Tristan Luca Saidi

Education

Carnegie Mellon University — Pittsburgh, Pennsylvania
P.h.D. student in Statistics and Data Science — 2025–Present

Columbia University — New York, New York
M.S. in Computer Science — 2024

Columbia University — New York, New York
B.S. in Computer Engineering, *Summa Cum Laude* — 2023
GPA: 4.10

Publications and Pre-prints

1. **T. L. Saidi**, A. Hickok, B. Rieck, A. J. Blumberg, "EmbedOR: Provable Cluster-Preserving Visualizations with Curvature-Based Stochastic Neighbor Embeddings", *Under review*, 2025.
2. **T. L. Saidi**, A. Hickok, A. J. Blumberg, "Recovering Manifold Structure Using Ollivier-Ricci Curvature", *The Thirteenth International Conference on Learning Representations (ICLR)*, 2025. (Spotlight work, top 5%)
3. G. Guo, **T. L. Saidi**, M. Terban, M. Valsecchi, S.L. Billinge, H. Lipson, "Ab Initio Structure Solutions from Nanocrystalline Powder Diffraction Data", *Nature Materials*, 2025.
4. G. Khandate*, **T. L. Saidi***, S. Shang*, E. Chang, Y. Liu, J. Adams, M. Ciocarlie, "R×R: Rapid eXploration for Reinforcement Learning via Sampling-based Reset Distributions and Imitation Pre-training", *RSS Special Issue: Autonomous Robots*, 2024.
5. G. Khandate, S. Shang, E. Chang, **T. L. Saidi**, Y. Liu, S. Dennis, J. Adams, M. Ciocarlie, "Sampling-based Exploration for Reinforcement Learning of Dexterous Manipulation", 19^{th} *Robotics: Science and Systems (RSS)*, Daegu, Republic of Korea, 2023.

$*$ denotes equal contribution.

Research Experience

Andrew Blumberg Group — New York, New York
Research Assistant, Departments of Computer Science and Mathematics — 2024–Present

- Researching theoretically grounded approaches for leveraging discrete graph curvature to improve geometric data analysis algorithms like manifold learning and persistent homology
- Investigated the ability of Graph Neural Networks (GNNs) to regress scalar curvature for graphs sampled from model spaces with varying intrinsic curvature

Robotic Manipulation and Mobility (ROAM) Lab — New York, New York
Research Assistant, Department of Computer Science — 2022–2024

- Conducted research on machine learning for dexterous in-hand manipulation under Professor Matei Ciocarlie. Integrated sampling-based planning, reinforcement learning and imitation learning to enable dexterous robotic skills
- Implemented learning-based motor adaptation algorithms that leverage observation history to reason about environment properties and improve Sim2Real transfer
- Led a project centered around snake locomotion research, spanning mechatronics to motor learning algorithms

Bioelectronic Systems Laboratory — New York, New York
Research Assistant, Department of Electrical Engineering — 2021–2022

- Worked with optimization concepts to derive and help write the proof of convergence for the least squares cost function for a novel compressed sensing algorithm. Also implemented MATLAB code to generate figures and statistics for error and accuracy

Work Experience

AffectusAI New York, New York
Machine Learning Engineer 2024

- Implementing a vector-database visualization pipeline using manifold learning and network science techniques
- Assisting in the development of an audio based LLM with style mimicking and voice cloning
- Applying manifold learning and community detection algorithms to improve Retreival Augmented Generation (RAG) for LLMs

Teaching Experience

Varsity Tutors New York, New York
SAT Math Tutor 2025

- Tutoring two high-school juniors for the SAT math exam

Columbia University Department of Computer Science New York, New York
Teaching Assistant, Department of Computer Science 2022

- Assisted in teaching a graduate Machine Learning class taught by Professor Nakul Verma. Course covered topics such as SVMs, Kernel methods, KNN, Dimensionality Reduction, Clustering, and more
- Held weekly office hours, graded homework assignments and exams, and answered EdStem discussion questions from students

Honors and Awards

Computer Engineering Award of Excellence 2023

Summa Cum Laude Graduate from the Columbia School of Engineering and Applied Sciences 2023

Columbia Engineering Alumni Association (CEAA) Scholar 2022

Columbia Unversity Dean's List: Fall 2020, Spring 2021, Fall 2021, Spring 2022, Fall 2022

Skills

Technical Proficiency

- **Proficient:** Python, PyTorch, PyTorch Geometric, Git, NumPy, Scikit-Learn, LaTeX, Matplotlib, Linux (Usage and Shell Scripting), IsaacGym, Mujoco, C
- **Familiar:** C++, Java, SciPy, Matlab, Pandas

Relevant Courses

- *Columbia University:* Geometric Data Analysis, High Dimensional Probability, Machine Learning, Convex Optimization, Foundations of Graphical Models, Neural Networks and Deep Learning, Reinforcement Learning, Operating Systems
- *Self-taught:* Real Analysis, Functional Analysis

Projects

ORC-ManL: Recovering manifold structure using Ollivier-Ricci Curvature 2024

Scalar Curvature Estimation with Graph Neural Networks 2024

Exploring Adversarial Perturbations to Diffusion Models 2023

Examining the geometry of neural mode connecting loss subspaces 2023

On the Effect of Unsupervised Regularization for Image Classification 2023

Implementation of a functional scheduler and filesystem for Linux 5.10.182 2023
Implementation of a Finite Impulse Response (FIR) filter in Verilog 2021

Research Students Supervised

Geoffrey Wu, Columbia B.S. Computer Science 2024
Jamie Palmer, Columbia M.S. Mechanical Engineering 2024
Ethan Matzner, Columbia B.S. Mechanical Engineering 2023 - 2024

Selected Press

Time Magazine Best Inventions of 2023 Time Magazine
"Robot Hand Manipulates Complex Objects by Touch Alone" IEEE Spectrum
"This robot hand can manipulate objects without seeing them" The Robot Report
"Highly dexterous robot hand can operate in the dark—just like us" TechXplore
"This agile robotic hand can handle objects just by touch" Popular Science

Service

Reviewer for 2025 *International Conference on Learning Representations (ICLR)* 2024
Volunteer for *Robotics: Science and Systems (RSS)* Conference 2022