



The Spitzer Space Telescope Research Program for Teachers and Students: Program Summary



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http://coolcosmos.ipac.caltech.edu/cosmic_classroom/teacher_research/

Program Goal: To demonstrate the ability of teachers and students to conduct high-level astronomical research using the Spitzer Space Telescope.

Program Operation: This was a four-year joint project between the Spitzer Science Center (SSC) and the National Optical Astronomy Observatory (NOAO) that concluded in 2009 and has spun off a new program. Teams of teachers and students observed with the Spitzer Space Telescope and worked with Spitzer and NOAO scientists. Teachers received training in infrared astronomy, in how to conduct research, and worked at JPL to evaluate their data. Teachers also conducted professional development for other teachers. Teachers were selected from a larger cadre of teachers who had completed the NOAO Teacher Leaders in Research Based Astronomy program, which included a 15-week on-line class and observing at Kitt Peak National Observatory.

Program Products: Eleven major research projects were conducted by the program, 32 scientific posters have been presented at American Astronomical Society meetings, and a number of scientific papers have been published. Records indicate there have been nearly 100 newspaper, radio, and TV reports, and numerous Internet articles reporting on various aspects of teacher and student involvement in the project. Over 100 students feel the program has influenced them to pursue careers in science. This highly successful program has now become the NASA/IPAC Teacher Archive Research Project (NITARP), with funding from the NASA ADP program and the archives at IPAC.

Highlights are given below.

32 Teachers Trained

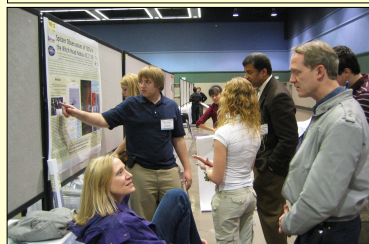


The teachers include Jeff Adkins - CA, John Blackwell - NH, Karen Borders - WA, Howard Chun - RI, Lauren Chapple - MI, Harlan Devore - NC, Velvet Dowdy - KY, Cris DeWolf - MI, Peter Gustella - NY, Rosa Hemphill - OR, Ardis Herrold - MI, Chelen Johnson - MN, Virginia Jones - ID, Susan Kelly - NY, Thomas Loughran - IN, Tony Maranto - NH, Chris Martin - AZ, David McDonald - MT, Jeff Paradis - NY, Vincent Pereira - NY, Peter Pittman - MN, Steve Rapp - VA, Theresa Roelofsen - NJ, John Schaefer - PA, Babs Sepulveda - CA, Linda Stefaniak - NJ, Tim Spuck - PA, Dwight Taylor - AK, Jen Tetler - WA, Beth Thomas - MT, Cynthia Weehler - TX, and Lynne Zielinski - IL.



TRAINING: Teachers/students attended work sessions at the Spitzer Science Center where they learned how to use MOPEX, SPOT, LEOPARD and other data analysis software and techniques. Thirty-two teachers and 79 high school students have visited the Spitzer Science Center and/or attended AAS meetings.

Spitzer Teachers and Students Deliver Nearly 200 Presentations - Reach Over 14,000



Thirty-two teachers and many more students involved in the project have been sharing their experience with other educators, amateur astronomers, and members of the general public. These presentations have taken place in their local areas, as well as in the state, national, and international arena. Some forums include:

- American Astronomical Society meetings
- National Science Teachers Association conferences
- State Science Teachers conferences
- Christa McAuliffe Planetarium
- Carnegie Science Center
- Hands-On Universe Conference in France
- INTEL Science Fair

High School Students using Spitzer Data/Research Receive Regional and International Science Awards

- 1200+ students use Spitzer data through the program,
- 105 students feel the program has influenced them to pursue careers in science,
- 45 students select careers in space sciences,
- 42 students involved in the project have entered science fairs across the United States, and they are bringing home top prizes.

Deer Valley High School, CA - Brielle Hinckley won 3rd place at the 2006 Contra Costa County Science and Engineering Fair. Thomas Travagli and Aleksandr Morton won 1st place at the Contra Costa County Science and Engineering Fair 2007 and 1st place Contra Costa County Science and Engineering fair 2008. 1st place California State Science Fair 2008.

Manhasset High School, NY - Ashley Peter, Will Wassmer and Rose Haber won 3rd place at the Robt. Haas Invitational Science Fair.

Mecosta-Osceola Intermediate School District, MI - Justin Boerma, Stephen Brock, Trevor DeWolf won Regional Science & Engineering Fair - Top Team Award and the Michigan Earth Science Teachers Association Award of Excellence in Earth & Space Science.

Oil City Area High School, PA - Danielle Yeager won 1st Place at 2008 Pittsburgh Regional Science & Engineering Fair - Engineering/Robotics Senior Division; Matt Walentosky won a top three award to move on to the 2008 International Science & Engineering Fair where he took 2nd Place in the Physics and Astronomy Division and the American Astronomical Society Sponsors Award; Nick Kelley won 1st Place in EarthSpace and Environment Senior Division and the Carnegie Science "Best of Show" Award. Matt Walentosky was a semifinalist in the Intel Science Talent Search 2009. Jennifer Butchart was awarded 1st place EarthSpace and Environment Senior Division, and one of only 3 students selected to move on to the 2009 International Science Fair where she took 4th place in the Physics and Astronomy Division.

Oregon Episcopal School, OR - Emily Petroff won the 2007 Aardvark Science Expo with 1st Place in Physics & Astronomy and Best of Fair Physical Science and the Priscilla and Bart Bek Award, a 2nd Place Award at the 2007-2008 Siemens Competition in Math, Science, & Technology and was a Semifinalist at the 2008 Aardvark Science Expo and 1st Place in Physics.

11 Research Articles Published

Steve B. Howell, D. W. Hoard, C. Brinkworth, S. Kafka, M. J. Walentosky, Frederick M. Walter, and T. A. Rector. Dark Matter* in Accretion Disks. 2008 Apr 685: 418-427.

Steve B. Howell, Carolyn Brinkworth, D. W. Hoard, Stefanie Wachter, Thomas Harrison, Howard Chun, Beth Thomas, Linda Stefaniak, David R. Ciardi, Paula Skolydy, and Gerard van Belle. First Spitzer Space Telescope Observations of Magnetic Cataclysmic Variables: Evidence of Excess Emission at 3-8 μ m. July 2006, ApJ 646 No 1 L65-L68

Rebull, L. M.; Stauffer, J. R.; Spuck, T. S.; Maranto, A. R.; Roelofsen, T. E.; Sepulveda, B.; Weehler, C. R.. Spitzer Observations of Young Stars in the Witch Head Nebula (IC 2118), 2006, IAU5, 237, 199

Articles Published in the 2009 Research Based Science Education Journal:
Identifying T Tauri Stars Using Small Optical Telescopes by Jennifer Butchart, Oil City Area Senior High School, Oil City, PA. Teacher: Mr. Tim Spuck, pages 24-32.

Investigating Star Formation in Lynds Cloud 981 by Rachele M. Siegel Oil City Area Senior High School, Oil City, PA. Teacher: Tim Spuck, pages 33-45.

Star Formation in Isolated Dark Nebulae: YSOs in LDN 981 by Justin Boerma, Stephen Brock, and Trevor DeWolf Chippewa Hills High School, Remus, MI. Teacher: Cris DeWolf - pages 46-56.

Articles Published in the 2007 Research Based Science Education Journal:
Spectral Analysis of Blazar S5 0716+714 using Spitzer Infrared Space Telescope and New Mexico Skies Telescopes by Aleksandr Morton, Manugeth Mulyavesala and Thomas Travagli, Deer Valley High School, Antioch, CA (Teacher Jeff Adkins) - pages 49 - 56

Galaxy Clusters: The Local Effects on Star Synthesis by Zachary Schroeder, Gross Pointe North High School (Teacher Ardis Herrold) - pages 66-79

Star Formation Rate in Three High-Redshift Galaxy Clusters: A Contribution to the Study of Galactic Evolution by Vinay Patel and Matt Pellegrino, Saint Joseph's High School, South Bend, IN (Teacher Thomas Loughran) - pages 80-94

Articles Published in the 2006 Research Based Science Education Journal:
Micro-Variability of 429-45 using the Spitzer Space Telescope, and Ground Based Telescopes by Brielle Hinckley, Deer Valley High School, Antioch, CA (Teacher Jeff Adkins) - pages 12-21



TOP-LEFT: Student Jessica Herrera, San Antonio, TX, interviewed SSC Director Dr. Tom Soifer for a story about authentic science research in the classroom for Texas Public Radio. Her interview was broadcast on station KSTX in San Antonio. **TOP-RIGHT:** Oil City students and teacher Tim Spuck get front page in the Sunday paper. Forty-eight newspaper articles, 37 radio broadcasts, 14 magazine/newletter articles, two TV broadcasts, and numerous Internet articles across the USA reporting on various aspects of teacher and student involvement reached an estimated 6 million viewers.