

# TOONING THE EXTREME COSMOS

---

*Elizabeth Ferrara & Roopesh Ojha*

# PRIME MOVERS

---

*Prof Laurence Arcadias*

*Animation Department*

*Maryland Institute College of Art*

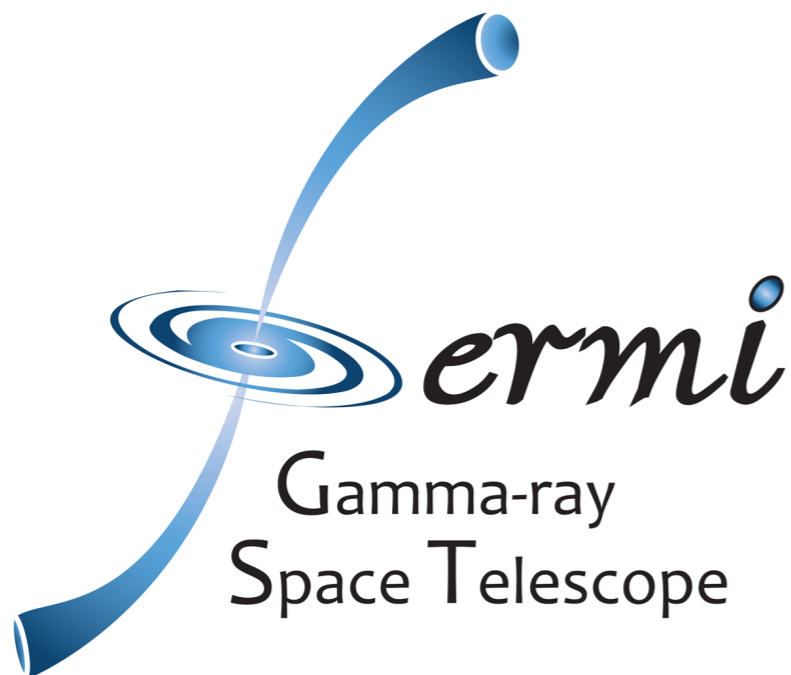
*[larcadias@mica.edu](mailto:larcadias@mica.edu)*

*Dr. Robin Corbet*

*Fermi Scientist*

*UMBC/NASA Goddard Space  
Flight Center*

*[robin.corbet@nasa.gov](mailto:robin.corbet@nasa.gov)*



# MICA, BALTIMORE- 40 MINS FROM GSFC



*Provides easy access between MICA and GSFC campuses*

# MICA ANIMATION DEPARTMENT

---

Three tracks:

- 3D animation
- 2D animation
- Stop motion



“Tooning the Extreme Universe” program:

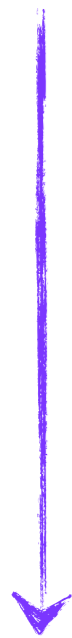
- Begun in 2014 - program allows advanced students to work directly with “top-notch” scientists. Provides access to the latest results in astrophysics.
- Inspired by “Dance your PhD,” “Cosmic Soup,” and other science+art collaborative efforts
- Students use Fermi science as inspiration and also learn to work within “scientific constraints”

# VARIETY OF SCIENCE TOPIC OPTIONS

.....  
Solicit 8-10 new science topics  
from science staff

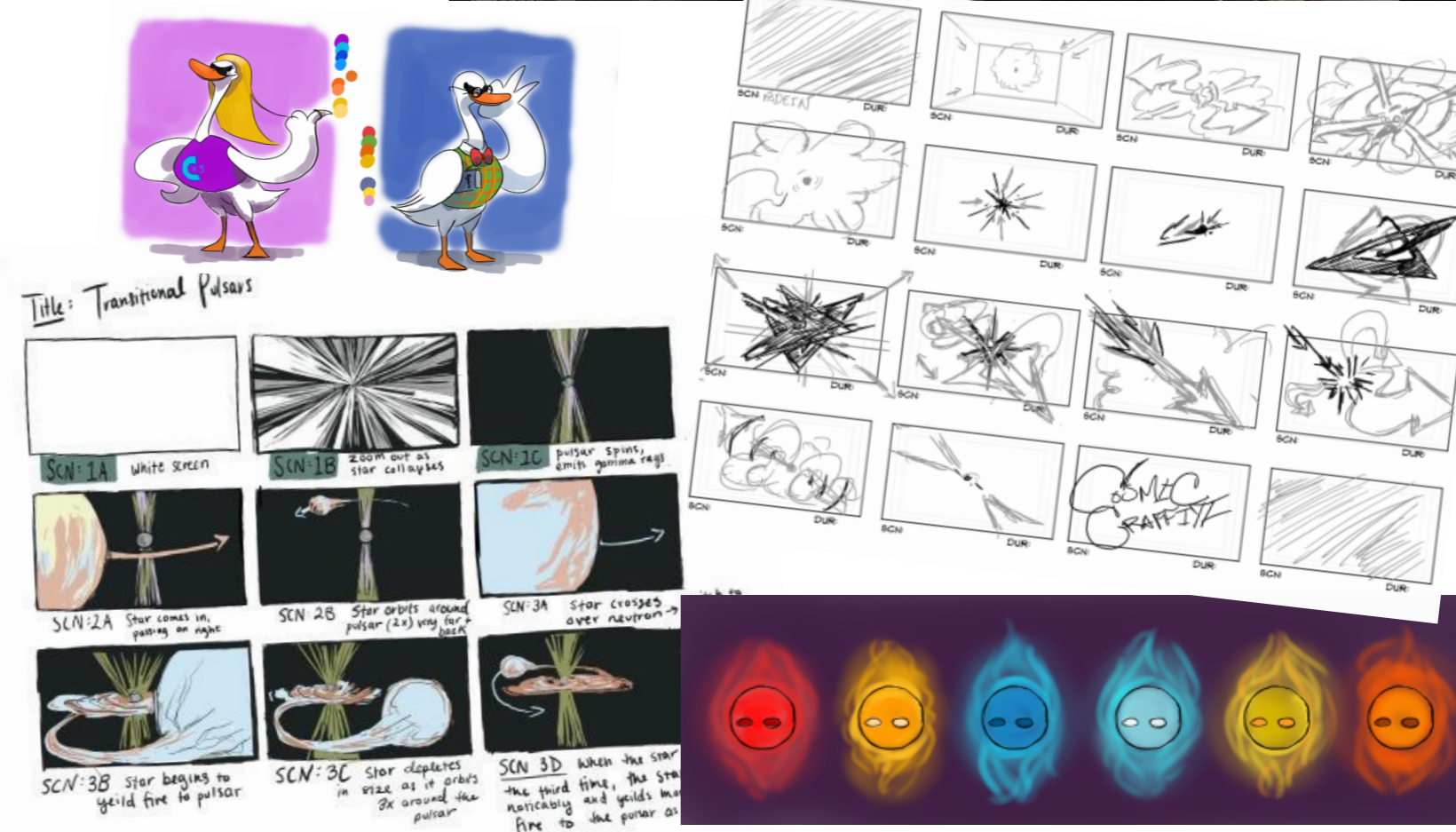
1 or 2 scientists present topics to  
animation students at MICA

Students select topics & form groups



~ 2 weeks

Animation storyboarding



# WIDE VARIETY OF OPTIONS FOR STUDENTS

---

Science ranges across a wide variety of topics:

- Gamma-ray & cosmic ray production & detection
- Gamma-ray sources - AGN, pulsars, binaries, SNRs, TGFs, etc.
- Other physics - dark matter, black holes, even space debris!



Animation display options:

- Flat screen
- Science on a Sphere
- Planetarium dome

# EXPOSURE TO SCIENCE/ENGINEERING

---

*Students visit NASA Goddard*

*Tour facilities*

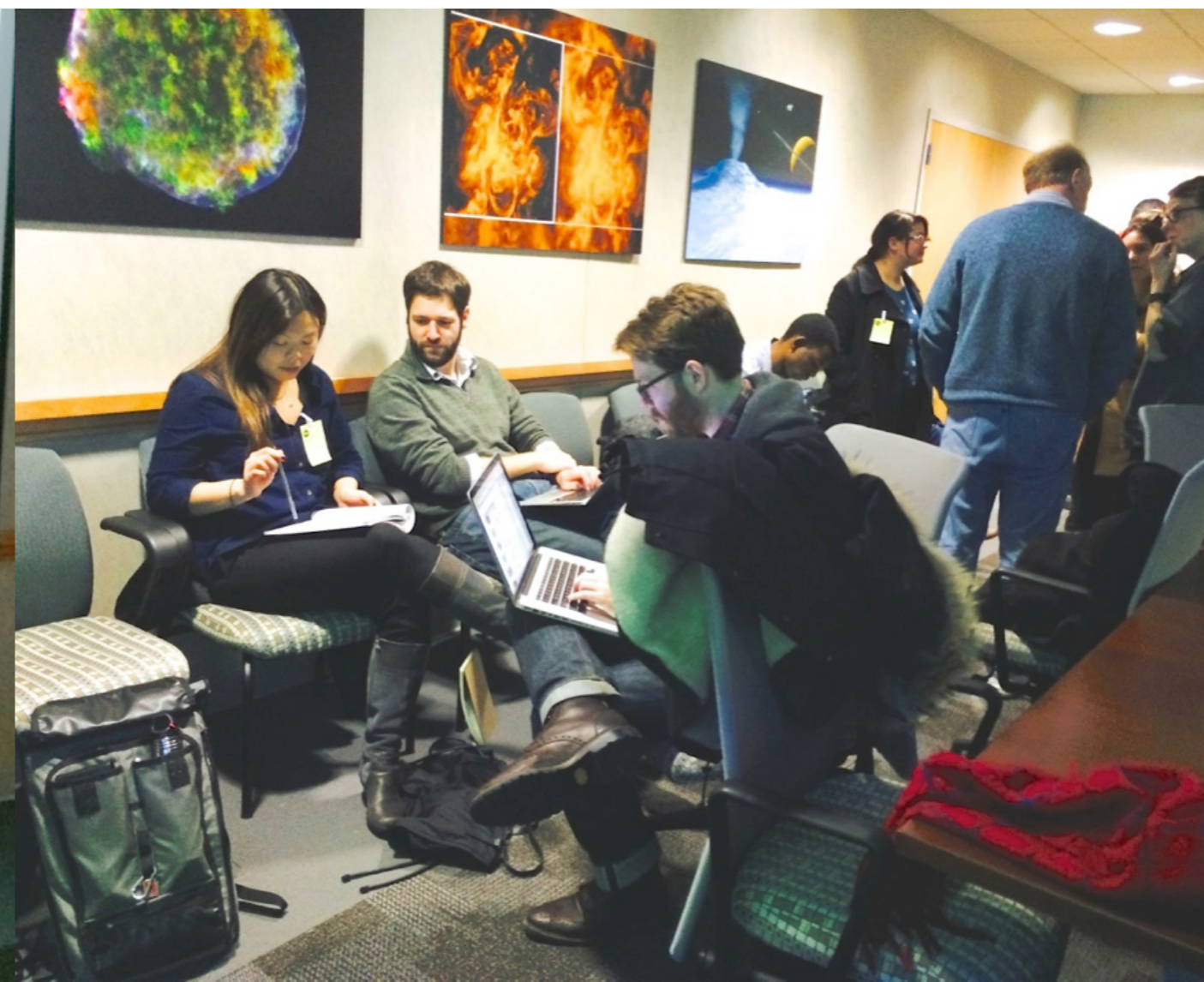
*Meet scientists & engineers*



# INITIAL PRESENTATION TO SCIENTIST MENTORS

---

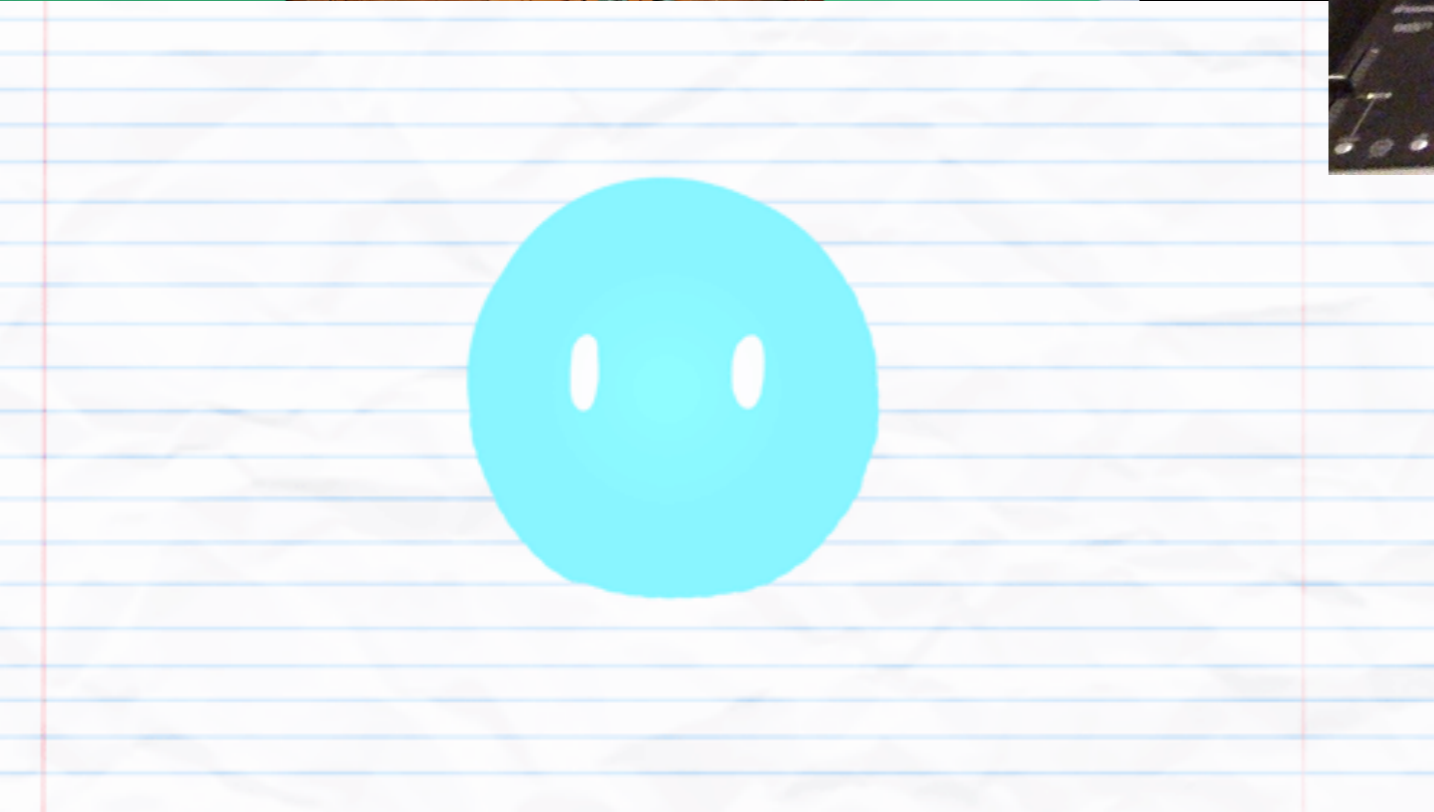
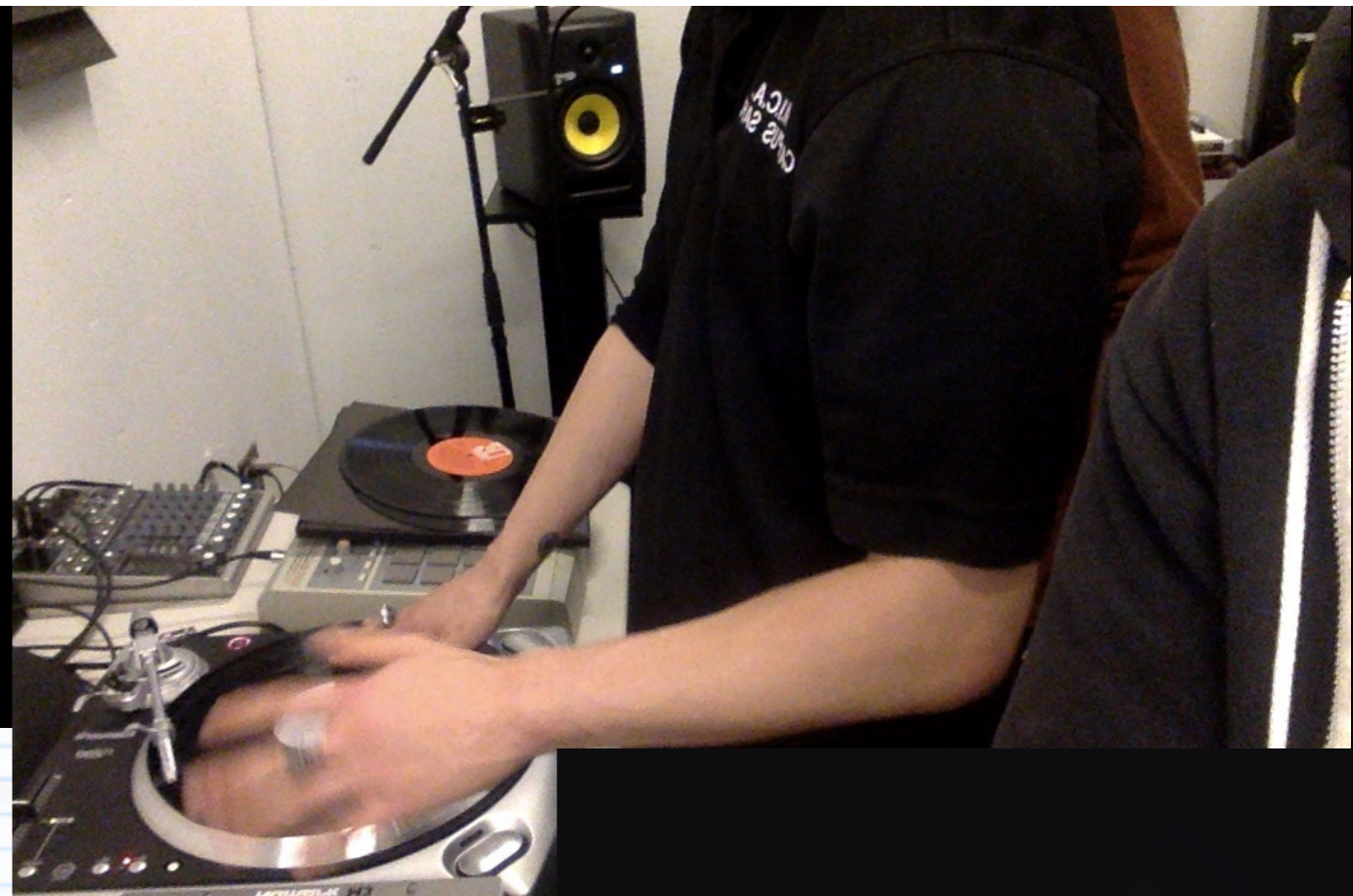
- Artists present storyboarded concepts to scientists
- Groups work details with scientist mentors assigned to them
- Feedback rolled into final animations





# ANIMATION PRODUCTION ~ 5 WEEKS

.....  
*Many different techniques: stop motion, paint on glass, stuff floating in soup, etc...*





# ANIMATION / SCIENCE DEVELOPMENT

**Mica Animates Fermi**  
Art students from MICA collaborate with scientists working on the Fermi Telescope at Nasa to create animated films inspired by the majesty of the cosmos. Pulsars Black Holes TGFs Novae

Search

in progress animation about Black Holes  
#black holes #mica animation  
7 MONTHS AGO | 1 note

Backgrounds for Black Holes  
#black hole #black holes #mica animation  
7 MONTHS AGO | 1 note

Name of Project: \_\_\_\_\_ Group Members: \_\_\_\_\_

<input type="checkbox"/> Stars	<input type="checkbox"/> Zoom in	<input type="checkbox"/> Rotate to the right planet
<input type="checkbox"/> The stars clash	<input type="checkbox"/> Stars back away and arms	<input type="checkbox"/> Stars clash and fight

The image shows a collage of space-themed animations. On the left, there are two vertical panels: the top one shows a bright white sphere with a smaller white dot nearby, and the bottom one shows a complex, swirling blue and purple structure resembling a black hole or nebula. In the center, there is a Tumblr post titled 'Backgrounds for Black Holes' with three small image thumbnails and a caption. Below that is another Tumblr post titled 'in progress animation about Black Holes'. At the bottom left, there is a grid of six small animation thumbnails with checkboxes and labels: 'Stars', 'Zoom in', 'Rotate to the right planet', 'The stars clash', 'Stars back away and arms', and 'Stars clash and fight'. At the bottom right, there is a vibrant, colorful illustration of a landscape with pink and orange mountains, a large multi-tiered cake with purple frosting, and a bright pink sky.

*Works in progress are maintained on Tumblr:*

- *Allows fast turn-around feedback from scientist mentor assigned to group*
- *Most interaction via email (to the amusement of the students)*
- *Amount of science incorporated into animations varies by group*
- *Scientists answer questions, but allow artistic vision to develop*

# PRESENTATION OF COMPLETED ANIMATIONS

---

Final screening of animations held at GSFC Visitor's Center:

- Very well attended!
- Wide range of participants, especially by GSFC animators
- Comments from viewers often incorporated into final versions

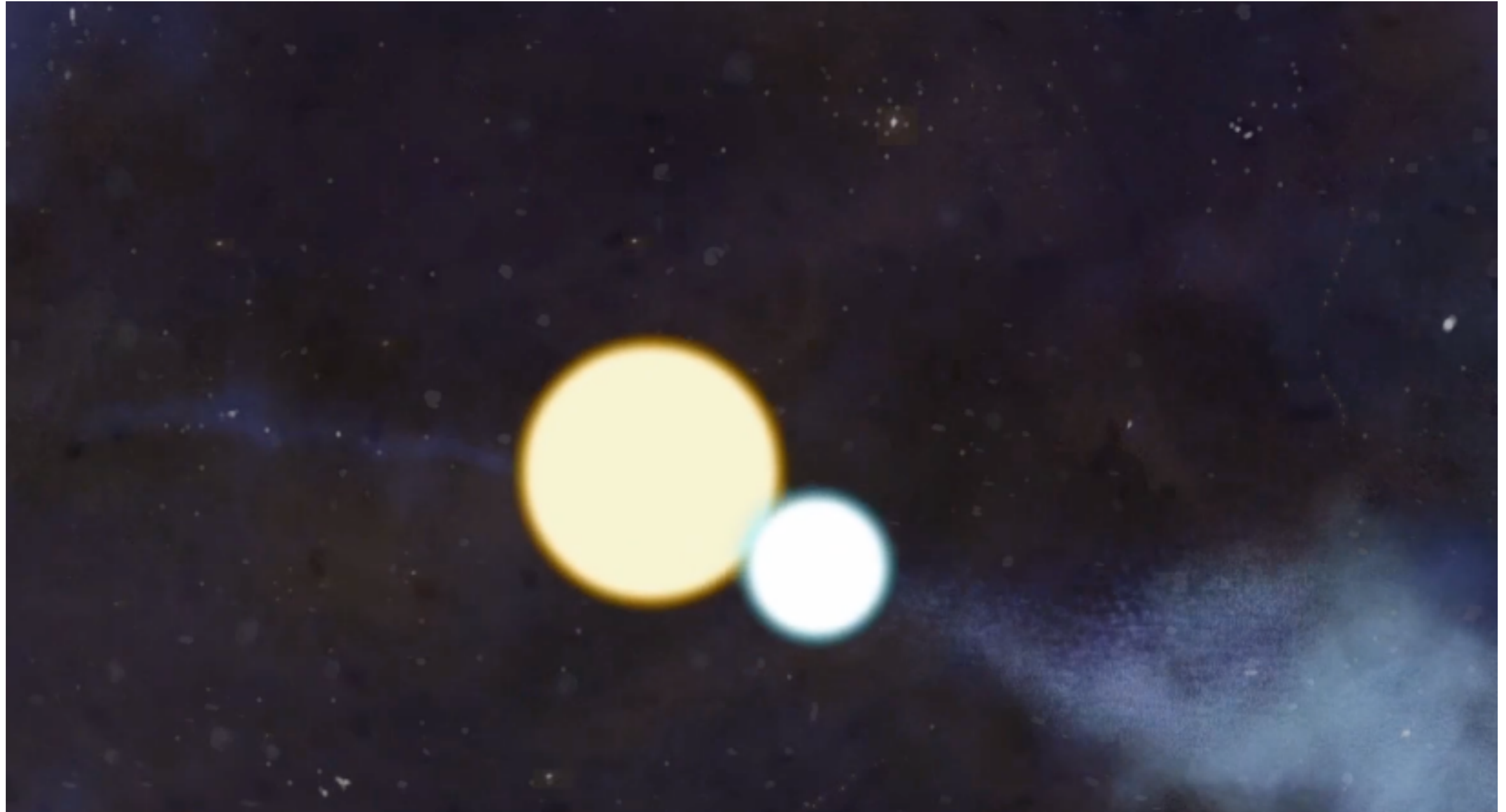


# RESULTING ANIMATIONS QUITE VARIED

---

*Some are very artistic:*

<https://vimeo.com/143018995>



# RESULTING ANIMATIONS QUITE VARIED

---

*Some are more explanatory:*

<https://vimeo.com/125091788>



*Science not always correct. We've learned to back off and just enjoy...*

# MICA ANIMATIONS HAVE ONGOING LIFE

---

*Animations have toured various festivals and conferences, both scientific and artistic:*

- NASA Goddard Visitor Center (2014)
- VERITAS Workshop, New York (2014)
- Be X-ray Binary meeting Valencia, Spain (2014)
- Chicago American Astronomical Society (2014; poster)
- SIGGRAPH 14: 3rd Annual Faculty Submitted Student Work Exhibit
- Art and Algorithms digital art festival, Florida (2014)
- Galactic Gamma-ray Sources, Heidelberg, Germany (2015)
- Explore@Nasa Goddard (2015)
- Astronomy Festival on the National Mall in DC Friday (2016)

*(partial list...)*

# ADDITIONAL FERMI ANIMATION EXPOSURE

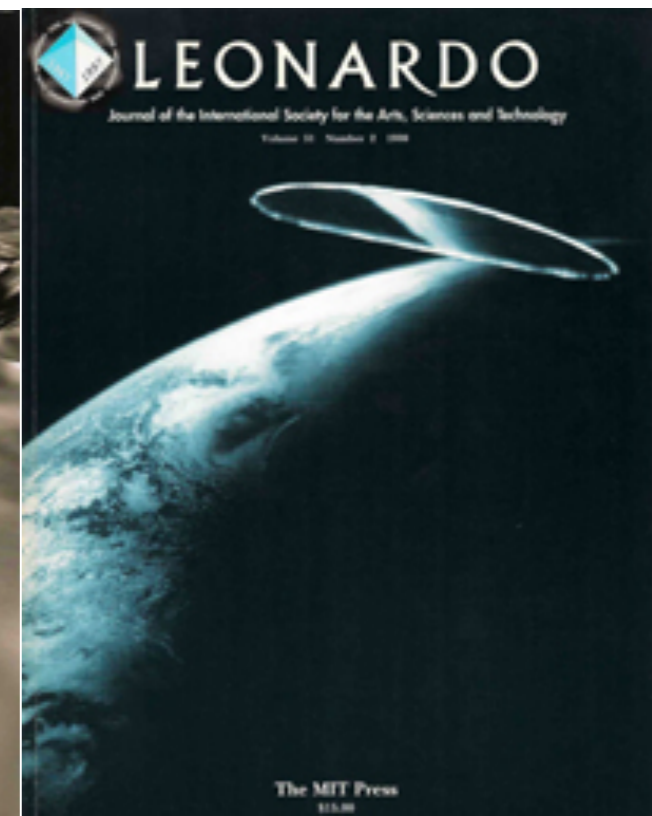
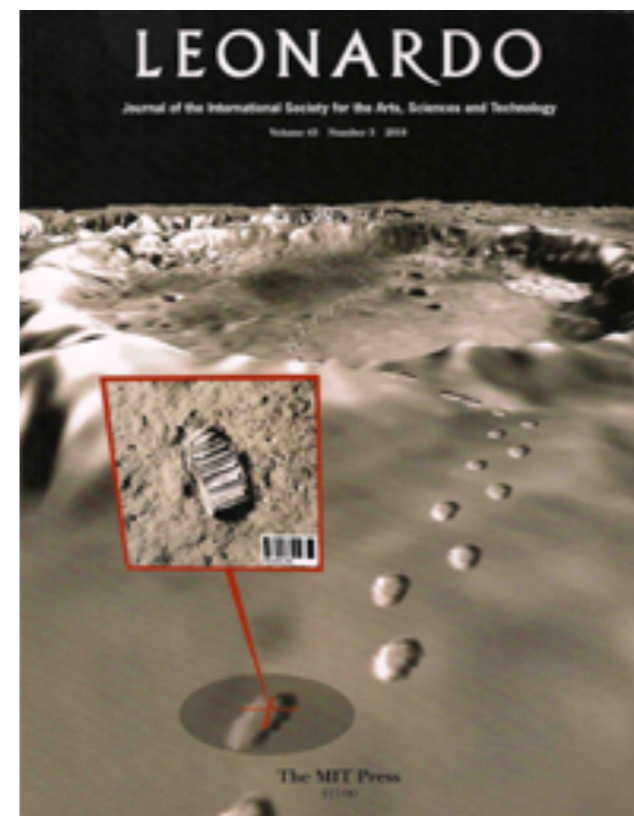
---

*At least two animators have gone on to internships at Goddard:*

- Turner Gillespie worked with Fermi scientist Sylvia Zhu to create an animation/sonification of several Gamma-Ray Bursts
- Isaac Ewart worked with “Lobster” mission team, creating an animation for “science on a sphere” for the X-ray telescope that uses a lobster-eye design.

*Paper published in Leonardo, a journal dedicated to Space and the Arts:*

*Arcadias/Corbet, 2015, 48, 484*



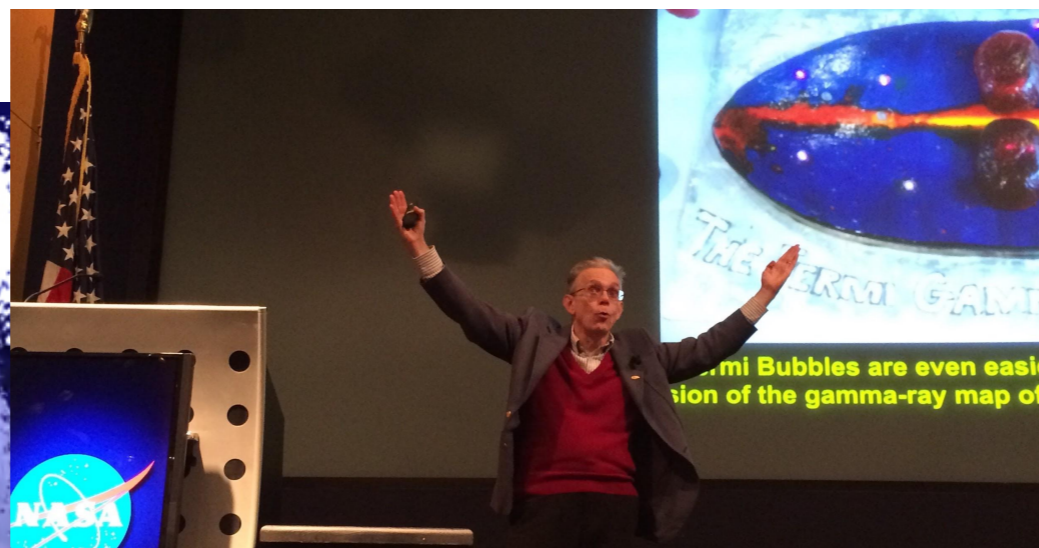
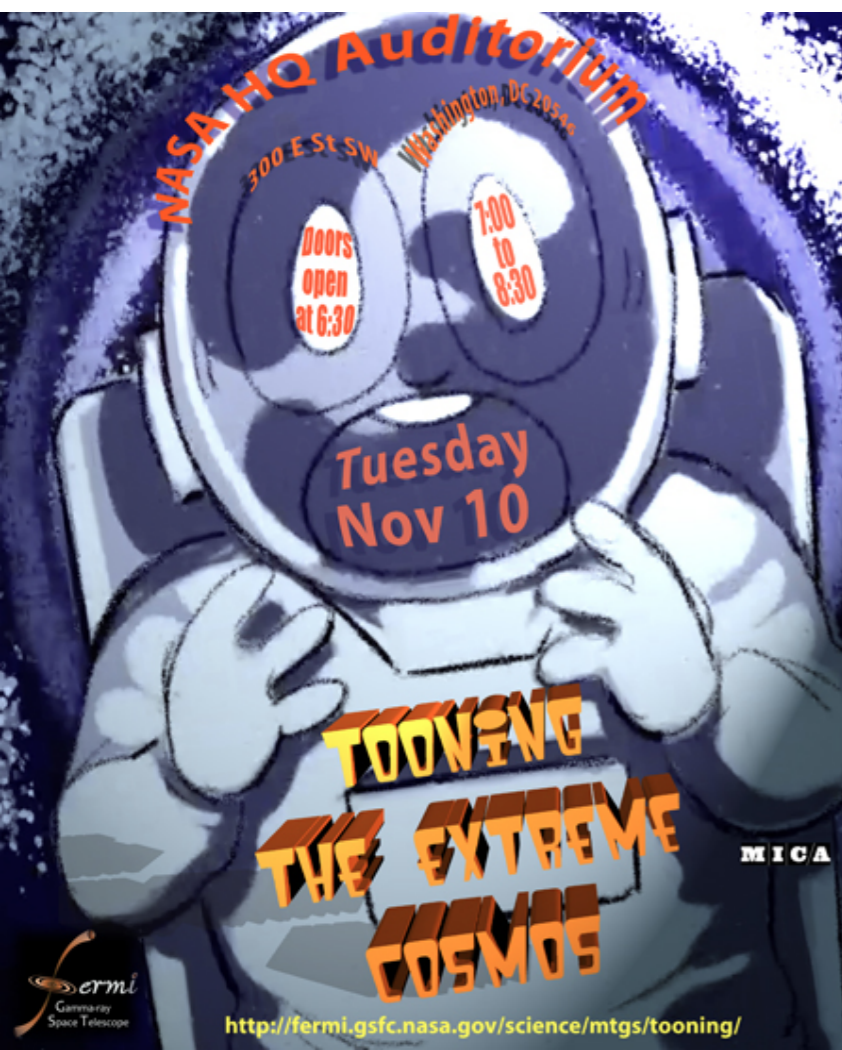


# TOONING THE EXTREME COSMOS

---

Event held at NASA HQ in association with the 6th Fermi Symposium

- Six 5-minute science topic presentations by Fermi scientists
- Screening of associated animations after each presentation



# LOOKING TOWARD THE FUTURE

---

*As Fermi's science broadens, so do the topics being presented by animators:*

- 3 groups working on a variety of gravitational wave animations
- 1 group doing X-ray science topic animation

*Widening the scientist mentor base to handle new topics:*

- Mostly pulling from GSFC expertise (ease of interaction)
- Also interested in remote experts
- Happy to connect you!

# LEARN MORE!

---

*To find out more, please check out the following resources*

Animation archive: <https://vimeo.com/micaanimation>

Video of NASA HQ event: <https://vimeo.com/153902582>

MICA Animation Tumblr: <http://mica-animates-fermi.tumblr.com>

MICA article:

[https://www.mica.edu/About\\_MICA/Departments\\_and\\_Services/Office\\_of\\_Community\\_Engagement/Curriculum\\_Enhancement\\_Grant/Past\\_Curricular\\_Projects/Animating\\_Fermi.html](https://www.mica.edu/About_MICA/Departments_and_Services/Office_of_Community_Engagement/Curriculum_Enhancement_Grant/Past_Curricular_Projects/Animating_Fermi.html)

Leonardo Publication information:

<https://www.olats.org/space/biblio/leonardoArticles/ArcadiasCorbet.php>

The background features a dark, deep blue space filled with numerous small, bright white stars. At the bottom of the frame, there is a soft, glowing nebula or cloud of gas in shades of light blue and white, creating a sense of depth and cosmic wonder.

**THANK YOU**