

Ritik Raina

<http://rainarit.github.io>

<https://www.linkedin.com/in/ritikraina/>

Email : ritik.raina@stonybrook.edu

Mobile : +1-818-629-7022

EDUCATION

- **Stony Brook University** Stony Brook, NY
Ph.D. in Cognitive Science 08/2023 – 06/2027 (expected)
 - **Research directions:** Developing multimodal generative models, bridging human and machine visual perception.
- **University of California, San Diego** La Jolla, CA
B.S. in Cognitive Science 09/2018 – 06/2022

WORK EXPERIENCE

- **EyeCog Lab - Stony Brook University**, Graduate Student Researcher 08/2023 - Present
Advisor: Dr. Gregory Zelinsky
 - Leading a project utilizing diffusion models to synthesize latent object representations that reverse engineer human perceptual mechanisms, providing key insights into the computational basis of human object perception.
- **de Sa Lab - UC San Diego**, Pre-doctoral Researcher 02/2021 - 06/2023
Advisor: Dr. Virginia R. de Sa
 - Developed and integrated DivNormEI, a novel bio-inspired convolutional unit, on ResNet/VGG backbones for enhanced image classification and semantic segmentation.
 - Worked on building adaptive convolutional RNNs with dynamic halting to learn conditional compute allocation for zero-shot generalization on visual reasoning tasks like Pathfinder and Mazes.
 - Built a novel synthetic face image dataset with controlled variations to facial tone and morphology. Utilized this dataset to explore the racial biases exhibited by various state-of-the-art FER networks.
 - Papers summarizing our research accepted at NeurIPS, VSS, and COSYNE.
- **Intel Corporation**, Researcher 01/2022 - 06/2023
Mentors: Dr. Jamel Tayeb, Dr. Farnaz Abdollahi, Dr. Bijan Arbab, Dr. Virginia R. de Sa
 - Led a project to develop a novel edge-based multi-modal anomaly detection library on PC performance metrics aimed at enhancing metric prediction and user experience.
 - Built real-time facial sentiment analysis pipeline using 3D CNN and EfficientNet-B7 models on webcam video. Integrated predictions to enhance context for edge anomaly detection.
 - Designed few-shot Bi-LSTM architectures optimized for PC metric prediction from limited samples. Achieved >90% accuracy despite sparse training data.

SELECT PUBLICATIONS

- **Generating objects in peripheral vision using diffusion models**
Raina, R., Ahn, S. & Zelinsky, G.
[Vision Sciences Society \(VSS\) 2024](#)
- **Adaptive recurrent vision performs zero-shot computation scaling to unseen difficulty levels** [Paper]
Veerabadran, V., Ravishankar, S., Tang, Y., Raina, R., & de Sa, V. R.
[Neural Information Processing Systems \(NeurIPS\) 2023](#)
- **Cortically motivated recurrence enables visual task extrapolation** [Poster]
Veerabadran, V., Ravishankar, S., Tang, Y., Raina, R., & de Sa, V. R.
[Vision Sciences Society \(VSS\) 2023, Computational and Systems Neuroscience \(COSYNE\) 2023](#)

- **Analyzing Biases in AU Activation Estimation Toward Fairer Facial Expression Recognition** [Paper]
Monares, M., Tang, Y., **Raina, R.**, & de Sa, V.R.
ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2023
- **Exploring Biases in Facial Expression Analysis using Synthetic Faces** [Paper]
Raina, R., Monares, M., Xu, M., Fabi, S., Xu, X., Li, L., Sumerfield, W., Gan, J., & de Sa, V.R.
SyntheticData4ML Workshop (NeurIPS) 2022
- **Bio-inspired divisive normalization improves object recognition performance in ANNs** [Poster]
Veerabadran, V., **Raina, R.**, & de Sa, V. R.
Vision Sciences Society (VSS) 2022
- **Bio-inspired learnable divisive normalization for ANNs** [Paper] [Poster]
Veerabadran, V., **Raina, R.**, & de Sa, V. R.
SVRHM Workshop (NeurIPS) 2021

HONORS & AWARDS

- Financial grants awarded for supporting my research:
IBM-UCSD Research Collaboration (07/2020 - 04/2021)
UCSD-HDSI & Intel DCA Collaboration (01/2022 - 06/2023)
- Received 2024 Elsevier/Vision Research Travel Award

SKILLS

Languages Python (proficient), C++ (moderate), Julia, MATLAB, R, Bash, L^AT_EX
Frameworks PyTorch (proficient), TensorFlow / Keras (proficient), OpenAI Gym, CUDA, OpenCV, git
Technologies Mechanical Turk, AWS, Google Cloud

MENTORING

- **Stony Brook University**, Graduate Teaching Assistant
Survey in Cognition and Perception, Prof. Gregory Zelinsky **Spring 2024**
- **Stony Brook University**, Graduate Teaching Assistant
Memory, Prof. Suparna Rajaram **Fall 2023**

PROFESSIONAL SERVICE

- Reviewer for NeurIPS (2022, 2023)