YUGUANG (ROGER) BAI

Mathematics Ph.D. Candidate

@ rogerbai92@gmail.com 📞 647-573-3158 📍 Toronto, Ontario, Canada 🌐 roger-bai.github.io/personal-webpage/
🔗 roger-bai-404a061b4 ⌨ roger-bai

PROFILE

Motivated and skilled Ph.D. candidate seeking a position in the cybersecurity sector. Highly capable in quantitative areas as well as being able to explain technical concepts to others. Very interested in using acquired skills and knowledge to improve and protect society as a whole.

EDUCATION

Ph.D. in Mathematics
University of Toronto

📅 Expected August 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

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

Course Instructor
University of Toronto

📅 Jan. 2020 – Ongoing   📍 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 ●●●●○

SageMath ●●●●○

SQL ●●●●○

CYBERSECURITY TOOLS

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

PROJECTS/PAPERS

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

Mirković–Vybornov Fusion in the Beilinson–Drinfeld Grassmannian

📅 June 2021   🌐 arXiv

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

Cluster Algebra Cryptography

📅 Ongoing   ⌨ GitHub

- Personal project to better understand cryptography by trying to create an asymmetric cryptographic algorithm based on the theory of cluster algebras