Angus Galloway

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Education

2016–present: **MASc Engineering** *University of Guelph*, ON, Canada.
Research emphasis on "Robust and Interpretable Machine Learning Models", supervised by Graham W. Taylor PhD, and Medhat Moussa PhD, P. Eng.

Lead researcher of several fundamental contributions in robust machine learning and defenses against the now well-known *"adversarial examples phenomenon"*, affecting the deployment of deep learning models in high-stakes environments (e.g autonomous driving, making medical decisions).

2012–2016: **Bachelors in Engineering Systems and Computing** *University of Guelph*, ON, Canada.
Capstone project titled *"Epileptic Seizure Prediction via Mobile Non-Invasive Electroencephalogram"* supervised by Dr. April Khademi PhD, P. Eng. Senior courses in signal processing, nano–scale integrated circuit design, computer and microprocessor design, and large-scale software architecture.

Publications

Predicting Adversarial Examples with High Confidence *Angus Galloway, Graham W. Taylor, and Medhat Moussa*, submitted to the International Conference on Machine Learning (ICML) 2018, doi arXiv:1802.04457, "top-6 recent-weekly" by `arxiv-sanity.com` community.

Attacking Binarized Neural Networks *Angus Galloway, Graham W. Taylor, and Medhat Moussa*, to appear in the International Conference on Learning Representations (ICLR) 2018, doi arXiv:1711.00449, top 19% of 935 submissions, "top-10 recent-weekly" on `arxiv-sanity.com`.

The Ciona17 Dataset for Semantic Segmentation of Aquatic Invasive Species *Angus Galloway, Graham W. Taylor, Aaron Ramsay and Medhat Moussa*, Conference on Computer and Robot Vision (CRV) 2017, doi arXiv:1702.05564.

Teaching

2018 – Part-time lecturer and principal TA for graduate machine vision (30 students)
2017–2018 – Part-time lecturer and TA for senior undergraduate robotics (40–90 students)
2016 – Principal TA for senior undergraduate real-time systems design (60 students)

Industry Experience

2017: **Co-Founder** *NextAI venture*, Toronto, ON.
Technical Co-Founder of a NextAI-backed venture providing speech transcription and context searching services for telephony applications. Among 6 of 20 ventures invited to present to media and sponsors at the *NEXT Canada 2017 Prototype Day*.

2016: **Systems Engineering Intern** *NXP Semiconductors Inc.*, Austin, TX.

Was actively involved in the new product introduction of a dual–radio bluetooth low-energy ARM based SoC. Developed a device characterization framework in *C* for ongoing use by the automated test team, and helped devise data collection procedures for official datasheet. Prototyped application level software for "low-power beacon" use cases (e.g as a Google Eddystone), and worked with design team to replicate and resolve an early-adopter systems integration challenge.

2015: **Engineering Intern** *Freescale Semiconductor Inc.*, Austin, TX.

Prototyped Internet-of-Things software reference designs (e.g in Linux and with an RTOS), and enabled *Kinetis family* microcontrollers with open source connectivity frameworks. Updated an R3 form factor CAN-bus PCB "shield" as part of the project, and maintained a technical blog in Freescale's community that received 10K+ views.

2014: **Microprocessor Engineering Intern** *Freescale Semiconductor Inc.*, Austin, TX.

Responsible for the power characterization of a new heterogeneous ARM Cortex-A9/M4 SoC under various benchmarks and multimedia use cases, publishing results in an application note.

2013: **Microcontroller Engineering Intern** *Freescale Semiconductor Inc.*, Austin, TX.

Prototyped software use cases in *C* and conducted experiments for an online power estimator tool (KINETIS-PET), initially for ARM M0+ microcontrollers. Fully characterized several device peripherals including the UART, SPI, I2C, ADC, and DAC, under a range of scenarios and servicing schemes.

Awards

UofGuelph: Helen Grace Tucker Design Award   *Highest avg. in design courses (major specific)–2016*

NXP: Second place (of 30 interns)   *Summer intern final project presentations–2016*

Freescale: Second place (of 10 teams)   *Global employee hackathon–2015*

Freescale: First place (of 80 interns)   *Summer intern final project presentations–2013*

Community Involvement

Canada Learning Code (Dec. 2017): Volunteer instructor for "Ladies Learning Code: Data Insights with Python for Beginners" workshop in Charlottetown, PE.

University of Guelph IEEE Student Branch Chair (2015–2016): Designed an inverted pendulum robotics kit including custom 3D printed componenents, and lead a workshop teaching circuits and digital control theory with microcontrollers to 60 students, in collaboration with the "Women in Science and Engineering" club. Additional activities included:

o Organized and ran an autonomous line-following car racing challenge, and developed starter code in MATLAB/Simulink for teams. Devised a related challenge for the Guelph Engineering Competition (GEC) and provided technical assistance to teams.

o Plan and M.C. research talks, helped run an Android programming workshop.

Unmanned Systems Canada (2015–2016): - Lead a multidisciplinary effort involving the development of an object recognition and navigation system for a UAV competition with an agricultural focus.

Consulting

o Digital filter and algorithm development in MATLAB/Python and C for temporal localization of ultrasonic reflections in an outdoor precision liquid-level sensing application. Deployed on a microcontroller with 64K SRAM.