GLOWING

VANDERBILT BIOPHOTONICS CENTER

VOL. I | ISS. V

Image by: Pratheepa K Rasiah, PhD

LIGHT READING

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BME GRADUATE RECRUITMENT

On March 20-22nd, the Biomedical Engineering department hosted their annual graduate student recruitment weekend. Over 60 prospective students visited Vanderbilt's campus to interview with professors, connect with current graduate students, and discover the facilities and resources available at Vanderbilt.

The planning for this special weekend starts long before the Spring semester for the Director of Graduate Recruitment, Dr. Yuankai 'Kenny' Tao, Associate Professor of Biomedical Engineering and VBC Member. As the Director of Graduate Recruitment. Dr. Tao spearheads the initial application reviews, coordinates faculty evaluations, and schedules and organizes the on-campus recruitment weekend. Dr. Tao emphasized "it's....rewarding to be able to track an application from December all the way to an in-person chat....during our on-campus event, and eventually to see them on campus as a graduate student."

One notable aspect of Vanderbilt's BME recruitment is the emphasis on student involvement. Graduate student coordinators work closely with Dr. Tao, other department leaders, and administrators to coordinate prospective student visits. Graduate student engagement is an essential aspect of the recruitment weekend, as this helps set the tone for our department/campus culture for prospective students and helps reaffirm connections between current students. Students participate in a variety of roles from Recruitment Chair, laboratory and campus tour guides, interview guides, and prospective student hosts. Dr. Tao says "it's a unique opportunity to get to know the graduate recruiting chairs really well over multiple months outside of the context of academics/research. And it's really amazing to watch all of the graduate student volunteers come together to make this thing happen every year."

VBC graduate students and faculty at lunch during BME graduate student recruitment weekend.

BME graduate student and VBC Member Vivian Krause said following her recruitment weekend she "left....feeling like I knew what it would be like to join the BME PhD program and the VBC. I felt strongly about the structure of the recruitment weekend and its success, between having a graduate student host and the amount of time I had to speak with graduate students and faculty in the labs I was interested in both casual and formal settings".

The VBC had many students volunteer for recruitment weekend with many serving as prospective student hosts. This position entails being the point person for visiting students including transporting them to recruitment events, being their contact person before/during the weekend, and answering questions about the department and life at Vanderbilt. When asked why she felt led to help with BME recruitment, current student Meagan McKee said "I had a great time during my own recruitment and wanted to pay it forward".

Following the recruitment weekend, offer letters are sent to prospective students and the VBC is looking forward to new students joining us next year!

By: Anna Funderburg

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VANDERBILT POSTDOCS GAIN NEW LEADERSHIP

Postdocs at Vanderbilt University have made significant contributions, securing over $1 billion in research funding through 3,100 external awards, and they play a vital role within the Vanderbilt community. There are more than 450 postdocs across various departments at Vanderbilt University and the Vanderbilt University Medical Center. In 1998, the Vanderbilt Postdoctoral Association (VPA) was established to provide support and foster a sense of community for postdocs, backed by the Office of Postdoctoral Affairs and led by the postdocs.

This year, Dr. Kanchana Devanathan became the interim president of the VPA. After joining Vanderbilt in 2023, Dr. Devanathan joined the VPA committee and became more involved in the Vanderbilt postdoc community. As a member of the VPA, she has helped organize career development events, Postdoc Appreciation week, and onboard new postdocs. Additionally, Dr. Devanathan and her fellow postdoc colleague, Dr. Mahima Sharma, attended the National Postdoctoral Association (NPA) Annual Conference in Boston, MA, this year. Devanathan represented the VPA at the national level and Sharma helped organize the conference. The NPA Annual Conference is the largest national conference and networking event dedicated to the postdoctoral community, allowing attendees to network and enhance their professional development and leadership skills. Devanathan's tenure as president has taught her to feel more confident and bold as she represents the large organization.

As a second-year postdoc, Devanathan has learned valuable skills beyond her research, such as effective mentorship, juggling multiple projects, and working better as a team. Her experience as president has also opened her up to more opportunities within academia, as she is now interested in future positions in higher education administration.

The VPA is currently recruiting postdocs to join the executive board, with elections coming up next month. Devanathan encourages postdocs to get involved, as it provides a unique opportunity to network, collaborate, and develop new skills beyond research.

Annie Evans (Office of Postdoctoral Affairs), Kanchana Devanathan (President of the Postdoctoral Association), Mahima Sharma (NPA Organizing Committee), Janani Varadarajan (Office of Biomedical Research Education and Training)

By: Alex Cousart

CONGRATS ZEKE

Ezekiel (Zeke) Haugen, a fifth year PhD candidate, was a recipient of this year's Provost's Pathbreaking Discovery Award. He was awarded $2500 in recognition as a doctoral student that has shown academic excellence in patents, awards, and publications on the national or international level.

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ALUMNI SPOTLIGHT

The Vanderbilt Biophotonics Center (VBC) is a place that many of our readers have called home at some point in their careers, either as a graduate student or a postdoctoral fellow. However, in the late '90s, there were only two newly minted Ph.D.s here: Dr. E. Duco Jansen and Dr. Anita Mahadevan-Jansen. They were some of the only people in the country conducting biomedical optics research at the time, which led Dr. Stephen Uhlhorn to study at Vanderbilt University and become the first doctoral candidate to graduate from the VBC.

Stephen earned his master's degree at the University of Miami with a focus on biomedical optics, so when he learned about the new research starting at Vanderbilt, he knew this was where he wanted to conduct his doctoral work. Working under Dr. Jansen, his dissertation focused around laser ablation of soft tissue for surgical applications using the Free Electron Laser (FEL) within the newly opened surgical suite. The FEL, which was located on the first floor, had a beam directed to the fourth floor then routed into several operating rooms for studies. Stephen was the graduate student directing the laser to the operating suites. During this project, he worked with Dr. Hans Pratisto, a postdoctoral fellow in Dr. Jansen's lab, from whom he learned an incredible amount.

After defending his dissertation, Stephen returned to the University of Miami, where he worked as a postdoctoral fellow at the Bascom Palmer Eye Institute under Dr. Fabrice Manns. In this role, he studied optical coherence tomography (OCT) and developed a system that increased the imaging depth five-fold from 2 mm to 10 mm, which was a significant improvement at that time. Stephen stayed at the University of Miami and became a research assistant professor before deciding to leave academia. Around this time, his family relocated to Colorado, where he worked as a freelance engineer, picking up various laser and optics development jobs before starting his own company, 6-D Laser, LLC.

6-D Laser manufactures industrial laser machining tools which integrate 3D imaging for process control to ensure tight tolerances for 5-axis machining. When asked why he switched from biomedical engineering to manufacturing, Stephen said it was not as dramatic a change as one might expect. It also taught him a fundamental lesson about his doctoral education despite coming nearly 15 years later. He said, like many other doctoral graduates, his professional work was never focused on the specific topic of his graduate research. Many people tend to view that disconnect between their research and their future work disappointing, but after several jobs, Stephen found that laser ablation is particularly important for manufacturing. He had many transferable skills such as understanding the principles necessary to machine ceramics with a laser, which are like those used in ablating tissue, making him very well qualified for implementing this product. He also uses many of the skills related to his OCT development work from his postgraduate years to ensure the manufactured products have micron-scale accuracy.

The advice Stephen likes to give to graduate students is that "you never know where your life or career will take you. It is best to learn as much s you can, about as many things as you can, when you have the chance." He wants to impart to current and recent graduate students that you might not see the purpose of your research for your professional life specifically, but it might pop up again, even far down the road, in an application you did not expect. So don't be discouraged because you don't use your dissertation at your first job. Just know that one day you might be better positioned than others to tackle a problem because of what you learned at this stage in your career.

By: Parker Willmon

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VBC SPOTLIGHT

Anupam Kumar, PhD

By: Anna Funderburg

On March 11, 2025, Anupam Kumar successfully defended his PhD dissertation, "Taking fNIRS Home: Enabling Cognitive Biomarker Discovery for ADHD using Naturalistic Neuroimaging". Dr. Kumar has spent his time at Vanderbilt, under the advisement of Dr. Audrey Bowden, with the goal of designing technologies to enable neuroimaging outside of the laboratory environment.

His dissertation aimed to 1) develop a low-cost and comfortable fNIRS (functional near-infrared spectroscopy) headband to enable ADHD screening and 2) develop an augment reality enabled app for neuroimaging headband alignment. These advancements in neuroimaging technology simplifies the data collection process without the need for experts or highly trained users. This enables higher neuroimaging throughput that commercially available systems cannot yet achieve. Anupam's work has been summarized in an article in medRxiv titled "NIRDuino: A modular, Bluetooth-enabled, Android-configurable fNIRS system with dual-intensity mode built on Arduino".

Following the completion of is PhD, Anupam will be working at the Wond'ry at Vanderbilt University to continue developing ground-breaking neurotechnologies through research, consulting, and technology commercialization.

ACS Graduate Student Chapter,

Vanderbilt University

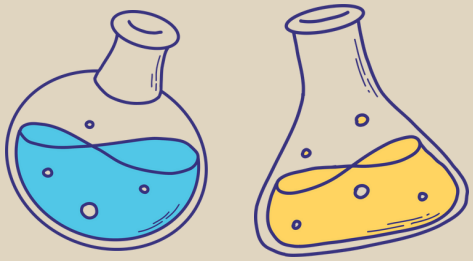
The establishment of an ACS (American Chemical Society) Graduate Student Chapter is being spearheaded by VBC member Darby Heffer (Locke lab) and Maureen Fieldhouse (Walker lab).

The chapter will focus on professional development, career exploration, and community involvement.

The chapter is currently speakers and welcoming new graduate student members, so we invite all those interested to join us! Reach out to Darby at darby.c.heffer@vanderbilt.edu if you are interested.

ACS Chemistry for Life®

Join us at Fluids Lab!



Join us in celebrating the VBC community at Fluids Lab! We gather every other week after work to socialize, enjoy some food, and cheer on the Vandy Boys during their games! To help support Fluids Lab supplies, please contact our social chair, Jet Rostykus, at jet.m.rostykus@Vanderbilt.edu.

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RECENT PUBLICATIONS, PRESENTATIONS, & AWARDS

Publications

- *NIRDuino: A modular, Bluetooth-enabled, Android-configurable fNIRS system with dual-intensity mode built on Arduino* (pre-print)
  - Anupam Kumar, Seth Crawford, Tiffany-Chau Le, Alec Walter, Duco Jansen, Audrey Bowden
- *Epithelial outgrowth through mesenchymal rings drives lung alveologenesis*
  - Nicholas Negretti, John Kozub, Anita Mahadevan-Jansen, Bryan Millis, Jennifer Sucre

Presentations

New Approaches in Endocrine Surgery: Fluorescence, Non-Surgical Ablation & More

- "Multi-center RCT results of probe NIRAF", Carmen Solórzano
- "Parathyroid Gland Identification in Neck Surgeries Using Augmented Reality Glasses", Parker Willmon
- "Physics of ablation", E, Duco Jansen
- "Polarized reflectance for intraoperative nerve imaging", Justin Baba

Society for Reproductive Investigation (SRI) Annual Meeting 2025

- "Ex-vivo 3D imaging of cervix reveals differential vascular patterns during cervical remodeling in mouse models of term and preterm birth", Pratheepa Rasiah
- "In vivo Raman spectral analysis of cervical remodeling in pregnant mice", Rafay Ahmed
- "Investigating Cervical Tissue Dynamics during Mouse Pregnancy with Multi-Modal Imaging", Kanchana Devanathan and Joseph Afreh

PittCon Conference

- "Analysis of Vaginal Fluid using Raman Spectroscopy", Kate Goncalves

2nd Annual Race and Research Fair at Vanderbilt University

- "Addressing Racial Disparities in Women's Health: Detection of Biomolecules in Vaginal Fluid using Surface Enhanced Raman Spectroscopy", Viannely Francisco

Vanderbilt Undergraduate Research Fair, Spring 2025

- "Analysis of Vaginal Fluid using Raman Spectroscopy", Kate Goncalves

Awards

- Kate Goncalves (Locke lab) won the James Manner Award of Excellence from the Society for Analytical Chemists of Pittsburg for an outstanding poster presentation at PittCon 2025.
- Viannely Francisco (Locke lab) won the Judge's Choice Award for her oral presentation at the 2nd Annual Race & Research Fair hosted by Vanderbilt University.
- Madison Walker (Locke lab) was one of the winners of the Chemistry Department's 3 Minute Thesis competition.

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ANNOUNCEMENTS

Checkout Dr. Audrey Bowden's feature in Vanderbilt Research News and a highlight of Dr. Jennifer Sucre's and Dr. Bryan Millis's work in VUMC News

UPCOMING EVENTS

Spring VBC Seminar Series:
May 6: Rongguang (Ron) Liang
May 27: Vanderbilt Internship in Biophotonics for Emerging Scholars (VIBES) 2025 begins