William Frederick **Koch III**

Hudson, MA

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Education

Boston University — *Boston, MA*

PhD in Computer Science — *Sept. 2014 - Sept. 2019*

- 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 — *Sept. 2014 - Sept. 2019*

- Developed next generation flight control systems through the fusion of deep reinforcement learning and digital twinning leading to the worlds first 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 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, and developed assignments for the 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.

Stevens Institute of Technology — *Hoboken, NJ*

Teachers Assistant — *Jan. 2012 - Dec. 2013*

- Grader for graduate class Real-Time and Embedded Systems and undergraduate class Mathematics for Electrical Engineers.

Work Experience

Boston Drone Racing *Boston, MA*

Founder/Organizer *Jan. 2017 - Present*

- Organizer for weekly races and monthly hack nights.
- Secured funding for racing track.
- Created website, designed logo, established communication channels and manage social media networks.

Capsules, LLC *Madison, CT*

Co-Founder/CEO *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) *Shelton, CT*

Software Engineer *Jun. 2006 - Jan. 2012*

- Lead software engineer on seven software applications supporting the Sikorsky CH-53K Aircraft's Integrated Support System (ISS) for fleet management and IVHM.
- Responsible for integration between Sikorsky CH-53K Aircraft's Integrated Support System (ISS) and Goodrich ground support software (GSS).
- Designed and implemented continuous integration environment.

CT Hackerspace *Watertown, CT*

Co-founder/Chairman *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)*

Projects

Neuroflight

https://github.com/wil3/neuroflight

Neuroflight is the first world's first neural network supported flight controller software (firmware) for remotely piloting multi-rotors and fixed wing aircraft. Neuroflight's focus is in providing optimal flight control.

GymFC

https://github.com/wil3/gymfc

GymFC is a universal flight controller tuning framework for synthesizing neural network based flight controllers using reinforcement learning.

Interests

Drone Racing | 3D Modeling and Printing | Backpacking | Camping | Cooking | Snowboarding | Surfing | Music