

BASUDHA PAL

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EDUCATION

[Johns Hopkins University](#)

2022-Present

PhD, Electrical and Computer Engineering

Advisor: [Prof Rama Chellappa](#)

CGPA 4.0/4.0

[Manipal Academy of Higher Education](#)

2018-2022

BTech Electronics and Communication Engineering

Minor in Computational Intelligence

CGPA 9.13/10.00

HONORS AND AWARDS

2022 Johns Hopkins ECE Departmental Fellowship

2021 MITACS GRI Scholar

2018 Indian School Certificate Examination (ISC): 19th/85,000 candidates all over India

2016 Indian Certificate of Secondary Education Examination (ICSE): 11th/170,000 candidates all over India

PUBLICATIONS

1. Sharif Amit Kamran, Molly V. Lucas, Brendon Lutnick, Chaitanya Parmar, **Basudha Pal**, Asha Patel Shah, David Apfel, Steven Fakharzadeh, Llyod Miller, Stephen Yip, Kristopher Standish, Gabriela Oana Cula “PSO-NET: Development of an Automated Psoriasis Assessment System Using Attention-Based Interpretable Deep Neural Networks”, The 22nd IEEE International Symposium on Biomedical Imaging (**ISBI**), April 2025. (Submitted)

2. **Basudha Pal**, Arunkumar Kannan, Ram Prabhakar Kathirvel, Alice O’Toole, Rama Chellappa “[GAMMA-FACE: GAussian Mixture Models Amend Diffusion Models for Bias Mitigation in Face Images](#)”, The 18th European Conference on Computer Vision, (**ECCV**), Sep-Oct 2024.

3. **Basudha Pal**, Aniket Roy, Ram Prabhakar Kathirvel, Alice O’Toole, Rama Chellappa “DiversiNet: Mitigating Bias in Deep Classification Networks across Sensitive Attributes through Diffusion-Generated Data”, IEEE International Joint Conference on Biometrics, (**IJCB**) Special Session: Responsible AI for Biometrics, September 2024.

4. V. R. Bhat, **Basudha Pal**, H. Anitha, T. Ananthakrishna “[Localization of Magnetocardiographic sources for Myocardial Infarction cases using Deterministic and Bayesian Approaches](#)”, Scientific Reports, Nature, Dec 2022.

5. **Basudha Pal**, V. R. Bhat, H. Anitha, “[The SIUQRD and Matern 5/2 GPR Models describing the Covid-19 Pandemic in India](#)”, The 4th IEEE International Conference on Electrical, Computer and Communication Technologies Sep, 2021.

AREAS OF INTEREST

Computer Vision for social good, Medical Signal and Image Processing, Machine and Deep Learning, Inverse Problems

EXPERIENCE

PhD student

Aug 2022 - Present

[Johns Hopkins University](#)

Baltimore, MD, USA

- **Bias Analysis in Computer Vision Applications:** Generated images added to original data help reduce bias in most downstream tasks. However, generative models can also amplify existing biases in images. Worked on mitigating bias in sensitive attributes for face generation using diffusion models, supported by the Office of the Director of National Intelligence (ODNI) and Intelligence Advanced Research Projects Activity (IARPA).

Data Science Intern (DSAI) Computer Vision Tech Squad

May 2024-Dec 2024

[Johnson and Johnson Innovative Medicine](#)

Boston, MA, USA

- **Automating Psoriasis (Pso) and Atopic Dermatitis (AD) clinical trials** Develop interpretable deep-learning tools for assessing Pso/AD to facilitate decentralized studies, easing patient burden and enhancing trial efficiency and diversity. Explored weakly supervised learning architectures to (i) classify Pso/AD severity

and (ii) predict the Eczema/Psoriasis Area Severity Index (EASI/PASI) score from home-taken mobile images. Results are further analyzed for improved explainability using data attribution algorithms.

- **Zero shot histology segmentation using foundation model embedding similarity** - Develop a tool to highlight similar histopathological tissue areas when a specific region is clicked. The backend uses a foundational model Dinov2 trained to match ground truth annotations from pathologists. Pathologist annotations of regions (eg. tumor or stroma) show high alignment with Dinov2's output, reducing manual annotation time.

Software Engineering Intern Aladdin Product Group Regulatory Technology
BlackRock Inc.

Jan 2022-Mar 2022
Gurgaon, India

- Coursework and introduction to the overall pipeline of software development, testing and release as a part of the Regulatory Technology team of the Aladdin Product Group.

MITACS Globalink Research Intern
École de technologie supérieure,

Jun 2021 - Sep 2021
Montreal, Canada

- **Deep Learning in Computer Assisted Radiology** Built a network to predict the Ejection Fraction of the heart from echocardiographic videos using semantic segmentation and spatio-temporal convolutions. The network was trained on the 'EchoNet' dataset from Stanford University. The Particle Filtering Algorithm was attempted to achieve the same objective for videos with an intervention device.

Undergraduate Research Assistant
Manipal Academy of Higher Education

Jan 2020 - Jun 2022
Karnataka, India

- **Localization of Magnetocardiographic sources for myocardial infarction cases:** Worked on the inverse problem of cardiac sources for noisy MCG signals using Tikhonov Regularization, Hierarchical Bayesian and a novel application Variational Bayesian Linear Regression models with non-stationary priors. Avoided the 'inverse crime' by using different models for forward and inverse problems in localizing cardio-magnetic sources.
- **The SIUQRD and Matern 5/2 GPR Models describing the Covid-19 Pandemic in India:** The SIUQRD model was used to study both waves of the Covid-19 pandemic in India by fitting Ordinary Differential Equations and estimating parameters. Future R-naught values and case numbers for a 14-day period were predicted using the Matern 5/2 Gaussian Process Regression model, showing satisfactory performance metrics.

SOFTWARE SKILLS

- **Programming Languages:** Python, MATLAB, Java
- **Developer Tools:** Git, Bitbucket, VSCode
- **Software:** PyTorch, MATLAB and Simulink, Scirun, ECGSim, LABVIEW, JIRA

HACKATHONS

- Coursera ShowYourSkills 2022(Second prize in the Research and Reports track).
- Innovation and Global Health Systems Hackathon, Digital Initiatives to Improve Type 1 Diabetes in collaboration with the Harvard School of Public Health and MIT Hacking Medicine, October 2021.
- Smart India Hackathon, January 2020 (First in South India zone).

RELEVANT COURSES

Signals and Systems	Manipal Academy of Higher Education, Fall 2019
Digital Signal Processing	Manipal Academy of Higher Education, Spring 2020
Introduction to Biomedical Engineering	University of New Brunswick, Spring 2021
Medical Imaging Systems	Johns Hopkins University Fall 2022
Machine Perception (Computer Vision)	Johns Hopkins University Fall 2022
Deep Learning	Johns Hopkins University Spring 2023
Machine Intelligence	Johns Hopkins University Spring 2023
Machine Learning	Johns Hopkins University Fall 2023

TEACHING EXPERIENCE

Machine Perception (Computer Vision) Johns Hopkins University Fall 2024

REVIEWING EXPERIENCE

IEEE TPAMI [2023], IEEE TIP [2024]