Akshay T. Rao

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Education

04/2021 | MSE in Biomedical Engineering (GPA: 4.0/4.0), University of Michigan (Ann Arbor)
04/2020 | BSE in Computer Engineering (GPA: 3.72/4.0), University of Michigan (Ann Arbor)

Research Experience

12/2019 – Present | Master's researcher | U-M Restorative Neuroengineering Group (Parag Patil, MD, PhD*)*

- Applying signal-processing and machine-learning methods to improve the efficacy of subthalamic deep brain stimulation (STN-DBS) surgeries for treating the motor symptoms of Parkinson's disease.
- Programming neuromodulation equipment used during surgery to record electrophysiological data from patients (LabVIEW).

09/2017 – 09/2019 | Undergraduate researcher | U-M Ultrasound Therapy Lab (Zhen Xu, PhD)

- Investigated the physics of histotripsy: non-invasive therapy that uses focused ultrasound to ablate tissue
- Analyzed acoustic data from ultrasound transducers/receivers to measure the energy efficiency of histotripsy therapies (MATLAB). Worked extensively with ultrasound transducer hardware, FPGA microcontrollers (Verilog, C), and networking equipment (Python).

09/2016 – 09/2017 | Undergraduate researcher | U-M Crowds+Machines Lab (Walter Lasecki, PhD)

- Developed and evaluated a phone application interface that allows visually impaired uses to take pictures of their surroundings and receive voice-to-text captions from remote workers.

Extracurricular Activities

06/2016 – 09/2020 | Co-founder | Perch Education at the University of Michigan

- Co-founded a student organization devoted to making STEM research opportunities more accessible for students at the University of Michigan.
- Led a team of student developers to create a web database of public information about academic labs and research opportunities for easy access.
- Developed peer-led courses to teach practical laboratory and research skills to undergraduate students with >100 total enrollment.

Community Service

05/2021 – Present | Volunteer | Beaumont Hospital (Royal Oak)

- **Inpatient Rehabilitation Unit**: Assisting nurses and staff with patient care and transport while maintaining social distancing and masking guidelines.

01/2018 – 06/2021 | Volunteer | University of Michigan Health System

- **Acute Rehabilitation Unit:** Assisted nurses and staff who provided care for patients recovering from spinal cord injuries. Helped paralyzed patients with daily tasks, like eating meals and moving around their room. Aided patients with rehabilitation exercises.
- **COVID response**: Helped prepare COVID test kits for campus-wide use.

09/2017 – 04/2019 | Volunteer | Shelter Association of Washtenaw County

- Helped run the weekly "ArtBreak studio", which offers opportunities for artistic expression for residents.
- Assisted staff with resume prep tutoring offered to shelter residents.

Publications

1. **[Article] Rao, A. T.**, Lu, C. W., Askari, A., Malaga, K. A., Chou, K. L., & Patil, P. G. (2021) Electrical biomarker predicts optimal subthalamic stimulation in Parkinson's disease. *Brain Stimulation.* IN REVIEW
2. **[Patent]** Patil P. G., **Rao A. T.**, Askari A., & Lu C. W. (2021) System and Method to Select Among Trajectories for Therapeutic Stimulation of a Target Volume Region within the Brain. *U.S. Patent Application No. 63/168,834, Filed 2021/03/31*
3. **[Article]** Duraivel, S., **Rao, A. T.**, Lu, C. W., Bentley, J. N., Stacey, W. C., Chestek, C. A., & Patil, P. G. (2020). Comparison of signal decomposition techniques for analysis of human cortical signals. *Journal of Neural Engineering.*
4. **[Article]** Lundt, J., Hall, T., **Rao, A. T.**, Fowlkes, J. B., Cain, C., Lee, F., & Xu, Z. (2018). Coalescence of residual histotripsy cavitation nuclei using low-gain regions of the therapy beam during electronic focal steering. *Physics in Medicine & Biology*.

Presentations and Abstracts

1. **[Poster] Rao, A. T.**, Lu, C. W., Askari, A., Malaga, K. A., Chou, K. L., & Patil, P. G. (2021) A Clinically Determined Biomarker to Select Optimal Trajectory in Subthalamic Deep Brain Stimulation. *North American Neuromodulation Society: Neural Interfaces Conference 2021*.
2. **[Conference Proceeding] Rao, A. T.**, Kaur, H., & Lasecki, W. S. (2018). Plexiglass: Multiplexing passive and active tasks for more efficient crowdsourcing. *Sixth AAAI Conference on Human Computation and Crowdsourcing*.

Awards and Honors

Academic

- 2017 – 2019 | Dean's List
- 2016 – 2017 | Michigan Competitive Scholarship
- 2015 | Regents Merit Scholarship

Grant competitions

- 2019 | MSU Burgess New Venture Challenge (2nd place)
- 2017 | National Student Startup Madness Semi-finalists (top 32 student startups in nation)