Zachary Espiritu

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Education

Brown University
Concurrent Sc.M. and Sc.B. in Computer Science · GPA: 4.0
Honors in Computer Science
Fall 2017 – Fall 2021

Awards

CrowdStrike NextGen Scholarship for Cybersecurity and AI
(6 selected nationwide)

(ISC)2 Undergraduate Information Security Scholarship
(20 selected nationwide)

1st at 2020 Hack@Home CTF
(1 out of ~100 participants)

Projects

Dropbox (Secure File Store)
As Head TA, authored new design project on using public key infrastructure as a root of trust for secure, efficient file storage on untrusted servers; with credential generation/rotation for sharing.

CS Concentration Validator
Developed Racket microservice using formal methods to validate / synthesize degree plans for 300+ CS majors; added to official University advising system.

Vehicle Logistics Optimization
Designed top-performing Python local search solver of 21 teams for NP-hard vehicle routing in graduate-level competition.

GrblGrader
Created modular feedback distribution framework and custom programming language to release student grades; in JavaScript. Used by 8 CS courses/year; seen by 1000 students/year.

Experience

D. E. Shaw & Co.　　　　　　　　　　　　　　2022 – Present
Systems Security Engineer
Developing projects related to Linux security on-premises and in the cloud.

Encrypted Systems Lab / CAPS Group　　　　　2020 – 2022
Researcher, Encrypted Databases and Systems
Authored several papers on applied cryptography research projects focusing on cryptographic protocol design, attacks, and implementation.

Google　　　　　　　　　　　　　　　　　　2020
Software Engineering Intern, Cloud KMS and HSM
Architected open source C++ OpenSSL engine, enabling servers to use hardware-backed secret keys for TLS signatures without source code changes.

Stage IV Lymphoma (a 6 month pause)　　　　　2019

Brown PLT　　　　　　　　　　　　　　　　　2018
Research Intern
Developed a machine learning library for Pyret, a language for education.

Negotiatus　　　　　　　　　　　　　　　　　2016 – 2017
Software Engineering Intern
Developed several flagship product features in JavaScript and Ruby on Rails.

Publications

1. **Zachary Espiritu**, Evangelia Anna Markatou, Roberto Tamassia. "Efficient Range Aggregate Queries on Encrypted Databases". *In review*.

2. Francesca Falzon, Evangelia Anna Markatou, **Zachary Espiritu**, Roberto Tamassia. "Attacks on Families of Encrypted Range Search Schemes in Multiple Dimensions". *In review*.

Teaching Service　　　　　　　　　*(@ Brown Computer Science)*

Head Teaching Assistant (for 6 CS Courses)　　　Fall 2018 – Fall 2021
- Hired, trained, and *managed 54 TAs for multiple CS courses*, including a three-year Head TA role for Computer Systems Security (2021, 2020, 2019).
- Taught in 2021 as *main lecturer for 9 of 22 lectures and course designer* on topics such as web application security, network security, cloud security, authentication, and building empathetic cultures of security.

Meta Teaching Assistant (TA Program Coordinator)　　Fall 2019 – Fall 2021
- Led hiring and training of 781 TAs over 56 courses by *managing 112 HTAs*.
- Spearheaded department-wide initiatives, including (1) increasing all TAs' pay by 25% over 2 years; (2) finding security vulnerabilities in courses' grading infra; and (3) launching student panel series w/ +100 attendees per event.