ENCOURAGING STUDENT INTEREST IN SCIENCE, MATH, AND TECHNOLOGY USING AN AUTHENTIC RESEARCH MODEL: FIRST YEAR RESULTS FROM THE MARS STUDENT IMAGING PROJECT. S. L. Klug[1], P. R. Christensen[1], K. Watt[1], P. Valderrama[1], and S. Watt[1], [1]Arizona State University, Mars Space Flight Facility, P.O. Box 876305, Tempe, AZ 85287-6305, sklug@asu.edu.

Introduction: The *Mars Student Imaging Project (MSIP)* provides the opportunity and pathway for educators to move students from studying science in an historical manner (i.e. text books) or passively observing scientists in action, to active participation in one of the still-remaining frontiers of science - the exploration of another planet - Mars. Dr. Phil Christensen, Principal Investigator for the THEMIS (Thermal Emission Imaging System) camera and long-time education and outreach advocate, recognized the opportunity to involve large numbers of students as actual researchers and has allocated a percentage of the THEMIS visible camera images to be targeted, acquired, processed, and analyzed by 5th grade through non-science major undergraduate college students participating in *MSIP*. The Mars Student Imaging Project curricula was created, written, developed, and tested by the ASU Mars Education Program staff, led by the efforts of curriculum specialist K. Watt and editor P. Valderrama. *MSIP* formally began beta testing the curriculum with student teams in March 2002, after the successful arrival and orbit insertion of the Mars 2001 Odyssey spacecraft and calibration of the THEMIS camera.

The *Mars Student Imaging Project* Overview: The *Mars Student Imaging Project* was designed:

- To engage students in authentic research and inquiry-based learning;
- To involve a large number of student teams on an annual basis via on-site visits to the Mars Space Flight Facility at Arizona State University in Tempe, AZ, through distance learning at their home institution, or through an archived data format;
- To actively recruit national participation by underrepresented groups (i.e. minority, rural, inner city, and female);
- To provide mentoring to the student teams through interaction with the THEMIS team members and ASU Mars Education staff;
- To provide guidance for teachers and students through the scientific process using the *National Science Education Standards*-aligned MSIP curricular materials;
- To provide Mars-related on-line resources for teachers, mentors, and students participating in the program.

Educational Implications of the *Mars Student Imaging Project*: Using the Constructivist approach to teaching, the academic and logistical support provided by *MSIP* for the student (and in some cases the teacher) was designed to increase their knowledge of current science and technology (using space science as the theme), but also to create a sense of ownership of the scientific process. *MSIP* models the authentic scientific process of inquiry and discovery and was modeled upon the actual process the planetary scientists use when they conduct their own research using THEMIS data.

MSIP students are motivated and challenged at many levels along a pathway of active engagement that extends their science literacy beyond the usual classroom experience of worksheets and simulations. *MSIP* involvement also facilitates in the development of core learning skills needed by all students, such as, synthesis and analysis skills, critical thinking and problem solving skills, and working within a team environment. The *Mars Student Imaging Project* utilizes an instrument onboard a NASA orbiter at Mars to help to reinforce these core skills, thus, providing a unique learning environment and experience for all involved.

***Mars Student Imaging Project* First Year Results:** The first year of the *Mars Student Imaging Project* has been extremely encouraging. The highlights of this year have included:

- The *MSIP* curriculum was reviewed by the NASA HQ Product Review Panel composed of scientists and master teachers and judged exemplary;
- 35 teams are currently active or have completed the *Mars Student Imaging Project;*
- Student teams (some states have multiple teams) from the following states have participated in *MSIP:* AZ, CA, IL, IN, NC, OH, MA, NY, PA, UT, TX, WA.
- The size of the *MSIP* teams has ranged from the minimum of 8 to 150 per team;
- *MSIP* has exceeded its goal of at least 25% minority participation for the *MSIP* on-site format;
- All three tiers of the *MSIP* format are now being utilized by educators (on-site, distance learning, and archive);
- *MSIP* has been successfully lead by non-science teachers;

- There has been a complete range of grade levels (5th grade through college) that have participated in *MSIP;*
- Teams are reapplying for a second visit to follow-up with more detailed research (i.e. infrared data for the same visible site);
- *MSIP* teams are now peer teaching the next year back at their home institutions, becoming the "local experts" and passing on their experience to the next set of students as mentors.

Future Directions for the *Mars Student Imaging Project:* *MSIP* was designed to be programmatic, thus spanning the continuous exploration of Mars. From the first results, it seems that there is a high interest in using *MSIP* as a portal to interest students in science, technology, and research. Follow-on projects that will be related to *MSIP* are already in development, as the requests from educators, or more importantly, from the *MSIP* students who ask, "What's next!" has been substantial. A longitudinal study of the impact of this project will be formulated in the near future.