

# Science Literacy and Research: Classroom Connections Using Kepler Data

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**Abstract:** Results of and future plans for education-related components related to educator participation in the NASA/IPAC 2011 Teacher Archive Research Program (NITARP) are presented. NITARP engages both formal and informal educators in conducting authentic science research utilizing publicly available Kepler Mission data sets under the direction of scientists.

## The Project:

This team's research entailed the analysis of photometry data from the Kepler archive. The analysis included comparing periodicity and temperature from a sample of 250 known variable stars, to determine their characteristics using light curves, power spectra, and phased-plot diagrams. Participating educators shared their research experiences with students, educators, and the public in a variety of ways. Additionally, students were directly involved in the research project, providing additional insights into how science research is conducted. Education activities related to the science research project are presented. NITARP provides educators, students, and the public at large, insight into the world of authentic science research while providing avenues to support science education. Linking the learning of science to the doing of science promotes true science literacy of students and the public. An understanding of the nature of science is vital to promoting the science literacy of civilization.



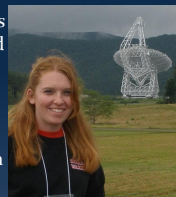
- \* Mentorship of under graduate students (Embry-Riddle Aeronautical University) in project analysis of Kepler data in order to compare stellar periodicity and temperature.

- \* Inclusion of research experience in teacher professional development and student outreach programs.



- \* Public and alumni, presentations introducing the project and related science, and importance to both science and education.

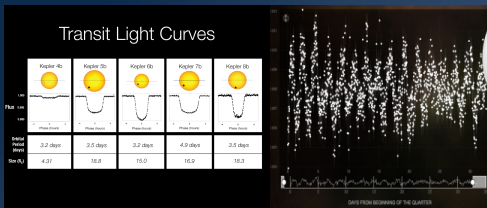
- \* Student and educator presentations introducing research methodologies and the use of Kepler light curve data.



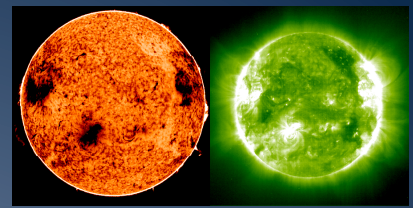
- \* Integration of authentic astronomical research into high school astronomy curriculum.

- \* Student exposure to careers in science, mathematics, engineering and technology.

- \* Creation of professional development programs for county Earth and Space Science teachers.



14 teachers attended the Phillips Exeter Academy Astronomy Education Conference in June 2011 and were introduced to the publically available Kepler data sets and online methods for reduction/analysis.



Teachers and students were introduced to *Multiwavelength Astronomy*. The Sun is shown here in both infrared and ultraviolet wavelengths. <http://coolcosmos.ipac.caltech.edu>

Using Kepler's Transit Tracks and Planet Hunter education resources, teachers and students investigate the nature of transits and determine stellar variability, periodicity (regular, pulsating, irregular), and mark potential transits.

**Summary:** This project provided the opportunity to conduct science research to enhance our abilities to communicate research as a vital component of improving scientific knowledge. Participation in and awareness of the project has allowed students teachers, and the public, to be exposed to the Kepler Mission and the importance of conducting scientific research in order to collect and analyze data to advance the scientific understanding of mankind.

**Future Plans:** Future plans include public talks regarding the project's science findings, student-conducted research using Kepler data, student outreach programs, and teacher professional development workshops. Additionally, we plan to compare our original dataset from Q1 with Kepler's Q3 data as well as investigate an additional set of stars to further substantiate our findings.



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