Planetary Science Education for Pre- and In-Service Teachers in RI: Defining Little Rhody's Place in the Solar System; John A. Grant, SUNY College at Buffalo, Earth Sciences and Science Education, Buffalo, N.Y., 14222.

The planetary sciences encompass a variety of high profile topics, many of which employ cutting edge technologies. As such, classroom discussions of planetary topics create opportunities for the introduction of a range of science concepts. Unfortunately, this potential is frequently under-utilized as a result of insufficient teacher training and/or incomplete knowledge of where resources related to the planetary and space sciences can be obtained. In recognition of the potential that planetary and related sciences hold for education purposes, a course is being developed that will emphasize discussion of RI's place in the solar system and will provide exposure to technologies and resources related to the planetary sciences. The Summer 95 course will target up to 40 advanced education majors at Rhode Island College and in-service teachers serving in districts in RI with considerable under-represented and under-served elementary and secondary pupils. The effort is the result of a cooperative agreement between Rhode Island College, NASA/RI Space Grant, and Brown University. Funds for the project are being provided via an Eisenhower Math/Science grant administered through the RI Office of Higher Education and the NASA/RI Space Grant. The intent of the class is to increase teacher and student knowledge of planetary and space sciences.

A primary goal of the project will be to develop a lecture course (with some specialized "lab" sessions) on planetary geology that will use references to geologic processes active in RI and draw comparisons with those occurring elsewhere in the solar system. The lack of any prerequisites for the course should ensure the participation of both active and future teachers even though they may not possess a strong background in math or the sciences. Input from an outside, pre-assigned Advisory Group comprised of a variety of educators and administrators will be used to help assure that the language and level employed is appropriate for the broad background of those taking the class (e.g., both science and non-science concentrators). Input will also be solicited from these advisors to ensure that information covered is pertinent and appropriate for inclusion in lesson plans for elementary and secondary students. The plan is to introduce and discuss high profile topics related to planetary geology and space exploration rather than emphasize the associated math that might be required in a more specialized and detailed course. In addition, teachers will be provided with some of the resources necessary to introduce space science into the classroom including the names of agencies and journals that distribute such materials. The ultimate goal of the proposed project is to pique students' interest in the sciences at an early age and to enhance their science literacy and awareness.

Class discussions and topics will include an introduction to image processing using a variety of existing, relatively inexpensive resources and materials purchased for the purpose of use in the class (e.g., CD-roms, SPOT and LANDSAT imagery of RI, and resources available at the Brown Regional Planetary Data Facility). Comparisons between various and satellite images of RI and recently acquired data of the planets (e.g., Magellan images of Venus, Viking images of Mars, and Voyager images of the outer planets and their satellites) will provide the opportunity to consider the evolution of RI and the planets within the perspective of the entire solar system. Such comparisons will familiarize class participants with the geologic processes responsible for shaping RI, the Earth as a planet, and the other planets and satellites of the solar system. This approach should simultaneously allow students to identify the changing relative importance of individual processes on the same and separate planets/satellites. The role of people in designing, flying (remote and manned), and analyzing the data returned from missions to the planets will be stressed throughout the course. As a result, participants should become better equipped with the information they need to convey the personal side of planetary geology and to let their students know how they might someday become involved (e.g., through ongoing and/or future NASA experiments that have been designed by students or involve students).

A number of class related activities are planned that are designed to achieve the goals for the course as outlined. Participants will be solicited from pre-teachers involved at the senior and graduate level in Science Education, Elementary Education, and Secondary Education at Rhode
Island College and in-service science teachers throughout RI (especially those in districts with significant populations of under-represented and under-served students). Resources at the Brown Regional Planetary Data Center, purchased reference materials (e.g., books, planetary and other maps), input from involved parties at the cooperating institutions, and suggestions from the Advisory Group will be combined to generate a syllabus geared towards accommodation of participants in both the sciences and liberal arts. Additional "lab" assignments will also be defined (e.g., using craters to tell time on the planets, the geology of Mars, or a review of the major events during the ongoing Galileo mission). Participants in the proposed course will be evaluated based on their performance on the "lab" exercises, exams, and participation in class (e.g., 25% of total grade). By placing a high value on class interaction it is anticipated that the participants will provide a maximum of feedback on their concerns and needs so that they can be addressed during the course whenever possible. In addition, anonymous student evaluation forms will be distributed during the course in order to try and identify and incorporate any changes that might help better meet the needs of the participants as educators. As a result, the original syllabus for the class will require a level of flexibility that might not be present in many traditional education classes.

Reference materials for the class will be reviewed and various subjective comments will be assigned to each as an aid to the participants in determining the potential usefulness in their future classrooms. Although a number of reference books will be purchased for use in the course, no formal text will be required. Instead, participants will be encouraged to review as many of the purchased resources as they can to obtain an over-view of the type and scope of information that is available on the planetary and space sciences. Use of reprints from current journal articles and other periodicals/texts will comprise the majority of assigned readings as a means of ensuring they are timely, accurate, and relevant as possible.

An attempt will be made to enlist the services of guest speakers with special expertise in planetary programs to give a personal glimpse at the human side of the science. Additional, hands-on experience will be gained through visits to the Brown Regional Planetary Data Center and a nearby observatory to explore available resources and become familiar with the individuals involved in their operation. Moreover, time will be provided for the students to browse these resources and develop their own personal experiences (e.g., by viewing the planets through the observatory telescope).

Finally, each person participating in the course will be given a copy of a "final report" consisting of the class notes and an individualized set of 30 slides that will be selected from those used during class presentations. These slides will be provided at no cost and should in turn be used by the participants to help their introduction of planetary science topics directly into the classroom. Copies of this "final report" will also be submitted to the Rhode Island Office of Higher Education, the resource center at Rhode Island College, and the NASA/RI Space Grant office for distribution to school systems/teachers upon request or for future use in the teaching of similar courses. It is anticipated that a report of the successes and failures of this project will be presented during the next LPSC meeting; however, any interested parties are encouraged to contact the author for additional information, for a progress report, or to make suggestions on how to improve the project.