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Jamini Bhagu

Summary of Qualifications

- Ph.D. candidate in Biomedical Engineering with advanced expertise in quantitative neuroimaging, ultra-high-field MRI (21.1T), and translational research.
- 5+ years of experience conducting preclinical MRI studies, developing image analysis pipelines, and extracting quantitative imaging biomarkers using Python and MATLAB
- Skilled in multimodal imaging techniques (^{23}Na MRI, diffusion MRI, MRS), large dataset management, and statistical analysis.
- Strong background in experimental design, protocol development, and cross-disciplinary collaboration with engineers, neuroscientists, and clinicians.
- Experienced mentor and educator, with a proven track record of guiding students in imaging techniques, data analysis, and scientific communication.
- Excellent publication record, conference presentations, and recognition with national and international research awards.

Core Competencies

- Quantitative MRI and Neuroimaging
- Image Analysis & Quantification
- Data Management & Processing Pipelines
- Image Reconstruction & Post-Processing
- Statistical Analysis: JMP, GraphPad Prism, R
- Experimental Design & Optimization
- Mentorship & Cross-functional Collaboration
- Scientific Communication and Grant Writing

Technical Skills

- MRI platforms: ParaVision, TopSpin, AMIRA, ITK-SNAP
- Programming: Python, MATLAB, LaTeX, HTML, UNIX
- Data analysis & statistics: JMP Pro, GraphPad Prism, R
- Other: Scientific & Grant writing, Microsoft Office

Education

Ph.D., Biomedical Engineering, Florida State University — Expected June 2025
Dissertation: “MR Evaluations of Biotherapeutics”

M.Sc., Biomedical Engineering (Cum Laude), Florida A&M University — August 2021
Thesis: “Probing the in-situ Conformation of Monoclonal Antibodies at Hydrophobic Interfaces Using NMR Spectroscopy”

B.Sc., Biological Sciences (Cum Laude), Florida Gulf Coast University — April 2019

Research Experience

Graduate Research Assistant / Laboratory Manager
National High Magnetic Field Laboratory, Florida State University — Jan 2020–Present

- Led preclinical MRI studies applying ^{23}Na MRI, diffusion-weighted imaging and MRS to evaluate stroke therapies.
- Developed and optimized image acquisition protocols, reconstruction pipelines and quantitative analysis workflows.
- Assisted external users with experiment design, data acquisition and analysis of ultra-high-field MRI data.
- Managed large multimodal datasets; ensured data quality and reproducibility.
- Collaborated with interdisciplinary teams (engineering, neuroscience, biology, chemistry) to design experiments and analyze imaging endpoints.
- Mentored undergraduate and graduate students in MRI acquisition, image processing, coding, data analysis and scientific presentation.
- Drafted experimental protocols in collaboration with Laboratory Animal Resources to meet compliance standards.

Representative Projects:

Treatment Efficacy in Acute Ischemia

- Cultured human mesenchymal stems cells for both treatment and enrichment of exosomes to evaluate therapeutic potential in rodent models
- Surgically induced transient ischemic stroke in rodents using a middle cerebral artery occlusion
- Monitored stroke evolution longitudinally using T_2W-FSE, diffusion-weighted EPI, MRS and ^{23}Na CSI
- Performed motor, cognitive and anxiety behavioral analysis in correlation with *in vivo* MRI/S
- Performed image reconstruction and data analysis using MATLAB and/or PYTHON
- Analyzed and segmented ischemic lesion volumes using AMIRA

Interfacial Studies of Monoclonal Antibodies

- Designed a custom NMR sample chamber allowing for the formation of an oil-solution interface
- Collaborated with FSU Hybridoma Lab to generate and purify monoclonal antibodies
- Designed, optimized and implemented a localized relaxation enhanced (RE) PRESS and Diffusion-weighted REPRESS sequences at 21.1T to acquire spectra from monoclonal antibody

Teaching Experience

Graduate & Laboratory Teaching Assistant
FAMU-FSU College of Engineering — Aug 2019–Dec 2022

- Supervised lab courses, trained students in experimental design, data analysis and scientific reporting.
- Facilitated team collaboration and technical communication among students from diverse backgrounds.
- Additional courses taught include Process Analysis & Design, Mass and Energy Balance I & II

Mentoring Experience

Mentored 8+ undergraduate and graduate students in MRI methods, image processing, data analysis, and scientific writing, including honors theses and research fellowships.

Awards & Honors

- Zuckerman STEM Leadership Postdoc Program (2025)
- Educational Stipend Award, ISMRM (2024, 2023)
- Best Poster Award, ISMRM Diffusion Study Group (2023)
- New Entrant Stipend, ISMRM (2022)

Professional Memberships

- International Society for Magnetic Resonance in Medicine (ISMRM)
- American Heart Association
- Biomedical Engineering Society

Publications

- **Bhagu, J.**, Grant, S.C., Mohammadigoushki, H., "Nuclear Magnetic Resonance Study of Monoclonal Antibodies Near an Oil-Water Interface", J Pharm Sci, 2025
- Liu, H., Chen, Y., Chien, P., Amouzandeh, G., Hou, D., Truong, E., Oyekunle, I., **Bhagu, J.**, Holder, S., Xiong, H., Gorkov, P., Rosenberg, J., Grant, S., Hu, Y., "Dendrite formation in solid-state batteries arising from lithium plating and electrolyte reduction", Nat. Mater., 2025
- Helsper, S., Yuan, X., Jeske, R., **Bhagu, J.**, Esmonde C., Duke, L., Sun, L., Li, Y., Grant, S.C., "Superparamagnetic Iron Oxide Nanoparticle-Labeled Extracellular Vesicles for Magnetic Resonance Imaging of Ischemic Stroke", ACS Applied Nano Materials, 2024
- Liu, C., Li Sun, L., Worden, H., Ene, J., Zeng, O., **Bhagu, J.**, Grant, S.C., Bao, X. Jung, S., Li, Y., "Profiling Biomanufactured Extracellular Vesicles of Human Forebrain Spheroids in a Vertical-Wheel Bioreactor"., J Extracell. Biol. 2024
- Mujtaba MG, Baliban T, **Bhagu J**, Herrera M. "A Laboratory Exercise Simulating Antibody and Antigen Reactions of the Ouchterlony Double Immunodiffusion Assay Using Inorganic Salts". J Microbiol Biol Educ. 2021

Conference Presentations

- **Bhagu, J**. and Grant, S.C., "Stem Cell-Derived Extracellular Vesicles Restore Sodium & Energetic Homeostasis in Ischemic Stroke as Quantified by Longitudinal MRI/S at 21.1 T", ISMRM Annual Meeting, Singapore, 04-08 May (2024)
- **Bhagu, J**. and Grant, S.C., "Recovery of Cerebral Ischemia by Application of Extracellular Vesicles from 3D Aggregated Adult Human Mesenchymal Stem Cells as Evaluated by High Field MRI at 21.1 T", 2023 Annual Meeting of the Biomedical Engineering Society, Seattle, Washington, United States, 11-14 October (2023)
- **Bhagu, J**. and Grant, S.C., "Therapeutic Efficacy of Extracellular Vesicles from 3D Aggregated Adult Human Mesenchymal Stem Cells for Ischemic Stroke Assessed by MRI at 21.1 T", 2023 ISMRM Annual Meeting, Toronto, Canada, 03-08 June (2023)
- Ogg, J.; Radovich, J.; Hartzog, J.; **Bhagu, J.**; Simmons, C.; Brea Guerrero, A.; Le, A., Moseley, S.; Clark, B.; Wilber, A.; Grant, S.C., "Longitudinal characterization of resting state fMRI, DTI, and action-place spatial learning in the TgF344-AD rat reveals impaired action-place learning emerging at 5-months", SFN Neuroscience 2022, Washington, District of Colombia, United States, 11-15 November (2022)

- **Bhagu, J**.; Grant, S.C.; Mohammadigoushki, H., "Probing Adsorption of Monoclonal Antibodies at Water-Oil Interfaces Via Spatially Resolved MRI Spectroscopy", 50th Southeastern Magnetic Resonance Conference, Tallahassee, Florida, United States, 4-6 November (2022)
- **Bhagu, J.**; Grant, S.C.; Mohammadigoushki, H., "Probing Adsorption of Monoclonal Antibodies at Water-Oil Interfaces Via Dynamic Surface Tensiometry and Spatially Resolved NMR Spectroscopy", 2022 AIChE Annual Meeting, Phoenix, Arizona, United States, 13-18 November (2022). Oral Presentation.
- **Bhagu, J.**; Grant, S.C. and Mohammadigoushki, H, "Volume and Frequency Selective NMR Spectroscopy of Monoclonal Antibodies at Water-Oil Interfaces", 2021 AIChE Annual Meeting, Boston, Massachusetts, United States, 5-19 November (2021). Oral Presentation.
- **Bhagu, J**.; Grant, S.C. and Mohammadigoushki, H., "Interfacial Studies of Monoclonal Antibodies Using Localized NMR Spectroscopy", 2021 Annual Meeting of the Biomedical Engineering Society, Orlando, Florida, United States, 6-9 October (2021).