

# Shyamal Dharia

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## EDUCATION

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**University of Winnipeg** Winnipeg, Canada  
*Masters in Applied Computer Science* 2022 – 2024

- GPA: 4.4/4.5—Graduated with Highest Distinction

**Gujarat Technological University** Surat, India  
*Bachelor of Engineering in Electronics & Communication* 2017 – 2021

- GPA: 7.9/10

## PUBLICATIONS

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### Preprints and Under Review Articles:

1. ***Differentiable Logic Gate Networks for Low-Latency EEG Classification on Edge Devices***  
S. Y. Dharia; S. D. Smith; C. E. Valderrama (***Manuscript under review***)

### Journal Publications:

1. ***Exploring the Interaction of APOE- $\epsilon$ 4 and PICALM rs3851179 With Dynamic Functional Connectivity in Healthy Middle-Aged Adults at Risk for Alzheimer's Disease***  
S. Y. Dharia; C. E. Valderrama; Q. Liu; S. D. Smith  
*IOP Journal of Neural Engineering*, 2026  
<https://doi.org/10.1088/1741-2552/ae4926>
2. ***A Novel Approach for the Early Identification of Genetic Risk Factors for Alzheimer's Disease Using EEG and Psychometric Data***  
S. Y. Dharia; Q. Liu; S. D. Smith; C. E. Valderrama  
*IEEE Journal of Biomedical and Health Informatics (JBHI)*, 2025  
<https://doi.org/10.1109/JBHI.2025.3639217>
3. ***Fractal Dimension of Resting-State EEG as a Biomarker for Autonomous Sensory Meridian Response (ASMR) — (Oral Presentation at BHI 25; 9.2%)***  
S. Y. Dharia; C. E. Valderrama; Q. Liu; B. K. Fredborg; A. S. Desroches; S. D. Smith  
*IEEE Journal of Biomedical and Health Informatics (JBHI)*, 2025  
<https://doi.org/10.1109/JBHI.2025.3612301>
4. ***Dual-Transformer Cross-Attention Framework for Alzheimer's Disease Detection via dPTE-Guided EEG Channel Selection and Multi-Modal Integration***  
S. Y. Dharia; Q. Liu; S. D. Smith; C. E. Valderrama  
*Biomedical Signal Processing and Control*, 2025  
<https://doi.org/10.1016/j.bspc.2025.108390>
5. ***Bipartite Graph Adversarial Network for Subject-Independent Emotion Recognition***  
M. Niaki; S. Y. Dharia; Y. Chen; C. E. Valderrama  
*IEEE Journal of Biomedical and Health Informatics (JBHI)*, 2025  
<https://doi.org/10.1109/JBHI.2025.3570187>

### Conference Publications:

1. ***Using Machine Learning to Model EEG-Derived Brain Activity During Emotion Regulation***  
M. Hojjati; S. Y. Dharia; S. G. Camorlinga; S. D. Smith; A. S. Desroches; B. D. Brenneman  
Proceedings of the 46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Copenhagen, Denmark, 2024  
<https://doi.org/10.1109/EMBC58623.2025.11253722>
2. ***CNN-Based Chagas Disease Detection with 12-lead ECG***
3. S. Y. Dharia; M. Hojjati; S. Rahman; M. M. T. Nur; C. E. Valderrama  
Computing in Cardiology Conference (CinC) 2025 — PhysioNet Challenge  
[\[Link\]](#)
4. ***Dataset-Independent EEG Channel Selection for Emotion Recognition***

S. Y. Dharia; S. G. Camorlinga; C. E. Valderrama; M. Hojjati  
Proceedings of the 46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Orlando, FL, USA, 2024  
<https://doi.org/10.1109/EMBC53108.2024.10782444>

5. **Leveraging Machine Learning and Threshold-Free Cluster Enhancement to Unravel Perception of Emotion and Implied Movement**

S. Y. Dharia; M. Hojjati; S. G. Camorlinga; S. D. Smith; A. S. Desroches  
IEEE EMBS International Conference on Biomedical and Health Informatics (BHI), Houston, TX, USA, 2024  
<https://doi.org/10.1109/BHI62660.2024.10913664>

6. **Multimodal Deep Learning Model for Subject-Independent EEG-Based Emotion Recognition**

S. Y. Dharia; C. E. Valderrama; S. G. Camorlinga  
IEEE Canadian Conference on Electrical and Computer Engineering (CCECE), Regina, SK, Canada, 2023  
<https://doi.org/10.1109/CCECE58730.2023.10289007>

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## RESEARCH EXPERIENCE

**University of Winnipeg** Winnipeg, Canada  
*Senior Research Assistant* 2025 – Present

- Conduct machine learning and statistical analysis on multimodal neuroimaging data (EEG, fMRI, sMRI) to study biomarkers of Alzheimer's Disease, ASMR, and other neurological conditions.
- Published two peer-reviewed papers in leading journals/conferences, contributing to the fields of biomedical signal processing and computational neuroscience.

**Misericordia Health Center** Winnipeg, Canada  
*Mitacs Accelerate Intern* May 2024 – Dec 2024

- Developed an EEG data collection pipeline using PsychoPy with custom experiment integration, enabling two successful EEG-based emotion regulation studies with 60+ participants using wireless OpenBCI devices.
- Designed and trained machine learning models for emotion recognition and intensity prediction, leading to two conference publications.

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## TECHNICAL SKILLS

**Programming Languages:** Python (PyTorch, scikit-learn, NumPy, pandas) and C++ (CUDA)

**Signal Processing & Neuroimaging:** MNE-Python, Nilearn, SciPy, fMRIPrep

**Software & Development:** Linux/Windows, Git, Docker, ROS (Robot Operating System)

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## AWARDS

- 2025 - Graduate Student of Highest Distinction
- 2024 - EMBC NextGen Scholar

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## LEADERSHIP EXPERIENCE

**University of Winnipeg** Winnipeg, Canada  
*CinC Physionet 2025* 2025

- Led a team in the PhysioNet/Computing in Cardiology Challenge on Chagas disease detection from ECG signals with a CNN-based morphological features and lead-wise learning approach.

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## TEACHING ASSISTANT & ACADEMIC SERVICES

- **Associate Editor**—EMBC 2026
- **Peer Reviewer**—International Journal of Human-Computer Interaction (2026)
- **Peer Reviewer**—Public Library of Science (PLOS) *Aging and Health* (2026)
- **Peer Reviewer**—IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 26)
- **Peer Reviewer**—IEEE EMBS International Conference on Biomedical and Health Informatics (BHI 25)
- **TA**—GACS-7203 Pattern Recognition (Fall 2024 and 2023—*Dr. Camilo E. Valderrama*)
- **TA**—GACS-7206 Advance Machine Learning (Winter 2024—*Dr. Sheela Rammana*)

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## GRANT WRITING EXPERIENCE

**Mitacs Accelerate (2023) | \$60,000 (Awarded)**

- Co-drafted the initial research-industry proposal in collaboration with PIs for a successful partnership between the University of Winnipeg and Misericordia Health Center.

**NSERC Alliance (2026) | \$30,000 (Awarded)**

- Contributed to the drafting of a collaborative grant proposal involving University of Winnipeg and Interaxon.

**UWinnipeg Major Research Grant (2026) | \$7,500 (Awarded)**

- Assisted the PI in preparing the proposal to support direct research costs and laboratory operations.