Akash Kumar **Maity**

+1 (713) 8159490 @ akashmaity@ymail.com
7315 Brompton Street, Houston, Texas- 77025

Skilled in Research, Computational Imaging, Computer Vision, Signal Processing, Signal Recovery, Data Science, Machine learning, R, Matlab, C/C++, Java. Strong research professional and a current PhD candidate at Rice University. Research Interest in areas of Computational Imaging and Biomedical Signal Processing.

Education

2018-present **Ph.D. candidate**, ECE, Rice University.
2016-2018 **Masters** in ECE, Rice University.
2012-2016 **Bachelors** in EE, Jadavpur University.

Research experience

Present – November 2016 | **Scalable Health Labs , Dr. Ashutosh Sabharwal and Dr. Ashok Veeraraghavan, Rice University**
Research Assistant.
- Research mainly focused on using signal processing, computational imaging and machine learning tools for scalable health applications.
- Developed a robust algorithm for detecting motion artifacts in PPG signals obtained from wearables.
- Developed a camera-based speckle contrast system for deep tissue blood perfusion imaging in high resolution
- Evaluated PulseCam-a superficial blood perfusion imaging system towards monitoring wound healing.

Computational Imaging | Wearables | Light Scattering | Optics | Algorithm Development | Hardware

August 2020 – May 2020 | **Computational Imaging Lab , Dr. Shree Nayar, Snap Inc.**
Summer Internship.
- Gained experience in camera calibration models, light reflection models and inverse rendering techniques.
- Experimented with deep learning architectures like CNNs and BiLSTM for signal recovery.
- Developed a motion-robust camera-based system for vital signs monitoring from human face videos.

Deep Learning | Long Short-term Memory (LSTM) | Camera Calibration | 3D Rendering | Healthcare

August 2019 – March 2019 | **Illumination and Imaging Laboratory , Dr. Srinivasa Narasimhan, Carnegie Mellon University**
Visiting Student.
- Learnt about different models for light propagation inside a scattering medium.
- Gained hands-on experience on building a hardware system consisting of a synchronized line-scanned camera and line scanning MEMS projector.
- Developed a Diffuse optical tomography (DOT) setup for reconstructing absorptive structures deep inside a scattering medium.

Light Scattering | Tomography | 3D Modeling | Camera | Algorithm Development

July 2015 – May 2015 | **Computational Photography Labs , Dr. Kaushik Mitra, Indian Institute of Technology, Madras**
Summer Intern Research Scholar.
- Collaborated with National Centre for Biological Science, NCBS, Bangalore towards 3-D Segmentation of Liver Tissue Cells.
- Gained experience about different software and techniques to analyze microscopic images.

Computer Vision | Image Segmentation | 3D Volume Reconstructin

Publications

High Resolution Deep Flow Imaging Using Convolution-based Speckle Contrast Tomography

Under review, Biomedical Optics Express

RobustPPG : Camera-Based Robust Heart Rate Monitoring Using Motion Cancellation
https://opg.optica.org/boe/fulltext
Biomedical Optics Express, 2022

High Resolution Diffuse Optical Tomography using Short Range Indirect Subsurface Imaging
https://ieeexplore.ieee.org/document/9105173
IEEE International Conference on Computational Photography (ICCP) 2020

PPGMotion : Model-Based Detection of Motion Artifacts in Photoplethysmography Signals
https://www.sciencedirect.com/science/article/abs/pii/S1746809422001549?dgcid=author
Biomedical Signal Processing and Control, Elsevier, 2022

Experimental integration of a spatial frequency domain spectroscopy and pulse cam system for quantifying changes in skin optical properties and vasculature among individuals with obesity
https://www.spiedigitallibrary.org/conference-proceedings-of-spie/11211/1121105
Photonics in Dermatology and Plastic Surgery 2020

Multifractal Detrended Fluctuation Analysis of alpha and theta EEG rhythms with musical stimuli
http://www.sciencedirect.com/science/article/pii/S0960077915002556
Chaos, Solitons and Fractals, Elsevier, 2015

Multifractal Detrended Fluctuation Analysis of the Music Induced EEG Signals
http://ieeexplore.ieee.org/document/7322880/
IEEE International Conference on Communications and Signal Processing, 2015

Software Skills

Programming C, C++, R, Matlab, Python, OpenCV, FIJI, CellProfiler, Inkscape

Poster Presentations

2019 **Seeing below the skin**, Sao Paulo School of Advanced Science in Modern topics in Bio-photonics, Sao Carlos, Brazil
2018 **ShapeCam : Robust extraction of PPG Shape Using a Camera**, Biomedical Engineering Society Annual Meeting, Atlanta
2017 **Estimation of Spatial Map of Pulse Transit Time with a Camera**, ECE Affiliate's Day, Rice University