



alex bellon

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EDUCATION

- 2021–Present **Ph.D., Computer Science**, *The University of California San Diego*
Advised by [Deian Stefan](#) and [Pat Pannuto](#), with a focus on the security of embedded and IoT devices and firmware. Part of [SysNet](#) and [CryptoSec](#) groups.
- 2017–2021 **B.S., Computer Science**, *The University of Texas at Austin*
- 2017–2021 **B.S., Mathematics**, *The University of Texas at Austin*

PUBLICATIONS

- [2] Enze Liu, Lu Sun, **Alex Bellon**, Grant Ho, Stefan Savage, Geoffrey M. Voelker, Imani N. S. Munyaka. “Understanding the viability of e-mail origin indicators for identifying the sender”. 19th USENIX Symposium on Usable Privacy and Security (SOUPS 2023). August 2023.
- [1] **Alex Bellon**, Alex Yen, and Pat Pannuto. “TagAlong: A Free, Wide-Area Data-Muling Service Built on the AirTag Protocol”. 24th International Workshop on Mobile Computing Systems and Applications (HotMobile 2023). February 2023.
- [0] **Alex Bellon**, Alex Snoeren, and Deian Stefan. “Hacking for Fun and Glucose: Reverse Engineering an Insulin Pump”. SRC TECHCON 2022. September 2022.

DEMOS/POSTERS

- [1] **Alex Bellon**, Miro Haller*, Andrey Labunets, Enze Liu, Stefan Savage (* = first author). “Short Talk: An Empirical Analysis on the Use and Reporting of National Security Letters”. 3rd ACM Symposium on Computer Science and Law (CSLAW 2024). March 2024.
- [0] **Alex Bellon**, Alex Yen, and Pat Pannuto. “Demo Abstract: TagAlong: A Free, Wide-Area Data-Muling Service Built on the AirTag Protocol”. 20th ACM Conference on Embedded Networked Sensor Systems (SenSys 2022). November 2022.

RESEARCH EXPERIENCE

- Fall 2023 **Research Intern**, *Max Planck Institute for Security and Privacy*, Bochum, Germany
- Extracted control flow from insulin pump firmware
 - Instrument insulin pump firmware in order to be emulated and fuzzed
- 2021–Present **Graduate Student Researcher**, *University of California San Diego*, San Diego, CA
- **Evaluating and securing insulin pump firmware**
 - Disassembled and reverse-engineered hardware of an insulin pump, developed custom PCBs to connect to board and allow firmware to be extracted from ICs
 - Reverse engineered extracted firmware using Ghidra
 - Rehosted firmware to run without any hardware or peripherals
 - **Finding security vulnerabilities in commercial airplane firmware**
 - Assisted in tracing out connections between chips and I/O ports on Flight Management Computer (FMC) board to allow firmware to be extracted
 - Added support for Motorola 68000 architecture to emulation tool
 - Rehosted extracted firmware from in-flight entertainment (IFE)/WiFi box
 - Currently constructing exploits for IFE box firmware, with entry from passenger WiFi
 - **Crowd-sourced and private downlink BLE communication**
 - Secured \$100,000 Qualcomm Innovation Fellowship to fund project
 - Designed protocol to allow for downlink communication to BLE embedded devices using nearby phones, while preserving the privacy of all participants in the system
 - Currently implementing proof of concept

INDUSTRY EXPERIENCE

- Summer 2023 **Software Engineering Intern, Micron, San Jose, CA**
- Wrote optimizations for LLVM/Clang to improve workload performance with CXL memory
- Summer 2020 **Security Engineering Intern, Mozilla, Mountain View, CA (remote)**
- Researched security issues in language-based package managers like Cargo, NPM and PyPI
 - Used research about past security incidents to fix security scoring algorithm on Mozilla's Dependency Observatory (github.com/mozilla-services/dependency-observatory) project, used to estimate the security of NPM packages
- Summer 2019 **Security Analyst Intern, Electronic Arts, Seattle, WA**
- Used Python to automate checking for open ports and other attack vectors on EA's cloud instances. Scanned 800+ instances, found 1400+ security incidents
 - Automated sending summary of vulnerabilities to affected parties, with descriptions of the vulnerabilities and instructions to resolve them

TEACHING EXPERIENCE

- Spring 2021 **Undergraduate TA - CS349 Contemporary Issues in Computer Science, UT Austin**
- Graded assignments and held office hours for a class of 40+ students
 - Shared resources and information regarding ethical and social issues in computer science
- Spring 2019, Fall 2019 **Undergraduate TA - CS361 Introduction to Computer Security, UT Austin**
- Created and graded security-focused assignments for 80+ students
 - Lectured on various topics in security including cryptography and data forensics
 - Wrote, hosted and ran a CTF competition for the students' final exam

FELLOWSHIPS, SCHOLARSHIPS & HONORS

- 2024 **Doctoral Excellence in Service & Leadership Award, UCSD Computer Science & Engineering**
- 2024-2025 **Qualcomm Innovation Fellowship, Qualcomm**
- 2021-2025 **San Diego Fellowship, UCSD Graduate Division**
- 2020-2021 **Louis E. Rosier Memorial Scholarship, UT Austin Computer Science**
- 2017-2018 **Jack S. Blanton Family Scholarship, Texas Exes Houston Chapter**

CONFERENCE GRANTS

- 2023 **GREPSEC Student Grant, USENIX**
- 2023 **ACM HotMobile Student Travel Grant, ACM HotMobile**
- 2022 **Linux Open Source Summit Diversity Scholarship, Linux Foundation**
- 2020 **Tapia Conference Scholarship, UT Austin Computer Science**
- 2020 **USENIX Security Student Diversity Grant, USENIX Security**
- 2019 **Grace Hopper Conference Scholarship, UT Austin Computer Science**
- 2019 **BlackHat USA Student Scholarship, BlackHat**
- 2019 **DEFCON 27 Scholarship, Women in Security & Privacy**

AWARDS

CAPTURE THE FLAG

- 2020 **AtlassianCTF (1st), with team "hhh_"**
- 2019 **SunshineCTF (1st), SwampCTF (3rd), AngstromCTF (3rd), with team "UTC"**
Texas Network Massacre (1st), AtlassianCTF (3rd), with team "hhh_"
- 2018 **AtlassianCTF (3rd), with team "hhh_"**

HACKATHONS

- 2019 **TAMUHack (1st), Hacklahoma (3rd), with team "Waitlisters"**
- 2018 **Hacklahoma (Top 10), with team "Waitlisters"**

LEADERSHIP

- 2024-Present **(Re-)Founder, Graduate Student Lounge Rep., UCSD CSE Graduate Student Council**
- o Led initiative to revive CSE Graduate Student Council, which had dissolved 10+ years prior
- 2022-Present **Administrator, UCSD “Chez Bob”**
- o Oversee operation of student-run snack and food co-op that handles hundreds of transactions per day
 - o Order and restock food and drinks, maintain cold brew kegerator
 - o Maintain infrastructure that runs POS system, fixing bugs and adding features
- 2018–2021 **President (previously Engineering Officer), UT Information & Systems Security Society**
- o Led a team of 15 officers and served an organization with 200+ members
 - o Led the UTCTF project in 2021 and 2020, a CTF with over 2500+ participants. Coordinated planning, communication, prizes, and wrote challenges ([isssec.io/github/UTCTF-21](https://github.com/isssec/UTCTF-21), [isssec.io/github/UTCTF-20](https://github.com/isssec/UTCTF-20))
 - o Created ForeverCTF, an always-up entry level CTF to allow people to practice security skills (forever.isssec.io)
 - o Led “Beginner Series” initiative, a series of talks teaching the basics of different security areas (isssec.io/talks/beginner-series)
 - o Wrote security challenges for biweekly Capture the Flag (CTF) competitions ([isssec.io/github/ctf](https://github.com/isssec/ctf))
 - o Gave talks about security-related topics such as cryptography, data forensics, privacy, etc. (isssec.io/talks)
- 2019–2021 **Captain, UT Collegiate Cyber Defense Comp. and Collegiate Penetration Testing Comp.**
- o CCDC: Led a team of 8 in a blue team simulation, where students must defend 8-10 machines from red team attackers while also completing business ‘injects’ (setting up new services, managing users, etc.). Competed at Nationals in 2021, placed 1st (2021), 2nd (2019), 3rd (2020) at Southwest Regionals
 - o CPTC: Led a team of 6 students in a red team simulation, where students perform a comprehensive penetration test of a company network with , then write a detailed report of the vulnerabilities and security flaws they found. Placed 2nd (2019) at New England Regionals
- 2018–2020 **Web/Tech Senior Officer (previously Web/Tech Junior Officer), UT ACM Chapter**
- o Implemented new features and fixed bugs on UT’s ACM chapter website
 - o Wrote curriculum for and hosted ‘CS101’, a series of 8-10 introductory workshops for freshmen with topics like Linux basics, Git/VCS, debugging, etc (github.com/UTACM/CS101)
 - o Created and implemented ‘A to Zs of UTCS’, a glossary of terms related to computer science, UTCS and UT Austin to help new students get up to speed (texasacm.org/AtoZ)

SELECTED PROJECTS

See my [GitHub](#) page for all personal projects.

Elitzur-Vaidman attack on quantum money, github.com/alex-bellon/quantum-money-attack

- o Implementation of an attack in which a user can recover the state of a piece of quantum money using only basic quantum logic gates

Anshel-Anshel-Goldfeld key exchange, github.com/alex-bellon/anshel-anshel-goldfeld-rubiks-cube

- o Implementation of a key exchange protocol that uses non-commutative cryptography with the Rubik’s Cube Group

Scrambled: Rubik’s Cube based steganography, github.com/alex-bellon/rubikstega

- o Implemented steganographic algorithm to encode text in Rubik’s Cube move notation
- o Wrote paper for “PagedOut” security zine about project (pagedout.institute)

SELF LEARNING

See my GitHub repository for all public notes/work: github.com/alex-bellon/learning

2022 **MIT 1.258J: Public Transportation Systems**, ocw.mit.edu, in progress

2018 **MIT 6.858: Computer Systems Security**, ocw.mit.edu, completed

TECHNICAL SKILLS

Most comfortable in Python, C and C++; familiar with Java assembly (M68K, x86), MySQL, JavaScript, HTML/CSS and Haskell.

Comfortable with Linux (Ubuntu, Arch/Manjaro) and UNIX, Shell (bash, zsh), git, vim, emacs (including org-mode), L^AT_EX, Ghidra (including scripting), LLVM (writing passes) and command line tools. Familiar with Wireshark, GNU Radio, gdb, Kubernetes and Docker.