SNEHAL SINGH TOMAR

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Research Interests

Computer Vision: Diffusion Models, Generative Adversarial Networks, Vision-Language Models, Self-Supervised Learning; Computer Graphics: Neural Rendering, Graph Neural Networks; Computational Photography; Robotics.

Education

Stony Brook University   New York, U.S.A
Ph.D. in Computer Science, Advisor: Prof. Klaus Mueller; GPA: 3.92/4.0   *January, 2024 -*

- Area of Focus: Efficient Diffusion Models for Image and Video Synthesis.

Indian Institute of Technology Madras   Chennai, India
M.S. (by Research) in EE, Advisor: Prof. A.N. Rajagopalan; CGPA: 9.0/10.0   *2020 - 2023*

- Area of Focus: Image Processing and Computer Vision

- Recipient of the **IIT Madras Institute Research Award** for excellence in research. (Given to the top 3 out of the 746 MS students at IIT Madras)

- Thesis:- Generative Self-Supervised Learning for Computer Vision: Applications & Causality Considerations

Manipal Institute of Technology   Manipal, India
B.Tech. in ECE, Minor in Signal Processing; CGPA: 8.42/10.0   *2016 - 2020*

- Activities: Member of the AI Robotics club, multiple research internships in robotics and control systems at IIT Delhi, research on applications of Fuzzy Logic

- Awarded the Institute Research Incentive and was a part of the team that secured world rank 9 at the Intelligent Ground Vehicle Competition (IGVC) 2018, Michigan, USA.

Experience

GenAI Research Intern   Santa Clara, CA, U.S.A
Advanced Graphics Program, AMD (Advanced Micro Devices) Inc.   *September, 2025 - December, 2025*

- Research focus: Physically-consistent and temporally stable autoregressive video generation.

Consultant-TCS Research Pre-doctoral Fellowship   New Delhi, India
Visual and Embodied AI group, Tata Consultancy Services   *June, 2023 - December, 2023*

- Engaged with Tata Consultancy Services on a retainership basis.

- Research focus: Efficient and physically consistent 3D Particle Mesh simulation using Graph Neural Networks.

- Worked on improving the state of the art in Garment Simulation and Animation for virtual try-on applications.

Publications

Under Review — **GriDiT: Resolution Factorization and Grid-Based Synthesis for Efficient Long Image Sequence Generation**, *Snehal Singh Tomar, Alexandros Graikos, Arjun Krishna, Dimitris Samaras, and Klaus Mueller*

TMLR 2024 — **PNeRV: A Polynomial Neural Representation for Videos**, *Sonam Gupta, Snehal Singh Tomar, Grigorios Chrysos, Sukhendu Das, and A.N. Rajagopalan*, Transactions on Machine Learning Research 2024. Paper

AAAI 2024 — **Latents2Semantics: Leveraging the Latent Space of Generative Models for Localized Style Manipulation of Face Images (Oral)**, *Snehal Singh Tomar and A.N. Rajagopalan*, Workshop on AI for Digital Human at AAAI 2024. Paper

AAAI 2023 — **Exploring the Effectiveness of Mask-Guided Feature Modulation as a Mechanism for Localized Style Editing of Real Images (Student Abstract)**, *Snehal Singh Tomar, Maitreya Suin, and A.N. Rajagopalan*, Proceedings of the AAAI Conference on Artificial Intelligence, 37(13). Paper

ECCV 2022	**Hybrid Transformer Based Feature Fusion for Self-Supervised Monocular Depth Estimation (Oral)**, *Snehal Singh Tomar*, Maitreya Suin*, and A.N. Rajagopalan*, Advances in Image Manipulation Workshop at the European Conference on Computer Vision (ECCV) 2022. Paper, Code

<div align="right">[*] Equal Contribution.</div>

CVPR 2022	**Latents2Segments: Disentangling the Latent Space of Generative Models for Semantic Segmentation of Face Images**, *Snehal Singh Tomar and A.N. Rajagopalan*, Workshop on Computer Vision for Augmented and Virtual Reality (CV4ARVR) at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), New Orleans, LA, 2022. Paper,Code
SOCPROS 2017 (Best Paper Award)	**Python-Based Fuzzy Classifier for Cashew Kernels**, *Snehal Singh Tomar and Narendra V.G.*, Proceedings of the 7th International Conference on Soft Computing for Problem Solving (SOCPROS) 2017, In: Advances in Intelligent Systems and Computing, vol 816 (2019). Springer, Singapore. Paper, Best Paper Award

▬▬▬ Invited Talk

○ "On Efficient Representations and Task Design in Generative and Self-Supervised Vision Models" at AMD Research and Advanced Development (RAD), June 2025. Host: Dr. Madhu Srinivasan.

▬▬▬ Scholastic Highlights

○ Recognized as a *Top Reviewer* for NeurIPS 2025.

○ Selected for the AAAI 2024 Travel Scholarship.

○ Awarded the IIT Madras Institute Research Award for excellent research contributions as an MS (by Research) student (3/746)

○ Awarded the IIT Madras Institute Travel Grant for attending CVPR 2022 at New Orleans, Louisiana, U.S.A.

○ Awarded Half Time Research Assistantship (HTRA) as funding support for pursuing graduate studies by Ministry of Education, Govt. of India

○ Awarded Research Incentive and Certificate of Appreciation in October, 2018 by Manipal Academy of Higher Education (MAHE) for producing award winning research work at SOCPROS 2017

○ Was a part of the team that stood 9th overall at the Intelligent Ground Vehicle Competition (IGVC) 2018 and was a finalist in the *Mahindra Rise Prize Challenge*, India's first autonomous vehicle competition

○ Qualified the National Talent Search Examination (Stage-I), conducted by National Council of Educational Research and Training (NCERT) in 2011 & 2013 (Selected among the top 500 students from Uttar Pradesh, India)

○ National Cyber Olympiad 2007 - All India Rank: 11, Unified Cyber Olympiad 2008 - All India Rank: 50, National Cyber Olympiad 2009 - All India Rank: 35

▬▬▬ Academic Service & Teaching

○ Served as a reviewer for CVPR (2026, 2025, and 2024), AAAI 2026, NeurIPS 2025, ICCV 2025, and ECCV (Workshops) 2022.

○ Served as a Teaching Assistant for the courses mentioned below at Stony Brook University (SBU) and IIT Madras (IITM). My responsibilities included the preparation and evaluation of tutorials, assignments, and exams.

   ○ CSE527 (Computer Vision at SBU) offered by Prof. Haibin Ling in Fall, 2024
   ○ ISE316 (Introduction to Networking at SBU) offered by Prof. Jalaa Hoblos in Spring, 2024
   ○ EE5175 (Image Signal Processing at IITM) offered by Prof. A.N. Rajagopalan in Spring, 2022 and 2023
   ○ EE5178 (Modern Computer Vision at IITM) offered by Prof. A.N. Rajagopalan in Fall, 2022
   ○ EE6132 (Deep Learning for Imaging at IITM) offered by Prof. A.N. Rajagopalan in Fall, 2021
   ○ EE5180 (Introduction to Machine Learning at IITM) offered by Prof. Avhishek Chatterjee in Spring, 2021

Presentations

- Attended and presented at AAAI 2023 and AAAI 2024 virtually.
- Attended (in-person) and presented at CVPR 2022. Video.
- Attended (virtually) and presented at ECCV 2022. Video.
- Attended and presented at the 7th International Conference on Soft Computing for Problem Solving (SOCPROS) 2017. The presentation led to a best paper award.

Academic Projects

- **Polynomial Expression fusion for Instant Volumetric Head Avatars**   Prof. Dimitris Samaras
  Computer Vision course research project at Stony Brook University   *Spring 2024*
  - The project explored the employment of Polynomial Neural Network (PNN) based architectures for fusing controllable expressions in learned 3D Morphable Model (3DMM) driven head avatars.
  - To this end, I modified the INSTA (Zielonka et al., CVPR 2023) architecture with PNNs to achieve superior expression transfer with fewer parameters.

- **LLM based Math-QA with improved reasoning**   Prof. Andrew H. Schwartz
  NLP course research project at Stony Brook University   *Spring 2024*
  - Math Question Answering is an important application of Auto-Regressive Transformer based NLP models. In this project, our team's endeavor was to improve the State of the Art (SOTA) to provide solutions in a structured step-by-step manner.
  - We did so by fine-tuning a Chain of Thought (CoT) and a Program of Thought (PoT) pretrained model (Meta Llama 3 -8B) to build an ensemble model that combines the best of both to yield accurate answers with mathematically consistent and plausible reasoning.

- **Low-Light Light Field Restoration**   Prof. Kaushik Mitra
  Computational Photography course research project at IIT Madras   *Spring 2021*
  - The project was geared towards building a Deep Neural Network capable of restoring raw Light Fields captured in Low-Light using the Lytro camera sans any pre-processing or decoding operation. Slides.
  - To this end, our team extended the L3FNet (Lamba et al., IEEE TIP 2021). We replaced all pre-processing operations used by L3FNet that were derived from the MATLAB Light-field toolbox with python functions for integration with the pytorch model. We retained minimal preprocessing steps in doing so.
  - We applied post-capture data augmentations to the L3F-wild dataset and experimented with the L3FNet's objective function to attain restoration PSNR and SSIM metrics comparable to those achieved by the vanilla L3FNet which uses decoded and pre-processed LF-views.

- **Undergraduate Internships in Robotics and Control Systems**   Prof. Shubhendu Bhasin
  Indian Institute of Technology Delhi   *2019 - 2020*
  - Torque-Based Position Controller for a Five DOF Robotic Manipulator (B.Tech. Project, Spring 2020)
  - Torque Transformer for Position Controlled Robotic Joints (Summer Internship, 2019)

Technical Skills

- **Programming Languages**: Python, C, C++, HTML/CSS
- **Deep Learning Frameworks**: Pytorch, Tensorflow
- **Familiar GPU programming Frameworks**: CUDA, ROCm
- **Tools and Packages**: MATLAB, Swift(Xcode), Blender, MeshLab, All standard image processing packages in Python

Relevant Coursework

Computer Vision (Prof. Dimitris Samaras, SBU), Natural Language Processing (Prof. Andrew Schwartz, SBU), Machine Learning (Prof. Yifan Sun, SBU), Deep Learning (Prof. Mitesh Khapra, IITM), Image Signal Processing (Prof. A.N. Rajagopalan, IITM), Computational Photography (Prof. Kaushik Mitra, IITM), and System Security (Prof. R. Sekar, SBU)