

# Vaidehi Patel

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## EDUCATION

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**MS, Cognitive Neuroscience** · **GPA 3.56** · CUNY Graduate Center, New York *Aug2022–Feb2025*  
*Thesis: Vertex-Based CBF-fALFF Neurovascular Coupling in Moderate-to-Severe TBI*

**BE, Computer Engineering** · **GPA 8.19/10** · University of Mumbai, India *Aug2014–July2018*

## SKILLS

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**Neuroimaging:** FreeSurfer, FSL, fMRIPrep, ASLtbx, SPM12, CONN, vertex-wise & ROI analysis

**Programming:** Python (NumPy, SciPy, Pandas, Matplotlib, Nibabel), R (modeling, doParallel), MATLAB, Bash

**Statistics:** Non-parametric inference, locally weighted regression, FDR & cluster-permutation correction, effect size estimation, Fisher z-transformation

**Clinical:** Experiment designing, IRB compliance, neuropsychological assessment, QA-QC 130+ neuroimaging sessions, human subjects research methods

## EXPERIENCE

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**Research Assistant** · Clinical Neuroimaging Lab, CCNY, New York *May 2025–Present*

- Identified critical thresholding and outlier exclusion issues in lab-specific ASL preprocessing pipeline; reconfigured with TBI-appropriate motion scrubbing parameters from literature review.
- Optimized time with parallel processing scripts running multiple subjects through FreeSurfer, cutting a sequential 4 hours-per-subject pipeline to 4 subjects simultaneously, a 4x throughput increase.
- Automated workflows for NVC calculation, group CSV comparisons, FDR corrections, lesion masking, and publication-ready visualizations using Python libraries across five scales (whole-brain, hemisphere-level, Yeo-7 networks, DKT- 68 parcellations, neighborhood vertex-wise).
- Prepared knowledge transfer documentation enabling junior lab members to independently replicate processes.
- First-author manuscript in preparation.

**Graduate Researcher** · Clinical Neuroimaging Lab, CCNY, New York *Sept 2023–Jan 2025*

- Preprocessed multimodal MRI (ASL, rs-fMRI, T1) using ASLtbx, CONN, and processed 63 subjects (29 msTBI, 34 HC) across 121 imaging sessions on FreeSurfer.
- Built R-based NVC calculation and analysis pipeline adapting Baller et al. (2022), across two spatial scales with FDR correction, becoming one of the first vertex-based NVC analyses in TBI.
- MS thesis submitted Jan 2025; 150+ downloads across 10 countries via CUNY Academic Works.

**Operations & Systems Associate** · RCH Orthopaedics, Mumbai, India *March 2018–June 2022*

- Maintained sole non-vendor server access, trusted with confidential records spanning finance, personnel, and active litigation, in a 40+ person medical device manufacturing facility.
- Identified gaps in quality control logs and internal systems that were creating legal and operational exposure.
- Absorbed cross-functional operations (administration, HR) without title change during unexpected vacancy.
- Coordinated CEO's communications and stakeholder engagements, briefings, visits.

## PROJECT

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**AI-Augmented Customized Job Search System: A Multi-Agent Architecture**

*Skills: Prompt engineering, LLM workflow design, multi-agent architecture, Python*

- Developed an 8+ agent LLM system across 6 versions: agents include title discovery, ATS X-ray search, OPT compliance verification, skills fit scoring, duplicate job posting detection, resume and cover customization with hallucination guards, networking mapper, weekly self-refinement loop to generate list of reverse lookup job titles and skills.

## PUBLICATIONS & PRESENTATIONS

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- Patel, V., Yamin, M.A., & Kim, J.J.** (2025). Non-Invasive Study of Neurovascular Coupling in Traumatic Brain Injury. *Poster, RCMI 2025, New York, NY.*
- Patel, V. H.** (2025). Vertex-Based Analysis of Cerebral Blood Flow and Fractional Amplitude of Low-Frequency Fluctuations (CBF-fALFF) Coupling in Moderate-to-Severe Traumatic Brain Injury During the First Year Post-Injury. Master's thesis, CUNY Academic Works. [https://academicworks.cuny.edu/gc\\_etds/6138/](https://academicworks.cuny.edu/gc_etds/6138/)

## CERTIFICATIONS

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CITI Human Subjects Research (HSR) · Valid 2027    CITI Responsible Conduct of Research (RCR) · Valid 2028