Micah Elliot Halter

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Education

Jan 2020 – Dec 2021
Master of Science in Computer Science
Georgia Institute of Technology, Atlanta, GA.
- Specialization in Machine Learning

Aug 2015 – May 2019
Bachelor of Science in Computer Science
Georgia Institute of Technology, Atlanta, GA.
- Concentration in system architecture and theory
- Dean's List Fall 2015, Spring 2016, Fall 2016, Fall 2018, Spring 2019

Aug 2017 – Dec 2017
Bachelor of Science in Computer Science
Hong Kong University of Science and Technology, Hong Kong.
- Studied abroad

Professional Experience

Feb 2021 – Present
Balena – Backend Engineer
Remote (Atlanta, GA).
- Develop backend code for the Balena ecosystem
- More details to come…

Jun 2019 – Feb 2021
Georgia Tech Research Institute – Research Scientist
Atlanta, GA.
- Lead contributor to research projects sponsored by large entities DARPA, NIH, DOD, and ONR
- Wrote and published peer reviewed conference and journal papers to communicate research findings to the greater research community
- Contributed and participated in white paper and proposal writing to bring in more funding for new and on-going projects
- Delivered applied research projects to sponsors such as source code, web applications, and technical reports

Jan 2016 – May 2019
Georgia Tech Research Institute – Undergraduate Research Assistant
Atlanta, GA.
- Lead contributor to research projects sponsored by large entities NIH and ONR
- Wrote and published a peer reviewed journal paper to communicate research findings to the greater research community
- Delivered applied research projects to sponsors such as source code, web applications, and technical reports
- Predicting crimes in Portland, OR using temporal and geographic features derived from crime statistics and GIS data

May 2016 – Aug 2017
The Boeing Company – Software Development Intern
Kent, WA.
- Developed a security auditing tool suite for Red Hat Enterprise Linux 7 to maintain hardened security on classified servers
- Developed a web application in C#, HTML, and JavaScript to view and analyze network traffic
- Developed several system administration scripts as needed by team members to complete tasks such as emailing system logs and automatic server backups
- Organized and led a software development team to create a minimum viable product of a Kanban board web application
- Pitched the Kanban board prototype to management to form a team to continue development of the application after I left
- Documented and executed an upgrade plan for the company's identity management servers
- Developed an Outlook-integrated conference room mapping tool in C#

Projects

AlgebraicJulia
Georgia Tech Research Institute.
- A GitHub Organization for a collection of Julia packages for defining modeling frameworks as generalized algebraic theories
- Includes Julia packages such as Catlab.jl, AlgebraicPetri.jl, and AlgebraicRelations.jl
- A category theory approach to defining metamodeling tasks for representing, composing, selecting, and tuning scientific models
- Research funded by the Defense Advanced Research Projects Agency (DARPA)

Petri.jl
Software Development.
- A stochastic petri net modeling framework for the Julia programming language
- Allow petri nets to be compiled to Gillespie and differential equation based simulations

VirtualEnv.jl

Software Development.

- Self-contained virtual environments for the Julia programming language
- A reimplementation of `venv` from Python in Julia

Corsair Database

Georgia Tech Research Institute.

- Research funded by the Office of Naval Research (ONR)
- Developed a web application for viewing and analyzing sonar SAS data using Go, Python, and PostgresDB deployed with Docker and Drone.io
- Engineered a database for managing scientific experiments to utilize the speed and efficiency of using a rigid relational database, while being flexible enough to handle the changing data requirements of scientific experimentation

Research

Funding

2020 – 2021 Task Lead, DARPA, *Computable Models - Generalized Algebraic Theories for Enhancing Multiphysics*, ≈$1.35M
2019 – 2021 Performer, Office of Naval Research, *Extracting, Explaining, and Estimating Information in Sonar Data*, ≈$400K
2019 – 2021 Performer, Office of Naval Research, *MCM Situational Awarness*, ≈$375K
2018 – 2020 Task Lead, DARPA, *Artifical Intelligence Exploration - Automating Scientific Knowledge Extraction*, ≈$1M
2018 – 2019 Performer, Air Force, *Network Risk Indication*, ≈$135K
2016 – 2019 Performer, Office of Naval Research, *Performance Estimation of Underwater MCM Operations*, ≈$990K
2015 – 2019 Performer, Office of Naval Research, *Automation for UxV-based Mine Countermeasures*, $540K

Peer Reviewed Conference Publications

- *Compositional Scientific Computing with Catlab and SemanticModels*, **Micah Halter**, Evan Patterson, Andrew Baas, James Fairbanks, Applied Category Theory, 2020
- *SemanticModels.jl: A Julia Package for Scientific Model Augmentation*, **Micah Halter**, Sreenath Raparti, Kun Cao, Christine Herlihy, James Fairbanks, JuliaCon, 2019
- *A Compositional Framework for Scientific Model Augmentation*, **Micah Halter**, Christine Herlihy, James Fairbanks, Applied Category Theory, 2019

Under Review Journal Publications

- *Accelerating Automatic Target Recognition Performance Estimation with a Relational Database for Synthetic Aperture Sonar*, James Fairbanks*, **Micah Halter***, Trevor Goodyear, Matthew Jackson, Brian O'Donnell, John Wilcher, Navy Journal of Underwater Research, 2018

Invited Talks

- *Compositional Epidemiological Modeling Using Structured Cospans*, **Micah Halter** and Evan Patterson, University of California Riverside Categories Seminar, Nov 2020

Posters

- *SemanticModels.jl: A Framework for Automatic Composition of Scientific Models Across Domains*, **Micah Halter**, Kun Cao, James Fairbanks, SIAM Conference on Parallel Processing for Scientific Computing, Feb 2020
- *Scientific Knowledge Extraction, Augmentation & Analysis*, **Micah Halter**, James Fairbanks, Eric Davis, Clayton Morrison, Ryan Wright, DARPA Demo Day, Sep 2019

Open Source Involvement

Core Maintainer

- **AlgebraicJulia** – https://github.com/AlgebraicJulia
- **Petri.jl** – https://github.com/mehalter/Petri.jl
- **TikzCDs.jl** – https://github.com/JuliaTeX/TikzCDs.jl
- **VirtualEnv.jl** – https://github.com/mehalter/VirtualEnv.jl
- **XDGSpec.jl** – https://github.com/mehalter/XDGSpec.jl

Contributor

- **Neovim** – https://github.com/neovim/neovim
- **JuliaTeX** – https://github.com/JuliaTeX
- **sir-julia** – https://github.com/epirecipes/sir-julia
- **qutebrowser** – https://github.com/qutebrowser/qutebrowser
- **vim-pandoc** – https://github.com/vim-pandoc/vim-pandoc
- **python-keyboard** – https://github.com/makerdiary/python-keyboard
- **Comonicon.jl** – https://github.com/Roger-luo/Comonicon.jl
- **voidrice** – https://github.com/LukeSmithxyz/voidrice/

Arch User Repository Package Maintainer

- **Ruby on Rails** – https://aur.archlinux.org/packages/ruby-rails/
- **OpenSCAP** – https://aur.archlinux.org/packages/openscap/
- **HTTP Prompt** – https://aur.archlinux.org/packages/http-prompt/
- **Translate Shell** – https://aur.archlinux.org/packages/translate-shell-git/
- **Antigen** – https://aur.archlinux.org/packages/antigen/
- **Ueberzug** – https://aur.archlinux.org/packages/python-ueberzug-git/
- **write-good** – https://aur.archlinux.org/packages/write-good/
- **MyEtherWallet** – https://aur.archlinux.org/packages/myetherwallet/

Languages & Skills

Full Stack Development • Deep Learning • System Administration • Database Design and Management

High Performance Computing • Machine Learning • Functional Programming • Category Theory
C/C++, Julia, Python, Go, Java, Haskell, Scala, Perl, Bash, SQL, MySQL, PostgreSQL, LaTeX, HTML, CSS, JavaScript