RAVI PRAKASH

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EDUCATION

Duke University
Doctor of Philosophy in Mechanical Engineering and Materials Science — *2022 - Present*
Master of Science in Mechanical Engineering and Materials Science — *2020 - 2021*

National Institute of Technology Warangal — *2015 - 2019*
Bachelor of Technology in Mechanical Engineering

PUBLICATION

Wang, V. Y., **Prakash, R.**, Oca, S. R., LoCicero, E. J., Codd, P. J., & Bridgeman, L. J. (2024). *Sampling-Based Model Predictive Control for Volumetric Ablation in Robotic Laser Surgery*. arXiv preprint arXiv:2410.03152.

Chen, D., **Prakash, R.**, Chen, Z., Dias, S., Wang, V., Bridgeman, L., & Oca, S. (2024). *Design and Evaluation of a Compliant Quasi Direct Drive End-effector for Safe Robotic Ultrasound Imaging*. arXiv preprint arXiv:2410.03086.

Prakash, R., Dupre, M. E., Østbye, T., & Xu, H. (2024). *Extracting Critical Information from Unstructured Clinicians' Notes Data to Identify Dementia Severity Using a Rule-Based Approach: Feasibility Study.* JMIR aging, 7(1), e57926.

Sperber, J., Zachem, TJ., **Prakash, R.**, Owolo, E., Yamamoto, K., Nguyen, AD., Hockenberry, H., Ross, WA., Herndon, JE., Codd, PJ., Goodwin, CR (2024). *A Blinded Study Using Laser Induced Endogenous Fluorescence Spectroscopy to Differentiate Exvivo Spine Tumor, Healthy Muscle, and Healthy Bone*. Scientific Reports, 14(1), 1921.

Prakash, R., Dupre, M.E., Ostbye, T. and Xu, H., 2023. *A Rule-Based Framework to Identify Severity of Dementia from Unstructured Electronic Health Record Data.* Alzheimer's & Dementia, 19, p.e075325.

Zachem, T.J., Chen, S.F., Venkatraman, V., Sykes, D.A., **Prakash, R.**, Spellicy, S., Suarez, A.D., Ross, W. and Codd, P.J. (2023). *Computer Vision for Increased Operative Efficiency via Identification of Instruments in the Neurosurgical Operating Room: A Proof-of-Concept Study.* arXiv preprint arXiv:2312.03001.

Ross, W., **Prakash, R.**, Ma, G., Eward, W., Mann, B., Codd, P. (2023). *Optimization of Laser Photoablation for Robotic Soft-Tissue Surgery*. Workshop on Data vs Model in Medical Robotics (DMMR), 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems, Detroit, Michigan, United States.

Ma, G., **Prakash, R.**, Mann, B.,Ross, W., Codd, P. (2023). *3D Laser-and-tissue Agnostic Data-driven Method for Robotic Laser Surgical Planning.* 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems, Detroit, Michigan, United States.

Prakash, R., Yamamoto, KK., Oca, SR., Ross, W., Codd, PJ. (2023, April 19-21).*Brain-Mimicking Phantom for Photoablation and Visualization.* International Symposium on Medical Robotics, Atlanta, Georgia, United States.

Chatterjee, A., Valaparla, R. K., **Prakash, R.**, Balasubramanian, K. (2019). *Comparative study of fluid flow and heat transfer in microchannels with uniformly varying cross-section.* In Proceedings of Emerging Trends in Mechanical Engineering (pp. 25–30). Warangal, Telangana.

PRESENTATIONS RECENT 5

Prakash, R., Ma, Guangshen., Wang, V., Schleupner, B., Mishra, A., Everitt, J., Mann, B., Zhong, P., Bridgeman, L., Draelos, M., Chen, B., Eward, W., Codd, P., (2024, October 25). *Towards Multimodal System For Non-contact Robotic Surgery* [Poster Presentation.] Duke Medical Robotics Symposium, Durham, United States.

Prakash, R., Dupre, M. E., Ostbye, T., Xu, H., (2023, July 16–20). *A Rule-Based Framework to Identify Severity of Dementia from Unstructured Electronic Health Record Data* [Poster Presentation]. Alzheimer's Association International Conference, Amsterdam, Netherlands.

Sperber J, Zachem TJ, **Prakash R**, Chamberlain G, Cummings T, Ross W, Codd, PJ, Goodwin CR. *Characterization of the TumorID Technology to Differentiate Tumor from Non-Tumor in Frozen Samples* [Oral Presentation]. Global Spine Congress; May 31-June 6, 2023; Prague, Czech Republic.

Ma, G.,**Prakash, R.**, Mann, B., Ross, W., Codd, P. J. (2023, March 13–14). *3D Laser-and-tissue Agnostic Data-driven Method for Cavity Prediction* [Poster Session]. Fitzpatrick Institute for Photonics Symposium, Durham, North Carolina, United States.

Ma, G., **Prakash, R.**, Mann, B., Ross,W., Codd, P. J. (2023, March 13–14). *3D Laser-and-tissue Agnostic Data-driven Method for Cavity Prediction* [Poster Presentation]. Fitzpatrick Institute for Photonics Symposium, Durham, North Carolina, United States.

AWARDS

Dean's Research Award for Master's Students, *Duke University*
Mechanical Engineering and Materials Science Graduate Scholarship, *Duke University*
Woo Center for Big Data and Precision Health Fellowship, *Duke University*
Duke Design Health Fellowship, *Duke University*
Laboratory and Curriculum Development Fellowship,*Mechanical Engineering and Materials Science, Duke University*
S.N.Bose Undergraduate Research Fellowship, *IUUSTF, Department of Science and Technology, Govt.of India*
Govt. of India Scholarship for Undergraduate Students, *National Institute of Technology Warangal*

GRANTS

Bass Connection Collaborative Teaching Grant	*06/2024*
Duke Colab Student Research Award	*03/2024*
Bass Connection Research Grant	*02/2024*
Research Travel Grant, Duke India Initiative	*03/2023*
Maclin Community Connections Grant, Office of Diversity, Equity, and Inclusion, Duke University	*03/2023*
DEI Microaward, Graduate and Professional Student Government, Duke University	*12/2022*

WORK EXPERIENCE

Graduate Researcher *01/2022 - Present*
Dr.Patrick Codd, Brain-Tool Lab, Duke University
- Developing closed-loop tumor identification and resection platform for neurosurgery with focus on sensor fusion and novel device development.

Graduate Researcher *07/2020 - 12/2021*
Dr.Xiaoyue Ni, Ni Lab, Duke University
- Designed and implemented multimodal epidermal flexible device for speech based psychological state identification and neuro-degenrative diseases

Woo Center Fellow *05/2021 - Present*
Dr.Hanzhang Xu, Duke University School of Nursing
- Investigating distinct pathways to predict the stage of ADRD at the time of diagnosis in underrepresented communities using Duke's EHR data

Teaching Assistant, Graduate Capstone Lab *01/2021 - 04/2022*
Prof.George Delagrammatikas,Duke University
- Facilitated setting up of Graduate Capstone lab (Garage Lab) and assisted in curriculum focused on open-source, hands-on experiential learning.Teaching assistant for Graduate Capstone course for Spring 2021,Fall 2021, and Spring 2022

Acting Co-Lead,India *05/2019 -08/2020*
Sustainable Living Lab
- Designed and implemented new technology ventures along with Intel's global AI curriculum for non-tech audience.
- Formulated and led "Futures+", a foresight driven community innovation program with entrepreneurial teams in Bhutan, India, Indonesia, and Singapore.

Undergraduate Thesis *08/2018 - 05/2019*
Prof.P.Bangaru Babu, National Institute of Technology Warangal
- Thesis: "Experimental Study of Ledinegg Instability". Designed and fabricated a leakproof low-cost open-loop mini channel test setup to study hydrodynamic instabilities.
- Enabled experimental heat transfer learning in resource-deprived areas.

S.N.Bose Fellow *06/2018 - 07/2018*
Prof.Debjyoti Banerjee ,Multi-Phase Flow and Heat Transfer Lab, Texas A&M University

Summer Research Intern *05/2017 - 07/2017*
Prof.Poh Seng Lee, Thermal Processing Lab, National University of Singapore

Summer Research Intern *05/2016 - 06/2016*
Dr.Atul Thakur, Mechatronics lab, IIT Patna

TECHNICAL SKILLS

Sensor Fusion, Multi-modal Deep Learning, Novel Acoustic Systems, High Power Laser Systems, Laser Optical System Design, Optical Coherence Tomography, Robotics, Signal Processing, Embedded Systems, Python, Ansys(Fluent), Abaqus, CAD Modelling,Open Innovation, Human Centric Design

PROFESSIONAL MEMBERSHIP

American Society of Mechanical Engineers
Institute of Electrical and Electronics Engineers

LEADERSHIP

President, Graduate Student Committee, Duke MEMS *01/2022 - 05/2023*
Secretariat Member, Graduate and Professional Student Government, Duke *08/2021 - 10/2022*
MEMS Representative,Engineering Graduate Student Committee *08/2021 - 05/2022*
Founder and Mentor, TEDxNITW *02/2017 - 05/2019*
Facilitator + Technical Lead, Innovation Garage (Incubation center cum makerspace) *03/2016 - 05/2019*