

Angel (Leyi) Cui

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Education

Carnegie Mellon University, School of Computer Science *Admitted, Fall 2025 start*
PhD in Software Engineering, Prospective advisor: Rohan Padhye

Columbia University, Columbia Engineering *Sep 2024 – Expected May 2025*
MS in Computer Science, Software Systems Track

- GPA: 3.92/4.0
- Relevant Courses: Operating Systems, Programming Languages, Formal Verification, Code Generation

Columbia University, Barnard College *Sep 2020 – Dec 2023*
BA in Computer Science, Minor in Dance

- GPA: 3.74/4.0; Major GPA: 3.9/4.0; **Dean's List; Computer Science Departmental Honor**
- Relevant Courses: Program Synthesis, CS Theory, AI, ML, Cloud Computing, Cryptography, Databases

Academic Positions

ARiSE Lab, Columbia University *New York, NY*
Research Assistant; Advisor: Prof. Baishakhi Ray, Prof. Junfeng Yang *Sep 2024 – Feb 2025*

- Researching methods to reduce vulnerabilities in code generated by LLMs
- Engineered backends for evaluating the proposed pipeline and existing LLMs on generating vulnerable code
- Proposed and engineered CWeval and CWeval-bench, a set of new framework and datasets for evaluating LLM-generated code functionality and security [3]

Software Design and Analysis Lab, Carnegie Mellon University *Pittsburgh, PA*
Research Assistant; Advisor: Prof. Eunsuk Kang, Prof. Matthew L. Bolton *May 2023 – Feb 2025*

- Extended Fuzzy Mental Model Finite State Machines (FMMs) for modeling human mental model, developed an Alloy-based model checker and an analysis tool to detect mode confusions in FMMs [2] [9]
- Researched use cases and HCI aspect for ATLAS, a tool that solves the constrained LTL learning problem through an encoding in a first-order relational logic and reduction to an instance of the MaxSAT problem [1]
- Conducted a usability study on an open-source EHR system and developed a tool to auto-generate erroneous workflows from software interactions through Carnegie Mellon's REU (REUSE) program.

Barnard Programming Language Lab, Columbia University *New York, NY*
Research Assistant, Advisor: Prof. Mark Santolucito *May 2022 – Present*

- Formalized, engineered, and evaluated a machine-learning based run-time validation approach for maintaining the system integrity for legacy system migrations [8]
- Finetuned and benchmarked an LLM pipeline for generating Temporal Stream Logic (TSL) spec [10]
- Designed and implemented user interfaces, and conducted user studies for TSL [5] [6]

Industry Positions

Amazon AWS *Arlington, VA*
Applied Scientist Intern *Summer 2025*

- Joining AWS Automated Reasoning Group

Apple *Jiangmen, China*
Apple Teacher for programming and music *Jun 2021 – Aug 2021*

- Taught 50+ kids computer programming and music in rural areas to promote education equality

ByteDance *Beijing, China*
Game Producer and Planner *Oct 2020 – May 2021*

- Sole producer of Hui Su Sha Tang, a music game with 545k views, 41k downloads, and a rating of 8.1/10.0

Selected Publications

Peer Reviewed

- [1] **Constrained LTL Specification Learning from Examples** [DOI](#) [↗](#)
ICSE 2025: 47th IEEE/ACM International Conference on Software Engineering
Chengjian Zhang, Parv Kapoor, Ian Dardik, **Leyi Cui**, Romulo Meira-Goes, David Garlan, Eunsuk Kang
- [2] **A Formal Approach to the Analysis of Human-Machine Interaction with Fuzzy Logic** [DOI](#) [↗](#)
SPLASH 2024: Student Research Competition
Leyi Cui
- [3] **CWEval: Outcome-driven Evaluation on Functionality and Security of LLM Code Generation**
LLM4Code 2025
Jinjun Peng, **Leyi Cui**, Kele Huang, Junfeng Yang, Baishakhi Ray
- [4] **Interactively Assisting Glaucoma Diagnosis with an Expert Knowledge-distilled Vision Transformer**
CHI Late Break Work 2025
Ziheng ‘Leo’ Li, Haowen ‘John’ Wei, Kuang Sun, **Leyi Cui**, David Li, Steven K. Feiner, Kaveri A. Thakoor
- [5] **Towards Reactive Synthesis as a Programming Paradigm** [DOI](#) [↗](#)
PLATEAU 2024: 14th annual workshop on the intersection of HCI and PL
Leyi Cui, Raven Rothkopf, Mark Santolucito
- [6] **Towards the Usability of Reactive Synthesis: Building Blocks of Temporal Logic** [DOI](#) [↗](#)
PLATEAU 2023: 13th annual workshop on the intersection of HCI and PL
Raven Rothkopf, **Angel Leyi Cui**, Hannah Tongxin Zeng, Arya Sinha, Mark Santolucito
- [7] **On the Two-dimensional Resilient Consensus**
ICCSNT 2019: IEEE 7th International Conference on Computer Science and Network Technology
Leyi Cui

Preprints

- [8] **NeuroMigrate: Machine Learning Based Run-time Validation as a Safety Net for System Migrations**
Under Submission
Leyi Cui, Elifia Muthia, Seth Pullman, Baishakhi Ray, Mark Santolucito
- [9] **Fuzzy Mental Model: A Formalism for Reasoning About Confusion in Human Technology Interaction**
Under Submission
Matthew L. Bolton, **Leyi Cui**, Eunsuk Kang
- [10] **Combining LLM Code Generation with Formal Specifications and Reactive Program Synthesis**
Under Submission
William Murphy, Nikolaus Holzer, Feitong Qiao, **Leyi Cui**, Raven Rothkopf, Nathan Koenig, Mark Santolucito

Selected Posters and Presentations

- A Formal Approach to the Analysis of Human-Machine Interaction with Fuzzy Logic**
Angel (Leyi) Cui
SPLASH 2024: Student Research Competition, Graduate Student Second Place *Oct 2024*
- Towards Reactive Synthesis as a Programming Paradigm**
Angel (Leyi) Cui, Raven Rothkopf, Mark Santolucito
PLATEAU 2024 @ US Berkeley *Feb 2024*
- Safe and Reliable Medical Records: Assessing the Robustness of OpenEMR**
Angel (Leyi) Cui, Eunsuk Kang
Columbia University DSI Research Fair, Best Overall Prize *Nov 2023*
Carnegie Mellon University REUSE Poster Session *Aug 2023*
- Advancing the Usability of Temporal Stream Logic**
Angel (Leyi) Cui, Raven Rothkopf, Mark Santolucito
Barnard College Summer Research Institute Poster Session *Aug 2022*

Scholarships, Prizes, and Honors

Columbia University, 2025 Andrew P. Kosoresow Memorial Award for **Excellence in Teaching and Service**
SPLASH 2024: Student Research Competition, **Graduate Student Second Place**
Barnard College, Columbia University, **Dean's List, Computer Science Departmental Honors**
2023 Columbia University Undergraduate Computer and Data Science Research Fair **Best Overall Prize**
2023 CMU Research Experiences for Undergraduates in Software Engineering Program **Scholarship Recipient**
Fall 2023 Beyond Barnard Internship Program **Grant Recipient**
2022 Columbia University DevFest **Best Design Prize**
2020 Byte Camp Game Design Track **Winner**
2019 CRC (FRC) Robotics Competition **National 2nd Place**
2018 MIT Energy Hackathon **Third Place, MIT Track Winner**

Teachings and Mentorship

Teaching Assistant, Computer Science Theory , Columbia University	<i>Fall 2022 - Spring 2025</i>
Instructor: Tal Malkin, Xi Chen, Toniann Pitassi, Josh Alman; Students: 400+	
Mentor, Barnard Peer Mentoring Program	<i>2022 - 2024</i>
Mentor, Application Development Initiative , Columbia University	<i>Spring 2022</i>

Invited Talks

ADI Mentorship's Panel , Columbia University	<i>April 2025</i>
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Service

Artifact Evaluation Committee for TACAS 2025

Skills

Languages: Java, Python, C++, C, C#, HTML/CSS/JS, SQL, Alloy, LTL, TSL, R
Frameworks/Libraries: Flask, Django, React, MySQL, MongoDB, TensorFlow, Pandas, NumPy, Selenium
Tools: Unity, Linux, Git, Docker, MATLAB, Figma, Adobe Premier, GarageBand
Clubs: Columbia Application Development Initiative; Barnard Better, Enhance, and Advance Research Series in Computer Science; Columbia University Ballet Ensemble (CUBE); Barnard & Columbia Chorus
Activities: Screenwriter of comic "The Female Prince Consort" adapted from Huang Mei Opera