

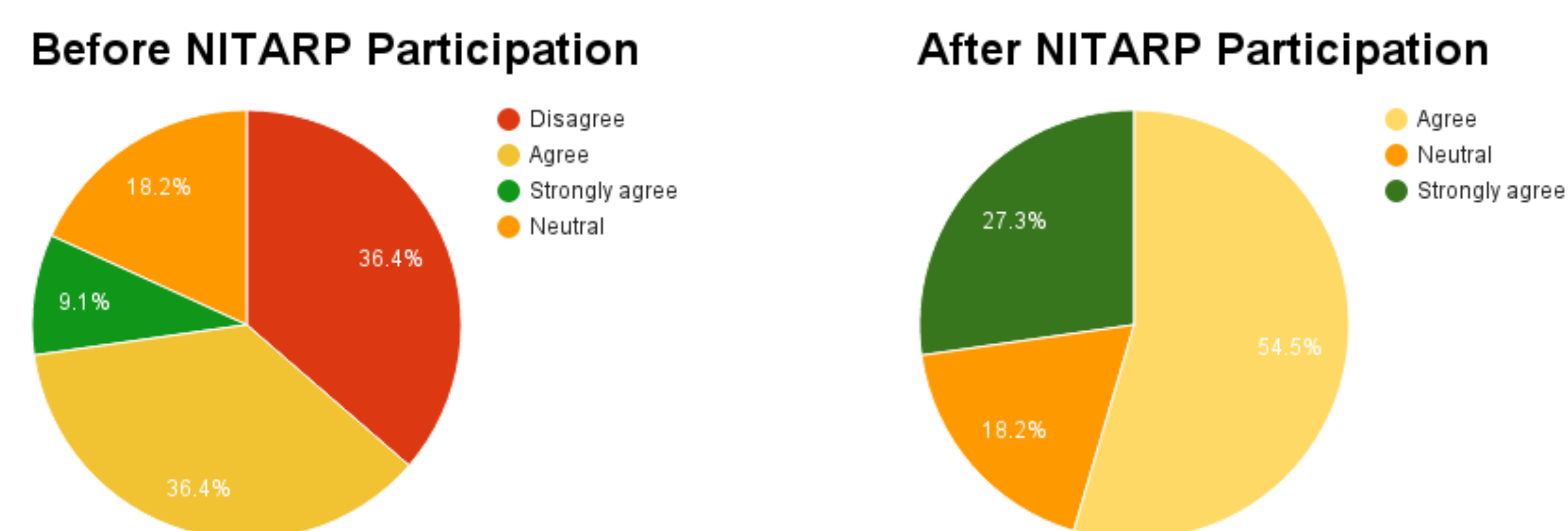
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**Abstract:** The NASA/IPAC Teacher Archival Research Program (NITARP) provides secondary teachers and their students with an authentic, high-level research experience. NITARP participants work alongside one another as colleagues, allowing both teachers and students to experience the challenges of actual research. Teachers and students learn that science does not always follow the prescriptive methodology taught in most high schools. Current NITARP students and teachers were interviewed on how their perceptions of the methods by which science is really conducted changed over the course of the program. Following participation in the NITARP program, both teacher and student perceptions of how science operates were found to have changed in many ways.

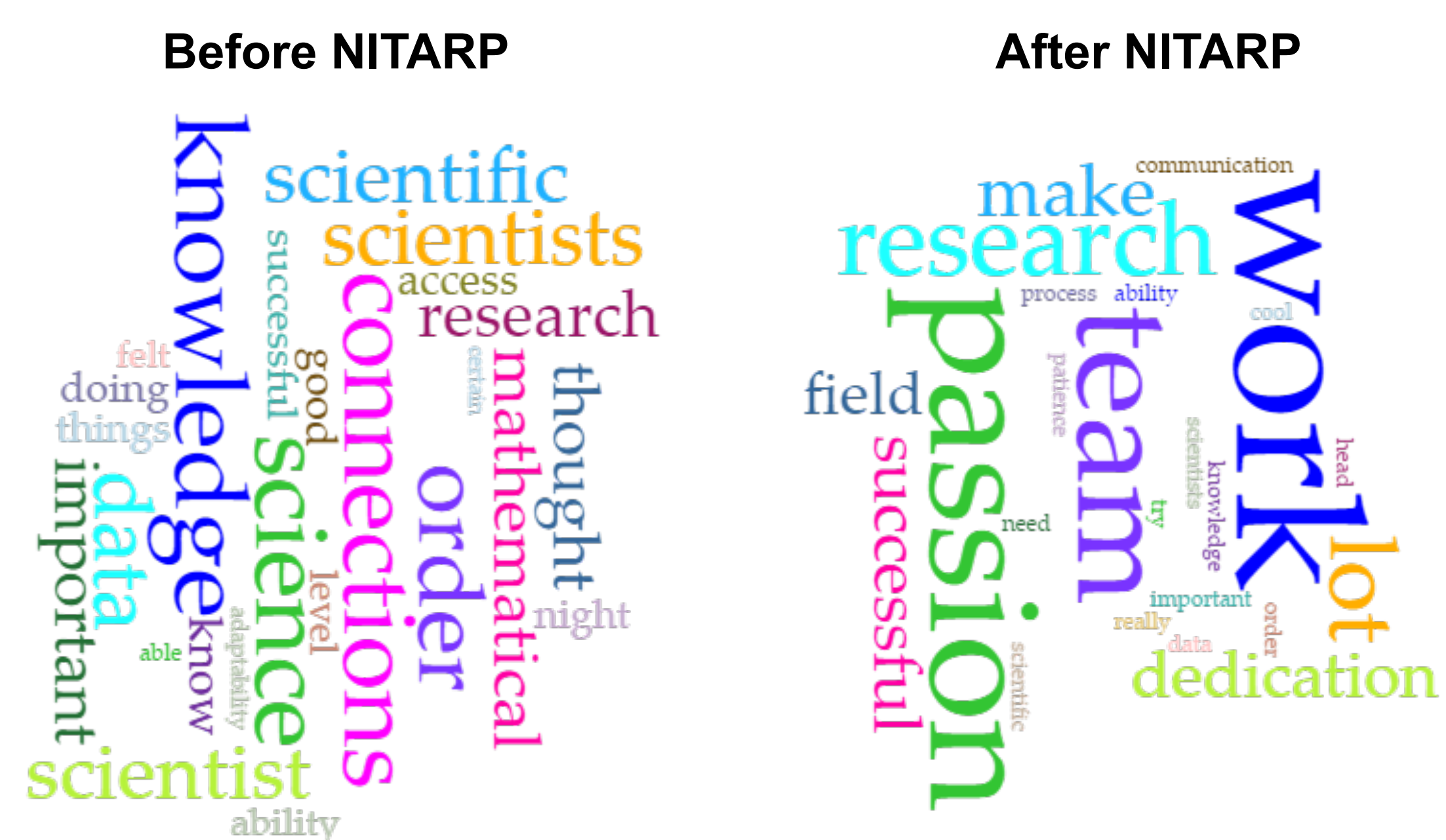
## Teachers and Students: We Have What it Takes



## NITARP Improves the Understanding of How Science is Done

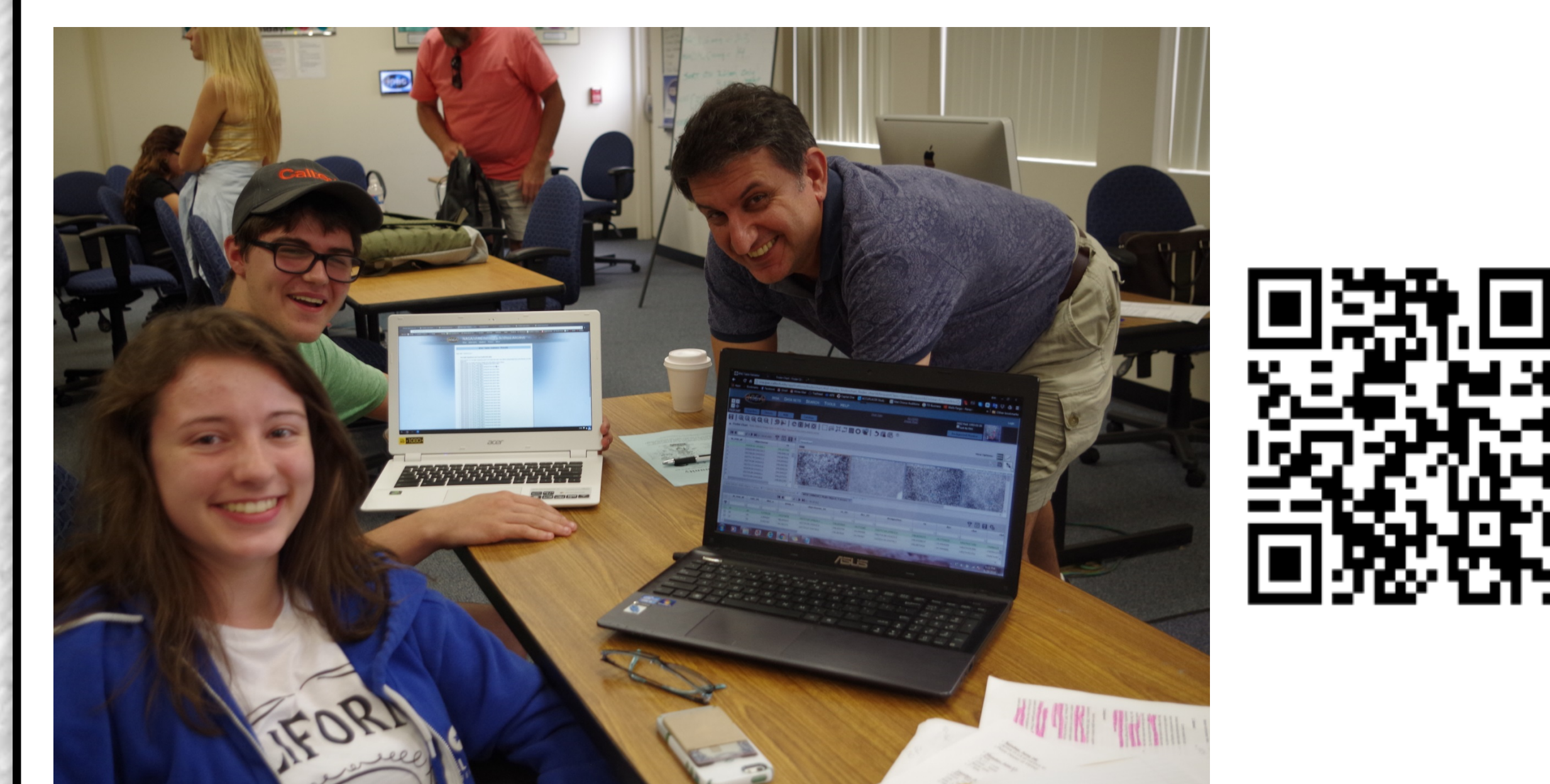
- “The scientific method, more than anything, must be open and flexible”
- “The scientific method cannot be narrowed down to 6 simple steps. The process is very much ingrained in trial and error and coming up with new solutions to problems.”
- “The process is focused but open to react and respond to learned outcomes - very circular.”

## Perceived Attributes of Successful Scientists



## Gaining Confidence to Talk About Science

- “I have sparked more scientific conversations with people in classes. I speak differently in these conversations because now I am more confident with what I talk about.”
- “I think I'm talking about science a little differently, with more focus on the scientific process than just the topics.”
- “Coming through NITARP allowed me to realize that being passionate about science is a beautiful thing. I'm much more likely to be open to rambling on about space, or blowing my friends' minds trying to explain quasars. NITARP reignited the "nerdy passion".



Teachers, Students, and Scientists Working Together



## Research: Onsite at Caltech + Teleconferences = Success

- “I was surprised how greatly we all connected with each other. We all became friends and trusted each other in such a short amount of time.”
- “I didn't expect that we would grow so close after connecting during just five days.”
- “I had expected the communication between group members to be more regular and for people to get back to each other faster, but that didn't always pan out.”

## NITARP is Unique Among K-12 Professional Development for Teachers

- “It was different because I had to do it with a large group.”
- “I felt more in control of the system, able to shift and manipulate it as I progressed through the scientific method rather than having to conform to it and feel as though it were stifling my creativity.”
- “NITARP felt different than previous research I conducted in that I felt what I was doing was actually something new and important.”

## Teachers and Students as Peer Researchers

- “It was interesting to see them struggle with the same things that I did. It truly humanized them, and I think it strengthened both my relationship with them and my respect for them.”
- “The students often bring a new perspective to things that maybe we as teachers might not have any longer.”
- “I got to re-experience what it's like to be a student faced with a difficult challenge; the wondering whether or not to ask a question; the struggle to make sense of the work being done by others around me...I think these experiences will make me a more empathetic and effective teacher.”

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