YUGUANG (ROGER) BAI

Mathematics Ph.D. Candidate

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PROFILE

Motivated and skilled Ph.D. candidate looking to conduct research in an applied setting, particularly in machine learning or cryptography areas. Highly capable in quantitative areas as well as being able to explain technical concepts to others.

EDUCATION

Ph.D. in Mathematics

University of Toronto

Expected Summer 2021 — Toronto, ON

Thesis: Cluster Algebra Structure for Mirković-Vilonen Cycles and Polytopes
Notable Course: CSC2426 Fundamentals of Cryptography

Palette x Fields Accelerated Cybersecurity Training

Fields Institute

Nov. 2020 – Jan. 2021 — Toronto, ON

Learned a variety of topics such as
- Risk Management, Cryptography, Penetration Testing

EXPERIENCE

Researcher

University of Toronto

Sept. 2016 – Ongoing — Toronto, ON

- Collaborated and wrote a paper with two others on a research project for interpreting geometric objects as matrices
- Conjectured my own formula about a relationship between geometric objects and proved it; invited to and presented results at Loyola University Chicago

Course Instructor

University of Toronto

Jan. 2020 – Dec. 2020 — Toronto, ON

- Taught hundreds of students in various disciplines in mathematics, particularly those in linear algebra
- Was one of the first instructors to teach and be in charge of a course during the COVID-19 pandemic, laying the foundation and provided advice for future courses
- Achieved an overall 4.4/5 course evaluation from students

Teacher's Assistant

University of Toronto

Sept. 2015 – Dec. 2019 — Toronto, ON

- Worked with and helped a variety of students in areas such as calculus, linear algebra, and MATLAB programming
- Debugged several students' code and helped them understand their own code

KEY SKILLS

Creative Thinking | Problem Solving | Excellent Writing and Communication

LANGUAGES

Python ●●●●○

MATLAB ●●●●○

SQL ●●●●○

CYBERSECURITY TOOLS

Metasploit | Meterpreter | nmap | PowerSploit | OWASP ZAP | Burp Suite | Wireshark | Splunk | ELK Stack

PROJECTS

Penetration Testing

Ongoing — TryHackMe

- Personal project to better understand computer security, its architecture, as well as learning the Linux command line

Mirković–Vybornov Fusion in the Beilinson–Drinfeld Grassmannian

June 2021 — arXiv

- A generalization of the Mirković-Vybornov isomorphism to help compute fusion products

Double Encryption in the Cloud

Jan. 2021 — GitHub

- A way to upload data to the cloud that ensures end-to-end encryption and prevents the cloud provider from unauthorized access to the data
- Helped design the protocol, coded the authentication and integrity parts, and created a demo with .csv files and GCP