MECHANICAL AND NUCLEAR ENGINEERING FALL 2021 CARL R. ICE COLLEGE OF ENGINEERING





Alan Levin Department of Mechanical and Nuclear Engineering

FROM THE DEPARTMENT HEAD

Welcome to the latest edition of Nuts. Bolts and Neutrons. We're excited to tell you about some of our successes from last year and share our plans for the academic term ahead. As we welcome a new class of freshmen to campus, we'll be showing them our Wildcat traditions. Sophomores will be on campus full-time for the first time and all will enjoy having classrooms filled with fellow students and faculty once again.

I could not be more proud of how our students, staff and faculty responded to the challenges of last year. Some exciting highlights from that time period include the rocketry team finishing fourth at its competition; Powercat Motorsports teams competing in multiple Formula competitions, including one this past spring in Michigan; and Kristine Davis, ME 2015, receiving the K-State Alumni Association Student Alumni Board's 2021 Distinguished Young Alumni Award. You will also read about other accomplishments throughout the magazine.

This fall will bring several changes to the makeup of our department

We were saddened by the passing of Warren White this past year, who was known for his dedication to students, his dedication to design teams and his teaching of many generations about controls. Donald Fenton announced his retirement this past spring after contributing in so many ways to MNE - even serving as department head for six years. We also welcomed new faces this fall. Alex Gibson will be joining us as an instructor teaching in the area of controls and design. Crystal Strauss is new to the advising office and works primarily with recruitment and student advising. Deborah Wilcox is the new department receptionist and HR liaison.

We are excited about the fall semester, though uncertainties remain. Students will have access to our new MNE makerspace and some of our new MNE labs. I hope you have a chance to visit Manhattan and see some of the changes and enhancement our students will receive due to your outstanding support.

Go Wildcats!

Stev Ell

Steven Eckels Department head Steven M. and Kay L. Theede Chair in Engineering







ABOVE MNE STUDENTS AT WORK IN LAB

ON THE COVER TAKING ON AN AEROSPACE PROJECT

RAITC AND NEIIT MECHANICAL AND NUCLEAR ENGINEERING FALL 2021 CARL R. ICE COLLEGE OF ENGINEERING

IN THIS ISSUE



EDUCATION



COLLABORATION

COLLEGIATE WIND COMPETITION

- DISTINGUISHED YOUNG ALUMNI AWARD
- NRC FUNDING FOR NUCLEAR 6 ENGINEERING FELLOWSHIP PROGRAM
- WILDCAT ROCKETRY
- POWERCAT MOTORSPORTS 8
- 2020-2021 SENIOR AWARDS 10
- 12 MNE GRADUATES
- DEPARTMENT NEWS 14

NUTS, BOLTS AND NEUTRONS

is published by the Alan Levin Department of Mechanical and Nuclear Engineering in the Kansas State University Carl R. Ice College of Engineering, 3002 Rathbone Hall, 1701B Platt St., Manhattan, KS 66506. It is available on the web at **mne.k-state.edu**.

Fall 2021	
Editing and design	. Engineering Communications
Photography	. Division of Communications and Marketing



K-STATE WILDCAT WIND POWER TEAM RECOGNIZED IN NATIONAL EVENT

The U.S. Department of Energy has joined universities and wind energy experts from across the country to announce the winners of the 2021 Collegiate Wind Competition. A team from Kansas State University was on that list as winner of the turbine prototype contest.

Over the course of the academic year, 13 previously selected teams designed, built and tested model wind turbines; developed project plans; collaborated with industry experts; and engaged with their local communities all in preparation for careers in the growing wind and renewable energy workforce.

Each year the Collegiate Wind Competition integrates a new challenge into the contest that reflects real-world wind industry needs. Taking the COVID-19 pandemic and the threat of supply chain disruptions into account, the 2021 challenge tasked teams with developing projects for deployment in highly uncertain times, with a significant degree of unknown risks and delays. The late Warren White, associate professor in the Alan Levin Department of Mechanical and Nuclear Engineering,

and Hongyu Wu, associate professor in the Mike Wiegers Department of Electrical and Computer Engineering, were the 2020-2021 Wildcat Wind Power team advisors. They worked with students from their respective departments as well as industrial and manufacturing systems engineering, and the College of Business Administration in preparation for the virtual 2021 DOE wind competition held June 7-10.

Earlier this year the U.S. DOE had announced the Kansas State University Wildcat Wind Power team as one of 11 groups selected to participate in the 2022 Collegiate Wind Competition, May 16-19, 2022, at the American Clean Power Association's CLEANPOWER 2022 Conference and Exhibition in San Antonio.

Since 2014 the DOE Collegiate Wind Competition has provided college students the opportunity to interact with wind industry experts, and build the skills and connections that will help them find jobs in the industry. The Kansas State University team has been selected to compete in seven of the past eight years.





ME GRADUATE RECEIVES 2021 **DISTINGUISHED YOUNG ALUMNI AWARD**



Kansas State University graduate, Kristine Davis, Houston, is a recipient of the K-State Alumni Association Student Alumni Board's 2021 Distinguished Young Alumni Award.

The award recognizes two K-State graduates annually who are younger than 35 and are using the scholarship, leadership and



service experience they acquired at K-State to excel in their professions and contribute to their communities.

"This recognition simultaneously honors some of our most accomplished young graduates while creating new ties among alumni, students and faculty," said Amy Button Renz, Alumni Association president and CEO. "The Alumni Association is pleased to support the Student Alumni Board in presenting this award."

Davis is a xEMU spacesuit engineer for NASA's Johnson Space Center. She earned a degree from K-State in 2015 in mechanical engineering.

As a K-State student, Davis was a member of the Society of Women Engineers, Engineering Student Council, Smurthwaite Scholarship/Leadership House, Women in Engineering Mentoring and Steel Ring Engineering Honor Society.

"I am honored and humbled to be recognized for the DYA award," Davis said. "I was a member of the Student Alumni Board when I attended K-State and I remember reviewing all the very impressive DYA applications that were submitted each year. It really inspired me as a student to try to make an impact when I left here."

Davis spoke about her journey during virtual keynote presentations of the awards on Feb. 23.

For more on the Distinguished Young Alumni program, visit k-state.com/DYA.

EDUCATION

K-STATE RECEIVES NRC FUNDING FOR NUCLEAR ENGINEERING FELLOWSHIP PROGRAM

The U.S. Nuclear Regulatory Commission, or NRC, has funded a new Nuclear Engineering Fellowship Program to provide financial support and mentoring to at least three Kansas State University nuclear engineering doctoral students.

Students selected for the four-year, \$400,000 program — under the direction of Amir Bahadori, associate professor and Steve Hsu Keystone research scholar in the Alan Levin Department of Mechanical and Nuclear Engineering — will perform research in areas of interest to the NRC.

Collaborators on the project — all K-State associate professors of mechanical and nuclear engineering and Steve Hsu Keystone research scholars — include Walter McNeil, Jeremy Roberts and Hitesh Bindra.

"Fellows will gain a deeper understanding of the present challenges facing nuclear engineering and contribute to solutions for these challenges," Bahadori said. "They will research topics such as advanced reactor safety and design, low-dose radiobiology and novel neutron transport methods."

Expected beneficial outcomes of this program include diversification of the nuclear engineering graduate student body at K-State; student completion of doctoral degree programs; publications and conference proceedings; and



employment of K-State graduates in the nuclear industry, government agencies and academia.

"Increasing the number of Ph.D. students and Ph.D. graduates through the Nuclear Engineering Fellowship Program will help achieve the goals of K-State 2025 and the Kansas Legislature's University Engineering Initiative Act," Bahadori said.

Applications are now being accepted for the program at bit.ly/ne-fellowship.

WILDCAT ROCKETRY PLACES FOURTH AT ANNUAL **INTERNATIONAL SPACEPORT AMERICA CUP**

K-State's high-powered rocketry team, Wildcat Rocketry, competed in the 15th anniversary of the international competition 2021 Spaceport America Cup, placing fourth out of 36 teams in its division and 10th out of 76 teams overall.

Seventy-six teams from 16 countries took part in the three-day online event June 18-20. The virtual competition allowed university student teams to submit rocket designs for evaluation and included technical presentations and forums, keynote addresses from aerospace industry leaders and rocket safety training.

"Besides the presentations, we had a great time meeting students from the U.S. and across the world," said Ben Murdock, senior in mechanical engineering and Wildcat Rocketry president.





Other team officers involved with this competition are Zach Deibert, senior in computer engineering, SAC competition manager; Miranda Dodson, master's student in electrical and computer engineering, treasurer; Brett Funk, senior in mechanical engineering, vice president; and Grant Nichol, senior in computer engineering, secretary.

Team members participating from mechanical and nuclear engineering include Nick Rodriguez, Brandon Cooper, Lindsey Crowell, Logan Nagle, Blaine Peery, Keegan Taylor and Cameron Weeks; and members from computer engineering are Brett Warren and Max Myzer. Wildcat Rocketry is a student organization in the Alan Levin Department of Mechanical and Nuclear Engineering. The late Warren White, associate professor in the department, was the faculty advisor.

۱

POWERCAT MOTORSPORTS COMPETES AT FORMULA SAE MICHIGAN 2021



K-State's formula race team, Powercat Motorsports, competed in Formula SAE Michigan, placing 15th out of 51 teams, and eighth in skidpad and 10th in acceleration.

Fifty-one teams took part in the three-day event July 7-10. The Formula SAE competition challenges teams of university undergraduate and graduate students to conceive, design, fabricate, develop and compete with small, Formula-style vehicles. It is an engineering education competition that requires performance demonstration of vehicles in a series of events, both off and on the track, against the clock. Each segment of the competition gives teams the chance to demonstrate their creativity and engineering skills in comparison to teams from other universities around the world.

Powercat Motorsports is a student organization in the Alan Levin Department of Mechanical and Nuclear Engineering. Kevin Wanklyn, teaching associate professor and undergraduate program director in the department, is the faculty advisor.

"Being part of a group that has built a car during a pandemic is a monumental achievement," Wanklyn said. "I am impressed by the team. I congratulate them on being the only Big 12 Formula team at the competition."

Vance Weber, junior in mechanical engineering, and Powercat Motorsports incoming president and chassis lead, was impressed by the team for competing in both FSAE competitions this year with respectable finishes.



Powercat Motorsports finished 11th out of 37 teams at the Las Vegas competition where individual event highlights included fifth in acceleration, sixth in skidpad and sixth in autocross.

Weber said the competition at Michigan International Speedway was much tougher than the Las Vegas event, adding, "We finished 15th overall out of 51 registered teams. Individual event highlights included eighth in skidpad and 10th in acceleration. The team has now finished the main endurance event in backto-back years, which is another measure of the progress our team is making."

Future goals for the team are to find even more speed by building a lighter, more agile and more balanced car. Recruiting new team members will be key as well to help with manufacturing while also sharing and building on knowledge with new members. Inperson meetings are expected for the 2021-2022 school year with numerous events, presentations and workshops planned. Those interested in joining the team or needing more information can email Weber at vance5w@k-state.edu.

"We want to thank the College of Engineering and the mechanical and nuclear engineering department for support throughout the year," Weber said, "as well as all of our amazing sponsors, supporters and alumni." Other team officers involved in the competition were Mark Rowland, spring 2021 graduate in computer science, outgoing president; Cameron Korte, spring 2021 graduate in mechanical engineering, outgoing chassis lead; Adam Meng, senior in mechanical engineering, engine design lead; Gage Weber, junior in mechanical engineering, aerodynamics design lead; Devin Wright, fall 2020 graduate in mechanical engineering, outgoing chief engineer; Blaine Thiessen, fall 2020 graduate in mechanical engineering, outgoing engine lead; Jack Mravunac, spring 2021 graduate in computer engineering, outgoing electronic design lead; and Michael Charest, junior in mechanical engineering, drivetrain design lead.

Team members participating from mechanical and nuclear engineering include Payton Lee, sophomore; Wyatt Haug, sophomore; Ibrahim Al Qabani, master's student; Eric Underwood, senior; and member from electrical engineering, Julio Gutierrez, senior.

Team members who graduated in 2020 and did not have the opportunity to compete with the 2021 car were Bailey Martin, electrical engineering; Colton Maxwell, Sam Slater, James Berry and Kyler Blank, all mechanical engineering; and Mickenzie Toler, accounting.

Kansas State University

Alan Levin Department of Mechanical and Nuclear Engineering Graduating Senior Awards December 2020

Most Outstanding Senior



Angela Gearhardt

Extraordinary Leadership and Service



Vibhav Vidyadhar



Anthony Null

Joshua Bergkamp

Outstanding Seniors

Madison Partridge



Devin Wright



Most Outstanding Senior



Braeden Ingold



Emilee Agnew

Kansas State University

Alan Levin Department of Mechanical and Nuclear Engineering Graduating Senior Awards May 2021





Nicholas Higgs



Nicholas Vogel

Outstanding Seniors



Kaitlyn Smallfoot



Dylan Kruep



Jeremy Dold

Congratulations, 2020-2021 graduates! -

Fall 2020

Ph.D. Mechanical Engineering Zhongkan Ren

Ph.D. Nuclear Engineering Brendan Ward

B.S. Mechanical Engineering

Alharith Alkotami James Allen Ibrahim Algabani Chad Armstrong Tyler Babbitt **Brock Barrett** Tanner Baumgart Joshua Bergkamp James Berry Garrett Binns Samuel Carey Alex Clark lain Dickie Nathan Dieckmann Maxwell Dillinger Jared Dyck Matthew Farrington **Bryce Freeman** Carter Fritze Angela Gearhardt **Brandon Grothen** Luke Hauswirth Aaron Henne Juan Hernandez lan Highbarger Phillip Hoang **Brendon Horyna**

Joseph Hoskinson Michelle Le Zachary Loveall Israel Lumpkins Peter Mascal Nathan Masson Kailey McDonald **Kraig Meares** Matthew Meinhardt Jack Mills Erik Moreno-Rodriguez Ryan Morrison Aimee Neilsen Dodge Nily Anthony (AJ) Null Damilola Okeowo Madison Partridge **Austin Petefish Eric Petersen** Nathan Reimer Payton Ruder Justin Salisbury Samuel Slater **Clinton Steiner Tanner Strickbine** Samuel Strohkorb Alexander Tharp **Blaine Thiessen Tanner Thomas Christopher Towry** Vibhav Vidyadhar Graham Walker Zhengrui Wang Kelli Ward Nicholas Westervelt Katherine Wetta Caitlyn White Wynter Wiebke

Riley Willt Lucas Wodrich Devin Wright

B.S. Mechanical Engineering with Nuclear Option

Angela Gearhardt Ian Highbarger Kailey McDonald Lucas Wodrich

Spring/Summer 2021

Ph.D. Mechanical Engineering

Ryan Huber Self Mahmoud

Ph.D. Nuclear Engineering

Priyarshini Ghosh

M.S. Mechanical Engineering

Sanzida Hossain Binghui Lui Dustin Thomas

B.S. Mechanical Engineering

Hayden Adam Reed Adams Emmanuel Adeniji Emilee Agnew Ethan Ahrenholtz Rajeh Albogami Ashton Albright Taylor Alley Maxwell Anderson Luis Ballesteros

Kyle Bannon **Robert Barickman** Andrew Becker Jett Bendure Kristen Boomer Nicholas Boyce **Devin Burgett** Alexander Bush Steven Bush Carly Byrne Jared Byrnes Lingzhi Cai Marcos Cantera **Thomas Carlson Christopher Carpenter** Jack Cashman **Randy Castellon** Sean Clennan Jordan Dewell Jeremy Dold Kaiwen Duan Tyler Eckberg **Byron Fangman Timothy Flax** Lucas Ford Peter Georaiou **Ricardo Gonzalez** Molly Greener Jon-Michael Grote Seth Hadley Levi Harapat Thomas Heppner Andrew Herbic Nicholas Higgs Braeden Ingold John Johanning Emma Karber Cody Kelemen

Emily Key Nicklaus King Owen Korschgen Cameron Korte Dvlan Kruep Hunter Kwartin Dustin Leakey Shane Lee Dalton Loos Anthony Lopez Andrew Loveall Yousef Mallallah John Marx William Mason **Connor McNorton** Jackson Menke Nicholas Mignano **Brock Minton Tristan Mitchel Keegen Mould Tyler Mounce** Joseph Nuncio Travis Ochs Ayomide Oribamise Adam Owens Mark Painter Mithulan Paramanathan Rhett Pierce Zachary Quam Adam Reelfs Jacob Schif Zacharv Schmidt Jordan Shafer Noah Siebert **Emily Simon** Isaac Singer Kaitlyn Smallfoot Jared Smart

- Noah Stevenson Cameron Stout Laif Strahm Andrew Suchan Bryce Teaford Zane Teague Clay Thomas Samuel Thomas Nicholas Vogel Zackary Von Mosch
- Keran Wang Benjamin Weinhold Reed Wiens Joshua Wilhelm Samuel Wilson Emiel Winkelmolen

B.S. Mechanical Engineering with Nuclear Option

Jared Demmel Chance Jordan Carter Nordhus Rene Santillana Padilla Samuel Tompkins

13

NEW TO THE MNE DEPARTMENT



Crystal Strauss joined the MNE department in late September 2019 as an academic advisor after previously working in the department of economics as an administrative professional. She holds bachelor degrees in marketing and women's studies from K-State.

Strauss is responsible for advising freshman, sophomore and transfer undergraduate students, as well as

providing support to all MNE students. She coordinates campus tours for prospective students, manages the MNE Ambassadors and maintains MNE social media accounts, and print and online materials for the department.



Shih-Kang Fan, MNE professor, received his B.S. from National Central University, Taiwan, in 1996, and his M.S. and Ph.D. from the University of California, Los Angeles, in 2001 and 2003, respectively. Fan began his faculty career at National Chiao Tung University, Taiwan, as an assistant professor and rose to associate professor at the Institute of Nanotechnology and its department of material sciences. He was an associate

professor, professor and distinguished professor at the department of mechanical engineering and the Center for Biotechnology at National Taiwan University, Taiwan, before coming to K-State. His research interests include microfluidics, electrowetting, in vitro diagnosis, 3D-bioprinting and tissue engineering.

FACULTY AWARDS

LAB RECEIVES NASA FUNDING

Jared Hobeck, assistant professor in the Alan Levin Department of Mechanical and Nuclear Engineering, has been awarded a subcontract as part of a short-term \$127,000 Seed Research Initiation grant from NASA.

The project seeks to develop a design framework for 3D-printable hybrid internal combustion engines to power unmanned aerial vehicles on both Mars and Earth

missions. Hobeck's Multifunctional Structures Lab is responsible for designing and simulating an electromagnetic linear generator integrated with the engine to provide electrical power while maximizing system efficiency.

This one-year project, led by Wichita State University, is 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 Glen Research Center.

The team expects these early efforts to pave the way for long-term sustained collaboration, STEM outreach events and future funding opportunities.



Three engineering faculty members were presented with plagues for patents granted in 2020. From left are recipients Jungkwun Kim, assistant professor, ECE; Behrooz Mirafzal, professor, ECE; and Gurpreet Singh, professor, MNE. Singh was awarded his patent for robust MOS2/graphene composite paper-based electrodes for NA+ battery applications.

PROMOTIONS AND TENURES

Three from MNE were among the 77 faculty members receiving promotions in rank and earning tenure from Kansas State University.

Earning promotion to full professor was **Gupreet Singh**; earning tenure and promotion to associate professor were Amir Bahadori and Walter McNeil.

"Promotion and tenure recognize the outstanding achievements of our faculty in teaching, research and scholarship, and service, and I am delighted to celebrate these contributions with them," said Charles Taber, provost and executive vice president at K-State.





GUPREET SINGH

AMIR BAHADORI

KANSAS STATE UNIVERSITY MECHANICAL ENGINEERING EXCELLENCE FUND 132000 Here is my check or credit card authorization for a gift of: \$1,000 \$250 \$500 \$100 \$250 Name (print) Address	Please make check payable to Kansas State University Foundation Credit card payment: If this is a business credit card, business name:
City ZIP	gift coordinator by calling 785-775-2000 or visit <u>ksufoundation.org/match</u> .
Phone Email	Thank you for your generous support! Please return this card to: KSU Foundation, P.O. Box 9200, Shawnee Mission, KS 66201-1800. I32000



WAITER MCNEIL

IN MEMORIUM



Warren White, Jr., Manhattan, died May 24, 2021. He began a career in the mechanical and nuclear engineering department at K-State in 1985, teaching many courses over the years and serving as an advisor to Women in Engineering, the Wildcat Wind Power Team, and the Final Frontier Aerospace Systems and Technology group. He is survived by his wife, Georganne; daughters, Heather and Chelsea; and sons, Warren III and Steven.



Alan Levin Department of Mechanical and Nuclear Engineering ^{3002 Rathbone Hall}

1701B Platt St. Manhattan, KS 66506-5200 387-001 Nonprofit Organization U.S. POSTAGE PAID Permit #525 Manhattan, Kan. 66502

NOTICE OF NONDISCRIMINATION

Kansas State University prohibits discrimination on the basis of race, color, ethnicity, national origin, sex (including sexual harassment and sexual violence), sexual orientation, gender identity, religion, age, ancestry, disability, genetic information, military status, or veteran status, in the university's programs and activities as required by applicable laws and regulations. The person designated with responsibility for coordination of compliance efforts and receipt of inquiries concerning the nondiscrimination policy is the university's Title IX Coordinator: the Director of the Office of Institutional Equity, equity@k-state.edu, 103 Edwards Hall, 1810 Kerr Drive, Kansas State University, Manhattan, Kansas 66506-4801. Telephone: 785-532-6220 | TTY or TRS 711. The campus ADA Coordinator is the Director of Employee Relations and Engagement, who may be reached at charlott@k-state.edu or 103 Edwards Hall, 1810 Kerr Drive, Kansas State University, Manhattan, Kansas 66506-4801, 785-532-6277 and TTY or TRS 711. Revised Aug. 29, 2017.

