Vikram Nitin

195 Claremont Ave, Apt 10B, New York, NY - 10027
+1 (347) 405-1209
vikram.nitin@columbia.edu
Website — Google Scholar

RESEARCH INTERESTS

LLM agents, static program analysis, Rust, code translation, application modernization

EDUCATION

Ph.D Computer Science - Advisor: Baishakhi Ray **Sep 2019 - Aug 2025**
Columbia University in the City of New York
Dissertation - Using AI to Automate the Modernization of Legacy Software Applications
GPA - 4.02

B.E.(Hons) Computer Science **Aug 2015 - May 2019**
Birla Institute of Technology and Science, Pilani (BITS Pilani), India
GPA - 8.50/10

PROFESSIONAL EXPERIENCE

Microsoft Student Researcher **Mar 2025 - Present**
LLM Agents for Vulnerability Test Generation

- Collaborating with the Data & AI (DevDiv) team at MSR.
- I'm working on building an LLM agent that can generate proof-of-vulnerability test cases for a project with a known vulnerability.

IBM Research Internship **Jun 2022 - Aug 2022**
Unit Test Generation for Database Access Code

- Worked with the Hybrid Cloud team (Manager - Raju Pavuluri) to generate unit tests for Java programs, with a focus on database access code.
- Traditional evolutionary test generation techniques struggle to generate unit tests for database access code. I researched techniques to track the flow of data through the program and explicitly map between database columns and variables in the code.

IBM Research Internship **Jun 2021 - Aug 2021**
Automated application refactoring

- Worked with the Hybrid Cloud team (Manager - Jin Xiao) to develop an AI algorithm to refactor legacy monolithic applications.
- Resulted in a publication, CARGO, that won a Distinguished Paper Award at ASE 2022. CARGO is now integrated into an IBM product.

Research Internship at IISc Bangalore **Aug 2018 - May 2019**
Bachelor's Thesis - Advisor: Prof. Partha Talukdar

- Worked at the Machine and Language Learning (MALL) lab, Indian Institute of Science (IISc).
- Worked on Graph Convolutional Networks (GCNs) and Knowledge Graphs. Resulted in 4 publications (links provided below).

PUBLICATIONS

C2SaferRust: Transforming C Projects into Safer Rust with NeuroSymbolic Techniques
Vikram Nitin*, Rahul Krishna, Luiz Lemos do Valle, Baishakhi Ray
ArXiv preprint, 2025

Spectra: Enhancing the code translation ability of language models by generating multi-modal specifications
Vikram Nitin*, Rahul Krishna, Baishakhi Ray
ArXiv preprint, 2024

Yuga: Automatically Detecting Lifetime Annotation Bugs in the Rust Language
Vikram Nitin*, Anne Mulhern, Sanjay Arora, Baishakhi
IEEE Transactions on Software Engineering (TSE), Oct. 2024 issue

CARGO: AI-Guided Dependency Analysis for Migrating Monolithic Applications to Microservices Architecture
Vikram Nitin*, Shubhi Asthana, Baishakhi Ray, Rahul Krishna
Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering (ASE 2022)
Distinguished Paper (top 10% of accepted papers)

DIRECT : A Transformer-based Model for Decompiled Identifier Renaming
Vikram Nitin*, Anthony Saieva, Baishakhi Ray, Gail Kaiser (* denotes equal contribution)
Proceedings of the 1st Workshop on NLP for Programming (NLP4Prog 2021), at ACL 2021

Multitask Learning Strengthens Adversarial Robustness
Chengzhi Mao, Amogh Gupta*, **Vikram Nitin***, Baishakhi Ray, Shurang Song, Junfeng Yang, Carl Vondrick (* denotes equal contribution)
Proceedings of the 16th European Conference on Computer Vision (ECCV 2020)
Oral Presentation (top 2% of accepted papers)

Composition-Based Multi-Relational Graph Convolutional Networks
Shikhar Vashishth*, Soumya Sanyal*, **Vikram Nitin**, Partha Talukdar
Proceedings of the 8th International Conference on Learning Representations (ICLR 2020)

InteractE: Improving Convolution-Based Knowledge Graph Embeddings by Increasing Feature Interactions
Shikhar Vashishth*, Soumya Sanyal*, **Vikram Nitin**, Nilesh Agrawal, Partha Talukdar
Proceedings of the 34th AAAI Conference on Artifical Intelligence (AAAI 2020)

NHP : Neural Hypergraph Link Prediction
Naganand Yadati, **Vikram Nitin**, Madhav Nimishakavi, Prateek Yadav, Anand Louis, Partha Talukdar
Proceedings of the 29th Conference on Information and Knowledge Management (CIKM 2020)

HyperGCN: A New Method for Training Graph Convolutional Networks on Hypergraphs
Naganand Yadati, Madhav Nimishakavi, Prateek Yadav, **Vikram Nitin**, Anand Louis, Partha Talukdar
Proceedings of the 33rd Conference on Advances in Neural Information Processing Systems (NeurIPS 2019)

TEACHING

Teaching Assistant (TA) for :

- **Programming Languages and Translators** (COMS W4115), Spring 2023.
- **Advanced Software Engineering** (COMS W4156), Spring 2020.
- **Security and Robustness of ML Systems (Graduate Seminar)** (COMS 6998-10), Spring 2020.

SELECTED COURSEWORK

At Columbia :

- Analysis of Algorithms (CSOR 4231)
- Machine Learning Theory (COMS 4995)
- Prog. Languages and Translators (COMS 4115)
- Causal Inference (COMS 4775)

At BITS Pilani :

- Mathematics-I (Calculus)
- Mathematics-II (Linear Algebra)
- Probability and Statistics
- Optimization

MISCELLANEOUS

Team AcYut, BITS Pilani **Aug 2017 - May 2018**
Humanoid Robotics Team

- Led a team of 8 members in the academic year 2017-18. Developed algorithms to improve walking pattern generation and stability
- Represented India at the RoboCup Soccer Competition 2017 held at Nagoya, Japan. Here is a Team Description Paper (TDP) we submitted for the RoboCup.

Google Summer of Code **Jun 2017 - Aug 2017**
Theano

- Added more types of Convolution operations to Theano, the (then) popular Deep Learning library
- Details and code available at this link