

# 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
- 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
- Streamlined 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 modeling 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

## 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

## 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

## PUBLICATIONS

**Lakshman, A.** and Wright, E.S. "EvoWeaver: Large-scale prediction of gene functional associations from coevolutionary signals" (**Under Review**). [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 **dendraply** 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](http://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*

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## 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
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