# Giorgi Merabishvili

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## About Me

I am a first-year PhD student at North Carolina State University (NC State). I am broadly interested in software testing and improving robustness of software systems. Prior to my doctoral studies, I earned my master's degree in computer engineering from New York University. During my master's studies, I had the opportunity to work with Professor Andrea Stocco at the Technical University of Munich. I was funded by a DAAD research stipend.

## Education

**North Carolina State University,** NC, US — 2025 – Present
Doctor of Philosophy, Computer Science — GPA: N/A
Coursework: Design and Analysis of Algorithms | Software Testing and Reliability

**New York University,** NY, US — 2023 – 2025
Master of Science, Computer Engineering — GPA: 3.80
Coursework: Machine Learning | ML for Cybersecurity | Deep Learning | Probability and Stochastic Processes

**St. Francis College,** NY, US — 2019 – 2023
Bachelor of Science, Information Technology — GPA: 3.95
Coursework: Systems Analysis and Design | Scripting Languages | Networking | Project Management
Honors Thesis: "Robotics and Environmental Issues", Northeast Regional Honors Conference 2023

## Work Experience

**Max Planck Institute for Security and Privacy** — Bochum, Germany
Research Intern — 2026 incoming

- Advisor: Dr. Marcel Böhme
- Project: TBD

**North Carolina State University** — Raleigh, NC
Research Assistant — 2025 – Present

- Currently working in the area of game testing. I developed MR-guided VLM glitch detection technique for gameplay videos.
- Worked on WebAssembly runtime analysis; transplanting regression tests across runtimes and using them as seed corpora for fuzzing.

**Technical University of Munich** — Munich, Germany
Research Intern — 2024 – 2025

- Advisor: Dr. Andrea Stocco
- Conducted research on automated testing for deep learning systems, focusing on identifying boundary inputs.
- Developed and implemented a method of latent space interpolation to minimize the distance from decision boundary.
- Improved validity of generated pairs.

**RoboMaster NYU** — New York, US
Computer Vision Engineer — 2024 – 2025

- Worked on real-time object detection systems for tracking enemy robots.
- Trained a model and tested real-time on robot provided by the mechanical team.

**Google Developer Student Club NYU** — New York, US
Member, Technology Specialist — 2023 – 2024

- Organized educational workshops with the GDSC team on machine learning and generative AI.
- Managed technical resources and maintained documentation.

## Publications

- **Latent Regularization in Generative Test Input Generation**
  **G. Merabishvili**, O. Weissl, A. Stocco.
  *In Proceedings of the 47th International Conference on Software Engineering Workshops, 2026*

- **Targeted Deep Learning System Boundary Testing**
  O. Weissl, A. Abdellatif, X. Chen, **G. Merabishvili**, V. Riccio, S. Kacianka, A. Stocco.
  *ACM Transactions on Software Engineering and Methodology, 2025 (TOSEM)*

- **MetaGlitch: Physics-Grounded Metamorphic Testing for Video Game Testing**
  **G. Merabishvili**, x, x .
  *Under Submission, 2026*

- **Left Behind, Not Forgotten: Reusing Regression Tests to Find Bugs in WebAssembly Runtimes**
  x, x, **G. Merabishvili**, x .
  *Under Submission, 2026*

## Honors and Awards

- **Recipient of DAAD Scholarship for the Research Project**
  *Munich, Germany, 2024*
- **Merit Award Recipient at New York University**
  *New York, US, 2023-2025*
- **Honors Program Scholar and Summa Cum Laude at St. Francis College**
  *New York, US, 2023*
- **St. Francis College Travel Grant for Northeast Regional Honors Conference**
  New York, US, 2023
- **Inducted to Sigma Beta Delta International Honor Society**
  *New York, US, 2023*
- **Merit Award Scholarship and Institutional Scholarship Recipient at St. Francis College**
  *New York, US, 2019-2023*

## Projects

- **Automated Gameplay Glitch Detection via Vision–Language Models Guided by Metamorphic Relations** 2025
  North Carolina State University
  Developed a system that mines metamorphic relation (MR) properties from gameplay data and leverages them to guide vision-language models for detecting visual and physical anomalies in gameplay videos, improving precision and recall.

- **Deep Learning Fault-Revealing Input Generation via Latent-Space Truncation** 2025
  ATS Lab at Technical University of Munich, Fortiss
  Developed a tool that uncovers faults in deep-learning systems by first synthesizing base images with StyleGAN and then applying only latent-space truncation to explore latent space and produce diverse fault-revealing test inputs.

- **Deep Learning Boundary Testing Input Generation via Latent-Space Interpolation on Selected Feature Layers** 2024
  ATS Lab at Technical University of Munich, Fortiss
  Developed a tool that generates boundary-revealing test inputs for deep-learning systems by selectively switching target feature layers in the latent representation and then applying linear interpolation within those layers alone to produce paired samples that reveal decision boundaries with precision.

- **Classical Artwork Generator using GANs** 2024
  Course Project at NYU - Deep Learning, ECE-GY 7123
  Implemented a Generative Adversarial Network (GAN) with a two-stage generator and discriminator. Applied spectral normalization, LeakyReLU activations and Gaussian noise for stable and efficient training. Enhanced image quality using dropout layers and dynamic learning rate adjustments. Incorporated data augmentation techniques to improve the diversity of generated images.

## Activities

- **Member of NCSU Water Polo Club,** North Carolina, US 2025 – Present
- **Member of NYU Water Polo Club,** New York, U.S 2023 – 2025
- **NCAA Division I Water Polo for St. Francis College,** New York, U.S 2019 – 2020
- **Member of Water Polo Youth National Team and Club(Iveria),** Tbilisi, Georgia 2015 – 2019