NRC group has assembled an oversight committee and several working groups, who have been pursuing this task for roughly a year. They have published several interim reports on which they have invited community comment. These reports (popularly called *The Pumpkin* (10/92), *The Turkey* (11/92), *The Valentine* (2/93), and *The Firecracker* (7/93)) may be obtained by calling the NRC office in Washington, DC at (202) 334-1399. The February edition provides the most current overview of tentative curriculum standards, while the July edition provides an introduction to the issues of teaching and assessment standards.

The intent of the NRC standards is not to define a "mandatory national curriculum," but to propose the adoption of certain "core topics" for each grade level. Local districts, schools, and teachers would have substantial latitude to supplement these "common denominator" topics with additional subject matter, as well as to determine how the core topics would be presented. Similarly, the teaching standards are not intended to force all teachers into the same mold, but to provide a set of baseline methods which each teacher would adopt *and* supplement, based on that teacher's individual style and creativity. One of the purposes of adopting standards in these two areas is to facilitate assessment, since assessment *will* be a part of the future educational system. Teachers will be encouraged to experiment with novel teaching approaches. Assessments will then be used to obtain an objective indication of which approaches work best, the objec-

tive being to promote the adoption by other teachers of the most effective approaches.

So how should MRS be involved in all of this? Take another look at item four under "national education strategy," the one that talks about community commitment to the schools. We believe that getting the technical community involved at the community level is important. A number of organizations, including Sandia National Laboratories (where I work), have taken this seriously and are making a substantial commitment to involving the scientific and engineering workforce in the task of enhancing science education in our local schools. The results have convinced many of us that technical professionals can have a highly positive impact on our communities' schools.

The technical workforce (scientists, engineers, health care workers, etc.) represents a great resource which the K-12 science education community has barely begun to tap. The United States has several million such workers—men and women who are knowledgeable and enthusiastic about scientific endeavor. Experience suggests that approximately 5% of them will make a serious commitment to the cause of improving K-12 science education, *provided* they are given appropriate opportunities and support. This works out to one to two individuals for every school in the nation—a potentially formidable force.

Following this model, MRS has for several years tried to facilitate its members' involvement in local K-12 science education programs. We have done this through Education Exchange columns in the *MRS Bulletin*, K-12 education sessions at our national meetings and, at recent meetings, poster sessions highlighting various K-12 education activities and resources. Some of these initiatives have been enthusiastically received, while others have been sparsely attended. However, even in cases where a lot of enthusiasm was generated and a significant number of people indicated their intention to get involved, we don't have much evidence that this enthusiasm was successfully transformed into action after folks returned home. (If you know of situations where new K-12 efforts were started or existing ones were significantly enhanced as a result of MRS activities, please get in touch with us—we'd love to know about them!)

The Grass Roots Education Committee wrestled with this issue at the 1993 Spring Meeting in San Francisco. We concluded that we need to find a way to

The Education Exchange highlights the experiences of scientists and engineers with local schools, along with helpful hints and resources. If you would like to share your own involvement in science education, contact Finley Shapiro, Department of Electrical and Computer Engineering, Drexel University, Philadelphia, PA 19104, U.S.A. Telephone (215) 895-6749 Fax (215) 895-1695 Email: shapiro@ece.drexel.edu

lower the activation barrier for people to get involved at the local level. It's easy for people to become enthusiastic at a national meeting, but when they get home they have phone calls to return, mail to answer, and a backlog of work that has built up in their absence. The good intentions developed during meetings have a way of being overwhelmed by these more urgent demands. This is especially true if people have to start from scratch in approaching a school, building relationships with the teachers, and developing their own activities—it simply requires more effort than many of us are willing to devote, especially when there's neither a deadline to meet nor a short-term payoff.

On the other hand, suppose that the names of the people who expressed interest were forwarded to existing local alliances for science education in their respective communities, and that within a week of returning home each was contacted by their local alliance coordinator. The local coordinator would suggest several possible types of involvement for the person to choose from, provide times and places where the person could sit in on exemplary existing activities, and connect the person with a teacher or school that had expressed interest in similar assistance. In addition, the local alliance would make available training materials on how to interact with teachers, how to prepare effective activities for students of various ages, and how to present activities in a compelling manner. Further, the local alliance would provide a resource center containing outstanding hands-on activity ideas and supporting materials catalogued by topic area and age level. Finally, help would be made available in obtaining the support of the interested persons' employers for their involvement in these activities. Included in this might be a letter, targeted to bosses, from a prominent national or local leader in business or government. The letter would explain the benefits of this type of activity and suggest ways in which employers and employees could take on such efforts as shared ventures. Hopefully, the availability of these kinds of resources at the local level would lower the activation barrier and make it easier for many more of us to become involved.

This is the type of infrastructure support that we're currently trying to put in

place. Of course, this sphere of endeavor extends much farther than just MRS! Five percent of the local MRS members (or members of any single professional society) are not likely to have a major systemic impact on science education in Peoria (or any other community). This is particularly true if they are naive about the schools and their needs, lack understanding about how to interact effectively with teachers and students, are disconnected from the many sources of high-quality activity ideas, and are oblivious to other complementary resources in their community.

On the other hand, if the committed members of *each* professional society band together in a joint effort, they are much more likely to constitute a "critical mass." In addition, by combining their efforts and aligning themselves with other community resources, they can establish the infrastructure needed to overcome some of the naiveté and organizational shortcomings listed above, thereby increasing their effectiveness manyfold. So MRS is working toward making this an interdisciplinary effort which involves numerous professional societies, as well as universities, retiree groups, companies, government labs, science museums, etc.

This new direction will involve some restructuring of our activities. For example, we're not planning to have the "K-12 Education Sessions" at the upcoming two MRS meetings because we don't want to enlist new people until the infrastructure of local alliances is in place to support them. However, we may have posters on K-12 science education at some MRS meetings to provide a forum in which those who are already involved can exchange ideas. We also have established contacts with people in the Boston area who are volunteering their time to bring science into the classroom, and we hope to meet with them during the 1993 Fall Meeting to enhance their local effort.

We're eager to hear your responses to our revised approach. There are also plenty of opportunities for you to begin laying the groundwork for the future—particularly for those of you who are highly concerned about science education and have an organizational bent. One of the most productive things you could do at present is to help organize a local alliance for science education in your community (or to become actively

involved in an existing one). Sounds like a big job? It is! But the payoff is great! And you don't have to undertake this independently—some excellent guidance is available to you. The National Association of Partners in Education has written *Guidelines for School-Business Partnerships* and has workshops available to help you with this task. You can write to them at 2100 M Street, NW, Washington, DC 20037, to order a copy or get additional information. The Triangle Coalition for Science Education has prepared a more concise guide, *A Guideline for Building an Alliance for Science, Mathematics and Technology Education*. You can get a copy of this, as well as inquire about becoming affiliated with the Triangle Coalition Alliances, by calling Lauren Williams at (301) 220-0886. In addition, training brochures on conducting effective activities with K-12 students are available from the North Carolina Museum of Life and Science (P.O. Box 15190, Durham, NC 27704) and from Sandia National Labs (contact Ken Eckelmeyer at (505) 845-8680). Finally, IEEE has published a guide to existing national programs you might become involved with. To get this brochure, call Ann Hartfiel at (202) 785-0017.

The task is formidable, but so are we, or so I've been told. Here's hoping that enough members of the scientific community will commit to this task to make a significant difference. There's little doubt that we have the potential! The question is: Are we willing to make the commitment? Or more appropriately: Are *you* willing to make the commitment? Remember the Peace Corps motto, "The best job you'll ever love"? Well, some of us are involved in that right now—in the area of K-12 science education. How about joining us?

Kenneth H. Eckelmeyer

Kenneth H. Eckelmeyer is a senior member of the Technical Staff and manager, School Partnership Program, at Sandia National Laboratories. He also chairs the MRS Grass Roots Education Committee.

To receive additional information on how you can get involved in enhancing K-12 science education, circle number 120 on the Reader Service Card.

REMINDER: MRS 1993 FALL MEETING PREREGISTRATION DEADLINE IS NOVEMBER 19, 1993