

Ad Astra Kansas Initiative Foundation Board named

With a ten-year history of celebrating science achievement in Kansas, the new Ad Astra Kansas Initiative Foundation begins its next decade of service to Kansas with an impressive and motivated board of directors.

Ad Astra Kansas Initiative Foundation Board members are: President: Thomas Armstrong, Fundamental Technologies LLC, Lawrence; Vice-president: Ken Moum, Topeka; Secretary, Vicki Johnson, Cessna Aircraft Co., Wichita; Treasurer, Jeanette Steinert, Hutchinson / Wichita. Other board members are Steve Durst, Space Age Publishing Company, Palo Alto, Calif; Margaret Hennessey-Springe, Kansas Children's Discovery Center, Topeka; Kansas Commission on Aerospace Education, represented by Ed Young, Topeka; Elias Jordan, Tucson, Ariz.; Kay Neill, past president Kansas Association of Teachers of Science, Emporia; Mark Smith, Washburn University, Topeka.

The non-profit's longstanding projects to promote education in the sciences, especially space sciences, include the Galaxy Forum held each August at the Kansas Cosmosphere and Space Center in Hutchinson. This is part of a series of international programs seeking to enrich science education by raising awareness of our Milky Way and our connection to it.

The recent sesquicentennial project provided teachers all over Kansas with materials to connect students with Kansas scientists in STEM fields for informational and inspirational purposes.

The annual Ad Astra Kansas Day Space Celebration each April provides hundreds of Topeka youth and their families with fun space science information and activities.



Voyagers' Kansas ties continue after 35 years

Voyagers 1 and 2, the little spacecraft that could, celebrate their 35th anniversary this year. Now past Pluto, they are poised to break loose from our solar system into interstellar space sometime in 2012. A Kansan will be one of the first to see the data sent back from interstellar space.

In the 1970s, NASA was considering how to make a single spacecraft to visit a number of planets. Dr. Thomas Armstrong of Lawrence, then a professor at KU, along with a friend from his graduate school days, submitted a proposal. NASA liked it. Besides being involved in the design, building and launch of the spacecraft, Armstrong has been a co-investigator on Voyager ever since.

According to the NASA website, the current mission the Voyager Interstellar Mission is to travel to the outermost edge of the sun's domain and beyond to discover the outer solar system environment.

"If Voyager lasts another 15 years --and it might-- and we can keep the ability to keep it pointed towards us in an attitude that allows us to hear and receive its signals, it will be approximately 15 billion miles or 170 astronomical units (AU) away," says Armstrong. That is nearly equivalent to a light day.

Voyager carries with it a golden record. "The golden record is emblazoned with the most representative stuff that another civilization should know about Earth plastered on the side of the spacecraft. It will be there for E.T. to find," says Armstrong.



Meet our Board / Learn about Voyager

**Ad Astra Kansas Day 2012
Space Celebration
April 21 in Topeka**

[more inside](#)

Cosmosphere celebrating 50th anniversary

Now celebrating its 50th year, the Kansas Cosmosphere and Space Center aptly illustrates where looking to the stars can lead.

With the help of astronauts Harrison Schmitt (Apollo 17), Charlie Duke (Apollo 16), Joe Engle and Steve Hawley (Kansas Shuttle astronauts), the Cosmosphere will celebrate this milestone anniversary on Saturday, April 28.

In 1962, science lover Patty Carey spearheaded the opening of Kansas' first public planetarium, the Hutchinson Planetarium, in an empty corner of a Kansas State Fairgrounds building. Carey died in 2003.

Fifty years later, the result is one of the world's premier space museums located on the Hutchinson Community College campus.

It houses the largest collection of space artifacts outside of the Smithsonian's National Air and Space Museum and the largest collection of Russian space artifacts in the West. Cosmosphere astronaut camps have been conducted for children and adults for more than 25 years.

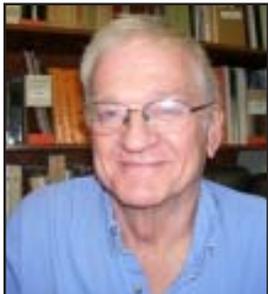
Spaceworks, the exhibit design and restoration unit of the KCSC, just completed restoration of an Apollo test capsule for the Columbia Memorial Space Center in Downey, Calif. Another recent project was building an Apollo Command Module and Lunar Module Ascent Stage replica for the exhibition "NASA: A Human Adventure." This exhibit opened in Stockholm in 2011 and now is in Madrid. Over 150 artifacts from KCSC collection are also included in the display.

Inside

- 2 Meet our Board members
Ad Astra Kansas Day 2012
Teacher workshop opportunity**
- 3 SCIENCE in KANSAS--150 Years and
Counting roster**
- 4 Interstellar R & D**

Meet our Board Members

Dr. Thomas P. Armstrong-- "I am a child of the Cold War and the Space Race. I grew up on a farm in north-east Kansas (Atchison) with dark skies and enjoyed watching Sputnik go over, and responded to President Eisenhower's call to get interested in science and catch up with the Russians," he says.



With degrees in Physics and Astronomy from the University of Kansas and the University of Iowa during the 1960s, space physics and space instrumentation and software have been a focus for the last 40 years. Armstrong has participated in the design, construction, calibration and analysis of instrument and raw computer data aboard 13 different spacecraft operating for more than 175 years in space. A professor at KU for 35 years, he is currently co-owner of Fundamental Technologies LLC, Lawrence.

Vicki Johnson--"It was an honor to be asked to join the initial Ad Astra Kansas Initiative Foundation Board of Directors to help move Ad Astra Kansas to the next step. It is a privilege to serve as the first secretary of the board. I first became aware of Ad Astra Kansas through Dr. Randall Chambers. He was always trying to get me to write an article for the newsletter. Unfortunately, he died before that happened, but I'm sure he is pleased now that I have finally gotten with it!



I am an Engineering Specialist-Sr. in Advanced Design at Cessna Aircraft Company. My primary project is serving as Principal Investigator on a NASA contract proving the feasibility of protective skins for composite airliners. Because of my NASA project, my second introduction to Ad Astra Kansas was as one of the people on a trading card in the Science in Kansas--150 Years and Counting sesquicentennial project. I am happy to work with and for the Ad Astra Kansas Initiative Foundation because I truly believe that science does play an important role in the future of Kansas, the United States and the world. It seems like people in Kansas have a hard time believing that we can contribute. We must help the next generation prepare to make that contribution to the well-being of the world."

FEATURE PRESENTATION

"Space History"— Space exploration from the 1950s to now, major discoveries and future possibilities—geared for general audiences, especially school children — given by Dr. Thomas Armstrong— longtime NASA co-investigator.



SCHEDULE OF ACTIVITIES

★ **5:30 to 8:30—**

Telescope displays
Flight and robotics demos
Interactive "Eyes on the Solar System"
Cool Voyager activities
Engineering and other science activities
Take-aways and more...



FREE-Fun for all ages

**5:30—10 p.m.
Sat., April 21**

★ **6:30 -7:30** "Space" ice cream
6:00 & 8:30 Planetarium show
6:15 - Flight demos
7:00 - Space History (including Voyager)
★ **8:30 -10** Crane Observatory open

**Stoffer Science Hall
Washburn University
17th and Washburn
Topeka**

SPONSORS

Ad Astra Kansas Initiative Foundation and
Washburn University Dept. of Physics/Astronomy

Ed Young--"The Kansas Commission on Aerospace Education was created in 1945 by executive order of Governor Andrew Scheppel. The aviation industry in Kansas contributes \$20 billion to the Kansas economy. It is the mission of KCAE to promote aviation and aerospace as a vocation. The KCAE is currently providing educational opportunities for all age groups in Kansas to experience aviation and aerospace opportunities. KCAE hosts a variety of activities from summer youth camps to continuing legal education for attorneys practicing air and space law. As a corporate member of the Ad Astra Initiative Foundation Board, KCAE appreciates the opportunity to influence aerospace education at the highest edge of human endeavor."

Ken Moum--"I joined the Ad Astra Kansas Initiative in 2009 to help the initiative with public relations, public affairs, writing, editing and graphic design. In the years since I have become a part of the movement to raise Kansans' awareness of the 21st-century importance of our state motto.

Now that we are on the doorstep of becoming a recognized non-profit organization with an established track record of supporting education in science, technology, engineering and mathematics I find myself on the board of directors of an organization with a bright future, as well as an illustrious past. I hope that the Ad Astra Kansas Initiative Foundation can continue on the course it has set since it began in 2001".

NASA RBSP Pre-Launch Teacher Workshop : July 31 - Aug. 2, 2012 accepting applications

Physics and astronomy teachers!

Applications are now being accepted for NASA's Radiation Belt Storm Probes mission (RBSP) pre-launch teacher workshop.

Held at the Johns Hopkins University Applied Physics Laboratory (JHU-APL) in Laurel, Md., this workshop is for educators who want to bring space weather science "down to Earth" and help teach the mysteries of the Sun-Earth connection, Earth's Van Allen Radiation Belts, and how space weather affects life and society.

An initial head-count will be taken April 20 to determine the number of remaining spaces, so please act quickly. Accepted applicants will receive a written confirmation and invitation from JHU-APL. Expense stipends are available.

Learn more here: <http://rbsp.jhuapl.edu/education/generalInfo/events.php>

Download the application here: <http://rbsp.jhuapl.edu/EducatorApplication.pdf>

Questions? Call Heather Mull at 785-840-0800, or email heather.mull@ftecs.com.

50 YEARS and Counting SCIENCE IN KANSAS

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The Ad Astra Kansas sesquicentennial project featured 150 Kansas-connected scientists, past and present, in STEM fields with the goals of honoring Kansas' science legacy and inspiring Kansas youth in the sciences. Each scientist is featured in downloadable trading card form on the Ad Astra Kansas website www.adastraks.org.

By fields of study*

AEROSPACE MEDICINE

Louis Lamb

AGRONOMY

Dan Devlin
Wes Jackson
Charles Rice

ARCHAEOLOGY

Walter Wedel

ASTRONOMY

Barbara Anthony-Twarog
Alexander Konopelko
Brian C. Thomas
Clyde Tombaugh

AVIATION

Clyde Cessna
Albin Longren
Lloyd Stearman

BIOLOGY

Donna Johnson
Mark Schneegurt
Virginia Rider
Mario Rivera

Anatomy/ physiology

Philine Wangemann

Bacteriology

Marshall Barber

Evolutionary

Joy Ward
Christine Chaboo

Food Microbiology

Abbey Nutsch

Ichthyology

David Edds

Microbiology

Cora Downs

Neurobiology

Steven Barlow

Wildlife Biology

Samantha Wisely

BIOMATERIALS SCIENCE

Paul H. Wooley

BOTANY

Elam Bartholomew
G. Washington Carver
David Fairchild
Walter Swingle
Joseph Thomasson
Anna Whitfield

CHEMISTRY

Christine Aiken
Hamilton Perkins Cady
Joseph Kennedy
Olga Koper
Otis Ray McIntire
Zoran Petrovic

Biochemistry

Elmer McCollum
Randy Scott

Medicinal

Barbara Timmermann

Neuroscience

Ralph N. Adams

EARTH SYSTEMS SCIENCE

F. Sherwood Rowland—
NOBEL

ENGINEERING

Aerospace

Thomas Aldag
Hall L. Hibbard
Cindy Hoover
Vicki Johnson

L. Scott Miller
Jan Roskam
Matthew Stinemetze
John Tomblin

Bioprocessing

Sigifredo Castro Diaz

Chemical

Christopher Ibeh

Civil

David Darwin

Electrical eng/ Computer science

Gary Burrell
Prasad Gogineni
David Gustafson
Min Kao
Jack Kilby—NOBEL
William B. Kuhn
Brian McClendon
Thomas Rudkin

Industrial/ Manufacturing

Zulma Toro-Ramos
Janet Twomey

Mechanical

Bob Minaie
Gerardo Olivares
Youqi Wang

Metallurgical

Dwight Burford

Petroleum

Charles Koch

EARTH SCIENCE

James Aber

ENTOMOLOGY

Francis H. Snow

FIRE SCIENCE

Rose Rozmiarek

FORENSIC SCIENCE

Timothy P. Rohrig

GEOGRAPHY

Kendra McLauchlan

GEOLOGY/ GEOPHYSICS

Gisela Dreschhoff
Erasmus Haworth
Karma Mason
Burton McCollum
Benjamin Franklin Mudge
Susan Nissen
Don Steeples
Lynn Watney

GRAIN SCIENCE

Mark Carleton

R. Carl Hoseney
Robert Schoeff
Paul Seib
Xiuzhi "Susan" Sun
Charles O. Swanson

HUMAN FACTORS SCIENCE

Alex Chaparro
Randall Chambers

INSECT ECOLOGY

Orley "Chip" Taylor

INVENTORS

Charles Angell
Walter Chrysler
William Coleman
Paul C. Fisher
A.A. Hyde
Omar Knedlik
William Purvis
Almon B. Strowger
Charles Wilson

MATHEMATICS

Virginia Naibo
G. Baley Price

MEDICINE

Lewis Coriell
William W. Duke
Carol Fabian
Jared Grantham
Creighton Hardin
Paul Harrington
Bill Narayan
Earl Sutherland, Jr. —
NOBEL
Walter Sutton

Psychiatry

C. F. Menninger
Karl Menninger
Will Menninger

Public Health

Samuel Crumbine

Veterinary

Elizabeth Davis
T. G. Nagaraja

METEOROLOGY

Neil Frank

METEORITICS

H.H. Nininger

NUTRITION

Norge Winifred Jerome

OCEANOGRAPHY

Robert Ballard

PALEONTOLOGY

Mike Everhart
Charles H. Sternberg

PHARMACEUTICALS

Takeru Higuchi
Elias Michaelis

PHYSICS

Thomas Armstrong
Jesse Beam
Gavin Buffington
Kristan Corwin
Chii-Dong Lin
Ernest Fox Nichols
Norman Ramsey, Jr. —
NOBEL
L. Worth Seagondollar
Nickolas Solomey
Christopher Sorensen

RENEWABLE ENERGY

Kristin Bowman-James
Ruth Douglas-Miller
Mary Rezac
Paul Rillema
Judy Wu

SPACE EXPLORATION

Joe Engle
Ron Evans
Steve Hawley

SPEECH/LANG- UAGE/ HEARING SCIENCE

Mabel Rice

TELECOMMUNICATIONS

Victor Frost
Richard Moore

TEXTILE SCIENCE

Elizabeth McCollough

WATER QUALITY

Dan Devlin

X-RAY TECHNOLOGY

Ed C. Jerman

ZOOLOGY

Mary Dawson
Lewis L. Dyche

* Though many scientists qualify for listing in several categories only one listing is given for space reasons. For more in-depth information, go to www.adastraks.org

Interstellar R&D

Ad Astra Kansas News

This "Interstellar R&D" feature in this *Ad Astra Kansas News* twenty-first 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 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

Active Galactic Nuclei

Galaxy studies continuing growth out through the 21st century is matched by parallel growth in black hole / singularity / active galaxy nuclei (AGN) research and observation.

AGN are supermassive black holes at the centers of some galaxies that are accreting surrounding matter at extraordinary rates which causes the AGN to radiate profusely across the entire electromagnetic spectrum. Excessive luminosities of these gravitationally compact regions have been observed in the radio, submillimeter, infrared, optical, ultraviolet, and especially X-ray and gamma ray wavebands. AGN, often outshining their host galaxies, are the most luminous durable sources of electromagnetic radiation in the cosmos, and thus can be used to discover distant objects and determine relative distances.

Several main types of Active Galaxies, such as Quasars, Blazars and Seyferts, have different distinguishing characteristics, though many astrodynamists believe that while appearing different they are essentially the same phenomena though observed from different directions. Quasars, or quasi stellar objects QSOs, are very distant active galaxies, up to 12 billion light-years away; Blazars are radio-loud — very bright / energetic in the radio band — whose accretion discs produce and eject massive bi-directional plasma jets; Seyferts are radio-quiet, closer to us and characterized by fluctuations in luminosity at their cores.

Observations of AGN are made across the electromagnetic spectrum in all wavelengths. The European Space Agency INTEGRAL X-ray Observatory and the NASA multi-wavelength Swift Observatory are pioneering high energy X-ray and gamma ray research, which provides astronomers unique x-ray information into the processes occurring at the centers of galaxies and gamma ray observations on the nature of particle acceleration in the jets of quasars. The newly-operating high altitude millimeter / submillimeter ALMA facility at Chajnantor, Chile, is already making x-ray observations of AGN.

COMMUNICATION

ATA: What Once Was Lost, Now Is Funded

The Allen Telescope Array (ATA) has resumed operations in the Search for Extra-Terrestrial Intelligence and is being enhanced by the launch of a new citizen science program called SETI Live.

Thanks to private donors, the 42 telescope radio interferometer came back online December 2011 after an 8-month blackout resulting from loss of National Science Foundation and state funding. With a staff of 10 the array costs \$2.5 million per year to operate. The objective of SETI Institute CEO Tom Pierson is to maintain funding so ATA can scan the 2,321 newly discovered exoplanets identified by NASA's Kepler mission.

Led by Dr. Jill Tarter, the Center for SETI Research has teamed up with Zooniverse to create SETI Live a web-based system that enables members of the public to contribute to the project by searching for patterns and anomalies in the ATA data stream that might indicate the presence of intelligent civilizations. The first 2 weeks saw more than 40,000 volunteers sign up and 1 million radio samples analyzed. These citizen scientists could be the first Earthlings to receive communications from our interstellar neighbors.

Human pattern recognition could be used to fine-tune the software algorithms that continuously inspect the 1 to 10 gigahertz swath of the radio spectrum data collected by ATA. Of course there's no telling what type of signal an alien civilization might emit. Radio broadcasts are a possibility, but so also may be signals based on pulsed lasers or quantum entanglement.

As the cost of optical electronic detectors has fallen over the last decade SETI experiments at optical frequencies have begun. Soon these will expand into the infrared portion of the spectrum.

TRANSPORTATION

Mae Jemison to Lead 100 Year Starship Project

The "100 Year Starship" project, a research initiative by the US Defense Advanced Research Projects Agency (DARPA) to develop a sustainable and multigenerational model for long-term private-sector investment to advance interstellar travel, will be led by former NASA astronaut Mae Jemison, along with Icarus Interstellar, and the Foundation for Enterprise Development.

Jemison's winning proposal, "An Inclusive Audacious Journey Transforms Life Here on Earth and Beyond," was the top-choice from over 520 entries vying for the US\$500,000 grant. A true pioneer in space travel, a physician and Peace Corp volunteer, Mae Jemison, became the 1st African-American woman to travel to space in 1992 and went on to pursue several successful ventures, including an education project based group known as The Dorothy Jemison Foundation for Excellence, and The Jemison Group, a technology design and consulting company.

As outlined in the 100 Year Starship Study RFI, proposals needed to describe the organizational structure, governance mechanism, investment strategy, as well as a business model for long-term self-sustainability. To cover these criteria, The Dorothy Jemison Foundation will handle the educational and broader social objectives, Icarus Interstellar will cover the technical aspects of the project, and the Foundation for Enterprise Development will contribute to innovative organization of operations.

Icarus Interstellar also heads related research projects such as Project Icarus, which will continue with its interstellar fusion propelled probe design, due sometime in 2014.

With the ability to lead 2 successful organizations as well as her own personal accomplishments, Jemison may well be qualified for the position to direct a multi-generational mission towards the next century.

Published through the Ad Astra Initiative of

Space Age Publishing Company, 480 California Avenue, Palo Alto, CA 94306
to promote and publicize Kansas high tech /
space tech research and development.

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