William Frederick **Koch III**

PHD CANDIDATE · INTELLIGENT FLIGHT CONTROL

Hudson, MA

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Education

Boston University *Boston, MA*

PHD CANDIDATE IN COMPUTER SCIENCE *Sept. 2014 - Present*

- Thesis title: Flight Controller Synthesis via Deep Reinforcement Learning
- GPA: 3.7/4.0

Stevens Institute of Technology *Hoboken, NJ*

M.S. IN COMPUTER ENGINEERING *Jan. 2012 - Dec. 2013*

- Thesis title: A framework for assisting learners by incorporating knowledge to aid in predicting nerve guidance conduit performance
- GPA: 3.8/4.0

University of Rhode Island *Kingston, RI*

B.S. IN COMPUTER ENGINEERING, MINOR IN MATHEMATICS *Sept. 2003 - May 2008*

- GPA: 3.2/4.0

Research Experience

Boston University *Boston, MA*

RESEARCH ASSISTANT *Jan. 2017 - Present*

- Developing next generation flight control systems through the use of machine learning including the worlds first open-source neural network powered flight control firmware, Neuroflight.
- Conducted research in wide area of cyber security including static and dynamic malware analysis, vulnerability analysis, cyber defense and attacks and mobile security.

MIT Lincoln Laboratory *Lexington, MA*

CYBER SECURITY RESEARCH INTERN *Jan. 2016 - June 2016*

- Developed novel SDN attack called Persona Hijacking which has been published in USENIX Security Symposium.

Stevens Institute of Technology *Hoboken, NJ*

RESEARCH ASSISTANT *Jan. 2012 - Dec. 2013*

- Worked on multi-discipline team consisting of biomedical and computer engineers to advance nerve guidance conduit performance.
- Developed novel machine learning algorithms to predict nerve guidance conduit performance.

Teaching Experience

Boston University *Boston, MA*

TEACHING FELLOW *Fall 2017, Spring 2019*

- Designed lesson plans, taught discussion sections, developed written and programming assignments for class Fundamentals of Computing Systems.

Internal Drive Tech Camps *Princeton, NJ*

PROGRAMMING INSTRUCTOR *June 2016 - Aug. 2018*

- Created lesson plans for wide range of skill levels including object oriented fundamentals, polymorphism, exception handling and third-party library integration.
- Emphasized lessons on coding style and best practices not taught and enforced in academia.
- Advised students through final projects ranging from web crawlers to video games.

Stevens Institute of Technology *Hoboken, NJ*

TEACHERS ASSISTANT *Jan. 2012 - Dec. 2013*

- Grader for graduate class CPE-555 Real-Time and Embedded Systems and undergraduate class EE-250 Mathematics for Electrical Engineers.

Additional Experience

Boston Drone Racing
Founder/Organizer
Boston, MA
Jan. 2017 - Present

- Created website and designed logo. Established communication channels. Manage social media networks.
- Secured funding for racing track and supplies.
- Organize weekly races and monthly hack nights.

Capsules, LLC
Co-Founder/CEO
Madison, CT
June 2013 - Aug. 2014

- Managed team to create a geo-location based augmented reality mobile app.
- Lead mobile developer responsible for overall architechure, design and implementation.

Sikorsky Aircraft (subcontracted through AIS Consulting and Sila SG)
Software Engineer
Shelton, CT
Jun. 2006 - Jan. 2012

- Lead software engineer on seven software applications for the Sikorsky CH-53K Aircraft's Integrated Support System (ISS).
- Designed and implemented continuous integration environment.
- Responsible for integration between third-party vendors.

CT Hackerspace
Co-founder/Chairman
Watertown, CT
Aug. 2010 - Aug. 2011

- Established organization through the development of bylaws, identity, physical and web presence.
- Ran monthly board meetings to facilitate in the growth and direction of the hackerspace.

Select Publications

2019 ★ **Neuroflight: Next Generation Flight Control Firmware**, **William Koch**, Renato Mancuso, and Azer Bestavros, *In submission*

2019 ★ **Reinforcement Learning for UAV Attitude Control**, **William Koch**, Renato Mancuso, Richard West, and Azer Bestavros, *ACM Transactions on Cyber-Physical Systems*

2018 **S3B: Software-Defined Secure Server Bindings**, **William Koch**, and Azer Bestavros, *IEEE International Conference on Distributed Computing Systems (ICDCS)*

2017 **Semi-automated discovery of server-based information oversharing vulnerabilities in Android applications**, **William Koch**, Abdelberi Chaabane, Manuel Egele, William Robertson, and Engin Kirda, *ACM SIGSOFT International Symposium on Software Testing and Analysis*

2017 **PayBreak: defense against cryptographic ransomware.**, Eugene Kolodenker, **William Koch**, Gianluca Stringhini, and Manuel Egele, *ACM on Asia Conference on Computer and Communications Security*

2017 **Identifier Binding Attacks and Defenses in Software-Defined Networks**, Samuel Jero, **William Koch**, Richard Skowyra, Hamed Okhravi, Cristina Nita-Rotaru, and David Bigelow, *USENIX Security Symposium*

2016 **Markov modeling of moving target defense games**, Hoda Maleki, Saeed Valizadeh, **William Koch**, Azer Bestavros, and Marten van Dijk, *In Proceedings of the 2016 ACM Workshop on Moving Target Defense*

2016 **Provide: Hiding from automated network scans with proofs of identity**, **William Koch**, and Azer Bestavros, *IEEE Workshop on Hot Topics in Web Systems and Technologies (HotWeb)*

★ Current research focus

Projects

Neuroflight
https://github.com/wil3/neuroflight
Neuroflight is the first open-source neuro-flight controller software (firmware) for remotely piloting multi-rotors and fixed wing aircraft. Neuroflight's primary focus is to provide optimal flight performance.

GymFC
https://github.com/wil3/gymfc
GymFC is an OpenAI Gym environment designed for synthesizing intelligent flight control systems using reinforcement learning. This environment is meant to serve as a tool for researchers to benchmark controllers to progress the state-of-the art of intelligent flight control.

Interests

Drone Racing | Machine Learning | Engineering | Backpacking | Camping | Cooking | Snowboarding | Surfing | Music