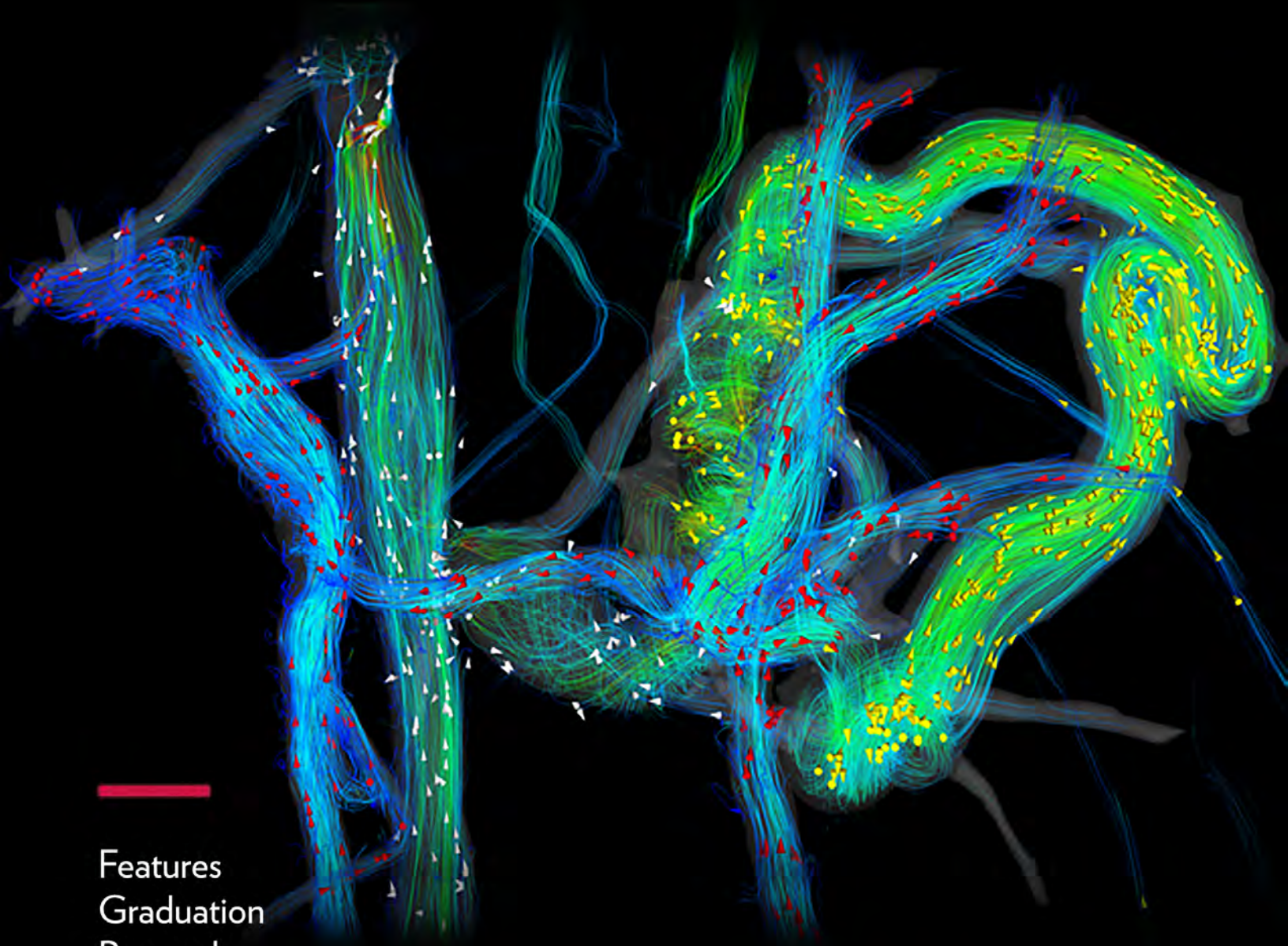
Spring 2019

# MEDICAL PHYSICS Newsletter

For our Alumni, Supporters and Friends



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Highlights

## 4D FLOW MRI MEASURES PORTAL VENOUS FLOW IN PATIENT WITH SPLENORENAL SHUNT

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## Contributors


*Editorial Team*
Edward Jackson
Amy Martens
Catherine Steffel

*Design Team*
Yacouba Traore
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# From the Chair

To our Alumni & Former & Current Faculty, Students, Residents, & Staff:

On behalf of the entire department, I am pleased to announce the most recent edition of the Department of Medical Physics Newsletter. As highlighted in this edition, the past year has been a busy one, with continued transitions in personnel and numerous research and education initiatives. A comprehensive graduate program "Curriculum Transformation" project that began in 2017 has neared completion of a major milestone, with the creation of five new graduate courses and major modifications to several others. These changes bring novel content into the curriculum and increase the rigor and integration of concepts. I am convinced these efforts will have a major impact on graduate medical physics education well beyond UW-Madison. My thanks to all faculty, staff, and students involved in this initiative.

The department's research programs continue to thrive and expand, thanks to the dedicated and innovative efforts of medical physics and collaborative faculty and very strong contributions from academic and administrative staff, post-doctoral fellows, graduate students, and residents. These efforts have led to research revenues and expenditures that continue to increase in spite of low federal funding levels and intense competition for such funds. Congratulations to all those involved in this wide range of research contributions! Your efforts continue to ensure the department remains at the forefront of medical physics research as well as graduate education and training.

Another very important area of activity that continued during the past year was focused on diversity, inclusion, and outreach. These efforts were led by the program's outstanding graduate student body with the support and encouragement of the department's faculty and staff. I encourage you to review some of the highlights of these efforts featured on pages 12-15 of this newsletter.

A new initiative was the creation of the Department of Medical Physics Board of Visitors. This august group will serve as ambassadors and advocates to the department, assist with philanthropic efforts, provide advice on means for optimizing the impact of the department's research and instructional activities, assist in recruitment of graduate students and residents, and, as appropriate, provide mentoring, networking, and career assistance advice to graduates of our educational programs. With regard to philanthropy, I want to sincerely thank all alumni and present and former faculty and staff who contributed donations during the past year. I encourage each of you to review pages 21-22 of the newsletter to find opportunities for you to contribute to the continued successes of the department. Philanthropic support of each of the department's mission areas is critical to departmental success, and this means of financial support continues to become increasingly important. Please consider contributing.

In other news, we are continuing the "History of the Department" project and plan to publish a book dedicated to the department, the people who made the department what it is, and their many contributions to research, education and training, clinical practice, and society. Many emeritus and current faculty are involved in this exciting project. Anyone interested or with photos or other information to provide, please contact Lyddia Ruch-Doll (ruchdoll@wisc.edu).

As always, we are eager to hear from our alumni and former faculty and staff. Please send any informational updates, such as changes of address, to Amy Martens (aemartens@wisc.edu). If your travels bring you to or near Madison, please let us know as we would be very pleased to see you and schedule a department visit.

Finally, I want to again express my sincere appreciation to all active and past faculty, staff, students and residents, post-doctoral fellows, and scientists who establish, and maintain, the reputation of the Department of Medical Physics as a leader in innovative research, education, and service. It is a deep honor and privilege to serve as chair of such a phenomenal department. While I and all involved are immensely proud of past and current achievements, I firmly believe the future of this department is even brighter. On Wisconsin, and Go Badgers!

Sincerely,
Ed Jackson

# Education

## Imaging Physics Residency Program

Increasingly, the FDA, State of Wisconsin, and Joint Commission recognize the essential roles of qualified medical physicists in the practice of Radiology and have mandated these roles in Mammography Quality Standards Act regulations, administrative codes, and new imaging standards. Because of the residency requirement in the pathway to qualified medical physicist status, imaging physicist residencies are critical to the future of both the medical physics and radiology communities.

The University of Wisconsin Medical Imaging Physics Residency program is a two year, CAMPEP-accredited training program that prepares two post-graduate medical physicists to perform independently as clinical medical imaging physicists. Since accreditation, two imaging residents have completed the program. **Zhimin Li, PhD**, is now a Medical Physicist at Massachusetts General Hospital, and **Christina Brunnquell, PhD**, accepted a position as Acting Assistant Professor of Medical Physics at the University of Washington.

Both are active in national committees and working groups of the American Association of Physicists in Medicine (AAPM) and are in the process of obtaining board certification. Two new residents, **Megan Lipford, PhD** and **Sean Rose, PhD** began their residencies last summer. In addition to assisting in quality assurance tasks, these residents have enhanced the value of many clinical support projects in Medical Physics. We anticipate their efforts will result in scholarly presentations and publications during their residency.

*Dr. Frank Ranallo (left) - Director, Medical Imaging Residency Program & Dr. John Vetter (right) - Director of Radiological Physics Services testing diagnostic radiological equipment*



## Radiological Sciences Training Grant (T32)

The Radiological Sciences Training Program is in its 41st year, and a competing renewal was submitted this past year and awarded this spring. The program prepares pre-doctoral graduate students and post-doctoral researchers for careers in the application of physics to medical diagnosis and treatment of cancer. Mentors maintain a broad spectrum of research collaborations with clinical and basic science researchers. Trainees are intimate participants in the research process and, after their training period, individuals are well-prepared to assume leadership positions as researchers and academicians.

Eight pre-doctoral trainees were appointed in 2017 and 2018. **Carson Hoffman, PhD** worked with **Oliver Wieben, PhD** on quantitative 4D flow MRI for abdominal cancers. **Sabrina Hoffman, PhD** worked on developing bromine auger electrons as potential therapeutic agents for prostate cancer therapy with **Bruce Thomadsen, PhD** and **Bryan Bednarz, PhD**. **Andrew Santoso, PhD** and **Tim Hall, PhD** (*above left*) worked on quantitative ultrasound characterization of the cervix. **Emily Ehlerding, PhD** worked on molecular imaging for personalized immunotherapy with **Weibo Cai, PhD**. **Leonard Che Fru, PhD** worked on an optical device that measures tumor hemodynamics with **Larry DeWerd, PhD** and **Randall Kimple, PhD**. **Andrew Antolak, PhD** developed a framework for quantitative assessment of treatment response and outcome prediction in head and neck PET/MRI under the supervision of **Edward Jackson, PhD**.

**Daniel Huff** and **Robert Pohlman** recently joined the cohort of T32 predoctoral trainees. Huff is working on a PET/CT-based framework for immunotherapy response assessment under **Robert Jeraj, PhD**, while Pohlman is working on robust electrode displacement elastography for microwave liver ablations with **Tomy Varghese, PhD** and **Hall**.

Post-doctoral trainees **Camille Garcia-Ramos, PhD** and **Paul Begovatz, PhD** were appointed to the training grant in 2017 and 2018, respectively. Garcia-Ramos is working with **Elizabeth Meyerand, PhD** on analysis methods and machine learning techniques to identify primary and functional outcomes in brain tumor patients. Begovatz is working with **Sean Fain, PhD** to design MRI/MRS measurements for clinical MRI research with collaborators across North America and Europe.

# Open House 2019

**25 Open House Attendees**
**17 Offers Extended**
**11 in 2019 Entering Class (10 PhD & 1 MS)**

**Kendall Barrett**
**UW-Madison**
**Nuclear Engineering**

**Christina Breeze**
**Colorado School of Mines**
**Metallurgical and Materials Engineering**

**Ruiming Chen**
**Davidson College**
**Physics**

**Jacob Lambeck**
**UC Davis**
**Physics**

**Thomas Lilieholm**
**UT Austin**
**Physics**

**Andrew McVea**
**University of Chicago**
**Physics**

**Ruvini Navaratna**
**Carnegie Mellon University**
**Physics**

**Brayden Schott**
**Wheaten College**
**Physics**

**John Stasko**
**Rice University**
**Physics**

**Xin Tie**
**Nanjing University**
**Biophysics**

**Jayse Weaver**
**Luther College**
**Physics, Mathematics**

## Incoming Class

**Demographics:**
30% women
70% men

**States Represented:**
Wisconsin, Texas, Illinois, Pennsylvania, California, Iowa

**Average GRE Scores:**
Verbal 160 / 85%
Quantitative 165 / 86%
Analytical 4 / 73%

**Countries represented:**
China, United States

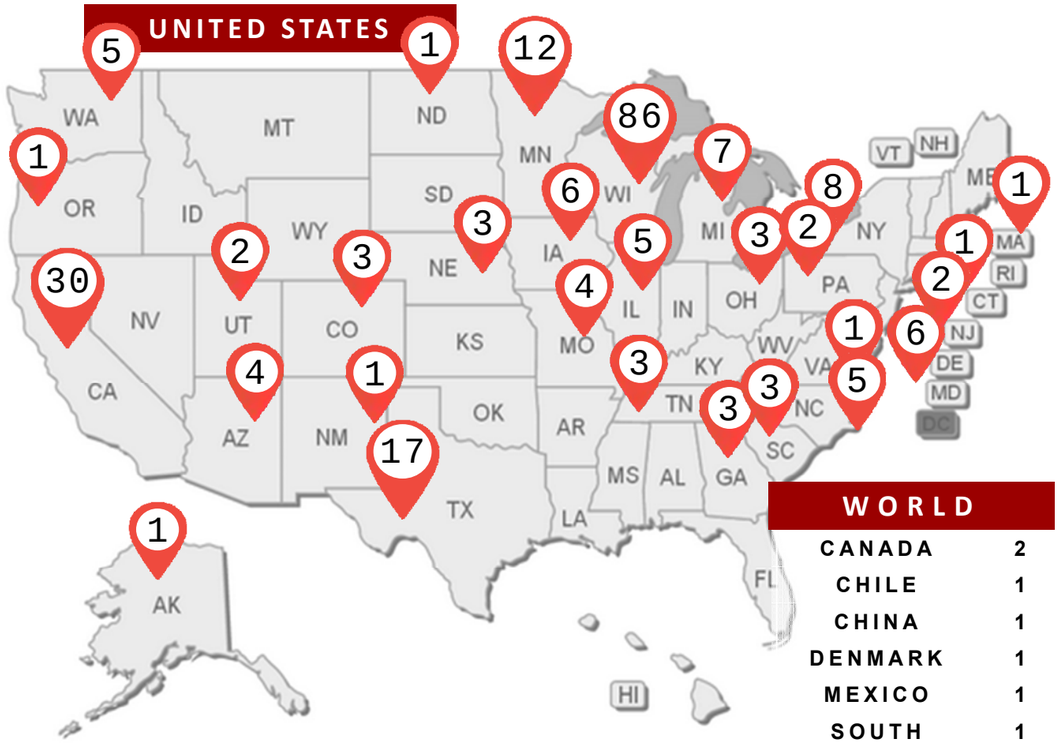
**Average Undergraduate GPA:**
3.55



# Where Are They Now?

Our Medical Physics graduates go on to make their mark in many ways, both near and far. Together, with their colleagues in clinics, universities, industries, public engagement sectors, and elsewhere, they advance state-of-the-art sciences and technologies to improve the lives of people in Madison, the state of Wisconsin, and beyond.

## Distribution of Alumni




| WORLD | |
|---|---|
| CANADA | 2 |
| CHILE | 1 |
| CHINA | 1 |
| DENMARK | 1 |
| MEXICO | 1 |
| SOUTH AFRICA | 1 |
| UK | 2 |

Alexander Antolak
Therapy Resident
Cleveland Clinic
Cleveland, OH

Juan Pablo
Cruz-Bastida
Seeking
Employment

Sarah Strand
Therapy Resident
University of Iowa
Iowa City, IA

Eric Simiele
Therapy Residency
Stanford University
Palo Alto, CA

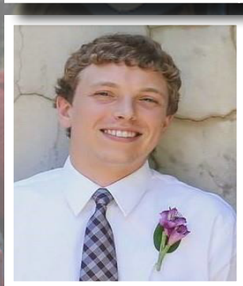
Andrew Santoso
Therapy Resident
University of Denver
Denver, CO


Gengyan Zhao
Senior AI Scientist
Neuroimaing
Siemens Healthineers
Princton, NJ

Vimal Desai
Therapy Resident
University of
Wisconsin-Madison
Madison, WI

Natalie Viscariello
Therapy Resident
University of
Washington
Seattle, WA

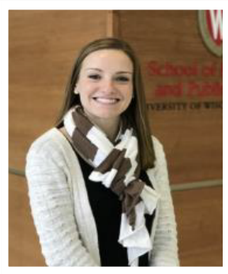
Sabrina Hoffman
Therapy Resident
Loyola University
Chicago, IL



Charles Matrosic
Therapy Resident
University of
Michigan
Ann Arbor, MI

Jacob Macdonald
Research Associate
University of
Wisconsin–Madison
Madison, WI

Erin Macdonald
Diagnostic
Imaging Resident
Henry Ford Health
System
Detroit, MI



Emily Ehlerding
Scientific Affairs and
Education Manager,
Society for the
Immunotherapy of Cancer
Milwaukee, WI

Leonard Che Fru
Therapy Resident
University of
Wisconsin-
Madison
Madison, WI

# 32nd Annual John Cameron Symposium, May 6-7, 2019

## Seeing is Believing: Total Body Position Emission Tomography

**Simon Cherry, PhD** was the invited guest of **Brad Christian, PhD** for the 32nd Annual John Cameron Symposium. Cherry received his BSc in Physics and Astronomy with Astronomy from the University College London and a PhD in Medical Physics from the Institute of Cancer Research, University of London. He is currently Distinguished Professor in the Department of Biomedical Engineering at the University of California, Davis.

Cherry's research interests focus on the development and application of biomedical imaging systems. Cherry is a fellow of six professional societies and serves as Editor-in-Chief of the journal Physics in Medicine and Biology. He was elected as a member of the National Academy of Engineering in 2016 and was elected to the National Academy of Inventors in 2017.

Cherry's presentation, titled "**Seeing is Believing: Total Body Positron Emission Tomography**," brought together an audience of approximately 100 people. A reception was held immediately following the presentation. The following day, Cherry met with faculty and had breakfast with 14 medical physics graduate students.



# Honors & Awards

## 2019

### June

**Kaelyn Seeley** and **Chris Kutyreff** Received UW Student Research Grants Competition Conference Presentation Awards

### May

**Rock Mackie** Received IOMP John Mallard Award and ASTRO Gold Medal
**Philip Corrado** Awarded F31 Grant for MRI Blood Flow Project

### April

**Catherine Steffel** Received UW Student Research Grants Competition Conference Presentation Awards
**Dalton Griner** Named Winner of 2019 Cool Science Image Contest
**Jim Zagzebski** Received William J. Fry Memorial Lecture Award

### March

**Emily Ehlerding** Received Science Literacy Award

### February

**Emily King** Received CIRMS Junior Investigator Award

### January

**Wesley Culberson** Elected as AAPM Fellow
**Bryan Bednarz** Chosen as 2018 Ride Scholar

## 2018

### November

**Andrew Shepard** and Colleagues' Paper Selected as Medphys.org Editor's Pick

### October

**Paul Campagnola** Elected as Fellow of The Optical Society
**Eric Simiele** Won First Prize in NCCAAPM Young Investigator Competition
**Weibo Cai** Invited to Serve as Co-Editor-in-Chief of Journal of Nanobiotechnology

### September

**Marina Emborg** Featured in UW News Stem Cell Feature

### August

**Weibo Cai** Invited to Deliver Plenary Lecture at Chinese Society of Nuclear Medicine Meeting

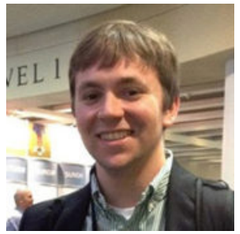
### July

**Martin Wagner** Received R21 Grant for 4D Fluoroscopy Project
**Weibo Cai** Received *Nano Research* Young Innovators Award

# Faculty News - New Hires & Promotions

**Alan McMillan, PhD** joined the department as a Visiting Associate Professor (CHS) effective October 1, 2018, with a joint primary appointment in Radiology. He obtained his BS, MS, and PhD degrees in Biomedical Engineering at UW-Madison. Currently the Lab Director of the Molecular Imaging/Magnetic Resonance Technology Lab (MIMRTL), McMillan was recently awarded an NIH R01 grant. His project, titled "Improved Techniques for Substitute CT Generation from MRI Datasets," will use deep learning to improve simultaneous PET/MR and MR-based radiation treatment planning. Read more about McMillan here.

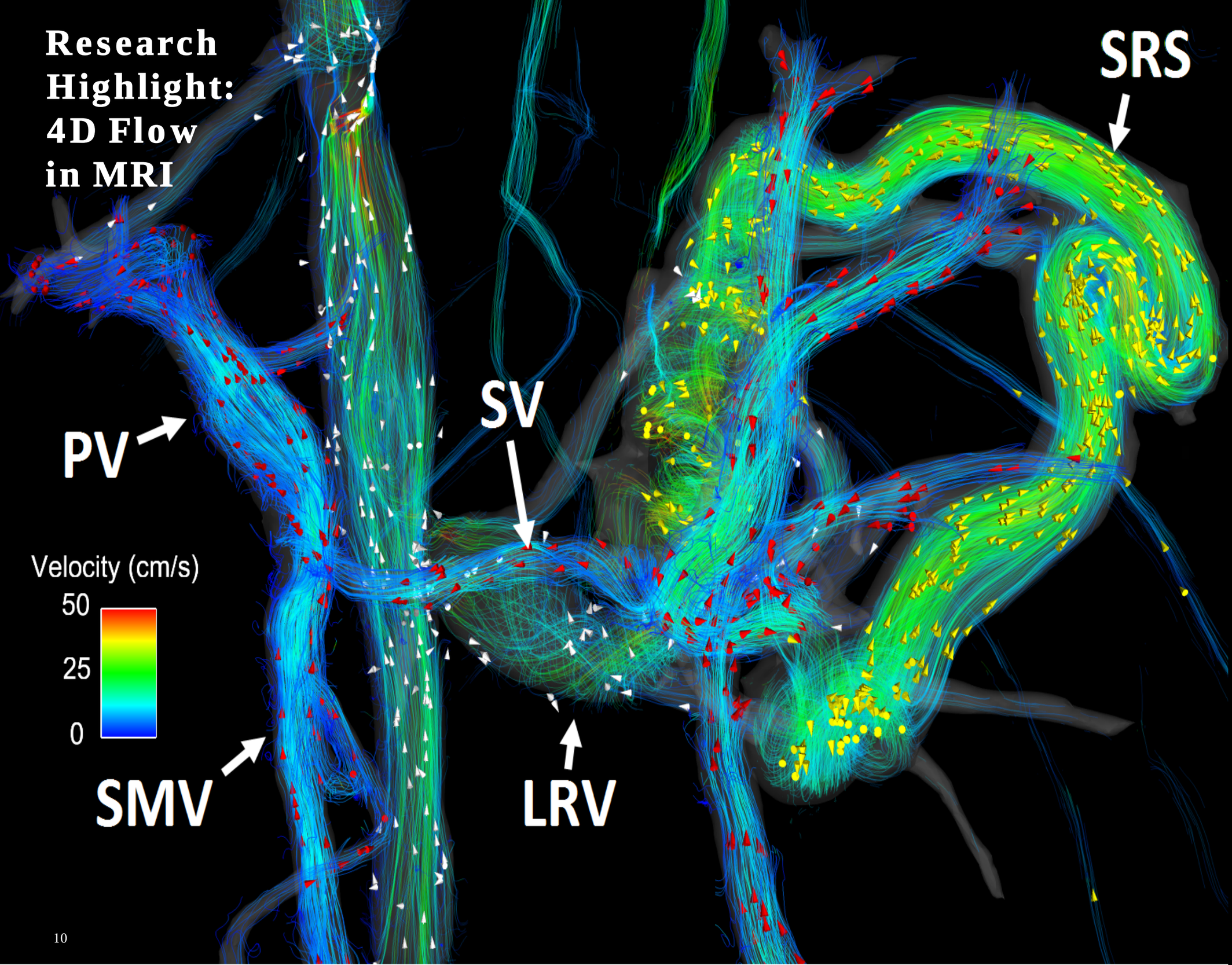
**Kevin Eliceiri, PhD** joined the department effective June 1, 2019 as a tenured Associate Professor. Eliceiri is an internationally-recognized expert in advanced light microscopy. His other appointments include founding and directing the Laboratory for Optical and Computational Instrumentation (LOCI), and serving as a Principal Investigator in the Laboratory of Molecular Biology and as an investigator and director of the Fab Lab at the Morgridge Institute for Research. His collaborations have resulted in over 170 publications in informatics, instrumentation, live cell microscopy, and cancer imaging. He has been funded by the NSF, NIH, DOD, the Susan G. Komen Foundation, the American Cancer Society, and the Welcome Trust. Read more about Eliceiri and his lab here.



**Douglas (Doug) Dean III, PhD** accepted a joint appointment in the Department of Pediatrics and Department of Medical Physics as an Assistant Professor effective July 1, 2019. Dean's research focuses on the development and application of novel quantitative MRI methods to measure and evaluate the brain structure throughout early neurodevelopment and aging. He is experienced in pediatric imaging, scanning more than 800 infants and young children during his graduate work. His current research is focused on examining how the white matter microstructure of the brain develops across the early development and how these microstructural processes are related to changes in cognition and behavior. He is an NIH Pathway to Independence K99/R00 award recipient. Read more about Dean and his research here.

**Oliver Wieben, PhD** was promoted to Professor with Tenure in the Department of Medical Physics, with a joint appointment in Radiology, effective July 1, 2019. He previously worked as a scientist at the University Hospital in Freiburg, Germany and joined the faculty of the Departments of Medical Physics and Radiology at UW-Madison in 2008. Wieben's research centers on the development of rapid cardiovascular imaging methods for non-invasive MRI and their application to improve clinically-relevant diagnoses. Wieben serves as the Vice Chair for Research for the Department of Medical Physics. Read more about Wieben and his research here.

# Research Highlight: 4D Flow in MRI




**4D flow MRI can capture useful clinical information, such as complex blood flow patterns through arteries and veins. Here, researchers visualize blood flow through the liver's portal venous system – specifically the portal (PV), superior mesenteric (SMV), and splenic (SV) veins – and a splenorenal shunt (SRS) that developed and directly empties into the left renal vein (LRV).**

**Colored streamlines and arrowheads depict the magnitude (color) and direction (arrowheads) of time-averaged flow patterns within the portal venous circulation (red arrow), vena cava drainage (white arrows), and a splenorenal shunt (yellow arrows) connecting the two.**

**This work is the result of a collaboration between Oliver Wieben and Kevin Johnson (Medical Physics & Radiology), Benjamin Landgraf (now with Children's Hospital of Wisconsin), Alejandro Roldán-Alzate (Mechanical Engineering & Radiology), and Christopher Francois and Scott Reeder (Radiology). The team seeks to establish non-invasive 4D flow MRI in clinical settings, where it might provide surrogate biomarkers of portal pressure to quantify treatment response and risk of variceal ruptures.**

**Credit: Oliver Wieben, PhD**

# Service, Outreach, and Diversity

## Congressional Staff Tours Wisconsin Institutes for Medical Research (WIMR)

The largest congressional staff group to ever visit UW-Madison gathered in WIMR to learn more about the importance of federal funding and other resources necessary for continued support and expansion of selected areas of research and patient care within the School of Medicine and Public Health (SMPH) and UW Health. Staff members from eleven congressional offices, including those of Sen. Tammy Baldwin, Sen. Ron Johnson, Rep. Gwen Moore, Rep. Mark Pocan, Rep. Glenn Grothman, Rep. Ron Kind, Rep. Sean Duffy, and Rep. Mike Gallagher, visited with Medical Physics and Radiology faculty, staff, and students on August 21, 2018.

The overall goal of this visit was to underscore the importance of federal funding, industry/foundation contracts and grants, and the need for increased funding levels. The information the congressional staff members took back to the Capitol will be important with regard to the allocation of funding statewide that will enable researchers and physicians to continue to develop novel, more effective techniques and provide the ability to translate such techniques via clinical research to improve patient care, increasing the quality of human life in Wisconsin and beyond.

The day began with a tour of UW Med Flight, led by **Ryan Wubben, MD,** Professor of Emergency Medicine, followed by presentations from **Jacques Galipeau, MD**, the Don and Marilyn Anderson Professor of Oncology within the Department of Medicine and UW Carbone Comprehensive Cancer Center, and **Amy Kind, MD, PhD**, an Associate Professor at UW SMPH, the founder of the UW Department of Medicine Health Services and Care Research Program, and Director of the Madison VA Dementia and Cognitive Care Clinic.

Afterwards, **Edward Jackson, PhD**, Professor and Chair of the Department of Medical Physics and Professor of Radiology and Human Oncology, emphasized the Wisconsin Idea in his presentation overviewing selected past contributions of collaborative efforts between the Departments of Medical Physics, Radiology, and Human Oncology, from basic research and development to translation to clinical trial applications and patient care. The importance of federal research funding, particularly at the beginning of this process, was stressed, along with returns on investment for such funding in terms of patents and technology transfer. Vascular imaging and TomoTherapy were provided as examples by Professors **Charles Mistretta, PhD** and **T. Rockwell Mackie, PhD**, respectively.

This overview was followed by presentations from **Bradley Christian, PhD**, Professor of Medical Physics and Psychiatry, and **Jonathan Engle, PhD**, Assistant Professor in the Departments of Medical Physics and Radiology, who presented recent accomplishments of the Department of Medical Physics, including cyclotron production, radiopharmaceutical research specifically related to Alzheimer's and Parkinson's Disease, and other high-interest public health issues such as prostate and breast cancers. Christian and Engle also discussed current grants, highlighted major accomplishments, and discussed recent collaborations with the Department of Radiology, Waisman Center, and other UW-Madison departments, centers, and institutes.

After the presentations, smaller groups, facilitated by **Timothy Hall, PhD**, **Oliver Wieben, PhD**, and **Guang-Hong Chen, PhD**, toured WIMR 1 Ultrasound, MR, and x-ray/CT facilities. At each location, staffers had opportunity to meet some of the students who contribute to research associated with these modalities. **Thomas Grist, MD**, Professor and Chair of the Department of Radiology, also participated in the tour and highlighted certain research initiatives as well as the impressive return on research and development investment to Wisconsin and beyond.

## Graduate Students Share Research at Wisconsin State Capitol

Graduate students and postdoctoral researchers from UW-Madison, including 11 students from SMPH programs, shared their research with Wisconsin legislators, staff, and alumni at the Wisconsin State Capitol on April 10, 2019.

Medical Physics graduate student **Catherine Steffel, MS** (*right*) collaborated with the UW-Madison Department of State Relations to organize the showcase, and Medical Physics graduate student **Ian Marsh, MS** presented his research on combining immunotherapy and low-dose molecular radiotherapy for hard-to-treat cancers.

"The showcase provides a valuable opportunity for graduate students and post-docs to connect with Wisconsin policymakers," says Steffel. The next showcase is tentatively set for April 23, 2020.


**Catherine Steffel, MS at the Research and the Wisconsin Idea Showcase**

## Department Outreach

The Graduate Student Outreach Committee aims to increase the visibility of medical physics by teaching community members about the role of physics in medicine as well as the educational and career opportunities in physics-based careers. Our focus is directed to the next generation of curious thinkers, especially under-represented groups in medical physics, by engaging them in conversation and hands-on medical physics activities.

Since August 2017, the Outreach Committee has engaged with about 500 community members, participated in seven events, and contributed a collective 125 hours of service with the help of 20 graduate students. With support of many faculty, staff, and graduate students, the program welcomed its second group of high school students to the department for a tour in fall 2018. Family Science Nights and Science Fairs encompass the majority of events, with a target audience of elementary and middle school students and their families. The Outreach Committee has partnered with the Committee for Recognizing Equity, Diversity and Inclusion in Medical Physics as well as students representing the Department of Radiology in order to broaden impact. None of this would be possible without generous equipment loans from Siemens Healthcare and various labs, faculty, and staff from the Department of Medical Physics.

Descriptions and pictures of all outreach events from the past year are available online on the UW Medical Physics Outreach Committee webpage. To learn more, please contact Aeli Olson (aeli.olson@wisc.edu) or Sydney Jupitz (jupitz@wisc.edu).

*Treatment planning demo brought to Science Fairs. Participants learn basics of forward planning X-ray beam placement.*

*Ultrasound demo. Participants "diagnose" a gummy bear phantom by finding grapes hidden inside.*

## Vice Chair For Mentoring, Diversity, & Strategic Collaboration

In 2019, a new Vice Chair for Mentoring, Diversity, & Strategic Collaboration was created based on the department's commitment to continuously increase its focus on mentorship (for learners as well as faculty and staff), the clear need for continued improvement in our diversity and inclusion efforts (for learners and, especially, for new faculty recruitment), and the department's focus on continued diversification of research opportunities across the UW-Madison campus. We were pleased that **Beth Meyerand, PhD** accepted the offer to serve as the inaugural holder of this Vice Chair position. Her prior leadership roles on a variety of campus-wide initiatives and her recent appointments in ICTR, Morgridge Institute for Research, and the SciMed GRS that are focused on mentorship made her the ideal person to hold this new position. She will oversee our expanding diversity and inclusion efforts, will serve as a member of each of our search and screen committees for new faculty hires, and will work with the Chair, the Vice Chair for Faculty, and the Vice Chair for Research.



## Committee for Recognizing Equity, Diversity, & Inclusion (REDI)

Bolstered by the success of their initiatives under a grant they received from the Women in Science and Engineering Leadership Institute (WISELI), graduate students **Amy Weisman, MS** and **Catherine Steffel, MS** formed the Committee for Recognizing Equity, Diversity and Inclusion (REDI). REDI's mission is to foster and build community within the medical physics department by raising awareness and facilitating conversations which aim to encourage diversity and inclusion. A visit from **Carri Glide-Hurst, PhD**, of Henry Ford Health Systems, in fall 2018 was REDI's last under WISELI support. After engaging in conversations about inclusion in medical physics at lunch and meeting with students and faculty, Glide-Hurst delivered a well-attended seminar on MR-guided radiation therapy. In February 2019, REDI held a discussion about unique challenges facing international students over lunch with faculty-sponsored speaker **Anant Madabhushi, PhD**, of Case Western University. They also took an active role in planning a Professional Career Development Panel in collaboration with the Medical Physics Student Representatives.

REDI encourages anyone who would like to get involved, or who is interested in nominating an individual or participating in REDI's Seminar Speaker program, to email redi@medphysics.wisc.edu. If you would like to hear about future events, send a blank email to join-redi@lists.wisc.edu.

# Alumni Feature

## *Evan Sengbusch (PhD'12)*

**Evan Sengbusch PhD, MBA**, graduated with a PhD in Medical Physics from UW-Madison in 2012. Today, he is President of Phoenix Nuclear Labs, one of the leading companies in technological development of healthcare, defense, aerospace, and energy applications and hardware. The company also makes neutron generators, whose high-speed particle beams pass through an object and create a highly detailed image. His entrepreneurial journey was surprisingly straightforward. While studying for his PhD, Sengbusch expressed an interest in also pursuing an MBA – an interest that his adviser, **T. Rockwell Mackie, PhD**, supported and inspired.

Sengbusch took two years during his PhD program to earn an MBA. As part of his MBA, Sengbusch had to find and help a local businessperson. Mackie introduced Sengbusch to **Gregory Piefer, PhD**, a UW-Madison alum who founded Phoenix Nuclear Labs. After graduation, Sengbusch became Vice President of business development at Phoenix. **Yacouba Traore, MS in Educational Science** sat down with Sengbusch earlier this year to discuss graduate school and life after a PhD.

*Why did you decide to study medical physics?*

Over the course of my education and career, I've found myself moving gradually towards more application-focused areas of physics. I started as an undergrad doing nuclear theory research. I moved from there into experimental particle physics and then to experimental plasma physics. Ultimately, I landed in medical physics as a grad student, and I found the direct and immediate impact of my research on patients to be extremely rewarding.

*How have your (career) goals changed, if at all, since you were a graduate student?*

As my career has evolved, I've developed an interest in not only developing new technologies for healthcare and other applications, but also in getting those technologies out of the lab and into practical use. A research breakthrough is only the first step – there is a lot more that needs to happen to commercialize something. I've found that a thorough understanding of the foundational technology is a great benefit when managing all the other business aspects of bringing a new technology to market.

## A Bit About Evan

**"I've got two kids, 2 and 4. I started them both with "Quantum Physics for Babies" at age 6 months. I think maybe we're going backwards though, because now the primary focus is on counting to 10.**

**I love playing racquetball, and I enjoy frequently taking down UW Med Phys IT specialist Yacouba Traore."**

**"As an undergrad summer student at CERN in 2006, I was the first (and as far as I know only) person to throw a massive toga party on the CERN grounds– I consider this my greatest contribution in spreading American culture abroad."**

*What was it that inspired you to pursue an MBA during your PhD work at UW-Madison?*

My advisor, Rock Mackie, played a huge role in my decision to pursue an MBA in parallel with my PhD. He's started multiple successful companies, and I got exposure to medical physics outside of academia early in grad school through his connection with TomoTherapy. I quickly found that I like the faster pace and focus on implementation of new technologies as opposed to research just for the sake of knowledge (not that that isn't incredibly important, too!).

*Do you have any advice for current medical physics students considering an MBA?*

If you want to work outside of pure research in the future, whether inside or outside of academia, and MBA is useful. Some of the coursework may never be relevant to you. However, just like having a foundational understanding of basic physics is essential to being a top notch medical physicist, a foundational knowledge of accounting, finance, and other basic principles of running a business goes a long way in helping you see the big picture in a commercial organization.

*Tell us a bit about your career trajectory.*

Right now I am 100% focused on making Phoenix a success. We've enjoyed incredible growth over the last couple years, but we have by no means "made it" as a company. There is still a lot of risk in our business, and my number one goal right now is maturing our technology and position in the market such that we become a fully established, sustainable, and thriving business providing technologies that truly benefit humanity across a broad range of applications.



*What are some of the things you were able to pursue or accomplish during graduate school that you found valuable later on in your career?*

I spent a summer interning at CPAC, a spinoff of TomoTherapy that ultimately failed. We were trying to develop a new compact proton therapy system, but the technology never panned out. As part of that experience, I spent the entire summer traveling around the US and meeting with top oncologists at various radiation oncology clinics. This exposure to clinicians and a broad range of clinical viewpoints across the country was incredibly insightful. It also was great personal development in terms of learning to interact with experienced, respected professionals at the top of their field.

*What was your experience juggling the MBA coursework and making progress on your PhD project?*

Rock was an incredibly flexible advisor. This was a great fit for my personality, as I'm a fairly self-motivated and autonomous person. The MBA was entirely my idea, but Rock never blinked an eye and was supportive right off the bat, despite the fact that it clearly stole some of my time away from my PhD research. In the long run, however, I think the different perspective that the MBA brought made my dissertation better, and perhaps Rock expected that. In retrospect, it was one of the best decisions I made with regard to my education and career.

**"For most people in my department, there are two paths, you're either going to be a professor, or you're going to work in a hospital doing clinical-medical physics, and, ultimately, neither of those was appealing to me."**
**- Evan Sengbusch**

# In the Spotlight: Machine Shop

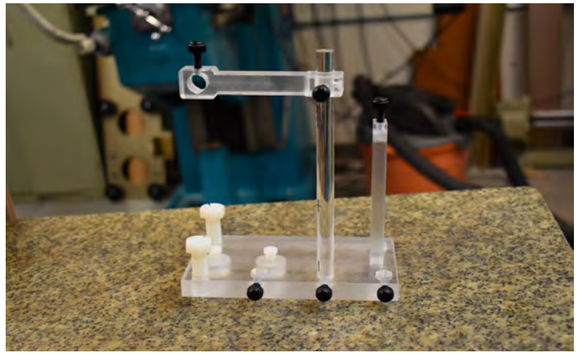
Imagine yourself in 1993, when the Pentium computer was brand new. Imagine using that same computer in your daily job functions today. The Medical Physics Machine Shop is facing this reality as compatible replacement hardware and software updates are no longer available.

Currently, the main 'workhorse' is a computer numerical controlled (CNC) milling machine from 1994. While the machine shop has been able to complete projects and meet customer requests, the shop is making plans to purchase a new CNC milling machine like the Hurco VM10i (*below*). With a modern CNC milling machine, the machine shop will be able to produce more intricate projects with a high level of accuracy and precision. Furthermore, a CNC milling machine will also reduce project time and the number of hand fitting assemblies. The new CNC milling machine will be able to cut a wide range of materials, from ferrous and nonferrous metals to plastic and wood.

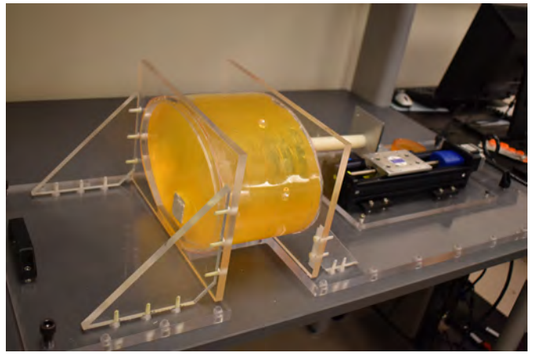

Through the use of Solidworks and Camworks, the shop can make tool cutting paths from a solid model. A postprocessor can convert virtual Camworks information and tool cutting paths into tool-specific CNC code. With integrated Solidworks, we can generate machine complex geometry with relative ease and quick turnaround.

To prepare for updates and improvements, the machine shop is being reorganized to create a more efficient work area as well as make space for a new CNC milling machine.

These improvements will make the Medical Physics Machine Shop a safer and more efficient workplace. Visit our website to review rates, services, and our new online work order form.



Ion chamber for X-Ray measurement



Deformable phantom to study tumor motion and dose delivering in radiation therapy



# Philanthropy: All Ways Forward

Recently, the Department of Medical Physics was delighted to announce the creation of a Board of Visitors (BOV), a long-standing goal. The BOV held its inaugural meeting in December 2018. Board members include Paul DeLuca (Chair), Rock Mackie (Vice Chair), and the following external members:

**Ryan Flynn** – Director of Medical Physics, Department of Radiation Oncology, University of Iowa Hospital & Clinics

**Steven Goetsch** – Director of Medical Physics, San Diego Medical Physics

**Jeff Kapatoes** – Senior Director, Product & Regulatory, Sun Nuclear Corporation

**Greg Piefer** – CEO, Shine Medical Technologies

**Kevin Royalty** – Director of Global Strategic Marketing–Interventional Solutions, Ethicon, Inc.

**Michelle Svatos** – Private Medical Device Consultant, Michelle Svatos Consulting

**Michael Harsh** – Chief Product Officer, Terapede Systems

**Thomas Foo** – Chief Scientist, GE Global Research

**Deepak Khuntia** – Senior Vice President, Chief Medical Officer, & Vice President of Medical Affairs, Varian Medical Systems

The Chair of the Department and Vice Chair for Research serve as ex officio, non-voting members of the board.

Members of the BOV will:

- Serve as ambassadors and advocates for department. Advise and assist department in increasing awareness of department's achievements in its mission areas among students, alumni, peers, and general public.
- Assist department and UW Foundation in identifying philanthropic donors to support key priorities of department.
- Advise on mechanisms for optimizing impact of department's research and instructional activities.
- As appropriate, assist in recruitment of highest quality graduate students and post-doctoral fellows.
- As appropriate, provide mentoring, networking, and career assistance to medical physics graduate students, residents, and postdoctoral fellows.
- Advise the department on impact of new research directions on society.

Philanthropy is a particular area of focus for the BOV, as philanthropy is an essential element to departmental health.

Wisconsin's state motto, Forward, symbolically reflects the state's "continuous drive to be a national leader." The UW-Madison Department of Medical Physics is no different. Our core aim is to advance state-of-the-art patient care by developing, validating, and translating to the clinical environment novel imaging systems, minimally invasive, personalized treatments, and early treatment assessment. Our board-certified clinical faculty provides expert medical physics services to clinical facilities in Madison, the state of Wisconsin, and beyond. As you can see in the pages of this newsletter, the department continues to grow and flourish. As alumni, supporters, and friends, we hope that you continue to be a part of it and consider giving back to help ensure continued success.

On, Wisconsin!

## Giving Matters

Alumni, supporters and friends like you ensure that the Department of Medical Physics will never stop making key advancements and contributions in each of its mission areas: research, education, and service. Your gift, whatever its size, makes a huge difference in assuring the 'Wisconsin

Experience' will be available to new generations. Graduate training in medical physics demands many resources, including equipment, student stipends, and facilities. Donations to the UW-Madison Medical Physics Department through the UW Foundation are critically important to enhance these programs, support students, purchase modern equipment, and initiate new research programs. Support us here:

The Medical Physics Fund. This fund provides discretionary funding to the Department of Medical Physics Chair and is dedicated to provide financial assistance for the department's missions of teaching, research, and service. Examples of how such funds may be used include, but is not limited to, travel awards, research support, and equipment.

The John Cameron Visiting Lectureship Fund. This fund is specifically dedicated to support the establishment and ongoing development of medical physics lectures and regularly held seminars. Examples of how such funds may be used include, but are not limited to, travel and honoraria for lecture speakers. (See more below)

The Medical Physics Alumni Fellowship Fund. This fund is specifically dedicated to provide funds for a fellow in Medical Physics. The fellowship will provide supplemental funding for a post-graduate fellow in Medical Physics, thereby, allowing that fellow the opportunity to pursue areas of research and teaching in the field.

## Administrative News

**Updates**

The past year has been a year of transitions and positive changes for the administrative team. Staff that were hired last year have now seen a full annual cycle with the department and are becoming more comfortable in their roles and responsibilities. Some highlights from the past year include:

- Developing and implementing the first ever week-long graduate student orientation
- Updating the department website according to campus templates
- Establishing an online software tool for invoicing and accounts receivable tracking that has led to greater efficiency and effectiveness
- Developing and improving department policies, including but not limited to, the Post Promotion Review Policy, Evaluation of Probationary Faculty Policy, and Research Effort Policy
- Establishing the Medical Physics Board of Visitors and hosting meetings of the board in December 2018 and May 2019.

**Staff Transitions**

**JoAnn Kronberg** accepted a new position in the University of Wisconsin Accredited Dosimetry Calibration Laboratory (UWADCL) in January 2019 following nineteen years of service as Assistant to the Chair in the Department of Medical Physics. JoAnn's contributions helped support innumerable changes within the university, School of Medicine and Public Health, and Medical Physics. Her helpful, can-do attitude is missed in the administrative area. Thank you to JoAnn for her many dedicated years of service. JoAnn's replacement will start in late July.

**Devyn Prielipp** was recruited by Exact Sciences shortly after joining the School of Medicine and Public Health HR Shared Services team. **Brittany Huser** has been serving as the Medical Physics Interim HR Business Partner. A huge thanks to both Devyn and Brittany for maintaining departmental HR services and ensuring smooth transitions.

## American Association of Physicists in Medicine

Congratulations to **Linday Bodart** (advised by **Michael Speidel, PhD**) and **Ruiyang Zhao** (advised by **Diego Hernando, PhD**) for receving the 2019 Standard Imaging Travel Awards! This award is given to medical physics students traveling to AAPM to present a poster or talk on research in radiation therapy related to radiation measurements, imaging, or quality assurance. Lindsay's project is titled "Customizable Phantom for Measuring Registration Accuracy in Interventional X-ray/echo Displays." Ruiyang's project is "Novel CT and MR Compatible Phantom to Mimic Liver Fat Concentration." For recipients of other travel awards, please see page 8.

**Thanks to our Sponsors**

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Midwest Medical Physics

**Join us in San Antonio, TX for the**

**Annual UW Alumni Reception**

held in conjunction with the AAPM 61st Annual Meeting

**Rio Rio Cantina**

**421 East Commerce St.**

**San Antonio, TX 78205**

**(201)226-8462**

**8:00 PM-10:00 PM**

**Monday, July 15, 2019**

Department of Medical Physics
UNIVERSITY OF WISCONSIN
SCHOOL OF MEDICINE AND PUBLIC HEALTH

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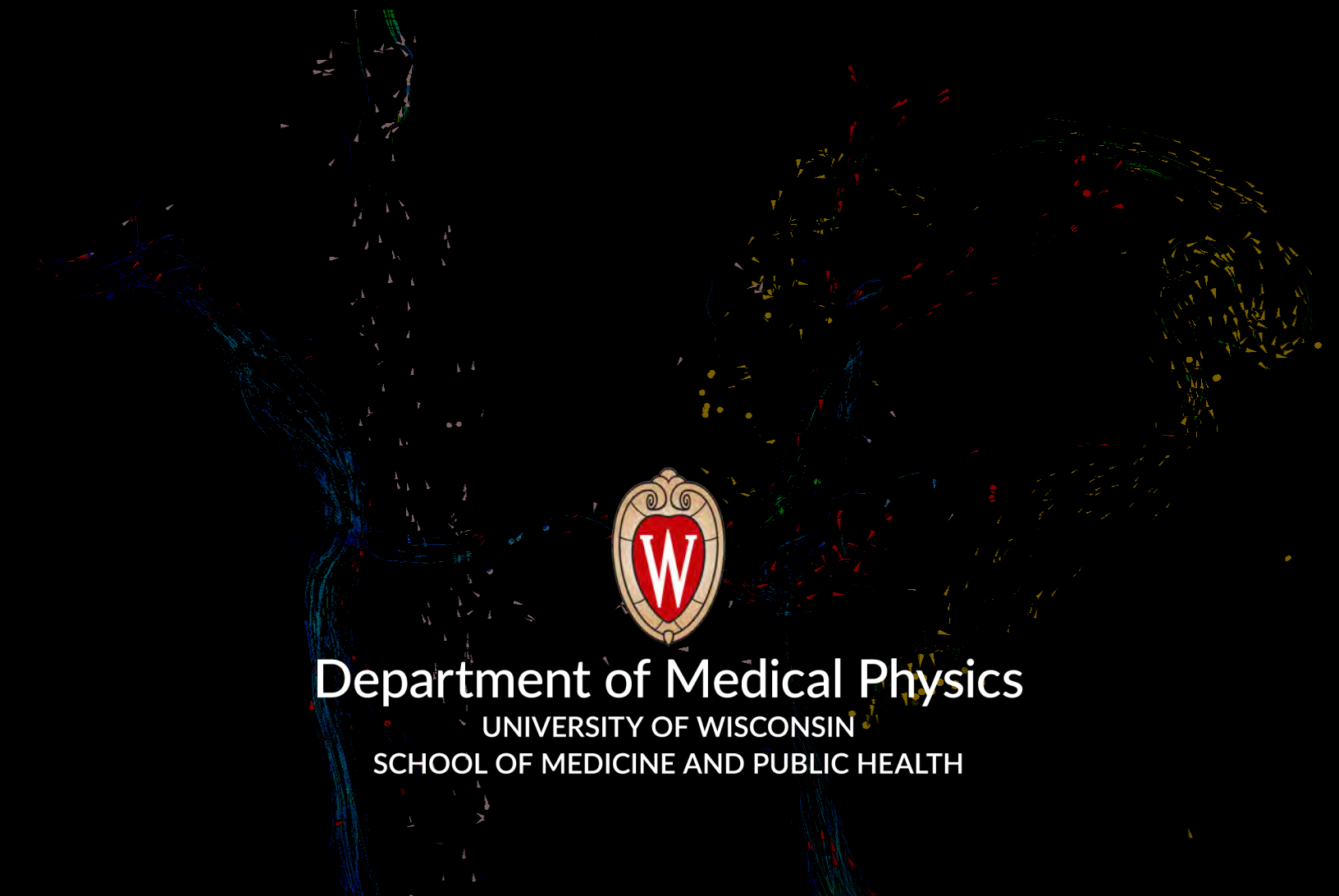

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