



## Ad Astra Kansas Foundation Newsletter

Volume 23 / Issue 4

Fall 2024

### IN THIS ISSUE:

August's Galaxy Forum speaker videos are done! Links provided.

Which Kansan's work is directly tied to the just-launched Europa Clipper mission?

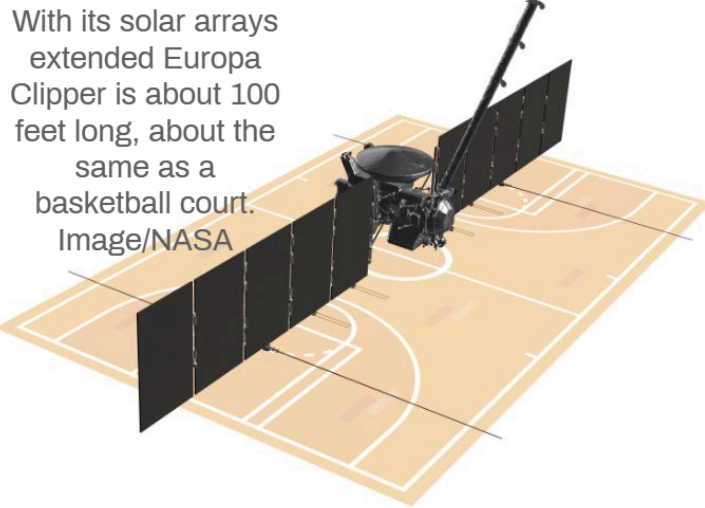
Also, we mention a couple of researchers whose fields intersect with planetary missions like Mars or Europa, searching out clues to the habitability of other worlds.

Also, there's a new format for the IR&D feature, scholarship apps,..

...and more.

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## It's a journey to an icy moon



Launched Monday, October 14, the space probe Europa Clipper is on a mission to Jupiter's 4th largest moon, Europa. Europa is coated with ice and past flybys suggest it has a great liquid ocean in its interior, possibly twice that of all Earth's oceans combined.

According to NASA, the main science goals are to understand the nature of Europa's icy world, its composition and geology and the astrobiological potential for habitable worlds beyond.

The Clipper will arrive at Jupiter in April of 2030, 1.8 billion miles (2.9 billion kilometers) from Earth. It will make 49 closeup flybys, with the closest being 16 miles (26 kilometers) from the surface.

The Clipper is the largest space craft NASA has ever built for a planetary mission. More below. *Image credit: NASA*

**BTW:** Kansan/ KU grad **Sarah Elizabeth McCandless** is an interplanetary navigation engineer at NASA JPL for the Europa Clipper mission. She helped plan Europa Clipper's trajectory, for safe arrival at Jupiter and to design the complex route enabling 49 flybys of Europa. [Read an interview with McCandless in a past newsletter below.](#)

Europa Clipper

McCandless

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## Between rocks and hard places

KU geology Ph.D. candidate Sarah Lamm spent two weeks last spring on an analog mission at the Mars Desert Research Station in Hanksville, Utah. The MDRS, owned and operated by the Mars Society, is a private space analog facility. which has been in existence since 2001. It is located in a landscape comparable to Mars' actual geology. Crew missions include rigorous field studies as they would be done on an actual space mission. Lamm was the crew geologist. Using a gamma ray spectrometer, the crew did a mapping survey, properties of the rocks and determination of elements, including uranium in the area. Lamm did a short interview for KU. See it below-- plus, the site has a lot of other cool stuff about the MDRS.

MDRS

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## Studying small subjects for big answers



**WSU grad student Theophilis Eshun works on the biological sciences NASA microbe project.**

*Courtesy photo.*

Wichita State University's Department of Biological Sciences has been working with NASA's Planetary Protection Research at the Jet Propulsion Laboratory for a dozen years.

So, it is no surprise that their current research intersects the Europa Clipper, Mars exploration or any other planetary mission with the potential of encountering the conditions for microbial life.

Working with an almost \$400,000 NASA grant, Dr. Mark Schneegurt and his team are studying the hardiness of microbes likely to be carried into space from earth.

The reason is forward planetary protection. "We need to know what we bring with us that might survive, and what will be its influence in the next world. Also, it informs us that if there is life on other worlds, who may have adapted, what kind they might be," said Schneegurt.

Microbes need to withstand hypersalinity, extreme cold and perhaps high pressure to survive. For example, high salt concentrations lower the freezing point of water increasing survival chances by keeping water liquid in the cold. Similarly, high ammonia concentrations lowers the freezing point of water.

Mars is salty, dry and cold, but has water ice under its polar caps. Europa is not dry, we don't know yet how salty, but it is cold. There's a lot to be learned.

“We are a cultivation lab, growing things and researching under analog conditions,” said Schneegurt.

For example, test subjects are microbes isolated from floor swabs at the JPL spacecraft assembly facility. At WSU, they spent 6 months in growth media containing 50% Epsom salt or 20% sodium chlorate. Researchers then surveyed the surviving bacteria looking at their genetics, characteristics, or other markers that give us clues as to how they survived.

Microbial cultures are also put into a hydraulic pressure chamber to simulate the icy waters of ocean world buried under the thick ice crust. For example, the ocean pressure is 10,000 psi about ½ way down Europa’s ocean.

Schneegurt’s team includes about 10 undergraduate and 2 graduate students, who do hands-on work. “We want for everyone to have real applied learning experiences with real scientists, learning scientific inquiry. When they find one answer, then ‘what’s next?’ is the next question,” said Schneegurt.

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## Missed the Galaxy Forum?

Then feel free to enjoy the 2024 Galaxy Forum presentations below. Each speaker has an individual video, thanks to the generosity and hard work of Doug Stice of Winding Road Media. Thank you, Doug.



**Mallory Jennings**

**HOUSTON: We are  
GO for Exploration**

Video



CosmoShox

## NASA STEM Challenges for Student Engagement

Video



Jeanette Bosch

## Solar System Ambassador resources for schools

Video



Steve Durst

## Interstellar University and ILOA projects updates.

Video

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## Crew-9 to do science + rescue

The NASA SpaceX Crew-9 mission carrying Kansas NASA astronaut and Roscosmos cosmonaut Alexandr Gorbunov launched on Saturday, Sept. 28, 2024, arriving on Sunday at the ISS. Their mission includes conducting over 200 scientific investigations, including blood clotting studies, moisture effects on plants grown in space, and vision changes in astronauts.

They are also the crew that will bring back NASA astronauts Suni Williams and Butch Wilmore next February after Crew-9's mission is done. The Boeing Starliner spacecraft which carried Wilmore and Williams to the ISS was deemed unsafe for return. They have been at the ISS since June. :  
NASA

Crew-9

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**For undergrad, masters and  
doctoral levels**

# Scholarship opportunities



Three scholarships, each \$2500, will be provided through the Interstellar Research Group for its 2025 Scholarship Program, which is merit-based and requires an essay. Eligible areas include STEM / related fields and any degrees which can be applied to interstellar space travel. Apply by December 15, 2024.

The Tennessee-based Interstellar Research Group is a non-profit educational organization with the purpose of facilitating interstellar research and exploration.

[Scholarship Applications](#)

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To access the Ad Astra Kansas Foundation Interstellar R&D Book chronicling interstellar matters during the first quarter of the 21st Century, [click here.](#)



## Ad Astra Kansas News

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### INTERSTELLAR R&D

This "Interstellar R&D" forty-sixth feature in the Ad Astra Kansas News starts a new editorial format experiment for this and the next two features of IR&D: *Interstellar University Exclusive Focus and Update*. The first 45 IR&D features with the Observation, Communication, and Transportation 3 column format provided a real-time chronicling of Interstellar Matters during the 1st quarter of the 21st Century, and perhaps, more valuably, IR&D features 1-45 provide an introductory, fundamental, general Curriculum for a possible Interstellar University in the Ad Astra State. The three experimental IR&D features should enable more concentrated focus and advancement for IU. Ad Astra, galactically—Steve Durst.

## An Interstellar University in the Ad Astra State Ad Astra Per Aspera "To the Stars Through Difficulties"

Kansas is well suited to help host, support, inspire, and direct an Interstellar University

- ❖ Ad Astra State Motto: Kansas 34th Star in USA Constellation – 1861
- ❖ Kansas State University – 1863
- ❖ University of Kansas – 1865
- ❖ Wichita State University – 1895
- ❖ Cosmosphere, est. 1962 – houses over 13,000 spaceflight artifacts
- ❖ Ad Astra Kansas News – 2001
- ❖ Ad Astra Kansas Day event annually since 2003
- ❖ Central Location Mid-way USA



## Recent Accomplishments for Interstellar University



- ▶ Topeka Capitol rotunda display of Interstellar University and Ad Astra Kansas Foundation – February 7, 2024

- ▶ Interstellar University (IU) observing Interstellar Research Group (IRG) 1<sup>st</sup> European Interstellar Symposium, Luxembourg, Dec 2024; preparing for IRG 9 Houston TX, June 2025



- ▶ Continuing "Interstellar R&D" bi-annual feature of the Ad Astra Kansas Foundation newsletter, *Ad Astra Kansas News*, published since 2001 / 2002 – chronicling Interstellar "Observation", "Communication" and "Transportation"



- ▶ Ongoing WSU "Interstellar Seminar LASI 150G"
  - Chaired by WSU Professor Dr. Mark Schneegurt
  - 1 credit course, offered in person and online
  - Successful Spring 2024 and Spring 2023 Seminar with 21+ lecturers

## Next Steps for Interstellar University



- ▶ Engage 50 USA State interstellar assets
- ▶ Advance proclamation from KS Government 29 January 2024
- ▶ Kansas Senate Resolution 1744: Designating April 24th as Ad Astra STEM Day in Kansas
- ▶ Continue Cosmosphere, AAKF, Galaxy Forum activities and Ad Astra Kansas Newsletter / IR&D features
- ▶ Identify interstellar global / international resources

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### **Mission of the Ad Astra Kansas Foundation**

**Our mission is to advance the Kansas State Motto, “Ad Astra Per Aspera” (to the stars through difficulties), by promoting space science and education in Kansas.**

**Vision: We envision a Kansas known in the 21st century as the Ad Astra State and as a leader in space science research, development and education. Our goal is to: Interest, Inform, Inspire.**

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### **Ad Astra Kansas Foundation**

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