



**S L O O H**

**VERSION: 4.0**

**FALL: 2019**

Inspired by the *Age of Discovery*, the new version of Slooh is designed for students and is the fruition of Slooh's National Science Foundation grant, 'Curriculum Driven Gamification of Space Exploration'.

**SUPPORTED BY THE NSF**

**The NSF awarded Slooh an SBIR Grant in 2018**





# Slooh Astrolab

Introducing Slooh Astrolab, a turn-key curricular space lab experience for students to learn scientific reasoning in the context of exploring space with their peers via a network of online telescopes.



## EDUCATION

Curricula with Astronomy Educators

## EXPLORATION

Robotic Telescopes + Photo Capture

## COLLABORATION

Private Virtual Clubhouse to Share Observations



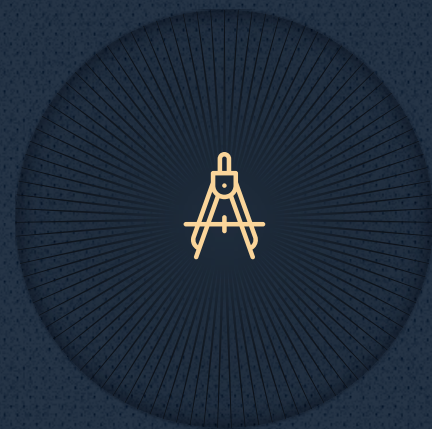


# Space for Everyone

Slooh's suite of tools work in unison to make offering astronomy easy, engaging and affordable for institutions without the requisite equipment or expertise on staff. No astronomy background is required and students are guided in self-directed learning with access to astronomy educators.



TELESCOPES



GUIDES



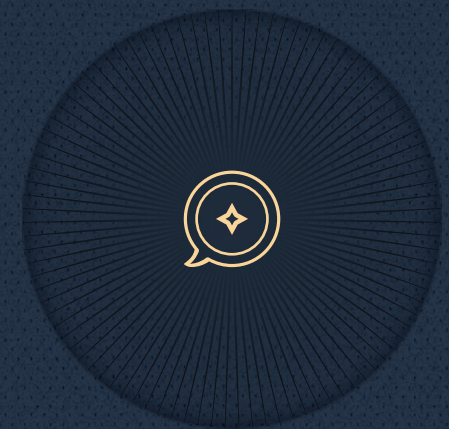
STORIES



SHOWS



QUESTS



CLUBS



# Robotic Telescopes

Unlike simulation software, Slooh provides real-time viewing and control of robotic telescopes, including seven telescopes situated at its flagship observatory at the Institute of Astrophysics of the Canary Islands, one of the world's top observatory sites, three telescopes based in Santiago, Chile, offering complementary views of the southern skies, and five new telescopes coming online in 2020 in the United Arab Emirates.

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# Live Viewing

Students get inspired to learn by looking into space through Slooh's patented Mission Interface. Our live views of space include a tandem information panel containing an array of contextual educational modules that aide in the learning process, including recorded audio.

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The screenshot displays the Slooh live viewing interface. At the top, there is a navigation bar with icons for home, menu, telescope, search, settings, notifications, and user profile. Below this is a horizontal menu with several circular icons, one of which is highlighted with a white border. The main content area is split into two sections. On the left is a large, vibrant image of a galaxy, identified as 'Canary Three', with a color palette of reds, purples, and blues. On the right is an information panel titled 'Canary Three'. This panel includes tabs for 'LIVE NOW', 'QUEUE', 'CONDITIONS', and 'SCOPE'. Below the tabs is a section titled 'Great Barred Spiral Galaxy' with a circular icon containing a spiral pattern. Underneath this are three categories: 'GALAXY', 'DEEP SPACE', and 'TRIANGULUM AUSTRALE'. At the bottom of the information panel are buttons for 'FOLLOW', a plus sign, and an information icon. Below the galaxy image are three buttons: 'INFO' with an eye icon, a camera icon, and 'PICS' with a photo icon. At the very bottom of the interface, a small text line reads 'YOUR PHOTOS ARE BEING SAVED TO "MY PHOTOS" IN YOUR PROFILE'.

YOUR PHOTOS ARE BEING SAVED TO "MY PHOTOS" IN YOUR PROFILE

# Advanced Control

Astrolab students have the ability to set up their own telescope missions using astronomical catalogs, coordinates, & imaging filters. They automatically obtain FITS file images from that mission in their Photo Hub once the mission is complete.

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The screenshot displays the 'MY PHOTO HUB' interface. At the top, there is a navigation bar with icons for home, menu, telescope, search, settings, notifications, and profile. Below this is a dark navigation bar with tabs for 'ACTIVITY', 'PHOTOS', 'LISTS', 'Q&A', 'QUESTS', and 'GROUPS'. The main content area is titled 'MY PHOTO HUB' and has sub-tabs for 'PHOTO ROLL', 'OBSERVATIONS', 'MISSIONS', and 'GALLERIES'. An 'OPTIONS' button and a search icon are also present. The 'MISSIONS' tab is active, showing a grid of mission cards. Each card includes the mission name, date, number of images, and telescope name, along with a circular image of the target.

| Mission Name        | Date          | Number of Images | Telescope    |
|---------------------|---------------|------------------|--------------|
| Mars                | DEC. 22, 2017 | 202 IMAGES       | CHILE ONE    |
| Saturn              | AUG. 16, 2017 | 3 IMAGES         | CANARY TWO   |
| Grand Design Galaxy | AUG. 16, 2017 | 42 IMAGES        | CANARY THREE |
| Andromeda Galaxy    | AUG. 16, 2017 | 42 IMAGES        | CANARY THREE |
| Mars                | DEC. 22, 2017 | 202 IMAGES       | CHILE ONE    |
| Saturn              | AUG. 16, 2017 | 3 IMAGES         | CANARY TWO   |



# Curriculum Quests

Students learn to explore space in a self-directed manner by completing learning activities which challenge them to use the telescopes to collect and analyze data to form their own conclusions.

Students are more likely to retain information by completing tasks that apply their learning.

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Step 1 in the Galaxy Hunt Quest

Step 1. Data Collection

4 OF 8 IMAGES COLLECTED

RESOURCES

Fill in the Slots!

If you don't have the required image(s) yet, select Find Image, we'll supply you with some available Upcoming Missions, or alert you as soon as one becomes available!

01  
Venus

02  
Mars

# Gamification

We've gamified exploring space with Quests. Students collect Gravity Points to move up the Leaderboard and earn Badges for completing Quests which challenge them to hunt down phenomena in space and follow in the footsteps of famous discoveries.

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CONGRATULATIONS!

## QUEST COMPLETED

YOU ARE AWARDED THE:

### Galaxy Hunter badge

Earned in the Galaxy Hunt Quest

REVIEW QUEST

- You've Collected Data ✓
- You've Created an Animation ✓
- You've Added Labels ✓
- You've Created a Montage ✓
- You've Got Creative with your Words ✓



# Learning Guides

Slooh Guides are a starting point to understand basic concepts and lead students to the most interesting objects in space.

Our astronomers have curated content across the spectrum of S.T.E.A.M. for over 1000 celestial objects, known as the Slooh 1000.

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The screenshot displays a web browser window with a dark blue header and a white main content area. The header contains navigation icons (home, menu, globe, search) on the left and settings, notifications, and user profile icons on the right. The main content area features a circular icon with a sun and planets at the top center. Below it, the text reads "A GUIDE TO" followed by the title "The Solar System" in a large, serif font. Underneath the title, there is a section titled "ABOUT THIS GUIDE" with a paragraph of text: "Home to all currently known life forms, Earth is one of eight planets in the Solar System. Not until the 16th century did we realize we orbit the Sun in a heliocentric model, not the other way around. Starting with the closest to the Sun and moving outward...*read more*". To the right of this text, there are three horizontal lines with labels: "CONTAINS 10 OBJECTS", "OBJECT TYPE GUIDE", and "BEGINNERS AND UP". At the bottom right of the content area, there is a button labeled "READING LIST" with a plus sign and a share icon.

G U I D E S



S L O O H

# Live Shows and Lectures

Slooh's Live Shows are anchored by Paul Cox and our team of astronomers, featuring live feeds of asteroids, comets, transits, eclipses, solar activity, auroras, and more. Monitor with us the happenings in space 24 hours a day and join us virtually on expeditions to Kenya, the Faroe Islands, Indonesia, Iceland, Australia, Chile, Idaho, and Alaska.

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L I V E S T R E A M S



L I V E S T R E A M S



# Collaborative Learning

The Slooh Community is founded upon the principle that telescopes are more interesting and affordable as a shared, social experience. When you look through a Slooh telescope, you are doing it in unison with a global community, looking up in wonder together. Therefore, we designed the experience to bring about an exchange of ideas.

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# Astronomy Clubhouses

Slooh Clubhouses offer students a private environment to exchange ideas with their peers, ask and answer questions, and find assigned learning materials.

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The screenshot shows a web interface for a Slooh Classroom Club. At the top, there is a navigation bar with icons for home, menu, globe, search, settings, notifications, and profile. The main content area features a dark blue header with a golden astrolabe icon. Below this, a table displays the club's details: 'TYPE: Private' and 'MEMBERS: 30'. A 'MANAGE CLASS' button with an edit icon and a share icon are also present. The main title is 'CLASSROOM CLUB Intro to Astronomy'. A welcome message reads: 'Welcome to your Classroom! In here you will be able to converse with your peers about your views of space in a private, virtual environment. Share your mission feeds, compete against the leaderboard, and learn how to explore space together.' Below the message is a 'WRITE TO CLASSROOM' section with a user profile icon and a text input field containing the placeholder 'Write something'. At the bottom of this section are buttons for '+ PHOTO', 'ANNOUNCEMENT' (checked), and 'POST NOW'. On the right side, there is a sidebar with four menu items: 'CLASS MEMBERS (30)', 'CLASS SYLLABUS (10)', 'RELATED GUIDES (3)', and 'RELATED OBJECTS (3)', each with a dropdown arrow.



# Inspire with Stories

Our vision of astronomy welcomes all forms of expression including art and literature. Our Illuminations stories inspire wonder and offer original perspectives regarding our place in the cosmos.

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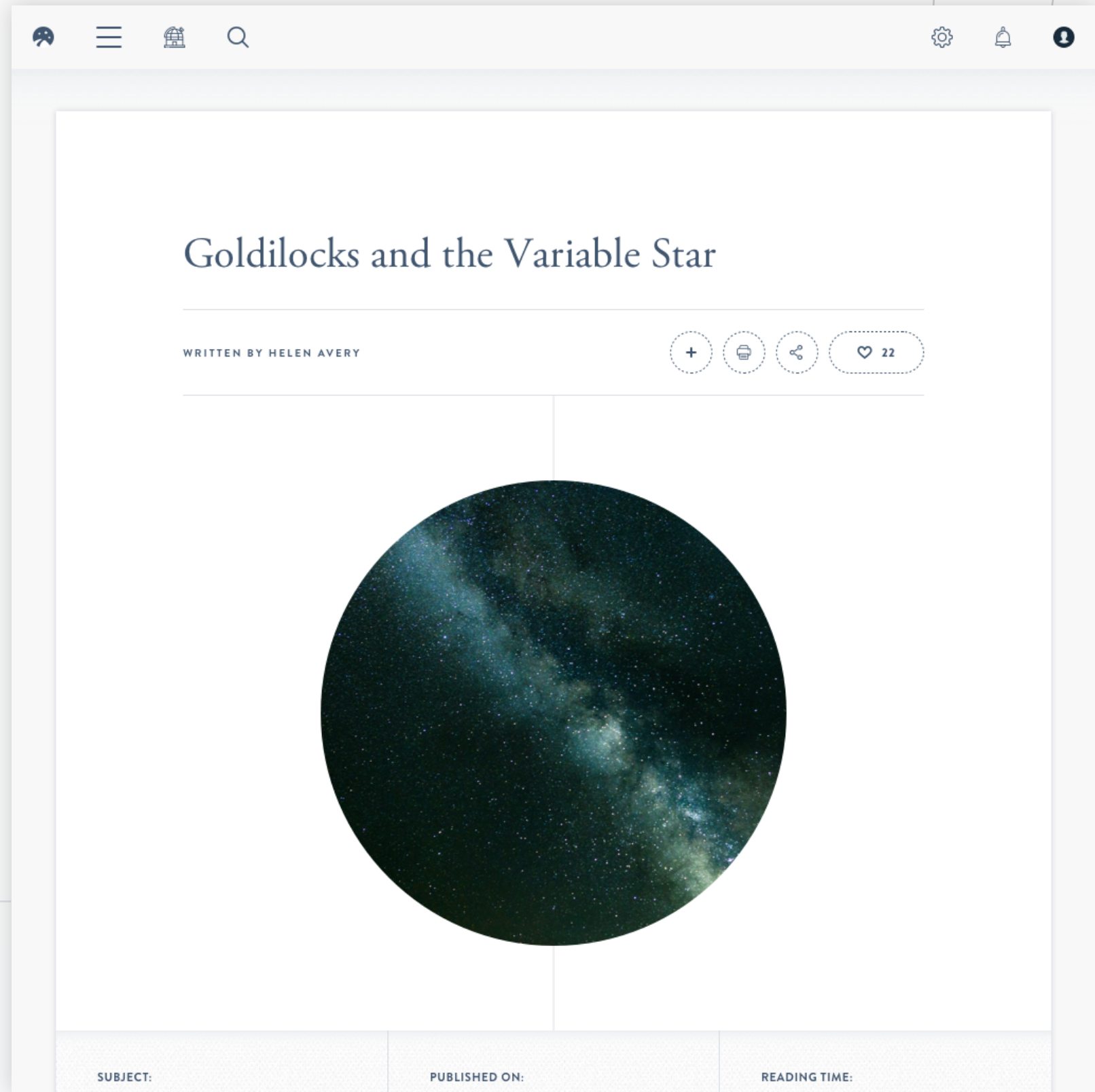
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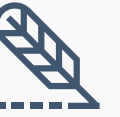
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STORIES



SLOOH

# Syllabus

Slooh's Astrolab curriculum covers astronomy topics for college astronomy 101 courses, in addition to scientific reasoning and literacy. Quests are each associated with appropriate NGSS curriculum codes and include a teacher's edition.

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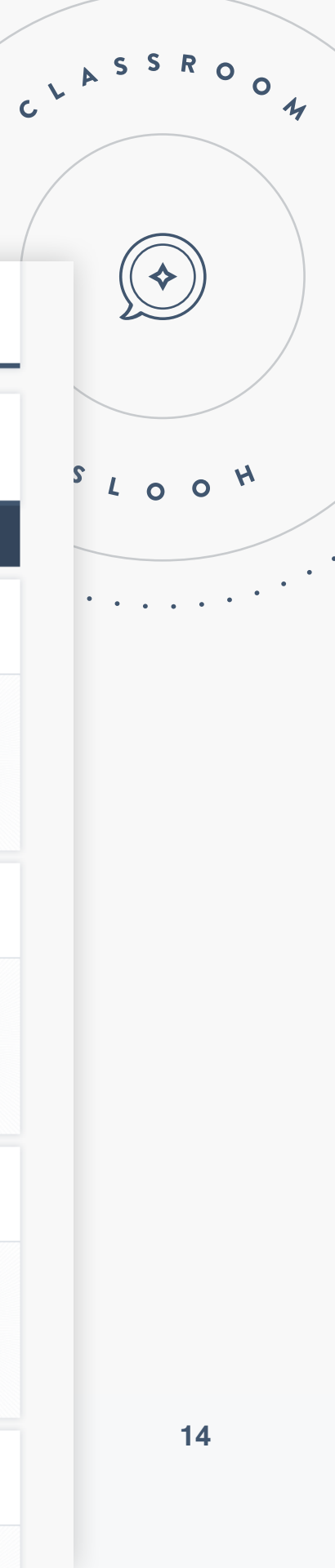
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The screenshot displays the Slooh Classroom interface. At the top, there is a header with a profile icon and a text input field labeled "Write something to your Classroom...". Below this is a feed of three posts:

- PAUL JOHNSON** (1 HOUR AGO): "One time my parents took us on a road trip and we stopped along the way to get out our telescope and we saw the rings of Saturn. It was fuzzy though. Look how clear this view is!" (22 likes, 04 comments, 1 pic, REPLY button)
- ANTHONY JOHNSON** (1 HOUR AGO): "I'm having trouble with the Phases of the Moon Quest. Can someone help me understand why the Moon doesn't eclipse the Sun every time it orbits the Earth?...*read more*" (22 likes, 04 comments, REPLY button)
- CARA MAINE** (1 HOUR AGO): "I missed last night's show on lunar surface features and I really want to see if before I start the Quest. Does anyone want to watch it with me after school today?" (22 likes, 04 comments, REPLY button)

The right sidebar contains a navigation menu:

- CLASS MEMBERS (30)
- CLASS SYLLABUS (10) with sub-tabs: ALL, IN-PROGRESS, COMPLETED
- A Three Dimensional Sky (DISCOVERY, 4 stars)
- Nearest Neighbors (EXPLORER, 4 stars)
- Phases of the Moon (ART, 4 stars)
- The Wanderers (ART, 4 stars)





# Review Student Progress

Professors/teachers can track student progress through Quests, Badges, Gravity Points, and much more via an administrative interface, as well as through our integration with Google for Education.

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| MY UPCOMING MISSIONS                       |                           |
|--|---------------------------|
| The Moon<br>CANARY THREE                   | MON. JAN. 06              |
| Great Barred Spiral Galaxy<br>CANARY THREE | TUE. FEB. 22<br>16:20 UTC |
| Andromeda Galaxy<br>CANARY THREE           | WED. MAR. 18<br>19:50 UTC |

# Pricing



Telescope reservations for both teachers and students

Collect images and complete curriculum-driven Quests

Access to live and recorded weekly virtual lectures/shows by Slooh Astronomers

Account management for professors/teachers including Google for Education integration

Slooh moderated discussion boards and leaderboards

\$60.00 USD

ANNUAL PRICE PER STUDENT

INDIVIDUALLY PURCHASED

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# Case Study

With the launch of Slooh Astrolab in Fall 2019, Slooh has received support from institutions such as the City University of New York.

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## Professor Testimonial



Updating our curriculum to provide students with real-time observing experiences, such as what Slooh Astrolab could provide, would greatly enhance the hands-on education of our students and their understanding of the fundamental practices of astronomers. In anticipation of the launch of Slooh's new platform this coming fall, we are engaging in conversation on ways to incorporate Slooh Astrolab Quests into the Astro 101 laboratory curriculum across the department.

CHARLES LIU

DEPARTMENT OF PHYSICS AND ASTRONOMY | CUNY COLLEGE OF STATEN ISLAND

# The Difficulty of Teaching Astronomy

Astronomy is difficult to teach in the classroom. We understand the barriers and have the tools to help teachers focus on what's important.

Light  
Pollution

Weather  
Conditions

Expensive  
Equipment

Obtaining Proper  
Images for Research

Very Steep  
Learning Curve

Evening On-site  
Visit Requirement

Our platform is designed to give students all they need to understand astronomy.



# The 5E Model

Slooh Classroom aligns to The 5E Model developed in 1987 by the Biological Sciences Curriculum Study, which promotes collaborative, active learning in which students work together to solve problems and investigate new concepts by asking questions, observing, analyzing, and drawing conclusions.

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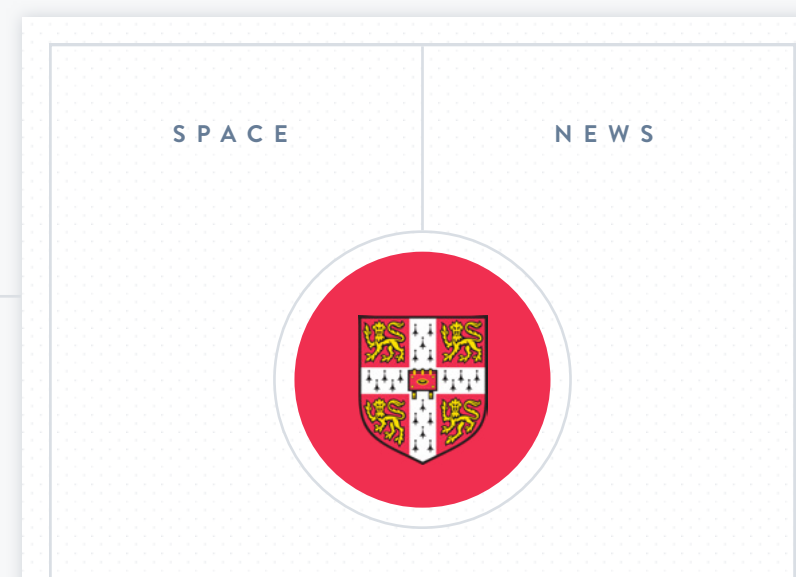


- ENGAGE** The student's interest is captured and the topic is established.
- EXPLORE** The student is allowed to construct knowledge in the topic through facilitated questioning and observation.
- EXPLAIN** Students are asked to explain what they've discovered, and the instructor leads a discussion to refine the students' understanding.
- EXTEND** Students are asked to apply what they have learned in different but similar situations, and the instructor guides the students toward the next discussion topic.
- EVALUATE** The instructor observes student's knowledge and understanding, and leads students to assess whether what they have learned is true.

# Understanding the Barriers

Astrophysicist Vinesh Maguire Rajpaul of the University of Cambridge, UK, and colleagues say that misconceptions about size seem to reflect deeper misunderstandings.

“We found that if students demonstrate a basic understanding of two different astronomical objects by giving basic, one-sentence explanations of them, they are almost guaranteed to be able to rank them correctly.” says coauthor Christine Lindstrom of Oslo Metropolitan University (OMU) in Norway.



# About Slooh

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✦ AUTHENTIC

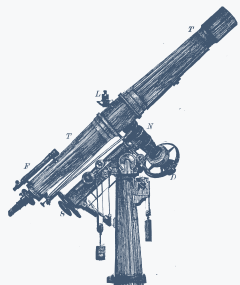
✦ INCLUSIVE

✦ INNOVATIVE

✦ UNITING

The New Space Age is upon us. People haven't been this inspired by space since we landed a human on the moon. Yet, while people have an innate curiosity about the cosmos, they have no practical, hands-on means of exploring it for themselves. With Slooh, people with little knowledge of astronomy or experience with telescopes can look into space just as professional astronomers do. Slooh teaches astronomy as a curricular, co-curricular, and extracurricular activity for schools and after-school programs.

A S T R O N O M Y





# Thank you!

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Join us in our mission to teach the world to explore space, by launching an Astrolab on the Slooh platform today!

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DE CHILE