



AAK Newsletter to go Quarterly

- Enables more timely content
- Expect April, July, October and January issues

Inside this issue:

New Astra Kansas Foundation board member	2
Kansas Observatory Resources	2
KU student to study deep riddles at Fermilab	3
WSU is top in aerospace R&D funding	3
PSU teams compete in NASA rover challenge	3
Interstellar R & D	4

Ad Astra Kansas Day calendar changes in 2016

Bolstered by a governor's proclamation, a university colloquium and a seasonal change of our popular space celebration, our 2016 Ad Astra Kansas Day will have a new look this year.

The proclamation (at right) honors science in Kansas and its impact on our past, present and future.

In keeping with our Ad Astra Kansas Foundation's goal to promote space science at all levels, we will sponsor a physics colloquium on Friday, April 22, at Wichita State University's Jabara Hall, in cooperation with the WSU Department of Physics. This 2 p.m. event is free and open to the public.

The speaker will be Dr. Gerald B. Cleaver. A theoretical particle

physicist and graduate program director at Baylor University in Waco, Texas, he is head of the Early Universe Cosmology and String Division of the Center for Astrophysics and Engineering Research there.

His studies into advanced propulsion systems for spacecraft will feature in his presentation "Matter-Anti-Matter Propulsion via QFT Effects from Parallel Electric and Magnetic Fields."

Our annual Ad Astra Kansas Day Space Celebration, usually held in April, will now move to the Fall this year, still at Washburn University in Topeka. Geared towards the public and families, it draws hundreds each year. Details will be in a future issue.

PSU-GAO Observatory marks 20th anniversary

Now celebrating its 20th year, the Pittsburg State-Greenbush Astrophysical Observatory (PSU-GAO) is a good example of cooperation.

In 1996, Pittsburg State had a telescope but no building. Citizens of southeast Kansas wanted more educational opportunities. PSU, Greenbush— also known as the Southeast Kansas Education Service Center, the Craw-Kan Telephone Cooperative and 30 school districts pooled resources to build one.

The agreement was that the observatory, its open houses and programs would be free to the public. And, PSU had its research-grade observatory.

The PSU-GAO's 24" Cassegrain telescope came from Blue Mesa

Station at New Mexico State University where its specifications and installation were overseen by Clyde Tombaugh in 1967.

Today, regular monthly events are held with current hot topic talks and viewing. Depending on the weather, attendance can be upwards of 80 people. A special event can bring hundreds.

There's a planetarium, also. Both sit on the same tract as the multi lab Abernathy Science Center, which is also part of Greenbush.

Observatory director Josh Cochran estimates that 16-18,000 students visit the science center each year, including the observatory.

Cont. "20th" pg. 2

Governor's Proclamation 2016

Whereas, Kansas has a long history of leadership in aeronautics and aerospace innovation; and

Whereas, Kansas' economic renaissance encourages development of opportunity in manufacturing, aerospace, scientific and technical services, energy, bioscience and technological innovation; and

Whereas in April 1990, Kansas astronaut Steve Hawley was Mission Specialist 1 on the shuttle mission to launch the Hubble Space Telescope; and

Whereas, Kansas' legacy to science and technology includes two Nobel Prize winners and three astronauts as well as cutting-edge research in astrophysics, information technology, bioscience and nanotechnology; and

Whereas, all these accomplishments depend on excellence in science, technology, engineering and mathematics; and

Whereas, Kansans have chosen "Ad Astra per Aspera," or "To the stars through difficulties," as the state motto:

NOW THEREFORE I, Sam Brownback, governor of the State of Kansas, do hereby proclaim April 24, 2016 as

Ad Astra Kansas Day

and encourage all citizens, university, business and government leaders to look to the stars and celebrate, encourage and promote the scientific achievements of our state and its citizens.



The PSU-GAO Observatory is located about 20 miles northwest of Pittsburg

Ad Astra Kansas Foundation welcomes new board member



Dr. Craig McLaughlin is the newest board member of the Ad Astra Kansas Foundation.

*“The interest in astronomy is always there...The universe fascinates everyone”—
Janelle Burgardt of NEKAAL*



Pittsburg State bought its 24" Cassegrain telescope and other research grade equipment from New Mexico State University in 1993.

Craig McLaughlin is an Associate Professor of Aerospace Engineering at the University of Kansas. He was previously in the Space Studies Department at the University of North Dakota and the Space Vehicles Directorate of the Air Force Research Laboratory.

He received his BS in aeronautical engineering from Wichita State University and his MS and

PhD in aerospace engineering sciences from the University of Colorado at Boulder. His research interests are in orbital mechanics and orbit determination including satellite drag, aeronomy, satellite formation flying, and satellite remote sensing.

Craig grew up in Greensburg and Anthony, Kansas, and says he was first inspired toward a

career in the space industry when his parents put him in his baby chair in front of the TV to watch Neil and Buzz take the first steps on the Moon.

The AAKF board also wants to express thanks to Drs. Tom Armstrong and Mark Smith, both of whom are stepping down from our board after four years.

Kansas Observatory Resources

Banner Creek Observatory — Previously Elk Creek Observatory on the Holton High campus, the observatory has a new location and name as part of the Banner Creek Science Center and Observatory. Its main telescope, a RC Optical Systems 20-inch reflector, made by RC Optical Systems of Flagstaff, Ariz., will be available for remote use in September 2016. Open houses, mini-classes and seminars on the natural and physical sciences are slated.

Crane Observatory — Opened in 1901, the Crane Observatory is currently located in the Stoffer Science Hall on the Washburn University campus, Topeka. Its unique Warner and Swasey refracting telescope was built in the late 1800s. The observatory is open to the public during scheduled open houses and to schools and other groups by appointment. There is also a planetarium.

Earl Bane Observatory — Opened in 1997, it is on the campus of Cloud County Community College in Concordia. Its 12-inch Catadioptric telescope has a magnification power of 600, allowing for deep space observation. Star parties are held regularly. Open to the public.

Farpoint Observatory — A private observatory in Eskridge, it belongs to the Northeast Kansas Amateur Astronomy League (NEKAAL). NEKAAL holds a public open house each month from March to November, with an extra session each in June and July. On cloudy open house nights, there are astronomy videos and presentations. Outreach presentations are also done on request, free of charge.

Lake Afton Public Observatory — Located west of Wichita, it closed last August. However, the Kansas Astronomical Observers has been working to reopen it. The LAPO project recently hit a milestone. “We have administration of the non-profit, but we are still negotiating an agreement with the county for use of the building,” said Harold D. Henderson, KAO president.

Powell Observatory—A private observatory 25 miles south of Kansas City, it is in Louisburg, Kan. Owned by the Astronomical Society of Kansas City (ASKC), about 200 of its members live in Kansas. Open to the public every Saturday night, May thru October. There is a fee. Off-site outreach year-round.

PSU-Greenbush Astrophysical Observatory —see front page article

“20th” cont. from page 1

One class belongs to Melinda Littrell, 3rd and 4th grade science teacher at Bartlett Grade School, part of the Altamont USD 506 district. For earth and space science 3rd, 4th and 5th grades do a field trip about every two years. “The telescope had a camera on it and each student got to take a picture of the moon which they

took home,” she recalls as a special impact item to the kids. The GAO draws from about a 2-hour driving radius, including an Arkansas community college which brings about 120 students each semester to study.

Through Greenbush’s Interactive Distance Learning capabilities, Cochran currently teaches science classes to five school districts. One is the USD 203 Piper

High School in Kansas City, Kan. As science electives astronomy and a meteorology classes are available each semester through IDL, as is a year-long physics class. This semester’s astronomy class has close to 30 students.

“The students and Mr. Cochran have a good rapport. And the relationship and communications between Greenbush and Piper make this a great [student] experience.”

KU grad student to study deepest riddles of physics at Fermilab

LAWRENCE—The billions of stars and galaxies we know about only form about 4 percent of our entire universe, according to Gopolang Mohlabeng, a KU grad student in physics and astronomy.

“The rest of the universe is composed of ‘dark matter’ and ‘dark energy,’” he said. “Dark matter accounts for about 23 %, and dark energy, 73 % of our universe. Dark matter holds our universe together — it’s like a kind of cosmic glue.”

Mohlabeng came to KU from South Africa in 2011 on a Fulbright Fellowship.

His focus is dark matter.

Working with physics and astronomy professors John Ralston and Kyoungchul Kong, his attention has been on particle physics, the development of new physics analysis tools, data analysis and “formulating astronomical questions other people weren’t asking,” he said.

Now, that hard work has earned Mohlabeng a yearlong Fermilab2 Graduate Student Fellowship in Theoretical Physics beginning in August. Fermilab in Illinois is America’s premier lab for particle physics and accelerator research.

At Fermilab, besides work on dark matter from a particle physics point of view, he is also

working on classifying astrophysical objects known as millisecond pulsars. “An important result recently reported by the Fermi gamma ray telescope observed a significant amount of gamma ray emission coming from the center of our galaxy. Many physicists think this might be due to dark matter interactions in the galactic center.

An alternative source of this emission, however, could be these millisecond pulsars,” he said.

He is also studying this current hot topic in astrophysics. “We want to know our place in the cosmos,” Mohlabeng said. Where we are, where we’re going and the history of our universe.”



“Dark matter is one of the greatest mysteries in current physics research,” says KU grad student Gopolang Mohlabeng

Wichita State is top in aerospace R & D funding

WICHITA—WSU remains first among all U.S. universities in business-financed aeronautical engineering R&D and third in overall aeronautical engineering R&D expenditures, according to newly released National Science Foundation (NSF) data.

The data comes from the NSF’s Higher Education Research and Development survey. Its information comes

from all reporting universities from fiscal year 2014, when WSU reported \$29 million in industry-funded aerospace R&D.

During this time, WSU also received \$10 million from agencies such as the DoD, FAA and NASA, and funding from the State. Overall aerospace R&D funding for 2014 totaled \$40 million, putting WSU in the No. 3 spot in overall funding. For fiscal year 2015, Wichita

State recorded \$43 million in aeronautical engineering R&D, including \$24 million in business-financed R&D funding.

Wichita State’s strength in aerospace R&D is primarily due to the National Institute for Aviation Research, the nation’s largest university-based aerospace R&D institute. In 2014, its top industry clients included General Atomics, Beechcraft, Bombardier and Learjet.

“In fiscal year 2015, WSU recorded \$43 million in aeronautical engineering R&D”

PSU teams compete in NASA Human Exploration Rover Challenge

Continuing on in a competition at which they have excelled since 1996, two Pittsburg State University teams will be among 80 teams, both national and international, at NASA’s annual Human Exploration Rover Challenge, April 8-9 at the U.S. Space and Rocket Center in Huntsville, Ala.

In the twenty years PSU has competed, besides many top tier placings, they have won the overall competition three times,

the design competition three times and in 2015 won the telemetry competition.

The two PSU teams each have a mix of eight students from both the mechanical engineering and manufacturing technology departments. “It makes them better equipped to see both sides of the process,” says Greg Murray, associate professor of mechanical engineering technology.

The process includes designing, constructing, testing and racing human-powered rovers over a 3/4-mile obstacle course simulating extraterrestrial terrain. In a new twist this year teams must design and fabricate their own wheels. Any component contacting the course surface for traction and mobility, including, but not limited to wheels, tracks, belts or treads cannot be bought or considered off-the-shelf.

In an interesting take “one of our teams took thick plastic and with a waterjet cut out mag wheels. Then they mixed up their own rubber compound, made a mold with tread. And adhered it to the spokes,” says Murray.

Every year a new crew of PSU students compete. “It’s a constant learning process for them, says Murray.

INTERSTELLAR R & D

Ad Astra Kansas News



Published through the
Ad Astra Initiative of
Space Age Publishing Company
230 California Avenue
Palo Alto, CA 94306

Editor/Publisher: Steve Durst
news@spaceagepub.com
Managing Editor: Jeanette Steinert
jeanettesteinert@att.net
Webmaster: Ken Moun

Board of Directors

President: Jeanette Steinert
Vice-President: Ken Moun
Secretary: Nick Solomey
Treasurer: Vicki Johnson
Shawn Carithers
Steve Durst
Margaret Hennessey-Springe
Craig McLaughlin
Kay Neill

We're on the web

Also, look for us on
Facebook

Got an item of interest? Send
to contact@adastra-ks.org

This "Interstellar R&D" feature in the Ad Astra Kansas News twenty-ninth issue continues an enterprise to research and gather information on the most important developments preparatory to humanity's greatest adventure—voyaging to the stars. Now, at the millennium's turn, is an appropriate time for grand vision and forward thinking, and there are strong signs of a renaissance in interstellar travel thought and activity. This new feature and newsletter, thus, now set forth to develop a national / international / global clearing center and storehouse of knowledge and know-how for travel to the stars: Ad Astra—Steve Durst

OBSERVATION Galaxy Center Phenomena

First Light / First object for many new observatory grand openings, the center of our Milky Way Galaxy and its supermassive black hole Sgr A* continues attracting study and wonder with barely-known astrophysics such as cosmic ray acceleration and dark matter annihilation providing galactic breakthrough discoveries.

Cosmic rays / particles, since their 1912 discovery, have been known to carry energies up to 100 teraelectronvolts (TeV), but their source of origin has long remained one of the most challenging mysteries of the 20th century. Now, 21st century deep-space observations with the High Energy Stereoscopic System (HESS) in Namibia, southern Africa, confirm that the center of the Galaxy is the location from where even higher energy petaelectronvolt (PeV) cosmic gamma-rays are emanating. Several objects at the galactic center such as supernovas and pulsars are capable of producing PeVs, though HESS astrophysicists now point to the supermassive black hole Sgr A* as the PeV's most likely engine of creation.

The Galaxy Center also is being observed as the place where dark matter / anti-matter annihilation occurs, resulting in very high energy cosmic gamma-ray emissions. If confirmed, this finding would be a significant breakthrough in the understanding of the nature of dark matter, which now is thought to constitute more than 95% of all matter in the universe.

TRANSPORTATION Interstellar Organization Matters, TVIW Workshops

The rise of starship conferences and interstellar organizations, certainly one of the more significant space movement phenomena in this still-young 21st century, validates the timing and relevance, and enhances outreach and growth prospects for the Ad Astra Kansas Newsletter and Foundation. AAKF considerations to host a major interstellar conference are resulting in closer observation and interaction with leading interstellar enterprises such as the Tennessee Valley Interstellar Workshop, and some of the more prominent interstellar organizations such as Icarus Interstellar, Starship Century, Tau Zero Foundation, Initiative for Interstellar Studies, and 100-Year Starship.

TVIW hosted its 2016 Workshop, "From Iron Horse to Worldship: Becoming an Interstellar Civilization", Feb 28 – March 2, in Chattanooga, Tenn. With much organizing direction provided by Les Johnson, and limited to some 100 participants, TVIW included such stellar luminaries as John Lewis, Chris Welsh, Rhonda Stevenson, Gerald B. Cleaver, Al Jackson, Cameron Smith, Kelvin Long, Greg Matloff, Jim Benford, Philip Lubin, amongst others. James Schwartz, of Wichita State University, helped represent AAKF. Planning for the next TVIW in Huntsville, Alabama, already is progressing towards early October 2017, around the 60th observation of Sputnik 1. Representatives from TVIW, Tau Zero and Icarus Interstellar, according to Dr. Schwartz, are interested in AAKF considerations to help host an Interstellar Conference after 2017 in the Ad Astra State of Kansas.