ALEX WASHBURN

Computational Engineer

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🌐 recursion.ninja
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⏳ Last Updated April 19 2024

Education

The Graduate Center - CUNY	New York, NY
Ph.D. Candidate Computer Science	Aug 2022 — Present
Hunter College - CUNY	New York, NY
M.A. Computer Science	Aug 2022
University of Wisconsin - Milwaukee	Milwaukee, WI
B.S. Computer Science, Mathematics (Double Major)	Dec 2014

Distinctions

Advanced Open Water Diver	
PADI Certification № 23020L2456	Feb 14, 2023
Open Water Diver	
PADI Certification № 2208AD4319	Aug 2, 2022
Graduate Center Fellowship	
The Graduate School of the City University of New York	Feb 21, 2022
Support for Undergraduate Research Fellows	
University of Wisconsin - Milwaukee	May 21, 2014
Virginia Berk Writing Contest, First Place	
University of Wisconsin - Milwaukee	Apr 21, 2011
Black Belt in Tae-Kwon-Do	
Cho's Martial Arts	Aug 8, 2009
Eagle Scout Rank	
Boy Scout Troop 67	Feb 18, 2009

Technical Strengths

Languages	C, C++, C#, Dhall, Haskell, Idris 2, Java, JavaScript, ML, PHP, Python, SQL
APIs/Protocols	CSS3, DIMACS, HTML5, REST, XML
Databases	MariaDB, MySQL, MSSQL, Sybase
Tools	Cabal, Docker, Emacs, Git, LaTeX, Pandoc, PicoSAT, Spin, VS Code, Z3

Publications & Presentations

doi Wheeler, W. C., A. J. **Washburn**, and Louise M. Crowley. 2023. PhylogeneticGraph (PhyG) a new phylogenetic graph search and optimization program. Cladistics.

doi Wheeler, W. C. and A. J. **Washburn**. 2023. Parsimony Optimization of Phylogenetic Networks. Cladistics.

doi **Washburn**, A. J. 2022. Formal Verification Applications for the TreeKEM Continuous Group Key Agreement Protocol. Masters Thesis.

doi **Washburn**, A. J. et al. 2021. Simulating SARS-CoV-2 Transmission in the New York Subway. Winter Simulation Conference.

doi **Washburn**, A. J. and W. C. Wheeler. 2020. Efficient Implied Alignment. BMC Bioinformatics.

ⓘ **Washburn**, A. J and C. McGill. 2019. Phylogenetic Software in Haskell. Compose Conference NYC.

ⓘ Wheeler, W. C. and A. J. **Washburn**. 2019. FASTC: A file format for multi-character sequence data. Cladistics.

Manuscripts in Preparation

Washburn, A. J. and Subash Shankar. 2023. Verifying the TreeKEM protocol with Spin and Continuous Group Key Agreement.

Work Experience

City University of New York (CUNY) <div align="right">New York, NY</div>

Graduate Research Assistant <div align="right">Aug 2022 - Present</div>

Apply software design and project management experience to conduct, document, and publish novel research
Perform literature review to locate and accessibly present relevant state-of-the-art techniques to stake-holders
Make interactive program synthesis UX by composing oracle-based, type-driven, and example-guided techniques
Utilize formal methods techniques for cryptographic protocol verification used by billions of people worldwide

American Museum of Natural History <div align="right">New York, NY</div>

Software Consultant <div align="right">July 2023 - Dec 2023</div>

Lead Software Engineer <div align="right">Sep 2015 - Jun 2020</div>

Architect a modular, extensible, and well documented open-source bio-informatics framework
Lead and coordinate a team with varying levels of technical overlap from conceptual research to end product
Improve asymptotic complexity of core string alignment algorithm by a factor of n
Prototype novel and performance tune graph algorithms for operating on big data sets of several TiBs
Design a declarative DSL as a Free Monad computation & implemented an optimized monadic evaluator
Integrate legacy C codebase into modern Haskell via well-typed FFI achieving critical low-latency throughput
Develop efficient, well-typed file parsers for a variety of informally defined, bespoke formats
Define robust data normalization and unification procedures for a disparate input data sources

City University of New York (CUNY) <div align="right">New York, NY</div>

Adjunct Lecturer <div align="right">Aug 2018 - Dec 2023</div>

Plan and present curricula which encourages active learning, problem solving, and collaboration
Adaptively utilize multiple instructional strategies to comprehensively demonstrate computer science topics
Author and grade papers, presentations, programs, quizzes, and exams designed to provide meaningful feedback

MSI Data, LLC <div align="right">Mequon, WI</div>

Software Developer <div align="right">Jan 2015 - Aug 2015</div>

Expanded abstracted data synchronization capabilities between multiple backend ERP systems
Maintained and extensively refactored MVC web service, improving throughput by 33%

University of Wisconsin - Milwaukee <div align="right">Milwaukee, WI</div>

SURF Research Team Member <div align="right">May 2014 - Dec 2014</div>

Calculated cellular automata input density to output density for small N-dimensional toruses
Modeled disease spread with incubation periods & vaccination schedules via cellular automata

Outpost Natural Foods Co-op <div align="right">Milwaukee, WI</div>

Software Development Specialist <div align="right">Dec 2013 - Dec 2014</div>

Pricing Specialist <div align="right">May 2011 - Dec 2013</div>

Maintenance Clerk <div align="right">Oct 2010 - May 2011</div>

Developed inter-store inventory transfer tracking & reporting system

Implemented an automated system which retrieves, archives & parses invoices into reports
Produced ergonomic web-interface for quick lookup of inventory retail & sale info
Automated the sale bulletin preparation platform
Engineered database diagnostic software to enforce dynamic business logic invariants
Authored scalable data retrieval & analysis queries
Worked directly with end users to assess problems & collaboratively develop solutions