

# Spitzer & Beyond: The NASA/IPAC Teacher Archive Research Program (NITARP) is Recruiting New Teachers!

## High-level summary

The purpose of this program is to provide teachers with an authentic research experience in astronomy. In exchange, we ask teachers to leverage this experience via providing professional development for their colleagues in their local school districts. It involves several trips to collaborate with scientists and present the research results, all of which are paid for by the program.

## Background

The program formerly known as the Spitzer Research Program for Teachers & Students has been expanded to include the use of NASA archives, and as of 2009 is named the NASA/IPAC Teacher Archive Research Program (NITARP). The NASA Infrared Processing and Analysis Center (IPAC) and the Spitzer Science Center (SSC) are soliciting applications from educators with experience in astronomy and bringing research into the classroom or other educational venues to conduct research with a teacher team and a mentor scientist.

Educators who are part of programs such as NOAO RBSE [Research-Based Science Education], HOU [Hands-On Universe], and SOFIA [Stratospheric Observatory for Infrared Astronomy] were the *original* audience for this program and its predecessor, but other similar experiences now also qualify educators for participation; please contact us if you have questions. Educators not currently in the classroom but working in other venues such as planetariums or observatories are encouraged to apply! Again, please contact us if you have questions.

The NITARP teams will use archival data from:

- the Spitzer Space Telescope (one of NASA's Great Observatories)
- the NASA/IPAC Extragalactic Database (NED)
- the NASA/IPAC/NEExSci Star and Exoplanet Database (NStED)
- the NASA/IPAC Infrared Science Archive (IRSA)
- other NASA astronomy archive holdings. (See end for links.)

The purpose of this program is to provide teachers with an authentic research experience in astronomy using data housed at NASA's Infrared Processing and Analysis Center (IPAC) at the California Institute of Technology in Pasadena, California.

## Program components

The main program components involve multiple trips for which NITARP pays and a commitment from the teachers to educate others about their experiences, both of which are conducted over at minimum of 2 years. The specific program components are:

1. **Attending a NITARP workshop** held in Seattle, WA at the American Astronomical Society (AAS) meeting in Jan 2011. The purpose of this workshop is to learn about the basics of the NASA archives to be used, including learning about infrared light, to meet your team, meet your scientist, and define the research project to be conducted. The reason for attending the AAS meeting (and not just returning home immediately after the workshop) is to understand how AAS meetings work and to learn about current astronomy research; the time will also be spent continuing to work with your team to define your project. Your project may be something that you or another teacher in your group initiates, or it may be something that your scientist mentor suggests, or some combination of the two; your team will discuss it in person.

The AAS meeting starts the evening of Sunday January 9, 2011 and goes through Thursday January 13. Our NITARP workshop is currently scheduled for Sunday, January 9.

On the assumption that the workshop will be Sunday, you are expected to attend the AAS from Sunday January 9 – Tuesday January 11, 2011. Travel would then be conducted on Saturday January 8<sup>th</sup>, returning Wednesday the 12<sup>th</sup> or Thursday the 13<sup>th</sup>.

2. **Working long distance** with each other on a research program that uses data from Spitzer, IRSA, NED, and/or NStED, in conjunction with NOAO and NASA scientists, using telephone conferences (telecons) and internet-based resources such as email and a wiki (where everyone with an account on the system can edit pages, post images or proposal drafts, ask and answer questions, etc.).

3. **Meeting for 3 days** in Pasadena, California at Caltech (specifically IPAC and the SSC) to work on the data and to understand the science process. Each team will decide when to meet (dates TBD, probably – but not necessarily – in the Summer of 2011). This program is primarily for teachers, but in order to support your educational efforts, you may have the opportunity to bring up to 2 students per teacher to IPAC. The students must be heavily involved in the project; more details will be available to the teachers in the program.

4. **Attending the AAS meeting** in Austin, TX in January 2012 to present results of your project, both from a scientific and educational perspective. Again, you may have the opportunity to bring up to 2 students per teacher to the AAS.

Travel costs associated with these meetings (trip to AAS meeting to get started, trip to IPAC to work on project, and trip to AAS to present project results), within reason, are covered by NITARP.

5. **Serving as NASA/NITARP ambassadors** who will give 12 hours of professional development workshops in their home school districts. Each teacher will be expected to give

the equivalent in hours of 3 half-day professional development workshops in their district, or neighboring school districts, and at least 3 talks on the project (e.g., local, state, regional, or national teacher conferences) over the first 2 years of your time in the program.

The professional development workshops will focus on teaching about infrared astronomy and may use infrared teaching kits that we will provide to you. These kits will have infrared teaching videos and other teaching materials based on, e.g., the NASA SOFIA project infrared kit.

**6. Serving as mentor teachers** in the community of NITARP teachers. The *first year* that you are in NITARP, you spend most of your program time learning about infrared, Spitzer, IRSA, NED, NStED, the relevant software, the relevant science, etc. As a “first year” NITARP teacher, you attend an AAS meeting and a meeting at IPAC to further these goals.

Your *second year* commences with the second AAS meeting, and extends at least through the end of that school year. As a “second year” NITARP teacher, you are more experienced and spend most of your program time working with your students on the project, conducting professional development workshops, and interacting with other teams, e.g., on the NITARP wiki.

Since, as a second year teacher, you are attending your second AAS meeting at the same time as it is anticipated that new first year teachers will be attending their first meeting, explicit mentoring of these new teachers is encouraged.

*Third year* and later teachers, known as “NITARP alumni teachers,” are still encouraged to be part of the NITARP community. (All of the previous Spitzer teachers are now regarded as alumni teachers.) Alumni teachers may be asked to join new teams to help mentor the new teachers. Some funding may be available to bring alumni teachers (even those not explicitly part of new teams) to subsequent AAS meetings. Some funding and opportunities may be available for additional ground- or space-based follow-up observations to further investigate questions raised by your research project. Additional activities are planned to create a sense of community among all alumni teachers; some alumni teachers may be asked to help lead these activities.

Teachers are asked to submit regular reports to us at IPAC describing project-related activities (workshops, etc.).

**Important notes:**

- (1) If you apply, you are selected for this program, and you accept our offer of participation in this program, we will use your name in conjunction with media events (such as press releases) associated with the entire program. If you have concerns regarding the use of your name as associated with this program (e.g., your institution would not approve, or you wish not to be seen as affiliated with NITARP), this may not be the program for you. Please contact us at the address given below if you have specific questions.
- (2) If you apply, you are selected for this program, and you accept our offer of participation in this program, you will be traveling for the government as part of the program. As such, complex and potentially non-intuitive travel restrictions may apply. Although we will make every effort to avoid it, in some instances, you may be asked to float a balance

for your travel expenses over a credit card billing cycle before your reimbursement can be processed.

- (3) If you apply, you are selected for this program, and you accept our offer of participation in this program, (a) any students you bring need to be heavily involved in the program, and (b) you are *not* obligated to bring two students on the two trips with student participation. It is just fine to bring just one, or none, if you believe that your participation is best served by such a decision. This program's goal is first to give *you* the experience, and secondly (really, *through* you) your students. On the other extreme, if you raise your own money, depending on your team, you may be able to bring more than 2 students, but more than 4 is strongly discouraged. You may involve as many students as you want at your home institution.

## Summary and Timeline

1. **May 2010:** Release of this application
2. **1 August 2010:** Application website opens to accept applications.
3. **24 September 2010:** Deadline for application submission.
4. **Late September/early October 2010:** Applicants notified of application status (acceptance/rejection) and assigned to teams with mentor astronomer.
5. **January 2011:** Go to the American Astronomical Society (AAS) meeting in Seattle to meet the astronomer you will work with, and to get a sense of how astronomy research is done and presented.
6. **Spring 2011:** work remotely by e-mail and telephone with your astronomer to write a proposal to use archival astronomical data to address a specific astronomical question.
7. **Summer 2011:** Travel with up to two students to Pasadena to the Infrared Processing and Analysis Center (IPAC) at Caltech for 3 days to train in analyzing the data for your science.
8. **Fall 2011:** Use the knowledge gained at IPAC back at your school to analyze the data and write a poster presentation about your scientific results.
9. **January 2012:** Present your results at the AAS meeting in Austin.
10. **Rest of 2012:** Give 12 hours of professional development workshops in your community based on your experience in NITARP.
11. **Beyond 2012:** Stay as involved as you wish with the program with the possibility of becoming a mentor to share your experience with the next group of NITARP teachers.

## The Application

**Applications are due by 3pm Pacific time (6pm Eastern time) Friday September 24, 2010.**

All RBSE, HOU, SOFIA, or other comparably experienced educators are eligible. Teachers are expected to know the basics of astronomy and computers (e.g., what is a magnitude, what is a FITS file and how to use it, etc.). Fairly recent vintage laptops will be required for the IPAC/SSC visit, as well as the ability to install software on said laptops.

*It is important to note that that the program is likely to be oversubscribed and that not all teachers qualified for this program will be chosen.*

This program is primarily aimed at 9<sup>th</sup>-12<sup>th</sup> grade teachers but 8<sup>th</sup> grade and/or community college teachers may also apply. In the 2010 class, we had three educators who were not currently in the classroom, but fulfilled their NITARP responsibilities in other ways. Applications from non-classroom educators will also be considered in response to this solicitation for the 2011 class.

The NITARP teacher application consists of a series of short answers to questions, submitted as a PDF file to a website. (PDF files can be created from Word using the file print---save as PDF command.) The questions are below. Please include the various question headings before each of your answers (note that you can copy-and-paste from this PDF file). **There is no page limit, but brevity is appreciated. The application should be submitted to the website <https://cat.ipac.caltech.edu/nitarp/> (note https, not http) by the deadline. This website will be open and available to accept applications by August 1.**

Selection will be conducted by a committee composed primarily of representatives from IPAC/SSC and NOAO. Additional external representatives from, e.g., HOU are likely to also be involved, depending on the numbers of teachers applying from those other programs.

Teachers who have applied before but did not get selected are encouraged to apply again. All applicants will be notified of the status of their application within 3-4 weeks of the application deadline.

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**The web form includes:**

- Name
- School
- School Address
- School Phone Number
- Grades Currently Taught
- Subjects Currently Taught
- Mailing Address for Correspondence
- Email address for Correspondence

And a place to upload your PDF.

Your PDF should include short essay answers to the following questions:

1. Educational Background-General

Describe your educational background, degrees, and subjects studied. Relate how this background sets a foundation for being part of an astronomy research team. Why did you become a science teacher?

2. Educational Background-Specific

Describe your specific background in physics and astronomy, if applicable. Describe your experience with scientific research in general and with astronomy in particular. Be specific about

your involvement in projects and how it might relate to being a NITARP teacher. Describe your involvement in any NSF or NASA-funded education or research projects. Describe any grants you have received or leadership roles you have assumed.

### 3. Experience with Student Research and Productivity

Describe your role in encouraging student research. Describe how you currently use research projects in the classroom or other educational settings. List any student papers published in a student research journal or other similar venues. Describe other student research efforts in which your students have been involved. Describe in general how you have made good use of experiences that attempt to bring research into your classroom or your educational venue.

4. Describe your ability to participate in a long-term research project. Describe support of school district and administrators for your involvement in this project and ability to miss school. Be as specific as possible about the level of support and flexibility of your district. Are you able to attend all of the program dates set so far (i.e., the AAS meetings in January)? If not, please explain.

5. Describe very briefly your general plan for your 12 hours of professional development presentations/workshops associated with this project. How will you bring your NITARP experience back to your local environment?

6. Describe your aptitude for astronomical research and why you want to be part of a team of NITARP teachers. What educational or scientific strengths do you bring to the team? How will you integrate the NITARP experiences with your teaching? Are you able to function on a research team that may be under some pressure to meet deadlines? Do you have any ideas for research that can be conducted using Spitzer, IRSA, NED, and/or NStED?

**Applications are due by 3pm Pacific time (6pm Eastern time) Friday September 24, 2010.**

If you have any questions, please contact us via our central email at [nitarp@ipac.caltech.edu](mailto:nitarp@ipac.caltech.edu) -- email is likely to result in the fastest response, but if you would like to have a phone conversation, please contact us:

Dr. Luisa Rebull, NITARP Program Manager, 626 395 4565

- or -

Dr. Varoujan Gorjian, 818-354-2068

More information on the program can be found at

[http://coolcosmos.ipac.caltech.edu/cosmic\\_classroom/teacher\\_research/](http://coolcosmos.ipac.caltech.edu/cosmic_classroom/teacher_research/)

The wiki on which previous Spitzer Teacher Research Program and NITARP teams have shared the resources they have developed is here:

<http://coolwiki.ipac.caltech.edu/>

Other sites:

IRSA <http://irsa.ipac.caltech.edu/> Spitzer <http://ssc.spitzer.caltech.edu/>

NED <http://ned.ipac.caltech.edu/> NStED <http://nsted.ipac.caltech.edu/>