Aidan Lakshman

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EDUCATION

University of Pittsburgh, School of Medicine
Doctor of Philosophy, Biomedical Informatics; expected graduation Summer 2025
- Dissertation: Comparative genomic methods to reveal functional associations among proteins

University of Central Florida
Bachelor of Science, Mathematics; magna cum laude, 2020
- Burnett Honors College
- National Merit Scholar

WORK EXPERIENCE

University of Pittsburgh, Pittsburgh, PA
Graduate Researcher, 2020 – 2025
- Designed novel algorithms to predict gene function using evolutionary signal; in review at *Nature Biotechnology*
- Optimized network clustering algorithms to process graphs with millions of nodes in constant memory complexity
- Created domain-specific network clustering algorithms to predict metabolic pathways from genome data
- Managed the Wright Lab's technical infrastructure, CI/CD pipelines, and code repositories
- Researched new approaches to infer causal relationships among variables in the presence of data missingness

Amazon Web Services, Herndon, VA [Virtual]
Software Development Engineer Intern, Summer 2020 & 2021
- Led a team to implement a robust testing framework for Research Service Workbench on AWS (RSW)
- Streamlined RSW user experience by redesigning frontend components and building new backend infrastructure
- Implemented frontend components using React, backend components with Node.js and AWS Lambda

Software Engineering Institute, CERT Division, Carnegie Mellon University
Data Science / Software Engineering Intern, Summer 2017
- Identified trends in malware execution behavior using Apache Spark and Python
- Developed a Python program to simulate web traffic and user activity for cyberdefense training environments

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GRANT FUNDING

R Consortium, Infrastructure Steering Committee
"Critical Updates to Biostrings", 2024 – 2025 [Award: $8,000]
- Became the primary maintainer of Biostrings, an open source R package with >1M downloads per year
- Optimized internal methods, implemented CI/CD pipelines, handled bug reports, and added unit testing

Carnegie Mellon University, Intelligent Coordination and Logistics Lab
Robotics Institute Summer Scholar, Summer 2018 [Award: $5,250]
- Optimized traffic signal control algorithms with Bayesian hierarchical modelling to predict bus behavior
- Developed assistive technology for mobility impaired pedestrians using cellular and DSRC GPS data

University of Central Florida, Evolutionary Computation Lab
Burnett Research Scholars Grant, 2018 – 2019 [Award: $3,000]
- Optimized embodied evolutionary robotic systems for multi-foraging problems by incentivizing exploration

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SKILLS

High Performance Computing
- Over 3.5 million compute hours on HTCondor systems
- Passed AWS Cloud Practitioner Certification Exam (2020-2023)

Programming Languages
- Expert proficiency: R (packages: Biostrings, SynExtend, froth; additional contributions to base R)
- Work Experience: C, Fortran, Python, JavaScript, Bash, PowerShell
- Other Experience: C#, Java, Haskell, Forth, Assembly (6502)

Computer Engineering
- Designed and built a cloud storage system with multiple layers of data redundancy
- Built a 6502 computer on a breadboard and developed a Forth OS from scratch in 6502-Assembly

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PUBLICATIONS

Lakshman, Aidan and Wright, E.S. "EvoWeaver: Large-scale prediction of gene functional associations from coevolutionary signals" **(Under Revision)**. *Nature Biotechnology*. [Preprint available on request]

Lakshman, A., and Wright, E.S. "ExoLabel: Scalable network clustering for massive datasets" **(In preparation)**.

CONFERENCE PRESENTATIONS

ISMB 2024 — July 12-16, 2024
Predicting Gene Functional Associations from Coevolutionary Signals with EvoWeaver — Montréal, Canada

useR! 2024 — July 8-11, 2024
Community Detection for Extremely Large Networks — Salzburg, Austria

Great Lakes Bioinformatics Conference — May 13-16, 2024
Scalable Community Detection for Large Networks — Pittsburgh, PA
- Organizer and co-chair for special session "Scalable Analysis for Big Biological Data"

RECOMB 2024 — Apr. 29 - May 2, 2024
EvoWeaver: Large-scale prediction of gene functional associations from coevolutionary signals — Cambridge, MA
- Poster Presentation, won Best Poster award

R Project Sprint 2023* — Aug. 30 - Sept. 1, 2023
- Refactored R's **dendrapply** function — Coventry, UK

Evolution 2023* — June 21-26, 2023
Protein Function from Coevolutionary Signal — Albuquerque, NM

Bioconductor 2022* — July 27-29, 2022
Using comparative genomics to predict protein coevolution networks — Seattle, WA
- Led a two hour workshop (materials available at ahl27.com/tutorials)

NSF Sponsored Workshop* — July 25-26, 2022
Detecting adaptive evolutionary events in genomes of polar species — St. Augustine, FL

Evolution 2022 — June 24-28, 2022
Protein Functional Inference using Coevolutionary Signal — Cleveland, OH

NLM Informatics Training Conference 2022 — June 22-24, 2022
Ensemble Methods Improve de novo *Prediction of Protein Functional Association Networks* — Buffalo, NY

**Awarded merit-based travel funding*

TEACHING & ADVISING

Undergraduate Mentor — Fall 2022
Advisor
- Mentored undergraduate students for a semester-long research internship program
- Designed an individualized curriculum to teach R programming for Bioinformatics

UPMC DDCF-UI Program — Summer 2022
Advisor
- Mentored undergraduate students for a summer-long research internship program
- Designed summer research projects for mentees
- Gave lectures to intern cohort

R Programming for Scientific Research, Univ. Pittsburgh — Fall 2021
Teaching Assistant
- Graduate level course in R programming
- Gave lectures, graded assignments, and wrote quizzes

Artificial Intelligence Club, Univ. Central Florida — 2018 – 2020
Director
- Gave regular lectures on machine learning to classes of >30 undergraduates
- Led several journal clubs for undergraduate students
- Coordinated sponsorship opportunities and guest speakers
