BASUDHA PAL

+1(781) 692-7606 ◇ Baltimore, MD, USA

Email ◇ Linkedin ◇ Google Scholar◇ Website

EDUCATION

Johns Hopkins University 2022 - 2026

PhD, Electrical and Computer Engineering

Advisor: Prof Rama Chellappa

Thesis: Towards Trustworthy Representation Learning: Understanding And Generative Refining Of Correlations In Deep Models

Manipal Academy of Higher Education 2018 - 2022

BTech Electronics and Communication Engineering

Minor in Computational Intelligence

CGPA 9.13/10.00

AREAS OF INTEREST

Computer Vision, Machine and Deep Learning, Medical Imaging, Foundation Models, Vision Language Modeling (VLM), VLM finetuning, Generative AI (Diffusion Models), Representation Learning, Data Attribution, Adversarial Attacks

HONORS AND AWARDS

2025 MICCAI NIH Grant Award

2024 Best poster award Women in Data Science and AI poster session, Johns Hopkins University

2022 Johns Hopkins ECE Departmental Fellowship

2021 MITACS GRI Scholar

REGULATORY SCIENCE & TRANSLATIONAL IMPACT

2026 Letter of Intent Accepted, FDA Drug Development Tool (DDT) Qualification Program, U.S. Food and Drug Administration (FDA). Project listed in the FDA DDT Qualification Program database: FDA DDT Project Page

SELECTED PUBLICATIONS

(Full list on Google Scholar)

1. Laura McDaniel†, **Basudha Pal**†, Crystal Szczesny, Yuxiang Guo, Ryan Roemmich, Peter Abadir, Rama Chellappa "The Gait Signature of Frailty: Transfer Learning based Deep Gait Models for Scalable Frailty Assessment", Under review, 2026.

2. **Basudha Pal**, Rama Chellappa "DiffInf: Influence-Guided Diffusion for Supervision Alignment in Facial Attribute Learning", Under review, 2026.

3. **Basudha Pal**, Sharif Amit Kamran, Molly V. Lucas, Brendon Lutnick, Chaitanya Parmar, Asha Patel Shah, David Apfel, Steven Fakharzadeh, Llyod Miller, Stephen Yip, Kristopher Standish, Gabriela Oana Cula "GRASP-PsoNet: Gradient-based Removal of Spurious Patterns for Psoriasis Severity Classification", **MICCAI**, Sept 2025.

4. **Basudha Pal**, Siyuan Huang, Rama Chellappa, "A Quantitative Evaluation of the Expressivity of BMI, Pose and Gender in Body Embeddings for Recognition and Identification", **IEEE IJCB**, Sept 2025 *(Oral Presentation).*

5. **Basudha Pal**, Rama Chellappa, Muhammad Umair, "Encoding of Demographic and Anatomical Information in Chest X-Ray-based Severe Left Ventricular Hypertrophy Classifiers" **Biomedicines**, Sept 2025.

6. 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", IEEE **ISBI**, April 2025 *(Oral Presentation).*

7. **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", **ECCV**, Sept 2024.

8. **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 **IJCB**, Sept 2024.

9. 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**, 2022.

† Denotes equal contribution

SELECTED CLINICAL CONFERENCES

1. Sharif A. Kamran, Brendon Lutnick, Chaitanya Parmar, **Basudha Pal**, Kevin Wilby, Asha Patel Shah, Steven Fakharzadeh, Lloyd Miller, Kristopher Standish, Gabriela Oana Cula *"Attention-Based Masking Artificial Intelligence Architecture for Remote Psoriasis Severity Assessment"*, **AAD Annual Meeting**, March 2026.

2. **Basudha Pal**, Muhammad Umair, *"Fragility of Deep Learning Models for Coronary Artery Disease Detection in Cardiac MRI: A First Look at Adversarial Vulnerability"*, **RSNA Annual Meeting**, Dec 2025.

3. **Basudha Pal**, Rama Chellappa, Muhammad Umair, *"How Much Demographic and Anatomical Information Do SLVH Classifiers Learn From Chest X-Rays?"*, **RSNA Annual Meeting**, Dec 2025.

4. **Basudha Pal**, Sharif Amit Kamran, Molly V. Lucas, Brendon Lutnick, Chaitanya Parmar, Asha Patel Shah, David Apfel, Steven Fakharzadeh, Llyod Miller, Kristopher Standish, Gabriela Oana Cula, *"AI-Enabled EASI Scoring using Remote Photography"*, **ESDR Annual Meeting [Journal of Investigative Dermatology]**, Sept 2025.

5. Molly V. Lucas, Sharif Amit Kamran, Brendon Lutnick, Chaitanya Parmar, **Basudha Pal**, Asha Patel Shah, David Apfel, Steven Fakharzadeh, Llyod Miller, Kristopher Standish, Gabriela Oana Cula *"Interpretable Deep Learning Framework for Automated EASI Scoring in Atopic Dermatitis Assessment"*, **EADV Congress Annual Meeting**, Sept 2025.

EXPERIENCE

Senior Data Scientist (Commercial DS Research Wing) May 2026 - Present
Johnson and Johnson Innovative Medicine *Titusville, NJ, USA*

- **Agentic AI & Commercial Optimization**: Architecting production-grade agentic AI systems for commercial healthcare workflows, integrating combinatorial optimization frameworks (e.g., Traveling Salesman Problem variants) for engagement planning and launch strategy under real-world constraints. Building Small Language Model-based agentic systems with structured reasoning along with guardrails and evaluation frameworks to enable HCC-compliant AI deployment in healthcare.

Data Science R&D (Computer Vision) Co-op May 2024 - Mar 2026
Johnson and Johnson Innovative Medicine *Boston, MA, USA*

- **Automating Psoriasis (Pso) and Atopic Dermatitis (AD) Clinical Trials:** Weakly supervised models to classify severity and predict Pso/AD scores from mobile images, with explainability via influence functions. Also extended to multimodal vision-language models for interpretable drug trials.

Doctoral student Aug 2022 - Mar 2026
Johns Hopkins University *Baltimore, MD, USA*

- **Fairness-Aware Representation Learning & Generative Modeling:** Explored how transformer-based foundation models encode sensitive attributes through hierarchical and temporal features. Leveraged diffusion latent clustering with GMMs to generate balanced augmentations mitigating disparities. Extended this representation-centric view by guiding diffusion latents with data attribution for controllable, out-of-distribution generation. Parallely supported efforts on medical image analysis projects primarily on chest X-rays, echo and cardiac MR to quantify structural and functional biomarkers, disentangle disease progression from demographic confounders, and evaluate adversarial robustness of clinical AI systems through mutual information and generative perturbation frameworks.

Software Engineering Intern Aladdin Product Group Regulatory Technology Jan 2022 - Mar 2022
BlackRock Inc. *Gurgaon, India*

- Introduction to the overall pipeline of software development, testing and release as a part of the Regulatory Technology team.

MITACS Globalink Research Intern Jun 2021 - Sep 2021
École de technologie supérieure *Montreal, Canada*

- **Deep Learning in Computer Assisted Radiology** Developed a model to estimate cardiac ejection fraction from echocardiographic videos using semantic segmentation, spatio-temporal convolutions, and particle filtering for device-assisted scans; later extended with SAM-based left ventricle segmentation for EF prediction.

Undergraduate Research Assistant Jan 2020 - Jun 2022
Manipal Academy of Higher Education *Karnataka, India*

- **Localization of Magnetocardiographic sources for myocardial infarction cases:** Investigated the inverse problem of cardiac sources in noisy MCG signals using Tikhonov Regularization, Hierarchical Bayesian, and a novel Variational Bayesian Linear Regression with non-stationary priors, avoiding the 'inverse crime' via distinct forward and inverse models.

SOFTWARE & TECHNICAL SKILLS

- **Programming Languages:** Python, MATLAB, Java
- **Frameworks & Libraries:** PyTorch, scikit-learn, NumPy, Pandas, SciPy, Matplotlib, Seaborn, ITK
- **Development & Collaboration:** Git, Bitbucket, VSCode, Domino Data Lab, JIRA
- **Simulation & Testing:** Simulink, Scirun, ECGSim, LabVIEW

RELEVANT COURSES

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 AND REVIEWING EXPERIENCE

TA for **Machine Perception (Computer Vision)** Johns Hopkins University Fall 2024 and 2025
Reviewed for: ICCV, MICCAI, IEEE FG, IEEE TBIOM, IEEE JBHI, IEEE TPAMI and IEEE TIP, Journal of the American Geriatrics Society

PROFESSIONAL SOCIETIES

IEEE Student Member, MICCAI Student Member, RSNA Member