



## KU graduate joins active astronaut corps



O'Hara (lower right) and the other NASA candidates were chosen from a pool of more than 18,000 applicants.

Kansas in 2005 and a master's in Aeronautics and Astronautics from Purdue University in 2009.

All astronaut candidates have completed training in space-walking, robotics, ISS systems, T-38 jet proficiency and Russian language. As astronauts, they'll help develop spacecraft, support the teams currently in space and ultimately, have the opportunity to join the ranks of only about 500 people who have had the honor of going into space.

Source: NASA

University of Kansas graduate [Loral O'Hara](#) recently joined the rest of NASA's first class of astronaut candidates to graduate under the [Artemis](#) program. NASA's Artemis program plans to land the first woman and next man on the Moon by 2024.

After completing over two years

of basic training, she becomes eligible for spaceflight assignments to the International Space Station (ISS), Artemis missions to the Moon and future missions to Mars.

A Texas native, O'Hara earned a bachelor's degree in Aerospace Engineering at the University of



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## WSU project studies human brain responses in space

**WICHITA**—A NASA-funded WSU research project seeks to understand how the human brain responds to different gravity conditions while in space.

This response affects the astronauts' ability to successfully perform mission tasks.

Last summer, the Kansas NASA EPSCoR Program awarded \$127,600 to a multidisciplinary research group project titled "Development of a Neuro-Virtual Interface System to Evaluate Astronauts' Cognitive Performance in Space."

This year-long project is divided into two trials, according to Jaydip Desai, WSU assistant

professor of biomedical engineering.

"The first offline study [is] where we record multimodal signals from the human brain during motor imagery and steady state visual evoked potentials tasks," says Desai.

The brain signals are identified using EEG technology to measure electrical activity in the brain and Functional Near-Infrared Spectroscopy—a type of optical imaging that uses near-infrared light to measure changes in hemoglobin concentrations and monitor blood flow in the brain.

[This is] followed by developing real-time control algorithms to



**WSU biomedical, aerospace and mechanical engineering students are playing key roles.**

manipulate a virtual robotic arm and quadcopter," says Desai.

The second trial is an online study to control virtual robotic devices using artificial neural

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## AAKF upcoming events

**Wednesday, January 29, 2020 / 9 a.m. to 3 p.m**

**Kansas Day activities** for students at the Kansas Museum of History in Topeka. The theme will be “105 Counties, 105 Stories.” AAKF will focus on Sheridan county and its hometown hero, astronaut Nick Hague. Students will receive a trading card featuring Hague. (See at right)

**Saturday March 28, 2020 / 9 a.m. to 3 p.m.**

**SWE Engineering Expo** to highlight hands-on STEM activities for all ages. FREE. To be held at Century II in Wichita.

**Saturday, April 25, 2020 / 1 p.m. to 4 p.m. FREE.**

**Ad Astra Kansas Space Celebration** to be held at Washburn University in Topeka



Photo credit:  
Heather Zweiner

## TVIW/NASA Interstellar Symposium and Propulsion Workshop proves intellectually stimulating and thought-provoking.

Despite starting out with a brisk (record low) temperature outside, the topics and talk inside at the Sixth Interstellar Symposium and Propulsion Workshop in Wichita in November warmed right up with the exciting presentations.

Over 100 attendees listened to about 40 presentations in a dozen fields, plus the added bonus of the NASA propulsion workshop.

The symposium presentations (excluding the NASA workshop

content) will be posted online in a timely fashion. We will post those links on our AAKF website and in the spring newsletter,

[The TVIW website is https://tviw.us/tviw-2019/](https://tviw.us/tviw-2019/)

### Thoughts from Attendees

“I was amazed by the selection of topics and participants. The meeting definitely stimulates [one] to think about the future in all its aspects.” —**Dr. Artur Davoyan, USC-LA.**

“The conference was enlightening, because, as an undergraduate, it gives me insight as to how professionals work and interact across their respective disciplines.

Events like these are important to those of us who are interested in one day working in scientific fields as they provide an irreplaceable experience and exposure to aid in our decision making.”—**Jerod Horsch, WSU Physics**

“When I got interested in interstellar flight, back in the 1950s, I never saw a technical paper in the journals. Later, only a few papers were given at the International Astronautical Congress and almost none at the American Institute of Aeronautics and Astronautics meetings.

Now, there has been TVIW since 2011, times have changed.” **Dr. Al Jackson, Lunar and Planetary Institute, Houston.**



A group shot of attendees at The 6th Interstellar Symposium and Propulsion Workshop included Ad Astra Foundation board members: (l .to r.) Steve Durst, Dr. Nick Solomey and Jeanette Steinert; also attending (not pictured) Dr. Vicki Johnson. Also on the planning committee from Wichita were Dr. Jim Schwartz, Dr. Atri Duta and James Brewster, all from WSU. TVIW board members Dr. Les Johnson and Martha Knowles are right front.



## New NASA eBook reveals insights of Earth seen at night from space

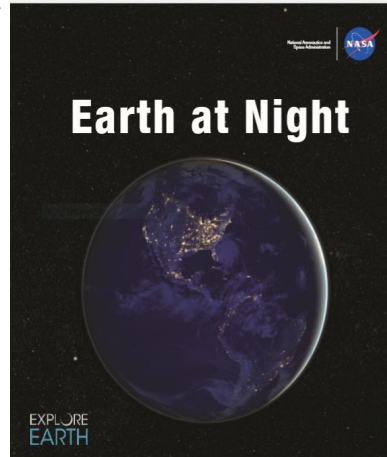
Earth has many stories to tell, even in the dark of night. Earth at Night, NASA's new 200-page ebook, is now available [online](#) and includes more than 150 images of our planet in darkness as captured from space by Earth-observing satellites and astronauts on the International Space Station over the past 25 years.

Free to the public for both study and enjoyment purposes, the images reveal how human activity and natural phenomena light up the darkness around the world, depicting the intricate structure of cities, wildfires and volcanoes raging, auroras danc-

ing across the polar skies and other dramatic earthly scenes.

In addition to the images, the book tells how scientists make and use these observations to study our changing planet and aid decision makers in such areas as sustainable energy use and disaster response.

NASA brings together technology, science, and unique global Earth observations to provide societal benefits and strengthen our nation. The agency makes its Earth observations freely and openly available to everyone for use in developing solutions to important global issues.



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networks containing the algorithms developed in part one.

The study also hopes to identify whether changes into human body weight due to gravity affects astronauts' ability to perform extra vehicular activities during space missions. Using an inversion table and unloading harness helps researchers study these weight changes and effects.

Critical also is how the space environment affects the brain's connectivity.

“The human brain has the tendency to make decisions based on learning experiences. [In the] space environment changes into gravity, temperature, and radiation might affect human decision-making due to no prior experience in long-term space missions or performing space mission tasks,” says Desai. Basically, the brain would have no reference point to work from.

“A recent study showed that due to microgravity, the human brain downweights vestibular nuclei responses and focuses more on visual and tactile feedback to learn about environment,” says Desai. Vestibular nuclei are neural elements in the brain that detect head motion and position relative to gravity and is primarily involved in fine control of eye movements, posture, blood pressure, and spatial orientation (a sensory system which helps coordinate movement with balance.)

Research findings from the neural-virtual interface system will help to develop protocols for human-machine interface both in space operations and after space missions for rehabilitation.

Benefits for us back here on Earth might include development of real-time brain-machine interface technology that can be utilized further for persons with spinal cord injuries to perform daily living activities; also, under-

standing neuroplasticity (the brain's ability to grow new connections) using neuro-virtual interface system in persons with disabilities.

“This will play an important and unique role in establishing astronauts' ability to successfully control robots and other mechanical systems,” Desai says. “It will also lay down a solid foundation to advance scientific knowledge and educate students in the field of neuro-robotics, human-machine interface, and artificial intelligence, and conduct experiments to ensure human safety and efficiency for future space missions.”

Along with Desai, the project team includes Professor James Steck, aerospace engineering; Asst. Professor Yimesker Yihun, mechanical engineering; the Neuroscience Lab at NASA Johnson Space Center and local company Brij Systems LLC. WSU students from biomedical, aerospace and mechanical engineering disciplines are also playing a key role.

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**INTERSTELLAR R & D will return in Spring 2020 issue**