LOKESH BOOMINATHAN

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EDUCATION

Rice University - Ph.D. in Electrical and Computer Engineering *Expected Dec 2023*

Rice University - M.S. in Electrical and Computer Engineering *Aug 2021*

NIT Calicut - B.Tech. in Electronics and Communication Engineering *June 2015*

RESEARCH EXPERIENCE

Lab for the Algorithmic Brain (LAB) - Rice University, Houston, TX *2018 - Present*
Research Assistant, Advisor: Dr. Xaq Pitkow

- Building reinforcement learning models to study animal foraging. I collaborate with experimental neuroscientists from the Baylor College of Medicine to validate my models with actual mice foraging datasets.
- Developed a mathematical theory on energy-efficient brain inference using optimal control theory.

Computational Imaging Lab - Indian Institute of Technology Madras, India *2017 - 2018*
Research Assistant, Advisors: Dr. Kaushik Mitra and Dr. Shanti Bhattacharya

- Developed state-of-the-art deep learning algorithm for phase retrieval in Fourier Ptychographic Microscopy.
- Collaborated with a medical imaging startup, *Aindra*, to validate my algorithm for clinical datasets.

Video Analytics Lab (VAL) - Indian Institute of Science Bangalore, India *2015 - 2016*
Research Assistant, Advisor: Dr. Venkatesh Babu

- Developed state-of-the-art deep learning algorithm for estimating crowd density from dense crowd images.
- Used Bayesian optimization with deep learning to compensate for large in-plane rotations in photographs.

RELEVANT SKILLS

Programming	Python, MATLAB, Mathematica, LaTeX, Shell
Tools	PyTorch, NumPy, Matplotlib, Illustrator

RELEVANT PUBLICATIONS

- **Boominathan L**, Pitkow X., "Phase transitions in when feedback is useful" in press at *Advances in Neural Information Processing Systems* (**NeurIPS**), 2022. arXiv:2110.07873.
- **Boominathan L**, *et al.*, "Phase retrieval for Fourier Ptychography under varying amount of measurements" in *British Machine Vision Conference* (**BMVC Spotlight**), 2018.
- **Boominathan L**, Kruthiventi SS, Babu RV, "CrowdNet: A Deep Convolutional Network for Dense Crowd Counting" in *ACM Multimedia Conference* (**ACM MM**), 2016.
- **Boominathan L**, Srinivas S, Babu RV, "Compensating for Large In-Plane Rotations in Natural Images" in the *Indian Conference on Computer Vision, Graphics and Image Processing* (**ICVGIP**) 2016.

OTHER POSTER PRESENTATIONS

- **Boominathan L**, *et al.*, "Inference as control" in *Computational and Systems Neuroscience* (Cosyne), 2021.
- **Boominathan L**, Pitkow X, "Towards a Unified Theory of Information Processing in Resource-constrained Brain Circuits" in *GCC Theoretical and Computational Neuroscience Annual Conference*, 2020.
- **Boominathan L**, *et al.*, "Phase retrieval for Fourier Ptychography under varying amount of measurements" in *Computational Cameras and Displays CVPR workshop*, 2018.

CO-CURRICULAR ACTIVITIES

- International School for Advanced Studies - Presented talk in TEX2022 conference. *Summer 2022*
- Rice University - Teaching Assistant for the course Neural Computation. *Spring 2021, 22*
- Marine Biological Laboratory - Attended Methods in Computational Neuroscience course. *Summer 2021*