

# Jianan Yao

489 Computer Science Department, Columbia University, New York, NY 10027

Tel: (347) 406-0301

E-mail: [jianan@cs.columbia.edu](mailto:jianan@cs.columbia.edu)

Github: <https://github.com/jyao15>

Google Scholar: <https://scholar.google.com/citations?user=I5M0hHsAAAAJ>

Website: <https://www.cs.columbia.edu/~jianan/>

---

## EDUCATIONAL BACKGROUND

- **Columbia University** New York, USA  
Ph.D. in Computer Science 09/2019 – Present
- **Tsinghua University** Beijing, China  
B.Eng. in Computer Science and Technology 09/2015 – 07/2019

## RESEARCH INTERESTS

- Programming languages, operating systems, with a focus on formal verification
- Machine learning for program analysis and synthesis

## PUBLICATIONS

- **Learning Nonlinear Loop Invariants with Gated Continuous Logic Networks.** [\[paper\]](#) [\[code\]](#)  
Jianan Yao, Gabriel Ryan, Justin Wong, Suman Jana, and Ronghui Gu.  
PLDI 2020
- **CLN2INV: Learning Loop Invariants with Continuous Logic Networks.** [\[paper\]](#) [\[code\]](#)  
Gabriel Ryan, Justin Wong, Jianan Yao, Ronghui Gu, and Suman Jana.  
ICLR 2020.
- **News Recommendation and Filter Bubbles.** [\[paper\]](#)  
Jianan Yao, Alexander G. Hauptmann.  
Workshop on News Recommendation and Analytics, CIKM 2018.

## RESEARCH EXPERIENCE

**Software Systems Laboratory, Columbia University** 08/2019-Present

*Graduate Research assistant, Advisor: Prof. Ronghui Gu*

- Automated loop invariant inference for program verification using parametric relaxation of SMT formulas. Neural model implemented in PyTorch, and Z3 used as verification backend.
- Learning inductive invariants for distributed protocols, including mutual exclusion, consensus, and blockchain protocols, with a simulation-enumeration-refinement workflow

**Language Technologies Institute, Carnegie Mellon University** 07/2018-09/2018

*Summer intern student, Advisor: Prof. Alexander G. Hauptmann*

- Empirical analysis of news personalization and filter bubbles. Studied how content-based and collaborative filtering recommendation algorithms interact with ideological perspectives. Topic models and clustering involved.

**Knowledge Engineering Group, Tsinghua University** 04/2017-06/2018

*Research assistant, Advisor: Prof. Jie Tang*

- Integrating secretary problem into online sampling of representative users for marketing
- Explored multistep personal strategy for targeted social connecting, a practical graph theory problem in networks

## AWARDS & HONARS

- Outstanding Graduate 2019
- Scholarship for Outstanding Academic Performance 2017

## PROFESSIONAL SKILLS

Programming Languages      C & C++ / Java / Python / Go / MATLAB / VHDL / Assembly  
Platforms & Tools:              Coq / Dafny / Z3 / PyTorch / TensorFlow

## TEACHING EXPERIENCE

- COMS W4115: Programming Languages and Translators 2021 Spring