Aidan Lakshman

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EDUCATION

University of Pittsburgh, School of Medicine
Ph.D., Biomedical Informatics; expected graduation Summer 2025
- Research Focus: Designing efficient, scalable algorithms to analyze massive datasets with messy data
- Dissertation Title: Comparative genomic methods to reveal functional associations among proteins

University of Central Florida
B.S., 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; preliminary results formed the basis of a successfully funded U01 grant, results 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

Carnegie Mellon University, Intelligent Coordination and Logistics Lab
Robotics Institute Summer Scholar, Summer 2018
- 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

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

University of Central Florida
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 (C99), Fortran (F90), Python, JavaScript, Bash, PowerShell
- Other Experience: C++14, 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, A. and Wright, E.S. "EvoWeaver: Large-scale prediction of gene functional associations from coevolutionary signals" (**Under Revision** at *Nature Biotechnology*). [Preprint available on request]

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

SELECTED TALKS

ISMB 2024
Predicting Gene Functional Associations from Coevolutionary Signals with EvoWeaver

useR! 2024
Community Detection for Extremely Large Networks

Great Lakes Bioinformatics Conference
Scalable Community Detection for Large Networks
- Also organized and co-chaired special session ”Scalable Analysis for Big Biological Data”

RECOMB 2024
EvoWeaver: Large-scale prediction of gene functional associations from coevolutionary signals
- Poster Presentation, won Best Poster award

R Project Sprint 2023*
- Refactored and optimized R’s **dendrapply** function

Evolution 2023*
Protein Function from Coevolutionary Signal

Bioconductor 2022*
Using comparative genomics to predict protein coevolution networks
- Led a two hour workshop (materials available at ahl27.com/tutorials)

Evolution 2022
Protein Functional Inference using Coevolutionary Signal

NLM Informatics Training Conference 2022
Ensemble Methods Improve de novo *Prediction of Protein Functional Association Networks*

**Awarded merit-based travel funding*

TEACHING & ADVISING

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

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

R Programming for Scientific Research, Univ. Pittsburgh
Teaching Assistant, Fall 2021
- Graduate level course in R programming (roughly 20 students)
- Gave lectures, graded assignments, and wrote quizzes

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