SEMEDS

Scanning Electron Microscope EDucatorS

Joseph P. Williams, UES, Inc.

Can you imagine the motivational value of a young adult being exposed to images of common day objects that they have an interest in, magnified ten, one hundred, or one thousand times? Then imagine the student learning the theory and operation of a scanning electron microscope. Finally, imagine walking into a laboratory to see these same students operating an SEM and taking their own micrographs.

For the past three years I have had the pleasure of teaching the laboratory portion of the SEMEDS program. The program's goal is not just to motivate high school students in science, but to expose them to the wonders of microscopy and how it affects their everyday life.

The program currently has three phases. During phase one, teachers from local high schools are contracted about the program. The teachers volunteer at the beginning of the school year then become students themselves during a four hour class. They learn about scanning electron microscopy though the same curriculum that their students will go though later in the year. This enables the teachers to augment their own science curriculum with microscopy. Students are selected for the program by their teachers with some advice from the SEMEDS volunteers to chose a cross-section of their class, not just the most gifted students.

Phase two is the students first visit which begins with a forty-five minute class on how the SEM works and how it is used in research. This is taught by Katie Thorp, the program's coordinator. The classroom session was given to Katie just this year and her ability to bring the complex theory of an SEM to the high school level is an important part of our success. After the student's classroom session they are split up into groups of five to eight and taken to the SEM laboratories. There they are shown the components and operation of the microscope which are related back to the theory taught in the classroom session. Thee students are in the operator's position during this entire session with volunteer instructors standing nearby to answer any questions about the controls or samples. The samples for this phase are selected from a growing collection ranging from integrated circuits to all types of insects. They are chosen by the students and their teachers. Any micrographs taken by the students are theirs to take home and we keep a negative for our records. This phase is some three hours in length and each student averages fifteen minutes at the microscope controls.

Phase three brings the students back a month later just to operate the microscopes. From their experience during phase two, they understand the type of samples that can be examined in a SEM. They then have the opportunity to choose, as a class, several samples related to their school science projects. These samples are picked-up by volunteers before the session, mounted and prepared for examination. When the students arrive, they spend the entire three hours on the microscopes examining their samples. Again, any micrographs taken are theirs to keep.

This program is currently run twice monthly at Wright-Patterson Air Force Base in Dayton, Ohio and has instructed over three hundred students in the past three years. There are several offshoots which we are currently seeking full time funding for including expanding the present program into a two year vocational program utilizing light and electron microscopy, equipping a mobile microscopy laboratory on a semi-trailer and the placing of small inexpensive SEMs in local high schools.

Thanks must be given to the originators of the program, Dr. Wade Adams of Wright-Patterson Air Force Base and Dr. Al Jackson of Systran Corp. Also to Katie Thorp of the University of Dayton Research Institute. And finally to those volunteers that are always there to help, John Woodhouse, Andy Krause, of UES, Inc. and Soumya Patnaik of Wright-Patterson Air Force Base.

We are more than willing to help others start their own pro-grams and may be available for speaking engagements. You have but to ask:

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MICROSCOPY FOR MIDDLE SCHOOLS

Caroline Schooley, MSA MICRO Coordinator

The Microscopy Society of America (MSA) is beginning a long-term educational effort; the first goal of the program is to bring the excitement of microscopy to middle schools. We'll begin by developing a curriculum manual that integrates an understanding of how lenses magnify with observation of the microworld; examples will be from both physical and biological sciences. Funding will come from NSF and private foundations, and science education expertise will be provided by the Lawrence Hall of Science in Berkeley, a leading developer of science curriculum. As educators often use acronyms, we've named ours MICRO, for Microscopy In Curriculum - Research Outreach.

Writing a manual is just the beginning. MSA is directing its first effort at middle schools, because teachers at that level who want and need to teach science often lack the background to do so as anything more than a dull textbook exercise; teacher training workshops will be offered nationally. The MSA membership will be given the opportunity to volunteer as classroom aides, and similar training workshops for microscopist-volunteers will be held at the meetings of MSA and its local affiliate societies.

Many of you who've read this far are way ahead of MSA; you have successful local outreach programs in light or electron microscopy already in operation. One such program is described on this page. MSA needs to hear from you, particularly if you have good classroom exercises that could be used in a curriculum manual, or if you'd like to help build the national program. These are ambitious plans, and success will require a lot of effort; please write! You can hear a progress report at MSA's Cincinnati meeting this summer, and there will be more info in future issues of *Microscopy Today*.

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