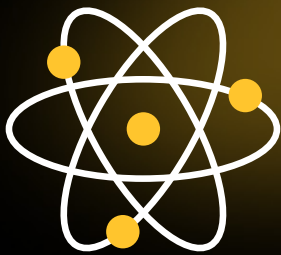


# PHYSICS, GEOLOGY AND ENGINEERING TECHNOLOGY



SPRING 2020

## A Message from the Chair of PGET



**Dr. Sharmanthie Fernando**

We had another eventful and busy year in the Department of Physics, Geology and Engineering Technology (PGET). We hired two new faculty members:

**Dr. Dilupama Divarathne**, who has a Ph.D. in physics, joined us as the first faculty advisor for the department. Her recruitment will help us to streamline advising engineering technology students. **Dr. David Cain** was hired as a renewable lecturer in the physics program. David is currently acting as the coordinator for our introductory physics courses.

The department had several retirements this year: **Dr. Karl Vogler** (Physics), **Dr. Janet Bertog** (Geology) and **Harold Wiebe** (Engineering Technology) retired after years of service. They will be missed.

Two of our tenure-track faculty, **Dr. Nathan De Lee** and **Dr. Mauricio Torres**, were promoted to rank of associate professor and were tenured. **Dr. De Lee** (Astronomy) joined NKU in fall 2014 and **Dr. Torres** (Engineering Technology) joined NKU in fall 2013.

In fall 2019, **Dr. Mauricio Torres** assumed duties as the program director of the Engineering Technology program. In fall 2019, program evaluators for the ABET accreditation board visited

campus to evaluate the Engineering Technology program. This is an event that happens once in six years. A new mechatronics lab, which was a result of a collaboration of NKU and Rockwell Automation and CBT Company, opened in March. This is a great boost to our mechatronics program, as it will support giving hands-on learning tools to our students.

We continue to engage in outreach and public engagement events: the observatory hosts public shows, and the planetarium attracts a large number of viewers. This year we had a very successful Engineering Career Day organized by our department in collaboration with the Kentucky Society for Professional Engineers (northern Kentucky chapter). We attracted nearly 100 high school students who were interested in engineering to this event.

We have continued to improve our curriculum by creating new courses and revising existing programs and courses. A new program, Engineering Physics started in fall 2019 and continues to attract new students. The Mechatronics Engineering Technology program, which started in fall 2018, is also attracting students. We have 25 students in that program.

Our faculty continue to thrive in all three areas in research, service and scholarships. Department research has been funded by external and internal grants. We continue to increase student involvement in research

activity; students present at both local and national conferences.

As we seek to continue providing the very best for our students, we ask you, our alumni, to consider partnering with us to help build additional opportunities for students. Investing in scholarships, research and engineering design opportunities, equipment and labs, and other experiential learning opportunities are amazing ways that you can have a direct impact on students now and in future generations. If you are interested in learning more about the ways that you can support the Physics, Geology and Engineering Technology department, please contact **Lori Shelley-Daniels** at [shelleyl@nku.edu](mailto:shelleyl@nku.edu) or (859) 572-5487.

As always, we look forward to hearing from our alumni. Please feel free to write to me at the given email address. We would like to have more news from alumni in the next newsletter. By the way, we are on Facebook; please "like us," at [facebook.com/pgetnku](https://www.facebook.com/pgetnku).

## DONATE



Gifts to support Physics, Geology and Engineering Technology can be made online at [supportnku.nku.edu/PGET](https://supportnku.nku.edu/PGET) or mailed to:

Northern Kentucky University  
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Highland Heights, KY 41099

Please make the checks payable to **NKU Foundation Inc.** and write **Physics, Geology, Engineering Technology, or Planetarium** in the memo.

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# STUDENT AWARDS

## Awards for 2019 NKU PGET Graduating Seniors

The Department of Physics, Geology & Engineering Technology presents several awards each year to graduating seniors. Here is the list of students who received awards in each discipline:

### OUTSTANDING SERVICE IN GEOLOGY

*Trent Edwards*

### OUTSTANDING SENIOR OF GEOLOGY

*Daniel Martin*

### OUTSTANDING SENIOR IN ELECTRONIC ENGINEERING TECHNOLOGY

*Kate Rockey*

### OUTSTANDING SERVICE IN ENGINEERING TECHNOLOGY

*Grant Gover*

### OUTSTANDING SENIOR IN MECHANICAL AND MANUFACTURING TECHNOLOGY

*Michael Caldwell*

### OUTSTANDING SENIOR IN PHYSICS

*Christopher Weaver*

### OUTSTANDING PRE-ENGINEERING STUDENT

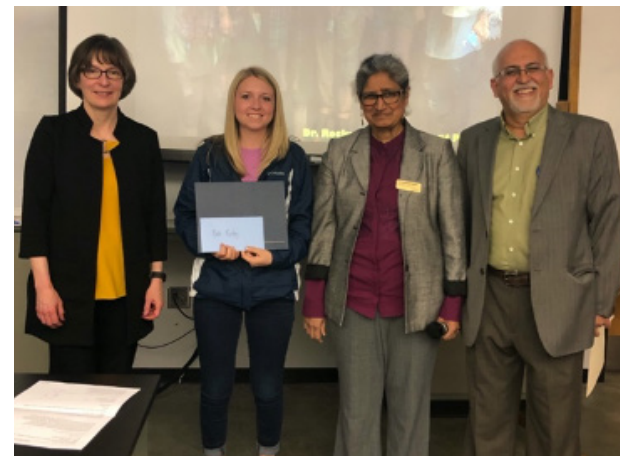
*David Hellmann*

### OUTSTANDING SERVICE IN PHYSICS AND PRE-ENGINEERING

*John Adamick*



David Hellman, outstanding Pre-Engineering student with Dr. Diana McGill (College of Arts and Sciences dean) and Dr. Sharmanthie Fernando (department chair)

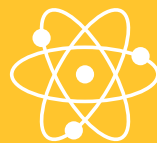


Kate Rockey, the outstanding senior in Electronics Engineering Technology with the dean, chair and the program director, Dr. Morteza Sadat-Hossieny.



Daniel Martin, the outstanding senior in Geology with Dean Dr. Diana McGill.

# ALUMNI UPDATE



Update your information or share your accomplishments and news!

supportnku.nku.edu/Class\_Notes,  
or email us at [alumni@nku.edu](mailto:alumni@nku.edu).

# NEW LABORATORY

## NKU Hosts Mechatronics Lab Ribbon Cutting



Grand opening of the mechatronics lab by President Ashish Vaidya, members of NKU and the community.

NKU's Engineering Technology program, in partnership with Rockwell Automation and CBT Company, has designed a new mechatronics lab to meet the needs of integrated manufacturing industry and give students hand-on learning in mechatronics engineering. The grand opening in March was attended by many distinguished visitors across campus and the community.

The new mechatronics lab includes 10 workstations, each consisting of an Allen-Bradley Logix5581 Programmable Logic Controller, a Human Machine Interface and a Variable Frequency Drive. In addition, with the Faculty Senate's project grant, 10 input module boxes and output device panels are being built for students' lab experiments and project design in industrial automated systems control.

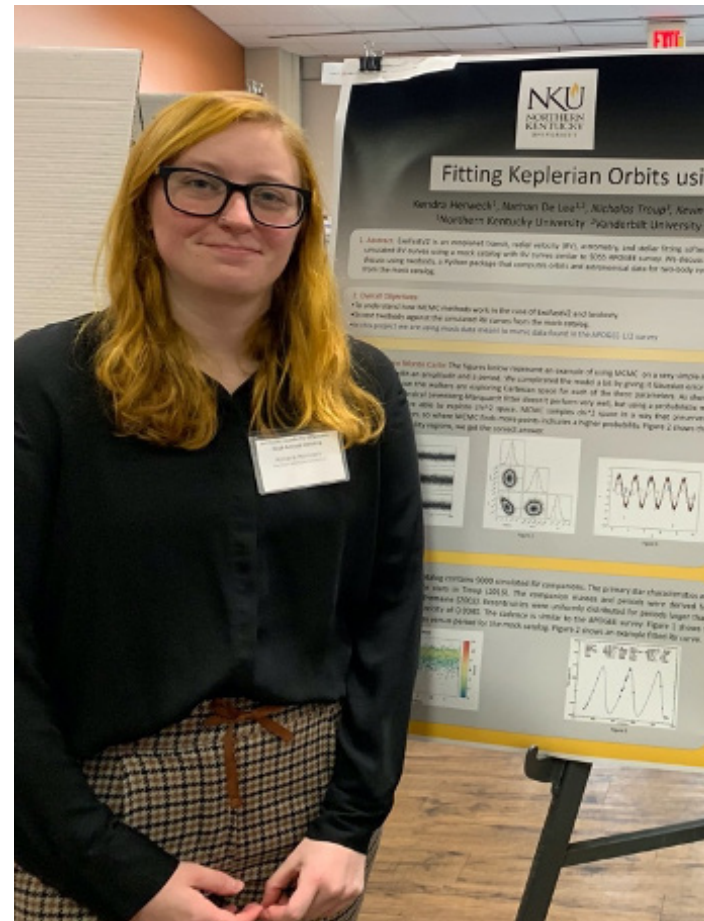
Moreover, the lab can be used to support K-12 STEM education and recruit more students from area community and technical colleges.

## THE NEW MECHATRONICS LAB IS PROJECTED TO:

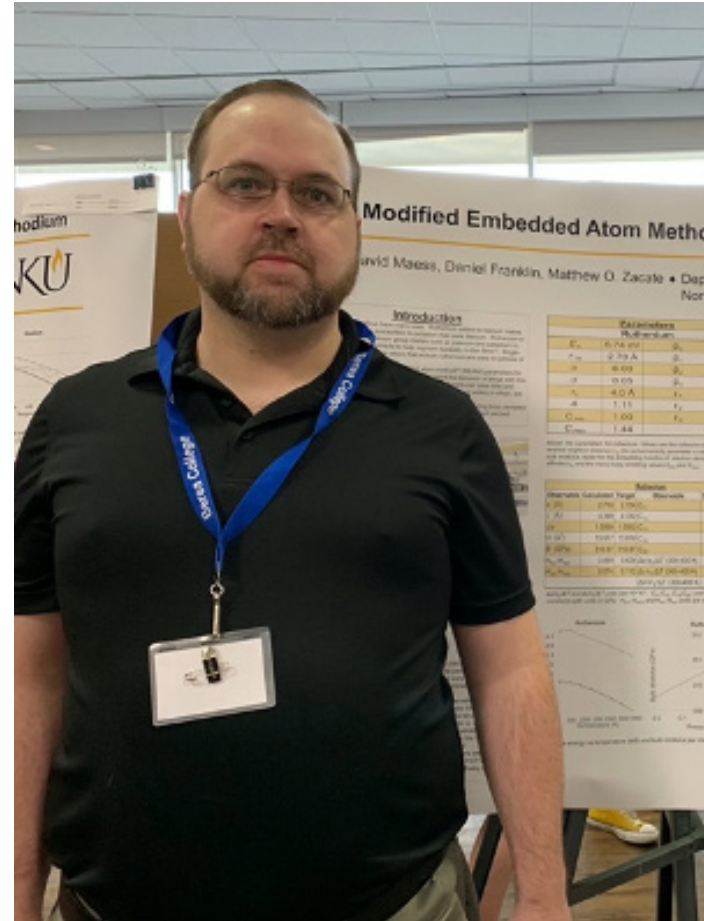
- ▶ Support laboratory-based experiential learning in state-of-the-art Allen-Bradley PLCs, ladder diagram PLC programming within the Studio 5000 environment, instrumentation and control systems design, etc.
- ▶ Provide a real industrial automation environment for EGT students to assemble, program and operate integrated manufacturing systems.
- ▶ Give capstone design students the opportunity to facilitate their systems design, development and test to meet the needs of project sponsors.

## Kentucky Academy of Science Annual Meeting

Every year PGET students and faculty attend the annual meeting of the Kentucky Academy of Science. This year, it was hosted at Berea College. Here are some photos of students presenting posters on their research at the KAS meeting:



Kendra Herweck, a Physics major, presented her work on astronomy supervised by Dr. Nathan De Lee.



David Maess, a Physics major, presented his work supervised by Dr. Matthew Zacate.

## PGET Faculty Retirements from the Past Year

### Dr. Karl Vogler

Dr. Karl Vogler joined NKU in 1998. He developed the Physics of Music and Backyard Astronomy courses. He taught a variety of physics and astronomy courses, including Stars, Galaxies and Cosmology, Geology of



Planets, Intro to Physics, Einstein 101 and General Physics for Biology majors. He is a frequent contributor to our summer camps, including

Astronomy summer camp, Emerging Technologies and Engineering Camp for middle schoolers by CINSAM.

Since the NKU Planetarium opened, Dr. Vogler has been a presenter at the shows that are free and open to the public. He also regularly participated in the telescope observation sessions at Big Bone Lick State Park. His outreach contributions have created an interest in astronomy throughout the region.

### Dr. Janet Bertog

Dr. Janet Bertog joined NKU in 2003 as an assistant professor, a full professor in 2017. When we asked students to describe her, the first response was that she is passionate.

Dr. Bertog is passionate about research, teaching and learning. At the core of her courses were her field trips – many of which are now legendary. These included 4-day camping



trips for Geology majors, across the Appalachians and Blue Ridge Mountains in all kinds of weather. There were also day trips to Mammoth Cave and Red River Gorge for all of her introductory geology students.

The logistics and planning for these field trips was daunting, but she made them happen almost every semester. There were more than 20 students per class, many of whom had never camped or done fieldwork before. She is an inspiration to the program, to develop meaningful field experiences in other courses.

Dr. Bertog also organized opportunities for students to do research at the Aaron Scott site in Utah. Some students accompanied her for several years. This was an amazing opportunity to be involved in discovering new species, collaborating on research and presenting at national meetings across the country. After retirement, she will be moving to Utah to continue her work in mineral and rock collection.

### Harold Wiebe

Harold Wiebe is an associated professor in the Electrical & Electronics Engineering Technology program, tenured since 1991. Prior to joining NKU's faculty, Harold worked as an engineer, employed at Cincinnati



Milacron for more than 30 years. He brought a wealth of knowledge and industrial experience to the program, greatly benefiting students and

colleagues alike.

He is also noted for his contributions to the university and to the community, serving on multiple committees and as a judge for many science fairs.

Wiebe holds several patents in industry and is the author of many technical papers and presentations. We are honored to have him as a colleague and wish him all the best.

# ALUMNI UPDATE

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## Faculty Advisor Dr. Dilupama Divarathne

Dr. Dilupama Divarathne joined the department as the first faculty advisor in July 2019. Dr. Divarathne earned her bachelor's degree in Physics and Mathematics from the University of Peradeniya in Sri Lanka. She completed her two master's degrees in Material Science & Engineering and Condensed Matter Physics in 2006 and 2008 respectively. She did her Ph.D. in Experimental Nuclear Physics at Ohio University (Athens, Ohio) and graduated in April 2014. Her dissertation is titled "Ground State Wavefunction of  $^{24}\text{O}$ " and explores the doubly magicity of higher Oxygen isotopes like  $^{24}\text{O}$ .

Prior to joining NKU, Dr. Divarathne was working in the department of Physics at Miami University (Oxford, Ohio) as a visiting assistant professor for the past five years. She has a growing interest in practicing and implementing different techniques of physics education into her teaching. She is driven to turn innovative ideas into realities, and always looking for new strategies for improvement. She believes that her commitment, and involvement in developing new teaching tools and method for introductory physics courses would be beneficial to create a perfect classroom for students at NKU. Besides teaching, she also has experience in advising students about curriculum, graduation requirements and how to select graduate programs. She provides recommendations for medical school and also makes them aware of internship opportunities. She also is experienced in working with various learning centers in advising students about services such as tutoring and peer mentoring for students experiencing academic difficulty and learning disabilities.

Dr. Dilupama was nominated to receive the 2017 Mallory-Wilson Center Faculty Recognition Award in recognition of outstanding dedication and commitment to undergraduate pre-health training at Miami University and was also recognized multiple times by the Center for Teaching Excellence as a faculty member who made a positive impact on student's learning and development.

Dr. Dilupama is an experimental nuclear physicist by training with an ongoing interest in physics education research. Her most recent first-authored paper was



published in Phys.RevC in summer last year. She works with Prof. Carl Brune from Ohio University and MoNA collaboration in Michigan State University for nuclear structure experiments. While advising Engineering Technology students at NKU and teaching Physics as her primary responsibilities, as time permits, she would like to spend some time doing research as well.

Apart from academics, Dr. Dilupama loves traveling and exploring different cultures and cuisines. Together with her husband and kids, she has so far visited 45 states in the U.S. and counting. She also enjoys singing and dancing in her leisure time.

## Permanent NKU Lecturer Dr. David Cain

Dr. David Cain joined the department as a renewable lecturer in Fall 2019. He received his bachelor's degree in Physics from the University of Cincinnati (1976) and continued his studies at UC. His MS thesis (1978) is entitled "Diffusion Coefficients of Krypton-Noble Gas Systems" and involved experimental measurements from room temperature to 1300K. His Ph.D. thesis (1982) is named "Thermal Diffusion in Equimolar  $4\text{He} - 20\text{Ne}$  Gaseous Mixtures." In contrast to his MS thesis, this experimental work was conducted at temperatures down to 20K, near the condensation temperature of neon gas at normal pressures. Both graduate degrees involved comparison to theoretically calculated values of the transport properties. Quantum effects were included in the theoretical comparisons for the He-Ne system.

It was Dr. Cain's early "plan" to go directly into teaching and research after graduate school. However, his work with (somewhat) exotic gases during graduate school brought him employment in a government lab. He spent many years running analytical labs in support of nuclear energy research, nuclear weapons component manufacture and development, and space missions. Magnetic sector mass spectrometry was the primary analytical method used in the light-gas analyses to support these programs. New analytical methods were developed when changing program requirements and new programs brought about the need.

The call to teaching persisted during this period and was partially satisfied through outreach programs sponsored by Dr. Cain's employers. He moved away from direct government employment and spent a few years as an independent technical consultant to government and industry. Dr. Cain came back to academia in 2000 when he began teaching at the post-



secondary level at ITT Technical Institute in Cincinnati. He has taught at UC, Xavier and Gateway Community and Technical College in northern Kentucky. He actually started at NKU as an adjunct faculty member in January 2014. He became involved with service work for the department through committee appointments as soon as he achieved full-time, temporary status as a lecturer.

Dr. Cain has expressed his earnest pleasure with the teaching environment at NKU. The absence of a graduate program in Physics encourages a close relationship between the student and mentoring faculty members. With the appointment to the renewable lecturer position, Dr. Cain hopes to turn his past experiences in mass spectrometry and methods-development into fruitful research that will invite student participation. He has already begun conversations with faculty members in both the Physics and Chemistry departments for future collaborative work.

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