

SATTAA2024

San Antonio Teacher Training Astronomy Academy

INTEGRATING ASTRONOMY **CONTENT** WITH
STEM LEARNING **PEDAGOGY** AND
TECHNOLOGIES.



LEARNING ONLINE
JULY 15 - 19, 2024

The University of Texas at San Antonio

UTSA

FOREWORD

Astronomy can inspire the public like perhaps no other scientific discipline, despite the reliance on difficult concepts, mathematical foundations, and on engineering and technology. It is thus a privileged discipline to inspire STEM/STEAM education. The San Antonio Teacher Training Astronomy Academy (SATTAA) brings together content experts in astrophysics with educators who are at the forefront of STEM learning. We hope you will find the program, and the community of practice you are joining, to be enriching personally and to enhance your future teaching of astronomy content in your classrooms.

We are delighted to welcome you to SATTAA2024. Thank you for taking time to join us; we can't wait to talk astronomy and astronomy education with you!

Carmen Fies & Chris Packham, University of Texas at San Antonio



Statement of Interactions

In an ideal world, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. In this workshop, we attempt to present knowledge from a diverse group of scientists, but limits exist on this diversity. We acknowledge that it is possible that there may be both overt and implicit biases in the material even though the material is primarily of a scientific nature. Integrating a diverse set of experiences is important for a more comprehensive understanding of science.

Please contact Carmen or Chris, or submit anonymous feedback, if you have any suggestions to improve the quality of the course materials. We hope to create a learning environment that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.). To help accomplish this:

- If you have a name and/or set of pronouns you prefer, please let us know.
- We (like many) are still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to us about it (anonymously, should you prefer).
- As a participant in discussions, we strive to honor the diversity of your colleagues and we encourage everyone to critique ideas, not people.

ZOOM Link

All registered participants will receive a link to a Zoom Room via email. The link is not included in this program to protect participants from potential intruders interrupting the learning journey.

Participant Stipends

We are grateful to our friends at B.E.A.T. for sponsoring participant stipends this year. Teachers admitted into the week-long program who complete the sequence in its entirety will receive \$1,000. Teachers who are wait-listed and opt to complete the program regardless will, however, not be eligible to receive the stipend.



Changed Science TEKS

SATTAA2024

Beginning with the Fall of 2024, the Science TEKS follow a new sequence. Although many of the items remained intact, the new TEKS include a reorientation towards integrating science and engineering more explicitly, and strengthens associated mathematical practices. In the Astronomy TEKS, this is evident in the first statement which, instead of noting *scientific processes*, now explicitly speaks to *scientific and engineering practices* (Science.Astro.1). In addition, the new Astronomy TEKS require students to practice communications that are typical of scientific and engineering contexts (Science.Astro.3.8), to become informed about the types of astronomical tools in use and their limitations (Science.Astro.10), and to pay attention to ancient models of the universe (Science.Astro.5). These shifts are, however, not unique to the new TEKS for astronomy. All science TEKS, including those for elementary school students, now emphasize cross-connections and foster communicative practices more explicitly.

SATTAA2024 offers participating teachers direct support in transitioning to the new TEKS by developing four strands of astronomy content. Our intent is to present an integrated STEM view of current astronomy knowledge and practices:

Underlying Science	Space Exploration	Telescopes	Cultural Connections
The Electromagnetic Spectrum	Europa Clipper	Dark Skies Exploration	Ancient Astronomy in Mexico
Optics	Rockets	Telescope Design	People of the Pecos (cosmology, the layered universe, and the night sky)
The Solar System	Exoplanets	Ground-based Telescopes	
Black Holes	Hypersonics	Space Telescopes	
Stars and star clusters			
Terrestrial Climate Change			
Vera C. Rubin Observatory Online Investigations			

We invite participants to ask questions freely throughout the week. The schedule lists a formal Q&A session mid-week, but we are excited to hear your wonderings and to answer any questions you might have about astronomy education. If you should prefer to not ask your questions during a session, you could send them in an email instead.

Schedule

Date	Time (CT)	Topic	Facilitators
Jul 15, MON	9:00 am	Meet and greet; logistics	Chris Packham & Carmen Fies, UTSA
	10:00 am	Light, color, EMS	Lindsay Fuller, UTSA
	11:00 am	Europa Clipper	Kurt Retherford, SwRI
		LUNCH	
	1:00 pm	Ancient Astronomy in Mexico	Cuauhtémoc Méndez Rosas, Tecnológico de Monterrey
	2:00 pm	Virtual Fieldtrip: People of the Pecos (cosmology, layered universe, role of the night sky)	Cassandra Santillan, & Harry Shafer, Witte Museum
Jul 16, TUE	9:00 am	Solar system	Chris Packham, UTSA
	10:00 am	Black Holes	Eric Schlegel, UTSA
	11:00 am	Ground-based telescopes	Antonio Cabrera Lavers, GTC & Sergio José Fernández Acosta, GTC
		LUNCH	
	1:00 pm	Virtual Fieldtrip: Dark Skies	Judith Meyer, Rachel Fuechsl, and Martinique Pautzke, McDonald Observatory
	2:00 pm	Virtual Fieldtrip: Dark Skies	Judith Meyer, Rachel Fuechsl, and Martinique Pautzke, McDonald Observatory
Jul 17, WED	9:00 am	Optics	Chris Packham, UTSA
	10:00 am	Terrestrial Climate Change	Lindsay Fuller, UTSA
	11:00 am	Terrestrial Climate Change	Lindsay Fuller, UTSA
		LUNCH	
	1:00 pm	NOIRLab's Teen Astronomy Cafe	Justine Schaen, NOIRLab
	2:00 pm	Q & A	Chris Packham, UTSA
Jul 18, THU	9:00 am	Telescope Design	Chris Packham, UTSA
	10:00 am	Vera C. Rubin Observatory's online investigations	Justine Schaen, NOIRLab
	11:00 am	Vera C. Rubin Observatory's online investigations	Justine Schaen, NOIRLab
		LUNCH	
	1:00 pm	Space Telescopes	Swara Ravindranath, NASA HQ
	2:00 pm	Stars and star clusters as building blocks of galaxies	Atsuko Nita, NOIRLab
Jul 19, FRI	9:00 am	Hypersonics	Chris Combs, UTSA
	10:00 am	Rockets	Araceli Ortiz, UTSA
	11:00 am	Exoplanets	Thayne Currie, NASA AMES & UTSA
		LUNCH	
	1:00 pm	Eyes on Exoplanets; Planet Search	Thayne Currie, NASA AMES & UTSA
	2:00 pm	Closure and final paperwork	Chris Packham & Carmen Fies, UTSA

SESSION FACILITATORS

CABRERA LAVERS, ANTONIO
Gran Telescopio Canarias (GTC)

COMBS, CHRIS
University of Texas at San Antonio (UTSA)

CURRIE, THAYNE
University of Texas at San Antonio (UTSA)

FERNANDEZ-ACOSTA, SERGIO
Gran Telescopio Canarias (GTC)

FIES, CARMEN
University of Texas at San Antonio (UTSA)

FUECHSL, RACHEL
McDonald Observatory

FULLER, LINDSAY
University of Texas at San Antonio (UTSA)

MÉNDEZ ROSAS, CUAUHTÉMOC
Tecnológico de Monterrey

MEYER, JUDITH
McDonald Observatory

NITA, ATSUKO
National Optical-Infrared Astronomy Research Laboratory (NOIRLab)

Ortiz, Araceli
University of Texas at San Antonio (UTSA)

PACKHAM, CHRIS
University of Texas at San Antonio (UTSA)

PAUTZKE, MARTINIQUE
McDonald Observatory

RAVINDRANATH, SWARA
NASA

RETFERD, KURT
Southwest Research Institute (SwRI)

SANTILLAN, CASSANDRA
Witte Museum

SCHAEN, JUSTINE
National Optical-Infrared Astronomy Research Laboratory (NOIRLab)

SCHLEGEL, ERIC
University of Texas at San Antonio (UTSA)

SHAFER, HARRY
Witte Museum