Abhishek Raje

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Research Interests

Theoretical & Computational Neuroscience, Biophysics, Machine Learning

Education

Indian Institute of Technology Hyderabad Hyderabad, India
B.Tech in Biomedical Engineering, Minor in Mathematics 2022–2026
Advisor: Dr. Mohan Raghavan GPA: 9.04/10

Research Experience

Computational Neuroscience Laboratory, IIT Hyderabad Hyderabad, India
Undergraduate Researcher Sep 2025–May 2026
Generative Models for Human Movement – Advisor: Dr. Mohan Raghavan

- Processed optical motion-capture data from 16 subjects into a parametric representation for generative movement modeling.
- Adapted MotionGPT to the laboratory dataset, mitigating VQ-VAE reconstruction degradation by freezing the encoder and codebook during decoder fine-tuning.
- Constructed directed, weighted movement-token transition networks; observed consistent changes in algebraic connectivity, transitivity, and path length across training seeds.

Cancer Systems Biology Laboratory, IISc Bangalore Bangalore, India
PHCCO Summer Program Jun 2024–Dec 2024
Agent-Based Models for Angiogenesis in Cancer – Advisor: Dr. Mohit Jolly & Dr. Mohd Suhail Rizvi

- Implemented a C++ multiscale model of angiogenesis incorporating cytotoxic T-cells and anti-angiogenic drugs.
- Observed increased hypoxic tumor-cell populations under anti-angiogenic treatment in simulations, consistent with reported experimental findings.

Publications

GATI: Gait and Temporal Intelligence – A Large-Scale Multi-View Movement Dataset of Daily Activities in the Indian Context 2026
Y. M. Rangayyan*, A. K. Singh*, J. Chand*, S. Suvitti*, … **A. Raje**, K. S. Sridharan, M. Raghavan
Manuscript submitted to Gait & Posture (Elsevier)

Segment Activity Effect (SAE): A Novel Structural Reliability Metric for Markerless Human Pose Estimation Using a Large Multi-View Motion Capture Dataset 2026
Y. M. Rangayyan*, A. K. Singh*, J. Chand*, S. Suvitti*, … **A. Raje**, K. S. Sridharan, M. Raghavan
Manuscript submitted to Gait & Posture (Elsevier)

Awards

Institute Silver Medal 2026
Awarded for the highest cumulative GPA in Biomedical Engineering.

Academic Excellence Award 2026
Highest GPA in the Department of Biomedical Engineering across semesters 6 and 7.

Academic Excellence Award 2024
Highest GPA in the Department of Biomedical Engineering across semesters 2 and 3.

Industry Experience

Bheri Intelligence & Analytics Bangalore, India
Systems Engineer Jun 2026–Present

- Trained an LSTM-based time-series regression model for marker augmentation in a markerless motion-capture pipeline.
- Evaluated multi-camera 3D reconstruction and joint kinematics against optical motion-capture ground truth across functional movements.
- Conducted motion-recording experiments, camera calibration, and hardware/software validation for the markerless motion-capture system.

Selected Course Presentations

- Sparse MRI: The application of compressed sensing for rapid MR imaging
- Neural networks and physical systems with emergent collective computational abilities.
- MotionGPT: Human Motion as a Foreign Language

Teaching Experience

Teaching Assistant – Linear Systems & Signal Processing Fall 2025
Indian Institute of Technology Hyderabad Instructor: Dr. Neelavali Jaladhar

- Assisted with creating and grading assignments and conducting laboratory sessions.

Teaching Assistant – Analog & Integrated Circuits Fall 2024
Indian Institute of Technology Hyderabad Instructor: Dr. Kousik Sarathy Sridharan

- Assisted with creating and grading assignments and conducting laboratory sessions.

Relevant Coursework

Mathematics & Statistics: Wavelets & Applications, Probability & Random Processes, Mathematics Behind Machine Learning,
Computational Biology: Foundations of Natural Intelligence, Mathematical Modeling & Systems Biology, Bayesian Inference in Bioengineering
Biomedical Engineering: Linear Systems & Signal Processing, Medical Image Processing & Analysis, Neurotechnology & BCI Theory

Technical Skills

Methods: Statistical Modeling, Scientific Computing, Machine Learning, Signal Processing, Statistical Analysis
Tools & Frameworks: Python, SciPy, PyTorch, NumPy, Slurm, Git, LaTeX