



ARCHIBEQUE AWARDED FELLOWSHIP

Benjamin Archibeque, BS in Physics and Psychology, 2018, was one of six K-State students and two alumni among the National Science Foundation's 2018 Graduate Research Fellows and honorable mentions.



The fellowship supports and recognizes outstanding students conducting science, technology, engineering or mathematics research as they undertake master's or doctoral degrees at accredited U.S. institutions.

While at K-State, Archibeque participated in several undergraduate research projects, including a meta-analysis of the impact of teaching methods and other institutional variables on student learning in introductory physics classes that used surveys from more than 50,000 students.

Ben's research was conducted under the mentorship of Eleanor Sayre, associate professor, through the Developing Scholars Program and the Ronald E. McNair Baccalaureate Achievement Program.

Archibeque is currently a graduate student pursuing his doctorate in physics education research at Florida International University.

UPCOMING EVENTS

March 25, 2019

Nichols Lecture
Joanna Behrman
Johns Hopkins

September 10, 2019

Neff Lecture
Daniel Kenefick
University of Arkansas

October 7, 2019

Peterson Lecture
Lincoln Carr
Colorado School of Mines

GREETINGS FROM THE DEPARTMENT HEAD

It is a great pleasure to be writing to you. It has been far too long since our last newsletter in 2016 and I would like to update you on your Physics Department and extend greetings to all of you on behalf of myself and my colleagues.

I've had huge shoes to fill as head and I'd like to take this opportunity to thank Amit Chakrabarti, current dean of the K-State College of Arts & Sciences, for handling the department so well.

The most rewarding aspect of K-State Physics continues to be the people that make up this community: inquisitive students, both undergraduate and graduate, staff who make the department run smoothly and efficiently, faculty who provide leadership in many ways, and alumni who continue to give back in so many ways.

The department is in good shape and well placed to tackle the future. The challenges we face, to grow student numbers and increase our research impact and funding, are not unique to K-State nor

are they new; however, I can't think of a department better placed to address them. Thanks to the continued support of my colleagues along with YOU, our alumni and friends, I know that we can meet these challenges.

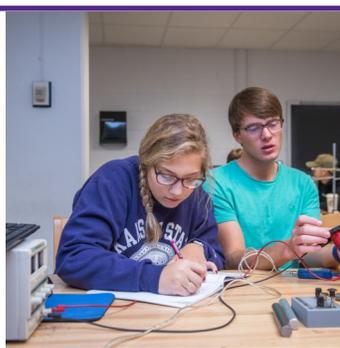
We hope you enjoy hearing about our department, fellow alumni, and friends in this issue. We would love to hear what is happening in your life, so please drop us a note, send an email, or give us a call.

Keep up to date on things here in the department by visiting our website, www.phys.ksu.edu, Facebook page, www.facebook.com/ksuphys, or Twitter, @KSUPhysics.

Once again, thank you for all you do to support the department.

Brett DePaola, Porter Professor & Head
depaola@phys.ksu.edu





UNDERGRADUATE HIGHLIGHTS

2017-18 Undergraduate Degrees Conferred

Benjamin Archibeque, Graduate Student in Physics,
Florida International University

Reid Brown

Pauline Dredger, Graduate Student in Physics, University
of Texas-Arlington

Austin Jantz

Margaret Lang, English Teaching Assistant, Académie
de Bordeaux

Patrick McIntyre

James (Zach) Minton, Software Engineer Consultant

Matthew Nixon

Jonathan Opila, Technician, iGurus

Evan Shanelec

Tristan Wells Filbert, Graduate Student in Mathematics,
Michigan State University

Wai Ka (John) Situ, Frontend Developer, Mi Media
Manzana, Peru

2016-17 Undergraduate Degrees Conferred

Maxwell Burr, IT Support, Propio Language Services

Kevin Carr

Spencer Childress

Drew Johnson, Graduate Student in Physics, University
of Minnesota

Trek Keck

Karan Mehra, RF Design Engineer at ViaSat, Tempe, AZ
and MS candidate, Electrical Engineering, USC

Timothy Moore

Steven Murray

Kevin Robben, Graduate Student in Chemistry,
University of Iowa

Andrew Walsten, Graduate Student in Mechanical &
Aerospace Engineering, University of Alabama in
Huntsville

Anthony Williams, Video Editor and Graphic Designer,
Bench Fly

McClain Named 2017 Cargill Global Scholar



Nathan McClain, computer science and physics major, Overland Park, was one of 10 U.S. students selected as a 2017 Cargill Global Scholar for his potential as a leader and researcher in the spheres of food, farming and financial risk management.

McClain is an ambassador for the College of Engineering and an event coordinator for the university's Game Development Club. He has received the Putnam Scholarship, Wabash Cannonball Scholarship and the A.B. Cardwell Fund Scholarship.

Erdwien Receives Goldwater Honorable Mention

Reid Erdwien, senior in physics and math, Manhattan, was one of three K-State students who received honorable mentions for the 2018 Barry Goldwater Scholarship.

As an undergraduate researcher, Erdwien is researching the 3-D momentum imaging of dissociation in flight of metastable molecules with Itzik Ben-Itzhak, university distinguished professor in physics.

Some of Reid's Goldwater research resulted in a publication in the New Journal of Physics—"Three-dimensional momentum imaging of dissociation in flight of metastable molecules," which is available at doi.org/10.1088/1367-2630/aa81ab.

He also was a teaching assistant for Advanced Physics Laboratory. He was named a James R. Macdonald Memorial Scholar in 2016 and 2017.



PHD AND MS DEGREE RECIPIENTS

Utug Ablikim (PhD 2017, Advisor: Daniel Rolles) "Coulomb Explosion Imaging of Polyatomic Molecules after Photoionization with X-Rays and Strong Laser Fields" — Following a postdoc position at Berkeley National Lab for a year, Utug is currently a system design engineer at KLA Tencor in California

Benjamin Berry (PhD 2018, Advisor: Itzik Ben-Itzhak) "Imaging Laser-Induced Fragmentation of Molecular Beams, from Positive to Negative Molecules" — Ben is currently seeking employment

Tia Camarillo (MS 2018, Advisor: Bharat Ratra) "Fundamental Parameters of the Milky Way Galaxy" — Tia is currently employed as a STEM specialist at Bright Horizons in Seattle

Neda Dadashzadeh (PhD 2017, Advisor: Kristan Corwin) "Improved Performance and Characterization of an Optically Pumped Mid-IR Acetylene-Filled Hollow-Core Fiber Laser" — Neda is employed at Coherent Laser in Connecticut

Yuba Raj Dahal (PhD 2017, Advisor: Jeremy Schmit) "Equilibrium and Kinetic Factors in Protein Crystal Growth" — Yuba Raj is a postdoc at Northwestern University

Peyman Feizollah (MS 2018, Advisor: Itzik Ben-Itzhak) "Laser Induced Fragmentation: From Dissociation of Neutrals to Three-Body Breakup" — Peyman is pursuing a PhD in Condensed Matter Physics at K-State

Praful Gagrani (MS 2018, Advisor: Lado Samushia) "Improvements in Techniques for Understanding the Large Scale Structure of the Universe" — Praful is pursuing a PhD in High Energy Physics at University of Wisconsin, Madison

Sawyer Hopkins (MS 2017, Advisor: Amit Chakrabarti) "Examination of Non-local Screening Effects on Protein Crystallization" — Sawyer is in a machine learning & algorithms position at Import.io in California

Sajed Hosseini (MS 2018, Advisor: Kristan Corwin) "Acetylene-filled Pressure-broadened Short Photonic Microcells" — Sajed is now pursuing a PhD in AMO Physics at K-State with Cosmin Blaga

Han Hu (MS 2018, Advisor: Michael O'Shea) — Han is actively seeking employment opportunities in China

Bahar Modir (PhD 2017, Advisor: Eleanor Sayre) "Problem Solving in Physics: Undergraduates' Framing, Procedures, and Decision Making" — Bahar is an assistant professor of physics at Texas A&M University in Commerce

Jeffrey Powell (PhD 2017, Advisors: Chris Sorensen and Artem Rudenko) "Strong-Field Driven Dynamics of Metal and Dielectric Nanoparticles" — Jeff is a postdoctoral fellow at K-State

Aleena Rafique (PhD 2018, Advisor: Tim Bolton) "Tests of Neutrino Interaction Models with the MicroBooNE Detector" — Aleena is a postdoc at Argonne National Laboratory



Hui Wei (PhD 2017, Advisor: Chii-Dong Lin) "Characterization and Applications of Isolated Attosecond Pulses" — Hui is actively seeking employment

Derrek Wilson (PhD 2018, Advisor: Artem Rudenko) "The Scaling of Strong Field Interactions with Wavelength" — Derek is employed at Few-Cycle Inc, in Montreal, Canada

Youliang Yu (PhD 2017, Advisor: Brett Esry) "Computationally Exploring Ultrafast Molecular Ionization" — Youliang is a lead data scientist at Eluvio in California

Stefan Zigo (PhD 2017, Advisor: Carlos Trallero) "Photoionization of Isomeric Molecules: From the Weak-Field to the Strong-Field Limit" — Stefan is an optical/laser scientist at General Atomics in San Diego



FACULTY AWARDS, PROMOTIONS, AND NEWS

University distinguished professor **Bharat Ratra**, Cosmology, received the Olin K. Petefish Award in Basic Sciences in September 2017. The award recognizes the exceptional long-term research accomplishments of faculty at Kansas Board of Regents universities. The award included a citation and a \$10,000 award for his ongoing research efforts.

Professor **Tim Bolton**, high energy, was named one of the College of Arts and Sciences Faculty Stars. "We are pleased to recognize our arts and sciences colleagues as Faculty Stars for their excellence as educators, researchers and mentors," said Amit Chakrabarti, dean of the College of Arts and Sciences. The awards are funded and supported by a gift from



1996 graduate and Aspera CEO and co-founder Michelle Munson and her husband, Serban Simu.

Chris Sorensen, Cortelyou-Rust university distinguished professor, led a team that has patented a detonation technique that can mass-produce graphene with three ingredients: hydrocarbon gas, oxygen and a spark plug. Other K-State researchers involved include **Arjun Nepal** (PhD 2015), research assistant professor, and Gajendra Prasad Singh, former visiting scientist. The group is working to improve the quality of the graphene and scale the laboratory process to an industrial level.

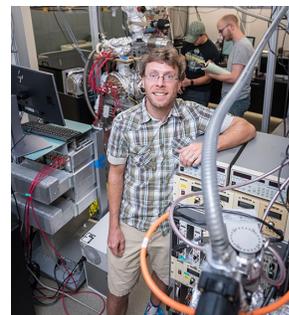
Kristan Corwin, Chapin Professor of Physics, had been serving as interim and then Associate Dean of Research for the College of Arts and Sciences



since 2017 while maintaining her research program in the Physics department. She has recently accepted an appointment as Division Chief of the Applied Physics Division at the National Institute of Standards and Technology (NIST) in Boulder, Colorado. Corwin began her appointment at NIST in January of 2019.

Brett DePaola was named head in 2017 after having served as interim head for a year. DePaola follows Amit Chakrabarti, who served as interim dean of the College of Arts and Sciences here at K-State until he was named to the permanent dean position in 2017.

Assistant professor of AMO physics, **Daniel Rolles** received a National Science Foundation Faculty Early Career Development (CAREER) award to investigate ultrafast electronic and structural dynamics during light-driven chemical reactions.

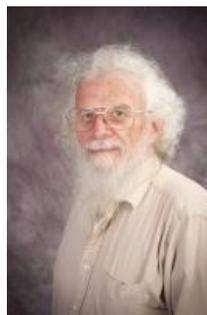


Glenn Horton Smith, high energy physics, was promoted to full professor in 2017. **Bret Flanders**, soft, condensed and biological matter physics, and **Yuri Maravin**, High Energy Physics, were promoted to full professor in 2018. **Artem Rudenko**, atomic, molecular and optical physics, was promoted to associate professor last year.

An-Thu Le achieved the status of research professor last year prior to joining the faculty at Missouri University of Science and Technology as a tenure-track assistant professor of physics.

Osku Kempainen and **Arjun Nepal** were appointed research assistant professors in 2017. They both conduct research in the soft, condensed and biological matter physics group.

Artem Rudenko, **Daniel Rolles**, and **Loren Greenman**, together with Robin Santra from the University of Hamburg, recently received a \$2.1M three-year grant from the Department of Energy as part of a new initiative for "ultrafast" science. The project aims at investigating charge transfer and charge migration dynamics on the few-to-sub-femtosecond time-scale. It includes research that will be conducted at the LCLS-II free-electron laser facility at SLAC.



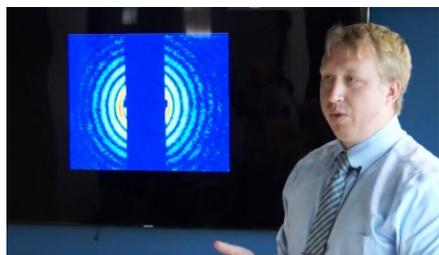
Dean Zollman celebrated his retirement in 2016. Dean, a pioneer in physics education, mentored many students and postdocs over the years and served as head for 10 years. The department celebrated at a gathering at the Alumni Center. A highlight was a video containing messages from former postdocs and students.

Larry Weaver moved to emeritus status in fall 2018. Larry has been a faculty fave of students for many years. Larry has requested that there not be an over-the-top celebration. Instead, the department will host an ice cream party featuring Call Hall ice cream. More information will be forthcoming.



STUDENT KUDOS

Utug Ablikim (PhD 2017) was awarded a 2016-17 Advanced Light Source Fellowship that provided a stipend and the opportunity to conduct research at the frontier of synchrotron radiation and help advance state-of-the-art techniques and applications. During his year in residence at the Lawrence Berkeley National Lab, Utug worked under the direction of his research advisor, Daniel Rolles, in collaboration with Advanced Light Source staff scientists.



PhD candidate **Adam Summers** was invited by Department of Defense Director of Basic Research Dr. Robin Staffin to serve as a featured speaker at the inaugural Science, Technology, and Innovation Exchange event in 2017.

Adam was also awarded the 2018 Laser Technology, Engineering and Applications Scholarship by SPIE, the international society for optics and photonics, for his potential contributions to the field of optics, photonics or related fields.



Raiya Ebini, PhD student working with Cortelyou-Rust Distinguished Professor Chris Sorensen, was recipient of the 2017 ASEE Midwest Section's best poster award.

Nandana Weliveriya, PhD candidate in Physics Education Research, was selected as a K-State Alumni Associate 2017 International Student Scholar. Nandana is completing his PhD under the advisement of Eleanor Sayre.



Derrek Wilson (PhD 2018) was selected as the 2017 Ultrafast Optics Conference poster award. The conference recognized Wilson's presentation with a certificate and monetary prize.

Wilson's work also resulted in a funding award to former K-State faculty member Carlos Trallero. The award will be used to study the interaction of intense, long-wavelength, short laser pulses with solids and molecules and allow for development of new techniques for the characterization of short pulses in this spectral region.

STAFF SPOTLIGHT

The department said goodbye to two of our undergraduate advisors. **Sarah Golin** departed for the University of Connecticut in 2017. **Debra Dandaneau** left for Colorado State University in the summer of 2018.

Jessy Changstrom is the current advisor for the department. She received her MS from Creighton and is finishing her PhD under the advisement of Chris Sorensen.



Deanna Selby, office specialist, retired in December, 2016. She is enjoying retirement in Manhattan with her husband, Ken.



Lindsay Miller, accountant, moved on to a campus shared services position in fall of 2017 prior to starting a new position for the City of Junction City in 2018.

In a new shared services office model with math, the department now has **Peggy Matthews** and an assistant, **Kelsey Young**, completing the human resource duties.

Kim Elliott, former receptionist, has replaced Lindsay as accountant, with assistants **Jesse Medina** and **Cynthia Carlyon**.

The department has a new front office specialist who joined us after **Kelsey** moved to the human resource assistant position and **Anya Waters** left for a position at the University of Kansas. **Carrie Klusener** came to us in the fall from Wichita State University.

Kim Coy celebrated 30 years with the University in 2017; **Deanna** celebrated 40 years and her retirement; while **Peggy** celebrated 45 years. Peggy indicates she will retire in fall 2019, but the department is trying to convince her to stay on.

Kim Elliott, accountant, celebrated five years of service in 2018.

Al Rankin, longtime JRM lab assistant scientist, retired in December, 2016.

Al is currently enjoying his new adventure as owner of SkyEye sUAS Services. He is operating an unmanned aerial vehicle as a certified drone pilot providing aerial photography and video.



DEPARTMENT RESEARCH NEWS

Atomic, Molecular & Optical Physics

The AMO group hosted a successful visit from the Department of Energy this past fall in relation to its multi-million dollar funding. This grant keeps the J.R. Macdonald (JRM) Laboratory running and helps the group continue to perform experimental and theoretical research. It also enables them to go after developmental grants for specific projects.

Chapin distinguished professor **Brett Esry** will succeed distinguished professor **Itzik Ben-Itzhak** as lab director this spring. Esry will be responsible for the overall viability of the lab, coordinating planning and execution of the lab's research program. Esry looks forward to assuming the new challenges.

Itzik is stepping down after having served as JRM lab director since **Low Cocke's** tenure as director ended in 2007.

New Faculty Join the Group

The department welcomes two rising stars to the faculty and AMO group. **Loren Greenman** and **Cosmin Blaga** have joined in the past two years.

Cosmin Blaga, newly hired assistant professor, is an experimental physicist interested in ultrafast laser technologies. Blaga received his PhD from Stony Brook in 2009. He held appointments as a postdoc and research scientist at Ohio State since 2010.



Loren Greenman joined in fall of 2017. He earned his MS and PhD at the University of Chicago in 2007 and 2011, respectively. He was a postdoc at Berkeley National Lab prior to his appointment at K-State. Loren is a theoretical physicist interested in describing interactions of laser pulses with molecules.

Loren is also working with **Bret Flanders** on the Research Experiences for Undergraduate program.

Artem Rudenko and **Daniel Rolles** published an article in the June 1, 2017, issue of *Nature* that described how heavy atoms absorbing X-rays are sucking electrons from their molecular neighbors like a black hole pulling in matter. Understanding this ultrafast dynamic process is important for applications of intense X-ray lasers, including imaging of biomolecules. In addition to helping image and

understand biological systems, the research sheds new light on the charge and energy flow in a highly energized molecule. The research could prove to be important for solar energy conversion and radiation-driven chemistry.

Kristan Corwin, Chapin professor, is leading a team using a \$1.69 million grant from the National Science Foundation that will support the development of a new instrument created through a groundbreaking collaboration between physics and agronomy. The team will work to adapt Nobel Prize-winning technology that precisely measures optical frequencies and apply it to help agronomists improve crop genetics and feed the world. Corwin will continue to collaborate on this project while in her role as Division Chief at NIST.

Lasers successfully recorded a chemical reaction that happens as fast as a quadrillionth of a second. The idea for using a laser to record a few femtoseconds of a molecule's fast vibrations as it comes apart came from **C.D. Lin**, distinguished professor, and **A.-T. Le**, former research professor, during an international collaborative project. The results were published in the October 21, 2016, issue of *Science*.

Chii-Dong Lin, along with **A.-T. Le**, **Cheng Jin** (PhD 2012) and **Hui Wei** (PhD 2017), published a graduate-level textbook, a first of its kind, "*Attosecond and Strong-Field Physics: Principles and Applications*." The book was published by Cambridge University Press in June 2018.

Uwe Thumm's research was featured on the June 2018 cover of *Physical Review Letters* with a schematic diagram of an attosecond nanoplasmonic imaging setup with spatiotemporal resolution based on investigations of nanoplasmonic field-enhancement effects in metal nanoparticles through detailed atomistic numerical simulations.

Cosmology

Lado Samushia has been selected for a global team that will explore dark energy and its effects on the expansion of the universe. He will take part in DOE's Dark Energy Spectroscopic Instrument (DESI) project. The project will conduct a survey of distant galaxies through the use of a 4-meter telescope at Kitt Peak National Observatory. DESI will measure the spectra of tens of millions of galaxies and quasars in the universe over the next five years.



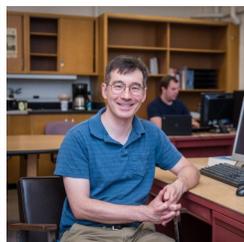
DEPARTMENT RESEARCH NEWS

High Energy Physics

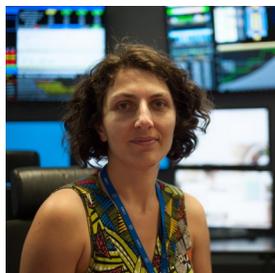
High energy physics researchers are contributing to DUNE, the world's biggest neutrino experiment.

Tim Bolton is serving on the leadership team that is organizing the experiment and **Glenn Horton-Smith** is helping develop the experiment's high-voltage system.

Both Bolton and Horton-Smith are experts in experimental high energy and particle physics and have been involved since the early planning phases of DUNE. "On the national level, DUNE is the highest-priority project in the U.S. Department of Energy's Office of High Energy Physics," said Tim Bolton, professor of physics. "It's important for us to engage with the international science community on groundbreaking projects like this."



Keti Kaadze, assistant professor, and her postdoc, **Abdollah Mohammadi**, were named LPC Distinguished Researchers for 2017. They are analyzing proton-proton collision data and working to upgrade the Compact Muon Solenoid hadronic calorimeter at CERN in Geneva, Switzerland. Mohammadi was named a Distinguished Researcher again in 2018.



The Distinguished Researcher program is a defining feature of the LHC Physics Center (LPC) at Fermilab. The individuals selected are recognized as accomplished individuals at different stages of their careers. The program provides resources to strengthen and expand their research programs.

Soft, Condensed & Biological Matter Physics

Grown like a snowflake and sharpened with a sewing machine, a novel device developed by **Bret Flanders**, professor of physics, and **Govind Paneru** (PhD 2014), may benefit biomedical professionals and the patients they serve during electrode and organ transplant procedures.



The device uses gold nanowires, which are 1,000 times smaller than a human hair, to manipulate and sense characteristics of individual cells in medical procedures.

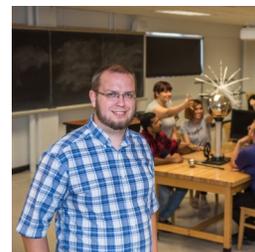
Matt Berg, associate professor, delivered a keynote address at the 13th International IR Target and Background Modeling & Simulation Workshop in June 2018 at the Oceanographic Observatory in Banyuls-sur-mer, France. He spoke about the digital holography of aerosol particles and discussed how methods used to determine the physical properties of aerosol particles are important in a vast array of scientific and applied contexts.



In March, Berg, along with research assistant professor **Osku Kempainen** and **Yuli Heinson** (PhD 2016), postdoctoral research fellow at Washington University published an article on imaging aerosols with digital holography in *Physics Today*.

Physics Education Research

J.T. Lavery joined the Physics Education group in 2016. Lavery received his MS and PhD from Michigan State University in 2008 and 2013, respectively.



J.T. has already established an active research program. He has been awarded two NSF grants—one with K-State

philosophy faculty and another collaborative award with Michigan State University.

NSF awarded a \$1.5M grant to **Eleanor Sayre**, associate professor, for her research project on PhysPort, an online professional development tool used by physics professors internationally. The project, in collaboration with the American Association of Physics Teachers (AAPT), investigates the effect PhysPort has on the practice of teaching physics. **Adrian Madsen** (PhD 2010) who works for AAPT, is a co-PI on the grant.

In August, after returning from a Fulbright Research Chair at the University of Calgary, Sayre led her second PEER field school in Rwanda with colleague Scott Franklin, Rochester Institute of Technology (RIT). The PEER program fosters education research expertise among graduate students and faculty. Now in its sixth year, PEER field schools have been held at RIT; Kibungo, Rwanda; Cologne, Germany; and Monterrey, Mexico.



ALUMNI SPOTLIGHT

Donald Burton (PhD 1970) received one of the highest recognitions at the Los Alamos National Laboratory after being named one of their four 2017 lab fellows.

Burton is in the Computational Physics division. He invented computational methods that have become standards in the field and used worldwide in hydrodynamic computations. His codes have impacted both the nation's nuclear stockpile stewardship program and the broader scientific community.

Jacqueline D. Spears (MS 1972) was named acting associate dean for academic affairs at K-State Olathe this past September. Spears oversees and guides the undergraduate degree completion and graduate programs at the campus in addition to overseeing enrollment and recruitment efforts.

Patrick Clevenger (BS 1996) was recently promoted to Engineering Manager at GAI Consultants in Export, Pennsylvania.



Dan Fry (PhD 2003) was awarded NASA's Exceptional Achievement Medal "for outstanding technical leadership in the field of Space Radiation protection, allowing for improved crew safety for NASA human exploration missions" in 2018. Dan and wife, **Erge Edgu-Fry** (PhD 2003) reside in Texas with their four children. Erge is managing editor of *Journal of Burn Care & Research*.



Alicia Allbaugh (PhD 2003) returned to give the 2017 Ernest Fox Nichols Alumni lecture. Alicia spoke about "Curiously Roving on Mars: Overview of the Mars Science Laboratory Project" to a full house. She brought a rover wheel model and a functional prototype of the Mars Pathfinder rover, Sojourner, which she demonstrated during the lecture and at a local school. Alicia is the Mars Science Laboratory Integrated Planning & Execution Team Chief at NASA's JPL.

Ioannis Chatzakis (PhD 2009) was named an American Society for Engineering Education Postdoctoral Fellow at the US Naval Research Lab. The program provides ~40 new postdoctoral appointments per year. Fellows are selected on the basis of their overall qualifications and technical proposals addressing specific areas defined by the host Navy laboratories.

Kevin Knabe (PhD 2010) recently began a new position at Vescent Photonics as a staff scientist. Vescent develops and manufactures novel electro-optic and laser technologies. Kevin lives in Colorado with his wife, Steph Kotas, and their daughters, Olivia, Lucy and Cora.

Jackie Chini (PhD 2010), assistant professor at University of Central Florida, was awarded an NSF CAREER grant. Jackie will research the barriers and supports encountered by undergraduate and graduate students and early career physicists with disabilities in their learning and research experiences.

Maia Magrakvelidze (PhD 2013) married Sony Grace on October 8, 2017. Maia received her PhD in AMO physics under Uwe Thumm.

Maia has been an assistant professor at the University of Mary Washington since fall 2016.

Maia met up with Brett DePaola, head, along with her colleague and K-State physics alum **Hai Nguyen** (PhD 2003) at a conference in Wisconsin in the summer of 2018.



Sara Crandall (MS 2016) has been awarded a Christine Mirzayan Science and Technology Policy Graduate Fellowship from The National Academies of Sciences, Engineering and Medicine. The fellowship provides early career individuals with the opportunity to learn about science and technology policy and the role scientists and engineers play in advising the nation.

Sara is currently pursuing her PhD in Astrophysics at University of California Santa Cruz.

Bahar Modir (PhD 2017) recently began a tenure-track position at the Texas A&M University Commerce. Bahar is an assistant professor of physics conducting physics education research.

Sayer Hopkins (MS 2017) recently moved from fullstack engineer to a machine learning and algorithms position at Import.io. He is also working as the lead JavaScript engineer at another startup—Radiowave.io.

Please send us your news for inclusion in the next newsletter. Call us at 785-532-6786 or send e-mail to alumni@phys.ksu.edu.



OUTREACH

K-State partnered with the city of Manhattan's Flint Hills Discovery Center to bring the 2017 Great American Eclipse to the community.

Chris Sorensen, Cortelyou-Rust distinguished professor, led astronomy viewing nights throughout the region. He also gave lectures about the eclipse in the months preceding the event.

Sorensen then traveled with a K-State contingent in a caravan of buses on the day of the eclipse to view what was the first total eclipse of the sun visible in the U.S. since 1979, and the first in Kansas in nearly a century.

The department continues to draw large crowds at the annual University open house. The Physics Club lines Cardwell Hall corridors and the lawn with hands-on demos.

Chris Sorensen wows audiences with his demonstrations. The Kansas Optical Society conducts hands-on demos and offers tours of the JRM lab.

Join us for this year's open house on April 6, 2019.

Bharat Ratra is a popular draw presenting talks worldwide on dark energy and matter. He is involved in numerous outreach efforts, including DOE's QuarkNet program for high school science teachers.

The physics undergraduate majors coordinated Manhattan's Marches for Science in April 2017 and 2018. The march champions robustly-funded and publicly-communicated science as a pillar of human freedom and prosperity.

These marches unite students, faculty, staff, and the community as a nonpartisan group to call for science that upholds the common good and encourages political leaders and policymakers to enact evidence-based policies that are in the public interest. The physics undergraduate students' efforts have resulted in more than 100 participants in both years.

PHYSICS ALUMNI GIVING BACK

The Department of Physics has many alumni and friends with successful careers in academia and industry. You all play an increasingly important role in supporting the department's initiatives in areas that make significant contributions to our society.

There are many ways you can help to make our programs even better ...

- Help us recruit! You know what it takes to succeed in our program, so help us find graduate students who will excel in the classroom and research labs. Recruiting for our graduate program is a high priority, so if you are in academics or working with student interns in industry, please let them know about the exciting research opportunities here in Physics at K-State.
- Invest time! Time is a generous offering that benefits our students. Interested in mentoring students? Want to host a student for a job shadowing experience? Have an internship or job position available? Contact the department at alumni@phys.ksu.edu or call (785) 532-6786.
- Make a gift! We welcome your support in the form of a gift to either a directed fund or a general gift to the department. If you wish to direct a gift to the department, please contact the K-State Foundation Arts & Sciences Development team who will match you to programs that connect with your interests and passions. They can be reached at (800) 432-1578. You can also make a gift online by visiting our website at www.phys.ksu.edu/giving/.

DEPARTMENT LECTURE SERIES THRIVE

The James R. Neff and Peterson Public Lecture series continue to be a great draw for the department. Both series have attracted some fantastic speakers in the past few years.

As part of the Peterson lecture series, the department hosted Lyman Page, John Preskill and Jo Dunkley.



Lyman Page, Distinguished University Professor of Physics at Princeton, presented a talk on "Observing the Birth of the Universe" in Spring 2016. As a key member of the Wilkinson Microwave Anisotropy Probe space mission, Page helped measure the cosmic microwave back-

ground, a backdrop of cosmic static visible everywhere in the sky and thought to be the afterglow of the Big Bang.

The 2017 spring lecture "Quantum Computing and the Entanglement Frontier" was presented by John Preskill, Richard P. Feynman professor of theoretical physics at Caltech. Preskill discussed how quantum laws governing atoms and other tiny objects seem to defy common sense and how information encoded in quantum systems has weird properties that can be baffling.



Princeton scientist Jo Dunkley, a professor of physics and astrophysical sciences who has received honors for her work on the Big Bang model, delivered the 2018 fall lecture on questions surrounding the origin of our universe. Dunkley discussed the human fascination with the night sky that gives us a window into space beyond our home on Earth.



The Peterson lecture series is supported by an endowment from Chester Peterson Jr. and is aimed at publicizing and presenting nontechnical public lectures concerning cosmology or quantum mechanics.

The James R. Neff lecture was funded by James R. Neff, in honor of Everett and Florine Neff, parents of James and Janice K. Neff Standish (his sister).

As part of this series, the department hosted Fred Espenak, scientist emeritus from NASA's Goddard Space Flight Center in spring of 2017. He spoke about "The Great American Total Eclipse of 2017." Espenak discussed the then upcoming total eclipse of the sun to an overflowing room. He has witnessed more than 25 total eclipses of the sun over the past 45 years.



Michael Ranney, professor of psychology at UC-Berkeley spoke on climate change in fall 2017. Ranney discussed how climate change acceptance can be increased through mini-interventions such as using videos, statistics, temperature graphs, and explanatory texts. His website,

HowGlobalWarmingWorks.org, directly enhances public climate change cognition and provides examples of the interventions discussed during his talk.

The department hosted physicist, author, and newly-elected American Physical Society vice president S. James Gates Jr. in fall. Jim is Ford Foundation professor of physics and affiliate professor of math at Brown University. He spoke about his time in the 1980s at the International Centre for Theoretical Physics headed by Nobel Prize winner Abdus Salam. At one point, Salam made a curious comment about jazz. The conversation resulted in an essay on diversity by Gates later cited by the Supreme Court.



In October 2018, former LIGO Collaboration spokesperson and professor at Louisiana State University, Gabriela González, presented "Einstein, Gravitational Waves, Black Holes & Other Matters." Her talk focused on the history and details of the first observations of gravitational waves traveling through earth and the gravity-bright future of this field.



The department will host Daniel Kennefick, Univ. of Arkansas, as Neff lecturer and Lincoln Carr, Colorado School of Mines, as Peterson lecturer in fall 2019.

CAMPUS TRANSFORMATIONS

The K-State campus continues to grow and change under the leadership of President Richard Myers, who began his tenure as the fourteenth president of K-State in 2016.

Even Cardwell Hall has had a bit of a facelift this year. In an effort to make the campus ADA compliant, the area outside of Cardwell's main entrance facing the quad and heading west toward the biology and engineering buildings was revamped. The stairs were demolished and there is now a new inclined walkway that has replaced the stairs and sidewalk.



New benches were installed outside of the main entrance of Cardwell where campus smokers used to hang out. Thanks to the "Cats for Clean Air" policy that went into effect in 2018, smoking is prohibited in university vehicles and on university property, except inside personal vehicles.



The university recently completed a much welcomed and long overdue restroom renovation project of the first floor restrooms in Cardwell Hall.

The renovation project included demolition of existing bathrooms, installation of tile walls, new ceiling tiles, paint, easy-to-clean toilet partitions and accessories, automatic faucets, sinks, lighting, and countertops. A new water fountain and water bottle filling station was also installed outside of the restrooms. In addition to the renovation of the men's and women's restrooms, a family bathroom was also added to the floor.

The College of Arts and Sciences moved to Calvin Hall in the winter of 2017. In addition to the dean's office and staff, the building houses the Student Academic Success Center — advising and student resources; accounting offices; the history department — including security studies; and the political science department.

The Graduate School relocated to Eisenhower Hall from Fairchild Hall in the spring of 2017 .

In May 2018, an accidental fire occurred on the roof of Hale Library. Prior to the fire, the University was ready to begin a renovation of the first floor to create a collaborative, technology-enhanced space to support student success at K-State. The University plans to continue this project and expand the renovation efforts since many areas of the library had to come down to the studs following the water damage sustained in the fire.



Other campus changes include renovations to the Student Union that were completed in spring 2017.

The Student Union now houses more restaurant concept areas in the food court, including everyone's favorite Call Hall ice cream. Other dining options include Radina's Coffeehouse, Panda Express, Chick-Fil-A, Fast Track, Qdoba, Subway, Union Kitchen and Union Station by JP's. Union Station menu items are locally sourced when possible and feature Weber Hall meats.

Other notable changes on campus include a new College of Business Administration building that opened in fall of 2016; renovations to Seaton Hall in 2017, which now houses the College of Architecture, Planning & Design; Phase IV of the Engineering Hall in spring 2016; Memorial Stadium renovations, which now houses the campus welcome center; and a new dining center and residence hall in fall 2016—Wefald Hall, named for former President Jon Wefald, on Denison Avenue, south of Marlatt Hall.

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PHYSICS REU PROGRAM CONTINUES TO MENTOR STUDENTS

Each summer the department runs a National Science Foundation-funded Research Experience for Undergraduates (REU) program. The 2019 summer marks the 27th year of our department's 10-week program.

Prior to **Kristan Corwin's** departure, **Bret Flanders** had been working with her as co-director for a few years following Larry Weaver's retirement from his active role as a co-director.

Now, Flanders has taken the leadership role on the latest funding award and **Loren Greenman** is assisting him with the program.

Larry Weaver is still sharing his wisdom with the students in the program via lectures and also participates in social activities.

REU allows undergraduate students the opportunity to spend their summer conducting research on a project with faculty mentors, post-doctoral fellows, and students.

To culminate their experience, the participants present their summer-long projects in oral talks and poster presentations.

Several students are able to present their works at national conferences and some even publish results from their summer here at K-State.

We encourage alumni at other institutions to invite their students to consider our program.

The K-State Physics REU has an annual application deadline in February.

