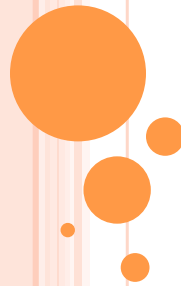
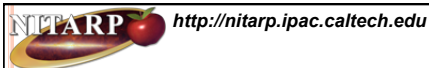


NITARP: THE NASA IPAC TEACHER ARCHIVE RESEARCH PROGRAM (OVERVIEW)



Luisa Rebull
06 Jan 2013



DATA IN THE CLASSROOM

- Four categories, with different audiences, challenges, goals:
 - Reproductions of simple or done projects, using real data (professional quality or really good amateur).
 - Essentially reproductions of done projects, using new data (or a combination of new+archival data).
 - Looking for new things in old data (e.g., citizen science).
 - Original research, professional quality new or archival data.
- Each is valid and worthy and important; each has a different footprint and reaches a different audience of educators and students and the public.
- ...But the last bin is kind of...empty. Reaches fewest people, requires most of participants, and is the most intense for participants.



WHAT IS NITARP?

- NASA/IPAC Teacher Archive Research Project. (IPAC = Infrared Processing and Analysis Center)
- NITARP has been going since 2009. In 2005-08, its predecessor was called the Spitzer Research Program for Teachers and Students.
- Goal is (and was) to *give educators an authentic research experience* using real astronomical data and tools.
- Educators then turn around and carry this experience into the classroom and beyond.



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BRIEF ASIDE: SCIENCE VS. ENGINEERING

- NITARP is going to be a science experience.
- (No reason it can't be expanded to engineering, but we haven't had the resources to do this.)
- So, what is the difference?
- Engineers build things, scientists learn about nature.
- Curiosity rover – engineers got it to Mars; scientists' jobs really start once it's there.
- There is a continuum of individuals, but mostly two populations, two cultures, etc. NASA has a lot of both, but more engr. And good missions/telescopes/facilities come out of the two groups working well together.



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NITARP <http://nitarp.ipac.c>

 **SarcasticRover** @SarcasticRover
I just got an text message from SCIENCE. It wants you to do it.
Expand




@sarcasticrover

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NITARP <http://nitarp.ipac.caltech.edu>

BRIEF (FUNDING) HISTORY

- The Spitzer program was funded out of the Spitzer EPO budget, which basically evaporated with Spitzer's cryogen.
- The NITARP program was rescued from the ashes and is now funded by the ADP program (if you see Doug Hudgins, THANK HIM) and the archives at IPAC (Spitzer, NED, IRSA, etc.).
- A healthy chunk of the money goes to teacher travel.
- We just got funding for another four years (YAY!), but are actively seeking more funding!



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EDUCATOR POOL

- We select our educators to be :
 - Very **savvy educators** (already capable of involving students in research or research-like experiences).
 - Reasonably savvy astronomers before we get to them, but **little/no experience in real (astronomy) research**.
 - Willing to commit to **fluctuating time commitment** over 13+ months, for **free**.
- National application process. (Due **September!**)
- This year, did very well – we had **~5x as many applicants as spots**.
- Big class, some of you with restrictions on having students, because we couldn't pick among you! ☺



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AN APOLOGY (1)

- Historically, we have been aimed at high school classroom educators, and this is still our largest contingent.
- First expansion was to 7-8th gr (in 2004-2008 era).
- Second expansion was to comm. coll. (2010).
- Then amateurs (2011).
- Then museum educators (2012).
- Now (2013), formally including 'lurkers' – other folks not in classrooms, not in museums, but in higher-level positions (we hope both NITARP and their institutions can mutually benefit).

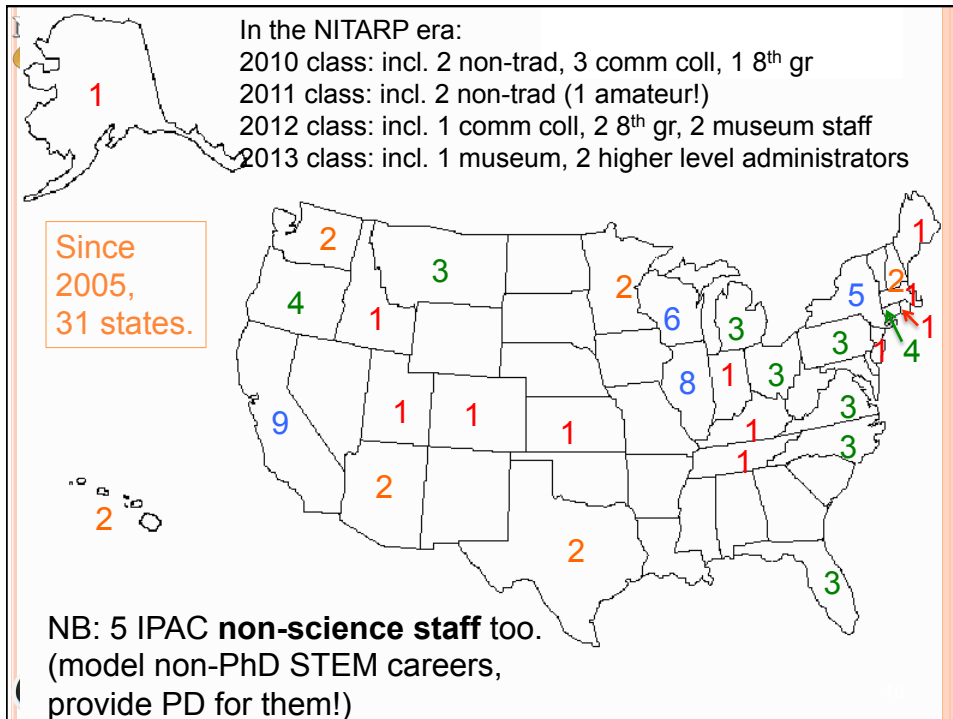


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AN APOLOGY (2)

- Classroom teachers are still the majority.
- As such, we do often slip and call you all 'teachers'.
- We are trying to do better and call you all 'educators.'
- I AM SORRY IN ADVANCE...



SCIENTIST POOL

- We select our scientists to be :
 - Very **patient**. Educators are skilled but not undergrad students.
 - Able to help team come up with a project that **MUST** be done **within a year**, no deferrals.
 - Willing to **step in** and rescue team (quickly finish reducing data, code something up, etc.), if team becomes too frustrated.
 - Willing to commit to **fluctuating time commitment** over 13+ months, for **free**.
- Each team has a **mentor teacher** (who has been through program before) to act as deputy lead, translating for both camps, which helps everyone.
- All essentially local, experienced scientists (so far).
- Have let scientists work independently, manage their teams, with support if they want it.



MAIN PROGRAM COMPONENTS (1)

- *Group of educators teamed with a scientist mentor; work to develop a science research program, do it, write it up.*
- Educators & scientist mentors attend a start-up workshop at a winter AAS (Jan 2013).
 - Workshop includes intro to program, etc.
 - Learn about how AAS meetings work.
 - Start to define project, exchange contact information.
 - (We pay for teacher travel.)
- Work long-distance with the team to write a proposal. (due **8 March 2013!!**)
 - Must use data from Spitzer, IRSA, NED, and/or NASA Exoplanet Archive.
 - Use telecons, internet-based resources such as our wiki, etc.
 - Proposal will be reviewed! (More on this later.)

You are here!





MAIN PROGRAM COMPONENTS (2)

- Meet for 4 days at IPAC to work on the data and understand how science works (Summer 2013).
 - Each team decides on a mutually acceptable date – **YOU SHOULD DO THIS TODAY!**
 - Each educator may bring up to 2 students to this visit; students must be heavily involved in the project. [*what if more students? what if no students?]
 - (We pay for educator/student travel.)
 - (Work remotely before and afterwards, using online resources.)
- Present results of the project in AAS posters (Jan 2014).
 - At least 2 posters: Science and Education.
 - Again, each educator may be able to bring up to 2 students; students must be heavily involved.
 - (We pay for educator/student travel.)



ASIDE: WHAT IF NO STUDENTS?

- This program is for **your enrichment first**, because of your leveraging potential.
- If you are a classroom educator:
 - You do not **HAVE** to bring students. If no one 'steps up', or you run into bureaucratic snags, or you would be more comfortable learning yourself first, or you feel your own learning would be enhanced if you were alone, **THIS IS FINE.**
 - We leave it to you to figure out (if) who to bring. Pick the leaders, or the ones who would benefit the most, or the smartest, or the ones who want it the most. You're their conduit; you gotta work with 'em!
 - Resources donated from past participants for student selection are on the website.
 - Talk with your mentor teacher, your scientist, your team.
 - Talk to the 2012 participants while you're here!





ASIDE: WHAT IF NO STUDENTS?

- If you are **not** a classroom educator:
 - We suggest NOT bringing students. We've had problems before.
 - (Many of you were offered a NITARP spot with the understanding you weren't bringing students on our dime.)
 - Additional *adults* change the chemistry more substantially than additional students, so please don't raise money to bring more adults.
 - Be mindful that your teammates will be bringing underage students (who often do not look underage).
 - You can work with whoever you want back at home!
 - **Think about how you can best leverage your participation, given your resources.**
 - Talk with your mentor teacher, scientist, team.
 - Talk to the 2012 participants while you're here!



ASIDE: MORE STUDENTS?

- Of course, all of you can involve as many folks (of whatever age) as you want at home, to whatever degree makes sense to you, on whatever timescale.
- If you were accepted with the offer of supporting students, we can pay for **up to 2** students to come on the summer visit and next year's AAS.
- You can raise your own money to bring **up to 2 more**.
- We **strongly** recommend no more than 4 (then you spend all your time shepherding rather than learning).
- The students you bring in the summer need not have to be the same ones you bring to the AAS – though they often are!
- Talk with your mentor teacher, your scientist, your team.
- Talk to the 2012 participants while you're here!



MAIN PROGRAM COMPONENTS (3)

- Educators serve as NASA/NITARP ambassadors.
 - 12 hours' worth of professional development workshops, talks, etc. over 2 years.
 - We help provide some of the tools to use.
- Educators report back to us all the cool stuff accomplished in connection with this. (Please do not forget!!)
- Some educators serve as mentor teachers to the rest of the NITARP community of educators and students.



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MENTOR TEACHER CONCEPT

- Now have ~70 educators who have been through the program, and almost uniformly they want to do more; they don't want to stop after just 1.5-2 years!
- “First year” educators are the brand new ones (first AAS, first IPAC visit, learning the ropes).
- “Second year” educators start with their second AAS, (conduct workshops, work with students, etc.).
- “Third year” and later educators = alumni. Some join new teams as mentors. Some are involved in follow-up research of their original project using other telescopes. Some are involved in the proposal review. (I also bundle 2nd yr into ‘alumni’.)



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WHAT WE EXPECT EDUCATORS TO KNOW

- How to work your computers. How to install software on your laptops.
- The basics of modern astronomy (what is a magnitude, what is a color-magnitude diagram, what is a FITS file).
- How to turn around and use research experiences in the classroom (or equiv).
- (If you feel you are weak on any of these, talk to your team for help -- someone on your team knows, or try other teams!)



WHAT WE WILL HELP EDUCATORS LEARN

- Basics of infrared (? [your wavelength here]) astronomy.
- Basics of your data (telescope, operations, data) and the other archives (contents, usage) as needed.
- Basics of software usage (e.g., ds9, etc.).
- “How the sausage is made” -- what takes time, what goes fast. (and some surprisingly obvious things...)
 - “Astronomers are normal people.”
 - “There is more programming involved than I realized.”



WHAT SOFTWARE WILL WE USE?

- It varies from team to team.
- Right now, your projects range over 5 orders of magnitude in wavelength – 0.1 μm (optical) to $>600 \mu\text{m}$ (FIR).
- Astronomers tend to use a wide variety of tools – they use whatever works fastest to accomplish the task at hand, and this will vary from person to person. (→)
- Some of you will be doing photometry, maybe using APT (demo on **Monday 9:30am**, IPAC booth; poster on Tues).
- Some of you will care about spectral energy distributions (SEDs) (demo on **Monday 3pm**, IPAC booth).



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...OR SOMETIMES WE TURN THE COMPUTER AROUND.





You are here!

FIRST AAS MEETING

- Day-long workshop to learn the basics, meet your team.
- Learn about your science topic, start on your proposal.
- Block off some dates for a summer meeting.
DO THIS TODAY.
- An alumnus (“mentor teacher”) is the scientist’s deputy for the team.
 - They will help a LOT because they’ve done this before.
- AAS meetings can be overwhelmingly busy!
 - We have a worksheet/treasure hunt (more later).



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AAS MEETING 1 – JUST ONE TEAM



2008 class



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AAS LAST YEAR – JAN 2012

2011 class finishing up; 2012 class getting going!



...Even bigger group this year!

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AFTER THE FIRST AAS

- Over telecons and e-mail, write proposal, learn the basics of the science and tools you will use.
 - Proposals due **March 8**.
- Keep working through the Spring in preparation for the Summer. (Journal club? Early data work?)
- A LOT of material already on how to do work with Spitzer+2MASS data is on our wiki, and some on Kepler too. (Scientists/mentor teachers probably will want to develop more.)
- We welcome any more material that you develop that you would like to share.



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WORKING REMOTELY

- Have you worked across time zones before? (important throughout year.)
- We have a **wiki** on which people can share information – text, discussions, instructions, examples, images, files. (Other long-distance collaboration tools blocked by schools!)
- **School email breaks** often – attachments vanish or entire mail vanishes. (Fall back to gmail [et al.] if any problems.)
- We strongly encourage **regular telecons**, via Skype or tollfree number (or G+ hangouts; join.me also has nice screensharing though no audio). *If you don't do this, team often dysfunctional.* **SET UP A REGULAR TIME TODAY.** Really. We mean it.



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VISITING IPAC

- 4-day IPAC visit (Pasadena, CA).
- Will meet more people from IPAC (including non-astronomer staff).
- Very very busy 4 days!
 - 0.5 day usually is a JPL tour.
 - If you want to do more (SOFIA?), you have to do it beyond our 4 days.
- Historically 3 days; offered 4th in 2011 as “training wheels” – e.g., you guys work without scientist in the building but also not far away, modeling what you will do at home. This seemed to work really well, will repeat.



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ONE TEAM'S SUMMER VISIT



2011 -
Bright
Rimmed
Clouds



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AFTER THE VISIT

- Work on the data while you visit and more after you go home.
- You then write up your results for the AAS, both science and education.
 - For the science, an educator should be the lead author. We try to encourage teachers rather than students to lead this. Could be mentor teacher, need not be.
 - For the education, an educator is expected to be the lead author, and include the whole team as appropriate.
 - If merited, your scientist will lead a paper for a refereed astronomy journal.




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

A 2010 team




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

12 HOURS OF 'SHARING'

- Generally can't stop educators from sharing ☺, but **closing the loop** is hard.
- You know about our **12 hour PD obligation** going in, and had to write up tentative plans as part of your application.
- But, we know your **plans will change** in a year, and thus we are very flexible in what we 'accept' – basically, want you to share the experience:
 - Workshops/Lectures (school, local, regional, national)
 - Articles (you write, or are interviewed for)
 - Anything else ...

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NEXT STEPS

- This is open-ended by design, and ‘success’ is measured differently for each team.
- (Formal assessment is being tried for the first time THIS YEAR, so you are the guinea pigs.)
- Are there follow-up observations that would help? Some KPNO or Spitzer time may be available, or we can approach other observatories. Talk to your team!
- Can you do a similar analysis on your own of a different object?
- Mentoring the new folks...



JUST SOME NOTES...

- At some point in this process, you will probably feel overwhelmed. Maybe you already feel like you’re in the deep end of the pool.
- This will ebb and flow over the course of the meeting and the year, *I guarantee it.*
- Talk to your mentor teacher. Talk to your scientist. *Talk to your teammates.*
- Everyone brings different strengths and weaknesses to your team. You’re all in this together!
- I have a “major milestones” document for you with a summary of most of this talk.
- If it doesn’t feel like you or your team is “on track” *talk about it!* Talk to your scientist, mentor teacher, me, or Varoujan. Maybe you need a nudge back on track. Maybe your team really actually does need to do something different than the ‘standard path.’



WEBSITES

- <http://nitarp.ipac.caltech.edu/>
- <http://coolwiki.ipac.caltech.edu/>
- First one is “public face” and will have a profile for each of you soon (it is also being completely overhauled). Second is working area – you will have accounts as soon as I can. In both cases, I need **team names** to finish this process.
- We will post talks from today when we get a chance (also “soon”).
- There is a ‘policies and procedures’ area on the NITARP site that includes all sorts of good stuff. (to be ‘resources for participants’)



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TRAVEL ANXIETIES

- Much of your participation in this is travel.
- I think this is cool!
- But this seems to cause the most angst, phone calls, money stress, etc.
- *The faster you turn in receipts, the faster you get your money back.*
- I consolidated EVERYTHING, all the most frequently asked questions, helpful advice, etc. into a multi-page travel advice document. (You got a version customized to you at the beginning of this process, and will get another one customized to each of your next trips.)
- **PLEASE PLEASE PLEASE read and follow those instructions!**



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RETURNING TO THE PRESENT...(1)

- The rest of today has two big blocks of time to work with your team.
- TAKE ADVANTAGE OF THEM.
- Rearrange things if you have to, e.g., don't pick up registration materials until after 5 if you need to.
- START THE HEAVY USE OF EMAIL NOW. Get the communication channels lubricated. After today, you should be able to 'hear' each other's voice in your head as you read emails. Make sure you are not in anyone's spam filter.



RETURNING TO THE PRESENT...(2)

- We found, from past years, that the one thing that educators wanted us to do was help them get good press (literal and virtual) at home.
- Towards that end, we collected media and administrative contacts from you.
- We will put out a press release TUESDAY with a few words advertising this class and the prior class's results.
- If you gave us no contacts, it's up to you to relay the release.





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



JET PROPULSION LABORATORY CALIFORNIA INSTITUTE OF TECHNOLOGY

MEDIA RELATIONS OFFICE
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Whitney Clavin 818-354-4673
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EMBARGOED UNTIL Jan. 11, 2012 9:20am CT

TEACHER PROGRAM BRINGS NASA RESEARCH TO HIGH SCHOOLS, MIDDLE SCHOOLS, MUSEUMS

Imagine you are a high school student walking into your science class in September and you learn that your teacher is doing research with NASA and you can actually participate.

This experience is occurring in schools around the US as more and more teachers become part of the NASA/IPAC Teacher Archive Research Program. 2012 marks the program's 8th year.

This program partners professional scientists with (primarily) high school teachers to carry out an original research project and present the results at the semi-annual meeting of the American Astronomical Society, the professional organization for astronomers in the US.



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

SOCIAL MEDIA

- Tweet away!
- Follow Wil Wheaton's law (see here if you need to look it up: http://en.wikipedia.org/wiki/Wil_Wheaton)
- NITARP hashtag is #nitarp
- There is a Facebook NITARP group – let me know if you are not a member, and/or add your students if you want.



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LIST OF SPECIFIC TASKS FOR TODAY

- (Interspersed with listening to the rest of the talks here.)
- Mark 8 March 13 on your calendar as the NITARP proposal deadline.
- Get started learning about your science.
- Pick a summer visit date (or window for dates) so people don't double-book.
- Pick a time/day/frequency for a regular telecon.
- Pick a team name (so I can get you on the wiki and main website).
- Plan a time tomorrow and/or later this week to meet again to keep working.
- Get a group picture! ☺ How about now?

