

Final Report:

Advancing Theoretical Astrophysics: a unique summer program designed to increase diversity in theoretical/computational astrophysics

Motivation/project:

The ability to explore fundamental questions related to the nature of our universe is sadly out of reach for a large segment of society. The fields of theoretical and computational astrophysics are demographically among the least diverse in all science, and these demographics have unfortunately changed very little over the last few decades. The lack of progress is likely due to several factors, including implicit bias in selection, but also the dearth of role models and stereotype threat, which can prevent many young people (particularly women and underrepresented minorities; URM) from even trying. Science itself suffers because of this - new ideas and perspectives are missed when certain groups are both overtly and subtly excluded from participating in the conversation.

In order to tackle this problem, a group of top international, and also predominantly URM, researchers in the field (led by Prof. Sera Markoff, UvA) to develop the [“Advancing Theoretical Astrophysics” summer school](#), at UvA's Science Park Campus, 15-26 July, 2019. The two week intensive school targeted early-stage graduate students with a BSc degree in (astro)physics, with a primary goal to provide skills and confidence needed to pursue theoretical studies.

Project Outcomes:

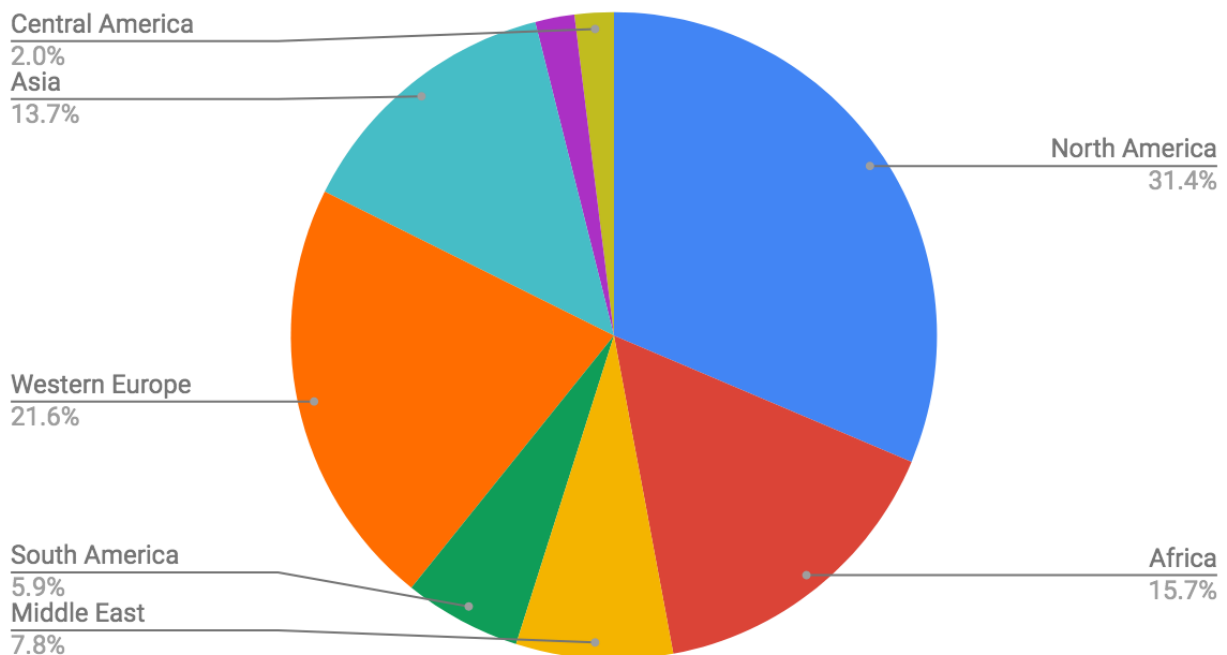


The ATA summer school was an unmitigated success. Please see the [website above](#) to find details about the organisation, curriculum, participants.

We had 51 students from all over the world, including the EU and North America, but also Argentina, Burkino Faso, Columbia, Ethiopia, India, Iran, Lebanon, Mexico, South Africa and Sudan.

In addition and a majority of students identified as under-represented minorities within astrophysics. This was not accidental, as we had over 205 viable applicants and selected based on several factors, including quality but also how much we felt the student would benefit from the school, as well as indications of community mindedness in their applications (we asked specifically about this) to see that the students who benefit might also help others in their environments by passing on materials and skills. All of the curriculum including tutorials is online on our Github site, and we are working on building a software container to make it even easier for students to just download everything as a virtual machine, which was the format we used for the school. Aside from scientific skills we had workshops on complementary skills such as giving presentations, self-care and networking/mentoring.

Count of Current Geographical Location

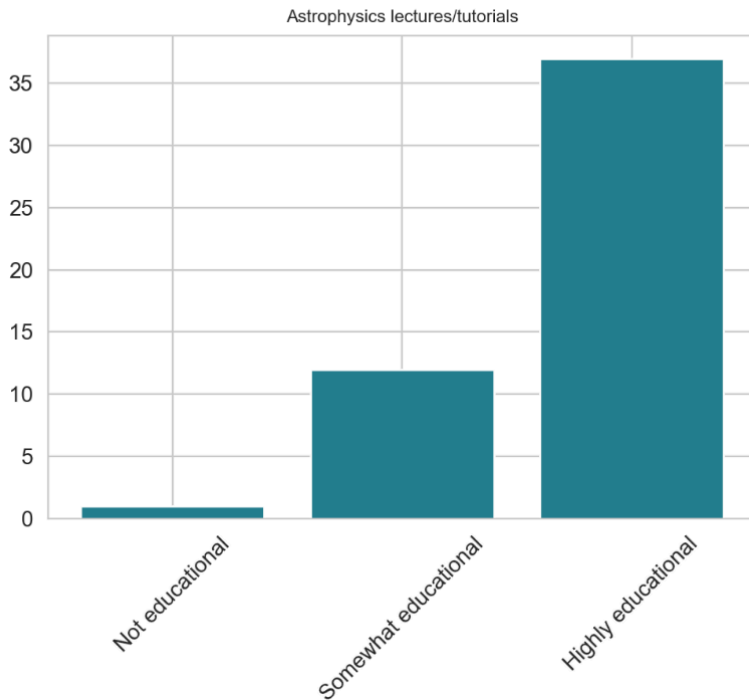


To continue the community building, after the school we assigned each student 1-2 mentors from the teachers or from our extended networks, and created a Slack community group for continuation. The students also formed a close network, and stay in touch via Slack as well as WhatsApp and Instagram groups.

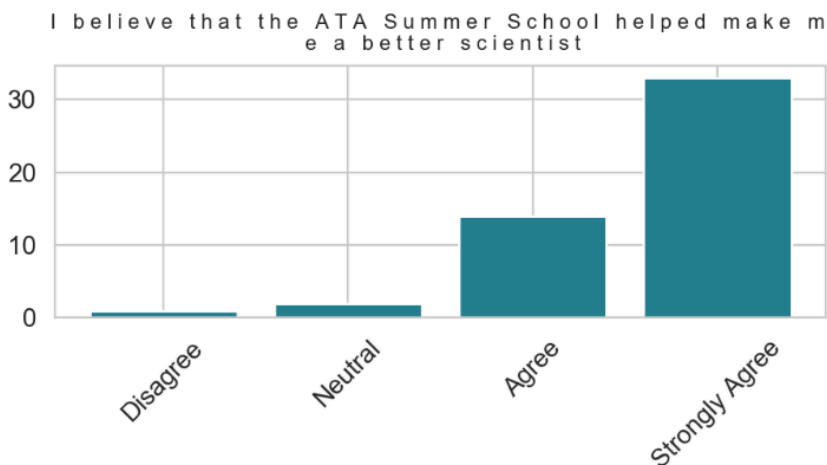
As a followup, using funding from Markoff's VICI, there will be a workshop in 2021 where some of these students will have expenses paid to attend and present their research.

We used Google Forms to do an extensive evaluation on the last day, and got overall very positive feedback. *Some examples of the evaluation feedback in chart form and quotes are appended at the end of the report.*

Evaluation Feedback Quotes & Graphics (excerpts)



“This is the best workshop I’ve ever attended. I learned a great deal about physics, made friends from all over the world, and learned life lessons. I feel rejuvenated and motivated for the next year of grad school, and ready to tackle a wide range of problems that I might experience both in research and social situations. I would never have had the chance to meet so many people from such diverse backgrounds if not for the school. I’m incredibly grateful to the organisers for their hard work.”



“I learned a lot about what physics/astrophysics could be. I have never felt this sense of openness and acceptance in physics before. The way every lecturer interacted with us the students were friendly and made me feel no pressure in having to prove that I am smart enough. This is honestly what I will take away the most from this school, what physics classrooms and community can be. Where there is no stifling power dynamic

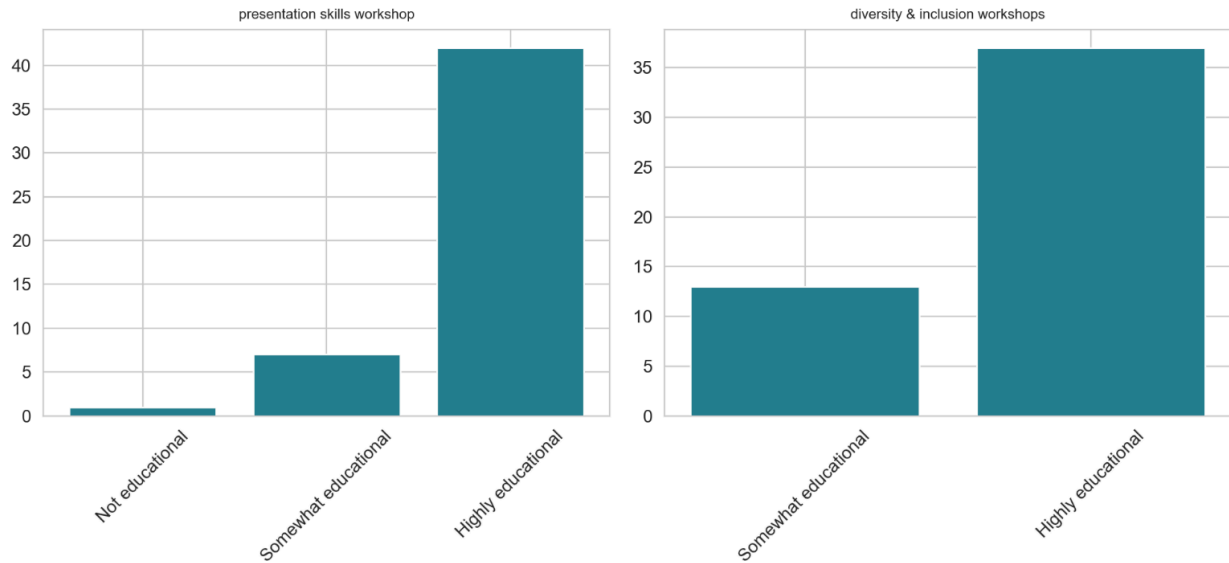
between people and everyone recognises each other as humans.”

“People who look up to then sky for beauty end up connecting very easily, its the best way to realise our collective humanity, and nothing portrays that better than variety and diversity of relationships cultivated in a short amount of time at this school”

“This made me realise this is what true international collaboration should aim to be. I felt very fortunate to learn from them and to exchange different cultural ideas. I feel very grateful towards the organisers who made it happen and the participants who I felt were very different and similar in both ways.

I think the most important thing that I learned here was a sense of perspective and community through interacting with other students. Because we all come from such different backgrounds and have such difference perspectives, I was able to learn a lot about the worldwide academic community, and the worldwide astronomy community. I can already tell that the community and connections I built here will be

I believe that the ATA summer school was useful fo



hugely beneficial to me. And the experience of interacting with such a diverse and welcoming group of peers has been so heartwarming. This experience helps me to have the courage that I need to face the challenges of being a woman in astronomy.

I also gained a lot of general experience and comfort with coding and bash commands. While it might take me some time to be confident with any single code we worked with, I now have the tools to figure any of them out and I feel much more comfortable exploring and trying things.”