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KU alum helps “Shepard” in a new era of space travel

When Blue Origin launched the 14th successful test flight of its New Shepard rocket booster and capsule on January 14, Kansas Laura Stiles was right on the front lines.

Since 2018, the 2008 KU alum has served as senior manager of launch operations for the NS program, which has as one goal—suborbital space tourism.

Her role includes both personnel management and project leadership—both tactical and strategic. An extremely talented launch ops group—including the flight controllers (Mission Control) and logistics leads for the launch operation—is responsible for the launch crew, the procedures for executing a launch operation, and the processes ensuring safety and mission success.

The launch operation itself is the most exciting and interesting part of the NS program to Stiles. “I’m biased--it is extremely rewarding to see the team successfully put their training into action in the high-consequence, fast-paced environment of the launch,” she said.

Growing up in northeast Kansas, camping trips with her dad sparked Stiles’ interest in STEM. She learned the constellations and they watched meteor showers together.

“Stargazing led to me asking questions about the universe and motivated me to read about physics and astronomy, and ultimately to pursue my degree in

engineering physics,” said the Prairie Village native.

Stiles earned that degree (with an aerosystems focus) in 2008 from the University of Kansas. The engineering physics degree was important she says, teaching her the importance of understanding the core concepts behind engineering practices.

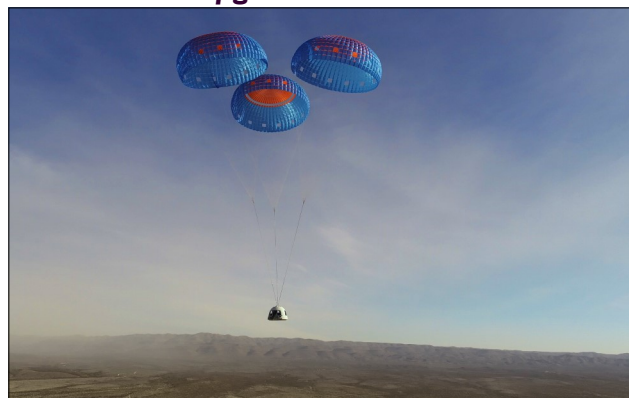
In graduate school at the University of Colorado, she was able to apply these fundamentals to new and interesting problems. Along the way, she served internships at the Large Hadron Collider, NASA Goddard Space Flight Center, Raytheon and the Air Force Research Lab.

Stiles has been with Blue Origin, the private rocketry company founded by Jeff



“I feel one of the most important things our New Shepard program can do—give people perspective on Earth, its beauty...”

Cont. Stiles pg. 3



The capsule from the January 14, 2021, New Shepard test flight returns to the ground above west Texas. Credit: Blue Origin press release

Marking Twenty Years of the Ad Astra Kansas Foundation



By Jeanette Steinert

Hard to believe—it’s been 20 years since Steve Durst, Randall Chambers and I met in Hutchinson to discuss an Ad Astra Kansas Initiative, highlighting our state’s STEM potential / space potential.

Steve had 20 years experience in the space publishing field and a fondness for our state motto. Dr. Chambers was a chief life scientist for NASA for over 25 years and a Distinguished Professor Emeritus at WSU; and I, a native Kansan with literary skills and an interest in science.

Our goal was to promote space science and education in Kansas using our state motto as a touchstone. With our 21st century vision for Kansas’ future—shooting literally and figuratively to the stars through scientific achievement.

I remember speaking early on to a professor about our goal to interest, inform, inspire and

acknowledge science achievement in Kansas.

He said he didn’t think Kansas scientists needed any help. I said—not with the science, but who else outside their lab knows about any of their cutting-edge work? But help with getting the word out and getting credit for what they do, especially among youth who we want to inspire.

“Touche,” he said.

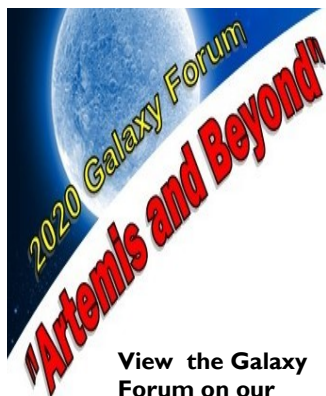
Since 2001, we have tried to do that through 48 (and counting) newsletters with over 350 articles (see archives at our website www.adastra-ks.org).

There have been ten Galaxy Forum educational events since 2010 (we went digital this year), eleven Ad Astra Kansas Day Space Celebration hands-on family events in Topeka since 2008; countless participation in public events and projects geared towards youth, and co-hosting of one international symposium. And more.



Present for our first Ad Astra Kansas Day proclamation in 2003 (to promote public awareness of science and technology’s importance to Kansas’ future) signed by Governor Kathleen Sebelius were (l-r) Jane Fortin, George Howard, Jeanette Steinert, Brenda Culbertson, Mary Jane Chambers, Dr. Randall Chambers and Dr. Paul Fortin. Since then we have had five proclamations under four governors. We hope for one again this year under Governor Laura Kelly.

In future issues this year, we will focus on various facets of our mission and plans for the future.



View the Galaxy Forum on our [Facebook](#)

page

NASA grant to Kansas universities focuses on 3D printing

MANHATTAN: Last September, researchers at three Kansas universities received a subcontract as part of a \$127,000 grant from NASA to design a method of 3D printing for a hybrid internal combustion engine to power uncrewed space vehicles on Mars and Earth missions.

The “MICE (Miniature Internal Combustion Engine)—High Powered Density Free Piston Engine” is a one-year project, led by Wichita State University, with a collaborative effort between three Kansas universities — Wichita State, Kansas State University and the University of Kansas; three industry

partners — KalScott Engineering, Brij Systems and Aerojet Rocketdyne; and the NASA Glenn Research Center.

The team expects these efforts to lead to long-term sustained collaboration, STEM outreach and future funding opportunities.

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Grant enables National Institute of Materials Advancement at PSU

Scientists with their deep knowledge of polymers are going to be the ones to find long-term sustainable technologies for that most ubiquitous of materials—plastics.

Developing new polymer technologies is the aim of a three-year \$2.39 million grant recently awarded to the Kansas Polymer Research Center (KPRC) at Pittsburg State University. The National Institute of Standards and Technology (NIST) grant will enable formation of the National Institute for Materials Advancement there.

Pittsburg State has a long history in plastics research. Its Plastics Engineering Technology (PET) program, founded in 1969, is one of the nation's oldest and foremost PET programs. It also has an 8-year-old Polymer Chemistry Program through the College of Arts and Science. And the KPRC has been operating since 1994 as a separate research institute.

"The formation of the National Institute of Materials Advancement will leverage all of PSU's materials science research into the NIMA" said Dr. Tim Dawsey, Executive Director for the Advancement of Applied Science & technology.

The grant focus will key on polymer research and development based on renewable material resources, with a strong core competence in polyurethanes and electroactive materials (polymers that respond to electric fields / smart materials used for energy generation, storage and transport).

KPRC has a bio-based core competence specializing in vegetable oil-based R & D (such as the BIOH® polyol jointly developed with Cargill and used in car seat cushions). As researchers delve for innovative and sustainable products, they will be asking two main questions. How can we make greater use of agriculture and bio-products to make green-

bio plastics? And what is the best way to recycle?

How broad are the applications for this? Limitless. Both for here on Earth and beyond.

Of course, space isn't NIMA's target, renewable resources for here on Earth are. But many polymer applications such as insulation, aerospace composite materials, adhesives, batteries, interactive materials, touch screens, clothing materials, face shields, food packaging with oxygen and moisture barrier capabilities have cross-over potential.

"Although our efforts are not focused on space exploration, much of our science is, or will be, directly applicable," said Dawsey. "For instance, payload weight and mass are critical on any space mission and our efforts to develop polymers of lighter weight and enhanced strength are directly relevant. Our activities in using renewable resources (like waste coffee grounds) to produce

carbon electrode materials for batteries is, again of immediate importance."

The second question is what is the best way to recycle plastic? The usual way—mechanical—grinding it up and adding to something else? Or advanced—using chemicals to depolymerize plastics back into the state it was in the beginning and then make something new?

This question has to be addressed, according to Dawsey. "It is the scientists who know the complexities of plastics that will need to figure out a solution." According to the EPA over 35 million tons of plastics were generated in the U.S. in 2018.

The vision is for NIMA to become a nucleus for a polymer research cluster with bachelors' and masters' degrees, attracting industry and diversifying the economy of the 4-state region of Kansas, Arkansas, Oklahoma and Missouri. Also, an additional \$1.6 million grant from the Economic Development Association (EDA) has just been awarded.

Cont. Stiles from pg. 1

Bezos in 2000, for over seven years. Having worked on many aspects of the company's New Shepard program (which plans for suborbital space tourism) from design to test, and now launch operations, has given her a good and holistic understanding of the vehicle and operations, according to Stiles.

The New Shepard is a VTVL—vertical take off / vertical landing human-rated suborbital rocket—a reusable commercial system for suborbital space tourism to the Karman line (altitude of 100 km—generally considered the edge of outerspace.)

Still in development for space tourism, the New Shepard (named for the first American to travel into space—Alan Shepard) has already had many successful

payload flights for NASA, universities and other research programs, including the one earlier this month.

Besides expanding payload system capabilities, data gained from these flights help prepare for launching humans into space.

According to the Blue Origin website, when NS tourism is eventually approved, passengers will have an 11-minute flight. A capsule atop a 60' tall rocket will launch, accelerating to Mach 3 before separating from the rocket and doing a free flight above the Karman line. Upon descent, parachutes will land the capsule upright back on Earth.

According to Stiles, NS is close to being ready to launch with the first crew—some time in 2021. There are several big milestones coming up, including a review by industry

experts. "It is a very exciting time for the program!"

Stiles would like to go to space herself sometime.

"For me, being able to lift off from the Earth and look back from the outside perspective of space would be life-changing. I feel that this would be one of the most important things that our New Shepard program can do—to give people perspective on Earth, its beauty, and the things that really matter," said Stiles.

Stiles encourages science as a career. "STEM is an exciting, rewarding and versatile field. Increasing students in STEM fields is a great investment in the future.

"We especially need to expand the demographics in STEM fields. I see a positive trend in diversity, but it

is not enough. It has been a challenge to be a female in a very male-dominated field and my hope is that those who come after me can have a path with at least some obstacles removed.

"There are a mountain of interesting and challenging science and engineering problems to solve to make our world a better place, and no one should have to waste time or energy on unnecessary challenges or setbacks—from being excluded, doubted, or dismissed for something like gender, race, or sexuality," said Stiles.