

MENU OF OPPORTUNITIES FOR SCIENTIST INVOLVEMENT IN PRE-SERVICE SCIENCE TEACHER PREPARATION. C. Shupla¹, S. Shipp¹, ¹Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston, TX 77058, shupla@lpi.usra.edu.

There is a widely-recognized national crisis in science education, and scientists will be an important part of the solution^{1,2,3}.

Introduction: The members of NASA Science Mission Directorate's former *PreService Education Working Group* recognized the need for scientist involvement in the preparation of future science teachers. Often, scientists have been unaware how to get involved, or concerned about the potential time commitment involved. This working group initiated the development of an online menu of opportunities for scientist involvement, and recently, select members of the *Faculty Institutes for NASA Earth and Space Science Education* (FINESSE) have completed this menu for greater access and use. It is now available online for broad dissemination among science researchers and science faculty:

http://www.lpi.usra.edu/education/pre_service_edu/index.shtml

Science and Education faculty collaboration is fundamental to long term solutions: The science and education communities may not understand the structures of operation, challenges, and needs of each other, yet each holds critical pieces in the preparation of qualified, confident, and enthusiastic science teachers. Education and science faculty have the years of in-discipline experience and need to build shared instructional strategies.

*To broaden science learning opportunities within and beyond the classroom, members of the scientific community can be recruited to participate in K-12 education as observers, guest speakers, tutors, and consultants. Scientists will need to become aware of the needs of teachers and students, but in the long run, their participation can enrich college and university classrooms and help K-12 teachers and scientists better understand each other.*¹

Opportunities for Involvement: The site presents eight types of opportunities for scientist involvement, arranged from least to most time and effort.

Advocate for and Assist Educators: Scientists can help science and education faculty and future teachers by participating in their conferences or organizations, providing access to science equipment, and more.

Adjust and Adapt Existing Educational Resources for Use by Future Teachers: This could involve revis-

ing education resources already created, or examining a set of existing resources and providing the extra information and details to make it more appropriate for use by future teachers or science and education faculty engaged in teacher preparation.

Provide Data for Use in Education: Science and education faculty need data formatted appropriated to conduct authentic inquiry. Such data should be in a format that is easy for future teachers to understand and manipulate to answer researchable questions.

Share Your Science Content: Scientists can present their science content to scientists and education faculty and future teachers to update or expand their science background, through resources, lectures, courses, and more.

Provide Professional Development: All science educators, including science and education faculty and future teachers, can benefit from quality professional development: in using existing resources, in science teaching methods, or in science content.

Promote Partnerships Between Scientists and Educators: These partnerships enable those engaged in preparing future teachers to collaborate, sharing their expertise to design optimal instructional strategies in science education.

Become a Mentor: Future science teachers benefit from mentors in the same manner that future scientists do. Scientists should consider future teachers when providing guidance for students.

Create Research Experiences: By involving science education faculty, science faculty, and future teachers in the process of science, they will have experiences that they can use to create new activities for the classroom and to share with their own students, in addition to adding to their understanding of the process of science.

Resources Provided: For each of the above opportunities, the site highlights useful information for scientists:

- **Best Practices for Success:** Each type of activity (or opportunity for involvement) has corresponding recommendations available, to help inform scientists' efforts.
- **Paths of Involvement:** Some of the opportunities have many different ways that scientists can become involved. For instance, under "Share Your Science Content," paths of involvement include supporting an online "ask the scientist" site, providing consultation, contributing to a lecture series, postcasts, speaker series, etc.

- *Models of Programs:* Links to existing and past programs known for their quality are provided, to help scientists connect to examples of ongoing efforts that they may wish to join or to replicate.

Conclusion: While most scientists are unfamiliar with the role of helping in the preparation of future science teachers, their efforts in this field are instrumental in the future of science education.

References: [1] American Association for the Advancement of Science (1998), *Blueprints On-Line* Ch. 9 Teacher Education. [2] National Commission on Mathematics and Science Teaching for the 21st Century (2000), *Before It's Too Late*. [3] Shupla C. et al. (2007) *American Astronomical Society*, "How Astronomers Can Help Prepare Future Teachers."