



Carle Illinois
COLLEGE OF MEDICINE

S P R I N G 2 0 2 3

CONNECTIONS

Building a community of future physician innovators together

LETTER FROM THE DEAN

Dear friends,

It's hard to believe it is Spring already, which signifies new beginnings and growth. This is certainly the case at Carle Illinois College of Medicine (CI MED), and we have many things to celebrate that we would like to share with you.

CI MED celebrated another incredibly successful Match Day for the Class of 2023 on March 17th building even further on last year's success. Match results this year again were truly impressive, with many of our students matching into incredibly competitive specialties such as orthopedic surgery, general surgery, urology, neurosurgery, and others at top institutions across the country. Their success is a testament to their hard work and the excellence of the training they received at CI MED—and that our physician innovators bring a unique and highly sought-after skillset to residency programs and will be even more highly sought-after each year by top health systems and institutions.

At the same time that our Class of 2023 prepares for graduation in just a few weeks, our Student Affairs team is busily recruiting the new Class of 2027, adding 64 more outstanding future physician innovators to our Carle Illinois family. Accepted applicants for the new class will bring their own sense of excitement and discovery as they visit campus in late April before matriculating this summer.

2023 has already proven to be a time of growth and expansion for our school as well as our health system partner. As we grow together, Carle Illinois' sphere of influence and impact will continue to grow regionally, nationally, and globally! Locally, we recently launched our new clinical site at Carle BroMenn in Bloomington-Normal. Simultaneously, the college continues to build relationships, key research and educational initiatives, and partnerships that will expand CI MED's impact both domestically and internationally.

I am also excited to share the immense interest surrounding our novel curriculum and the achievements of our students on both the national and international stages. In just the last six months, CI MED has been invited to ten leading

international and national medical schools to help them create or grow engineering-based medical schools and programs, including the top medical schools in Taiwan, Singapore, South Korea, Vietnam, South Africa, Ireland, Rome, Mexico, and Brazil.

I personally have visited several of these medical schools and health systems, along with others from the college, and have already put new partnerships in place that will allow for new student exchange externships, research collaborations, and branding of CI MED as an international leader and pioneer in engineering-based medical education.

CI MED is also being recognized by deans of medical schools at the most highly recognized health institutions in the US. I recently attended the Association of American Medical Colleges (AAMC) Council of Deans annual meeting where several came up to me to tell me how impressed and inspired they have been by our efforts and accomplishments in Urbana-Champaign. It was also publicly noted at the meeting that the integration of technology, engineering, big data, and medicine with a patient-focused approach is the future of where health care, medical schools, and health systems need to be heading in the next few years.

As part of that national recognition CI MED has been getting, we are excited to welcome Dr. Victor Dzau, the president of the National Academy of Medicine to deliver CI MED's 2023 convocation address. Dr. Dzau is an international leader in academic medicine and an advocate for transforming medical education through innovation. He has inspired countless physicians in his career and is an ideal keynote speaker to launch the careers of our physician innovators as they set out to change the practice of medicine.

Of course, the growth and success of our amazing college of medicine would not be possible without the generous and continued support from our loyal and forward-thinking donors. Donors like you accelerate everything we do – from our student “Capstone Innovation” and data science projects to new research opportunities and experiences – making it possible for us to develop new pathways of research and scholarly excellence. Your ongoing support provides the critical and growing infrastructure that allows us to re-engineer the future of medicine, from our communities here in Urbana-Champaign to a truly global scale. We are growing and the world is taking notice of the exciting and unique work and skillsets of our physician innovators as they take on medicine's tough challenges.

At no time in history has this work been more important. Your investment, both in terms of financial support and commitment to our mission, allows our students, faculty, and staff to succeed and create meaningful impact. Physician innovators thrive on pushing the envelope of ‘what's next.’ As dean, I'm profoundly humbled to lead this incredible community of people who approach the coming months and years with enthusiasm, expectancy, and a desire to be a part of the future of medicine, where health, community, and innovation flourish. Thank you all for your support and vision and for helping us continue to grow our important academic mission!

With gratitude,

MARK S. COHEN, MD, FSSO, FACS
Dean, Carle Illinois College of Medicine and
Senior Vice President and Chief Academic Officer,
Carle Health



CI MED CLASS OF 2023

Members Chosen for Top-Ranked Residency Programs, Competitive Specialties

Members of Carle Illinois College of Medicine's (CI MED) Class of 2023 are breaking new ground as residents in some of the top-ranked medical programs in the country starting in July. Their individual success during this year's residency match process positions them to bring a physician innovator's mindset to the hospitals and patients they serve, from Boston to San Francisco. It's the second consecutive year that CI MED's graduates have been selected for coveted residency positions, poised to impact patient care and to begin changing the face and practice of medicine.

Match Day 2023 brought Carle Illinois' soon-to-

be MD graduates offers for residency positions in highly competitive medical specialties, including orthopedic surgery, neurosurgery, anesthesiology, radiation oncology, and diagnostic radiology. The college's second group of graduates will serve as residents at some of the top teaching hospitals in the U.S., including Northwestern in Chicago, Mayo Clinic, Massachusetts General Hospital (Harvard), and Stanford.

The placement of CI MED students in elite residency programs and competitive and diverse specialties is a testament to the quality of CI MED's training programs and the caliber of its students. "It is truly

exciting and remarkable to see the expansion of our incredible physician-innovators across the country, influencing great residency programs with their talents and unique skillsets," CI MED Dean Mark Cohen said. "In just the last year, I have witnessed impressive growth and recognition of Carle Illinois College of Medicine both nationally and globally as a new and exciting paradigm for medical education that many universities are currently trying to replicate. With the graduation of this wonderful class, and these truly impressive Match results, I am convinced that physician innovators will be even more highly sought after each year by top health systems and institutions around the world."



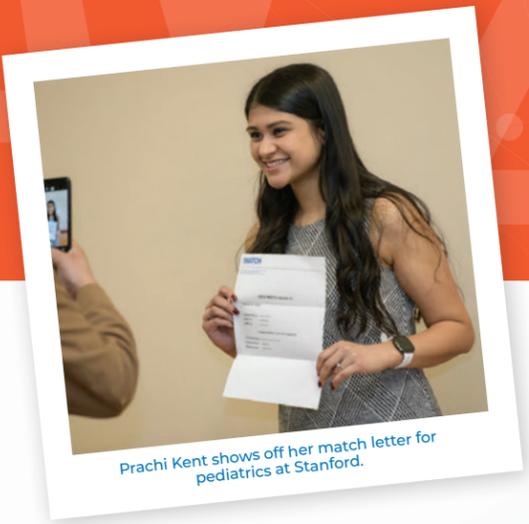
MATCH DAY 2023



Bailey MacInnis matched into orthopedic surgery at the Mayo Clinic.



Pavel Galchenko celebrates his match in internal medicine at Case Western Reserve.



Prachi Kent shows off her match letter for pediatrics at Stanford.



Jacques Lowe excitedly places his match photo on San Diego, where he matched in emergency medicine at Kaiser Permanente.

CI MED's female physician innovators continue to forge new paths as future leaders in medical specialties in which women are under-represented. Bailey MacInnis becomes the college's second female graduate to match into orthopedic surgery, following in the footsteps of Christina Mouwad (class of 2022). MacInnis was selected to serve as a resident at the prestigious Mayo Clinic, considered one of the top orthopedic programs in the country. "It's a huge accomplishment, and Christina was a really good mentor for me," MacInnis said. Three of her classmates -- Anton Christensen (Western Michigan University), Linus Lee (Georgetown), and Rahul Ramanathan (University of Pittsburgh Medical Center) -- will also specialize in orthopedic surgery. "We had a lot of great success. I think that's a testament to some of the mentorship we were able to get here. The principles in ortho apply a lot of engineering, and that attracts a lot of like-minded people," MacInnis said.

Lindsey Ades shed happy tears when she learned she matched into her chosen field of pediatrics at Massachusetts General Hospital in Boston – an affiliate of Harvard. "For me, it's always been peds, I knew it from the start. I'm beyond excited to match at one of the top programs in the country and to bring all I've learned at Carle Illinois with me," Ades said.

From early in his medical school career, Jacques Lowe developed a passion for emergency medicine. He's excited to carry that commitment forward at Kaiser Permanente in San Diego. "I know the reputation is that you're a 'jack of all trades,' but emergency medicine is really diversified, and I like the procedures you have to know and use. Plus, working in emergency medicine also supports vulnerable communities, and that was something that was very important to me," Lowe said. He hopes to follow up residency with a fellowship in wilderness medicine.

CI MED's 2023 Match Day also resulted in several students who will serve their residencies in Illinois, including several at Carle Foundation Hospital in Urbana. Among them is Bara Saadah, who led a

team to innovate a new anti-fatigue vest to help surgeons combat fatigue during long or physically demanding procedures (see page 9). Saadah will specialize psychiatry in the city he's called home throughout his academic career, from elementary school to medical school. "I love this city. I have a lot of faith in the hospital, I have a lot of faith in the community, and I want to continue to give back," Saadah said.

Residency match is a competitive process in which fourth-year medical students across the U.S. vie for a limited number of openings in specialties and hospitals offering advanced training under the supervision of experienced clinicians. A 'match' occurs when there's agreement between the medical student's preferred program and the residency program director's list of top applicants. Results are kept confidential until students receive official 'offer' letters on Match Day.

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DEAN MARK COHEN Becomes Founder Professor in Engineering

Mark Cohen, dean of the Carle Illinois College of Medicine and professor of bioengineering, has been recognized as a Founder Professor in Engineering. This distinction, which was awarded on February 24th, is an acknowledgment of Cohen's outstanding contributions to the field of engineering, particularly the partnership of engineering and health care.

"This professorship will allow me the opportunity to further advance my research in tissue engineering and cancer drug development that will translate into new therapies for patients in the future," said Cohen. "It is also an important conduit to exemplify the deep connection between The Grainger College of Engineering and the Carle Illinois College of Medicine, the world's first engineering-based medical school."

This professorship, which was first made possible by The Grainger Engineering Breakthroughs Initiative, is designed to support multi- and interdisciplinary study and promote innovative projects. Cohen's impressive career made him a standout candidate for this professorship. He has been a leading surgeon, a clinical and translational scientist, an entrepreneur, and an educator. His work has included the development of novel therapeutics with anolides for anticancer applications, nanoparticle drug delivery systems and more, all while contributing extensively to medical research.

Cohen's professional interests include improving clinical operations, telehealth, and ambulatory care – in short, giving patients the best possible care regardless of where they are. Cohen is also

passionate about using mixed reality and virtual reality to improve the student training experience and many different facets of endocrine surgery, including thyroid surgery and the surgical care of patients with melanoma. He is also a member of the Cancer Center at Illinois and the Beckman Institute for Advanced Science and Technology.

"I have been very fortunate to be able to participate in multidisciplinary research in bioengineering and medicine over the last twenty years, as well as opportunities to mentor and train incredibly talented engineering and medical students in their research and career development," said Cohen.

"I look forward to the great work we will do together in the future to advance both medicine and engineering."



Rashid Bashir, Dean of The Grainger College of Engineering, presents a medal to Dr. Mark Cohen, Founder Professor in Bioengineering.

CI MED ALUM AARON BROWN Recognized with Excellence Award at Stanford Medicine



Aaron Brown

Carle Illinois College of Medicine (CI MED) alumnus Dr. Aaron Brown has been honored for outstanding performance as a medical resident at Stanford Medicine. Brown, a 2022 graduate of CI MED, is a first-year resident in anesthesiology at Stanford. He was chosen by his peers as a 2022

recipient of the prestigious Julian Wolfsohn Award, recognizing residents who demonstrate outstanding performance in clinical judgment, leadership, teaching, and kindness.

Out of 65 interns in Stanford's Department of Medicine, Brown is one of only two selected to receive the Wolfsohn Award, an honor rarely granted to an anesthesiology intern. At Stanford, each year two residents per class are chosen as Wolfsohn Award recipients for exemplifying key values including humility, curiosity, empathy, honesty, responsibility, and kindness.

Brown was honored for those same qualities while completing his medical degree at CI MED. As a member of the college's inaugural class, Brown was the recipient of the James C. Leonard, MD, Gold-Headed Cane Award, the highest honor presented to a CI MED graduate. He also received the CI MED Humanism in Medicine award and high academic honors.

CI MED Students' Anti-fatigue Vest Keeps Surgeons Operating at Their Best

A novel invention by students at Carle Illinois College of Medicine (CI MED) is positioned to help surgeons combat fatigue during long or physically demanding procedures, ultimately helping them perform at their best.

It's a new vest that supports a surgeon's neck, tracks posture electronically, and provides feedback. It's designed to provide relief from postural fatigue after standing in a rigid position for hours at a time during surgery.



"With fewer work-related injuries, surgical professionals can hopefully take better care of themselves and their patients," Caywin Zhuang, CI MED student and co-lead on the project said.

Studies indicate that between 50 and 85 percent of practicing surgeons regularly experience musculoskeletal pain or discomfort in the back, neck, and shoulders. The strain puts them at increased risk for workplace injuries that can affect the surgeon's performance and, over time, lead to abbreviated careers. "It will be especially impactful for trainees in the OR to build good ergonomic habits early on, so that they can enjoy greater career longevity," Zhuang explained.



Zhuang and project partner Bara Saadah were inspired to create an ergonomic vest after spending time in clinic as medical students. "We identified this as a real problem among surgeons and wanted to innovate a solution," Saadah said.

Now, their solution helps surgeons take control of their own health, combining both monitoring functions and supportive features in one product.

The vest is made of soft, flexible fabric with a special elastic strap that supports the surgeon's neck — one of the areas most affected by postural fatigue. By electronically tracking the surgeon's neck and shoulder positions, the vest can objectively measure posture and prompt the surgeon to change position when their posture becomes unhealthy. Periodic changes in position, called 'micro-breaks,' are among the best methods of combating fatigue, so the new system includes a vibrating 'reminder' function that signals the surgeon when it's time to take a break and stretch out their muscles.

Surgical specialists who perform very long surgeries, such as neurosurgery, may benefit from the new tool. The vest is not only tailored for the surgeon's comfort but also for the unique operating room environment. "For instance, it is easily worn on top of existing scrubs/caps and within the surgical gown" Zhuang said. The vest is also compatible with the sterile environment required in an operating room.

The team plans to expand on their current prototype — developed in collaboration with Illinois Bioengineering students — to include more interactive user controls and an accompanying app that allow surgeons to track their own posture over the course of a surgery and to customize the alert features to meet their individual preferences.

The surgeon posture correction and measuring device is one of the Capstone Innovations proposed by the future physician innovators in Carle Illinois' Class of 2023. M.B.A. candidate Vaishnavi Ganesh is assisting with the business plan for this project. Bioengineering students Victoria Kindratenko, Clara Lynk, and Noah Chiou, along with Drashti Sikligar and John Halaka (MEng) worked to develop a prototype.

In the final phase of Carle Illinois' engineering-based, innovation-oriented curriculum, fourth-year students research a problem identified during their clinical rotations, propose a solution, and then work with a cross-disciplinary team, including engineering students from The Grainger College of Engineering, to develop a new prototype or process that will potentially change the practice of medicine and improve patient outcomes. Capstone Innovations are supported by The Henry Dale and Betty Smith Family.





Physician Innovators' New Bedside Table Keeps Comfort, Safety Close at Hand

A new design by Carle Illinois College of Medicine students is set to make one of the most common pieces of hospital equipment more stable, flexible, and easier to use. It's the bedside table that holds everything from water cups to eyeglasses and lifesaving call buttons.

CI MED students have redesigned the common bedside table to improve patient care and the workspace for nurses and other medical professionals. The innovation could be a key component of the hospital room of the future, incorporating engineering principles to ensure greater stability, easier use, and better maneuverability.



"The current tables are difficult to maneuver. The legs get caught underneath the beds, the wheels trip over cords and bedside mats and are awkward to maneuver. We wanted to create a new table that would function better and create less maneuverability hassle for patients and providers," **Greg Payne**, a fourth-year medical student at CI MED, said.



Payne and his partner on the project, fourth-year medical student **Bailey MacInnis** credit Carle Health nurses and medical staff with inspiring the innovation. "Nurses and patients have been frustrated with the current designs on the market," Payne said.

MacInnis and Payne collaborated with doctors, nurses, and patient-experience staff at Carle Health to develop features that work better in a real-world setting. The new design has no legs to become entangled with the patient bed or with other equipment. It also uses hydraulics to easily adjust tabletop height upward and downward.

While the new design represents a leap toward the hospital room of the future, it also includes features that improve function in older hospital rooms that weren't originally designed for optimal maneuverability. The new table uses higher-clearance wheels that keep the table stable when rolling over cords and other small obstacles that are common in a hospital setting. The over-the-bed arm folds down flat when it's not in use to save space, and an integrated cup holder prevents spills when the table is moved.

Payne says the design will keep all necessary objects close at hand, with stability, safety, and convenience in mind. "Patients and providers will benefit from having a bedside table that doesn't get caught on objects in the hospital room. It will be one less hassle that providers have to worry about when caring for their patients."

The table prototype – produced by students in the University of Illinois Urbana-Champaign Department of Mechanical Science and Engineering – will undergo further improvement this spring to make it more attractive and to ensure its cost-effectiveness. "We believe there is a market for this product and with revision and proper testing, our product could be brought to market successfully," Payne said.

The redesigned overbed table is one of the Capstone Innovations proposed by the future physician innovators in Carle Illinois' Class of 2023. M.B.A. candidates Sean Bain and Natali Henry are assisting with the business plan for this project. Faculty advisors include Professors Mariana Kersh and Sameh Tawfick (Department of Mechanical Science and Engineering). Mechanical sciences and engineering students Thomas Chapman, Jacob Harris, Julian Herrera, Neil Kotadia, Justin Miner, Ishaan Murarka, and Mason Sotomayor worked to develop a prototype for the bedside table.

Health in 3D: New App Helps Parents Visualize Their Child's Heart Disorder

A new digital learning app developed by students at Carle Illinois College of Medicine leverages 3D images to help parents visualize their child's congenital heart condition, so they're better equipped to make important treatment decisions. It's a visual approach to flatten the learning curve for parents of children born with heart defects.

Congenital heart defects (CHDs) are structural abnormalities in the heart and are the most common type of birth defect in the US, affecting nearly 40,000 births each year. One in every four congenital heart defects is a critical health need, requiring parental consent for intervention, such as surgery to repair the problem. Preparing parents to make those decisions often falls on a cardiologist or a patient educator, and current research indicates that the information doesn't always stay with parents over time.



"The concept of having a hole between the chambers of the heart or an abnormality in cardiac anatomy can be hard for parents to grasp and remember, especially when they're learning from paper diagrams," Carle Illinois College of Medicine student **Lindsey Ades**

said. "We wanted to create something that parents can interact with, painting a realistic and easily understandable picture of their child's specific problem."



Ades and fellow physician innovator **Prachi Keni** worked with Illinois bioengineering students to design the new app using a 3D block diagram of the heart and realistic 3D images of the heart to demonstrate how common defects affect the heart's function. The initial development of the app includes 3D images of an atrial septal defect (ASD), a ventricular septal defect (VSD), and a patent ductus arteriosus (PDA). The images will be customizable to represent defects of different sizes. Images of other defects could be incorporated in future versions.

It's common for children to be born with multiple cardiac defects, so the app's settings can be adjusted to reflect these defects in combination. Future versions will include anatomical labels, defect descriptions, and arrows to demonstrate how the various defects affect blood flow.

Kenis says while the primary goal is more effective parental education, the app may also save time. "Typically, a cardiologist spends time each visit teaching parents about their child's CHD. We believe this app will allow parents to review and refer back to information about their child's specific diagnosis, ultimately decreasing the frequency of repetitive in-office explanations by the specialist," Keni said.

The app is designed to be compatible with most mobile devices, including smart phones and tablets. The cardiac education app is one of the Capstone Innovations proposed by the future physician innovators in Carle Illinois' Class of 2023. M.B.A. candidates Zach Erbe and Chris Webb are assisting with the business plan for this project. Faculty advisors include Professors Holly Golecki, Joe Bradley, Brad Sutton, and Javed Zaidi. Bioengineering students Kevin Beck, Neha Hebbar, Yunji Nam, Zach Cacini, and Alhindi Abdalmahmoud worked to develop a prototype.



CARLE ILLINOIS PROFESSOR WAWRZYNIEC DOBRUCKI

Named as Inaugural Neil and Carol Ruzic Faculty Scholar



Wawrzyniec Dobrucki

The Carle Illinois College of Medicine (CI MED) has named **Wawrzyniec Dobrucki** as the inaugural Neil and Carol Ruzic Faculty Scholar. Dobrucki is a Health Innovation Professor at CI MED and is also the first named professor for the medical school.

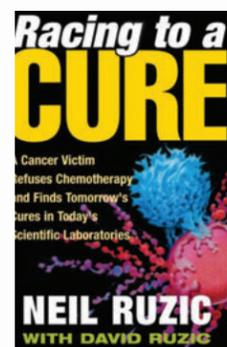
Professor Wawrzyniec Dobrucki, has expertise in preclinical molecular imaging, and his professional interests include developing novel targeted multimodal imaging strategies to noninvasively assess tissue microenvironments and various biological processes in vivo, including therapeutic neovascularization, atherosclerosis, neoplastic progression, and cancer response to experimental therapies.

The Neil and Carol Ruzic Carle Illinois College of Medicine Fund was established by **Carol Ruzic** and her son, **David Ruzic**, to honor the vision and spirit of their husband and father. The fund will be used to provide support to named faculty appointments for the Carle Illinois College of Medicine, with appointees holding expertise and academic abilities within the field of engineering medicine.

Along with funding, each recipient will also receive a copy of Neil Ruzic's book, "Racing to a Cure, a Cancer Memoir," detailing the search for new biotherapies in cancer treatment while encouraging others to research, question, and become self-advocates for their own treatments.

After being diagnosed with one of the most aggressive forms of cancer in Mantle Cell Lymphoma and given only about six months to live, his doctors wanted to prescribe chemotherapy, but Neil resisted because while it might give him a few more months of life, it had no chance of a cure.

"Being a scientific journalist, he figured there had to be people working on this across the country or world," said son David Ruzic. "So he threw himself into the research, being his own patient advocate and did discover people working on this and got into trials and other things, and while I'd love to say he became cancer free, he was certainly able to do some of these modern therapies and live another six years in really good quality of life."



In his book, "Racing to a Cure," Neil covers cancer research and curative techniques being developed in the laboratories and Universities around the world. He wrote it as a guide to inform cancer patients about vaccines and cancer cell targeting drugs being developed as alternatives to therapies that harm not only cancer cells, but healthy cells as well. Neil established the Ruzic Research Foundation to further develop such activities.

"He wanted to write about this journey and how other people could be patient advocates and could

look into research of the newest treatments and trials because the medical field is so fast traveling," said David Ruzic. "He didn't want to write the book to make money from the book, so he said, 'I will take all the proceeds from this book and devote it to medical research.' And funding this fellowship is what we did with all the profits of the book. That's where the money came from with the intent to help foster more medical research, because that is essential for curing all the things that may ail us in the future."

After an illustrious career and impactful life, Neil Ruzic passed away at the age of 73 in 2004.

"He was a really great man, very much an entrepreneur, did all sorts of different things, but always had a passion for writing and telling the world about science," David added.

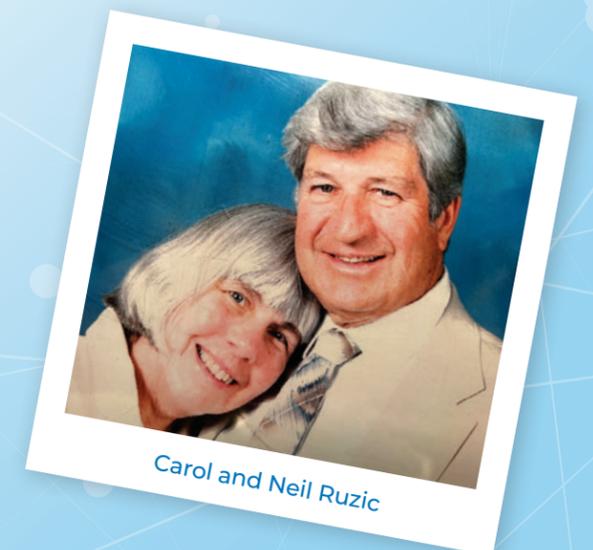
On his way to degrees in journalism and science from Northwestern University, Neil met his wife, Carol, while she was also pursuing a journalism degree from Northwestern. The couple were married for 54 years. An impressive person in her own right, Carol later became a school teacher after the couple moved to Beverly Shores, Indiana. Following the birth of their only son, David, Carol stopped teaching and moved to more civic efforts, including serving as the president of the town board, effectively acting as town major for eight years.

A professor at Illinois for 38 years, David is the director of the Illinois Plasma Institute and is also a named professor, the Abel Bliss Professor in nuclear, plasma and radiological engineering within The Grainger College of Engineering.

"I certainly know having that extra honor and funds is very helpful to me and it seems like a way to have your name remembered but do something useful to somebody or for a system," said David. "We wanted

to promote medical research, and I got involved in helping create this engineering-based college of medicine, and sort of in the spirit of the book my dad wrote – you want to look at the innovation, you want to look at the new things. So having the engineering-based College of Medicine and now supporting somebody that's working towards that, I think really fits the spirit of what my dad was trying to do in his book and in the later parts of his life."

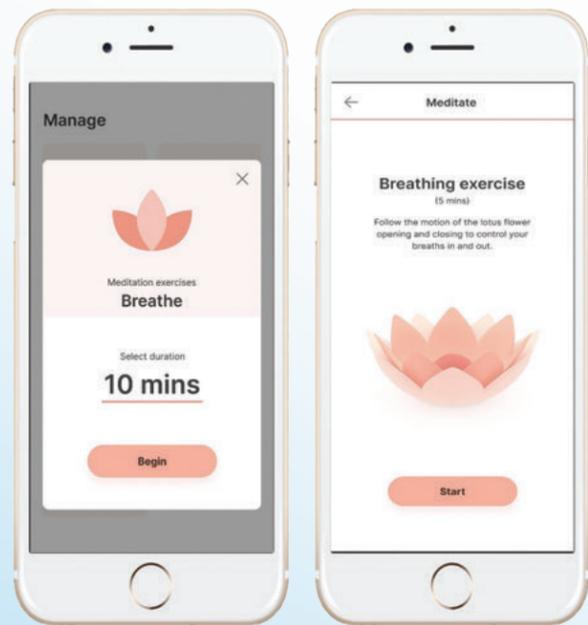
The inaugural faculty scholar at CI MED, Professor Dobrucki is an associate professor in The Grainger College of Engineering, Bioengineering Department, and is the associate head of graduate programs in Bioengineering. In addition, he holds a fulltime faculty position at the Beckman Institute for Advanced Science and Technology, where he serves as co-chair for the Integrative Imaging theme and directs the Experimental Molecular Imaging Laboratory (EMIL). He is also affiliated with the Carl R. Woese Institute for Genomic Biology and the Cancer Center at Illinois at the University of Illinois Urbana-Champaign, as well as the Medical University of Gdansk in Poland. Professor Dobrucki will hold the named professorship at CI MED for five years.



Carol and Neil Ruzic

TECH PLATFORM TO REVOLUTIONIZE PSYCHIATRIC CARE

Developed by CI MED Student and Harvard Team



A Carle Illinois College of Medicine (CI MED) student is the software architect behind an emergent technology platform that expands modern psychiatric care beyond the clinic or hospital. The system has potential to augment traditional visit-based clinical care, not just in psychiatry, but in many other medical specialties.



It was created by first-year medical student **Aditya Vaidyam** and a team at Harvard. It's called the LAMP Platform (Learn, Assess, Manage, Prevent), and it's designed to make psychiatric care possible whenever and wherever it's needed most.

"This kind of clinical model can really change the depth of care delivered to individual patients, but also allow a psychiatric care team to work with many more patients, too," Vaidyam said. "It's a health care delivery and resource allocation puzzle that we're trying to solve with this model, and the end goal is increased access to quality care. Better care for more people."

The LAMP Platform taps into patient data from off-the-shelf mobile and wearable technology (smart devices), mental health and fitness apps, and cognitive games like those built into the LAMP system itself. LAMP's machine-learning algorithms then analyze the data to detect changes in a patient's mental health status. The system detects patterns around emerging or recurring problems that can inform both population research and direct individual patient care.

LAMP was originally developed for neuropsychiatric research purposes under the direction of Dr. John Torous at Beth Israel Deaconess Medical Center/



Harvard, but its use has expanded to help augment clinical care. For example, the LAMP system can be in used a clinical setting to monitor or reduce symptoms in patients who are at risk for developing schizophrenia. "The first visit would start with the psychiatrist to discuss the treatment plan and objectives, like any normal outpatient psych visit. Then, the patient would spend some time with what our team calls the digital navigator, to educate the patient on using the mental health app, like our mindLAMP app," Vaidyam said. The incoming patient data may be monitored daily or weekly to alert the psychiatrist to any changes that signal reason for concern. Between the initial visit and a follow-up visit, all the data are being captured and analyzed in real time. The psychiatrist can then use the data to spark a follow-up discussion and to make more informed decisions about adjusting the patient's treatment plan.

Although LAMP was developed specifically for mental health, Vaidyam foresees broad application of the system's data analysis tools across other medical specialties and care settings. "It has the potential to help triage care needs; maybe urgent

care physicians or telehealth physicians use the data to lessen the load on ERs, or maybe primary care providers use the data to dynamically reschedule their patient load based on estimated patient health risks."

Vaidyam hopes to form collaborations with scientists at the University of Illinois Urbana-Champaign, Carle Health, CI MED, and private industry to leverage technology to use the LAMP platform to inform health decisions. "The doors are always open for any individuals and organizations to join!"

To learn more about Asynchronous Telemedicine and Digital Phenotyping, watch this presentation by Aditya Vaidyam as part of Carle Illinois College of Medicine's RISE lecture series.



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