# Aidan Lakshman

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## EDUCATION

**University of Pittsburgh, School of Medicine** — 2020 – 2025 (expected)
*Doctoral Candidate, Biomedical Informatics*

- Advisor: Dr. Erik Wright
- Dissertation: Comparative Genomic Methods to Reveal Functional Associations Among Proteins
- Funded by National Library of Medicine T-15 Training Grant

**University of Central Florida** — 2016 – 2020
*Bachelor of Science, Mathematics, magna cum laude*

- Burnett Honors College
- National Merit Scholar

**Nagasaki University of Foreign Studies** — Summer 2019
*USAC Study Abroad, Japanese Language and Culture*

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## PUBLICATIONS

Lakshman, A. & Wright, E.S. (2024). "EvoWeaver: Large-scale prediction of gene functional associations from coevolutionary signals" **(Under Revision)**. *Nature Biotechnology*. [Preprint available on request]

Cooley, N., Lakshman, A., & Wright, E.S. (2023). "SynExtend: Tools for Working With Synteny Objects". doi:10.18129/B9.bioc.SynExtend, R package version 1.14.0, https://bioconductor.org/packages/SynExtend.

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## CONFERENCE PRESENTATIONS

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

**Great Lakes Bioinformatics Conference** — May 13-16, 2024, Pittsburgh, PA
*Scalable Community Detection for Large Networks*

- Organizer and co-chair for special session "Scalable Analysis for Big Biological Data"

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

- Poster Presentation, won Best Poster award

**R Project Sprint 2023*** — Aug. 30 - Sept. 1, 2023, Coventry, UK

- Refactored R's **dendrapply** function

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

**Bioconductor 2022*** — July 27-29, 2022, Seattle, WA
*Using comparative genomics to predict protein coevolution networks*

- Led a two hour workshop (materials available at ahl27.com/tutorials)

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

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

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

**Awarded merit-based travel funding*

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## 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

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## OTHER FUNDED RESEARCH

**Critical Updates to Biostrings** 2024 – 2025
*R Consortium*

- Funding Agency: R Infrastructure Steering Committee
- Principal Investigators: Aidan Lakshman
- Contributed Work: Subsumed position as maintainer of the Biostrings R package. Implemented key enhancements to Biostrings to support modern genomics analyses.
- Total Award: $8,000

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

- Funding Agency: National Science Foundation
- Principal Investigators: Dr. Stephen Smith and Dr. Isaac Isukapati
- Contributed Work: used Bayesian hierarchical modelling to predict bus dwell times for traffic signal control optimization, and used cellular and DSRC GPS readings to improve positioning in an intersection for use in an app for mobility impaired pedestrians.
- Total Award: $5,250

**Burnett Research Scholars Grant** 2018 – 2019

- Funding Agency: UCF Burnett Honors College
- Principal Investigators: Aidan Lakshman, Dr. Annie Wu (Advisor)
- Project Title: Improving efficiency of embodied evolutionary robotic systems within the context of multi-foraging problems by incentivizing exploration behavior.
- Total Award: $3,000

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## WORK EXPERIENCE

**Amazon Web Services**, Herndon, VA [Virtual] Summer 2020 & 2021
*Software Development Engineer Intern*

- Led a team to implement a robust testing framework for Service Workbench on AWS, an open source AWS product to help researchers easily provision cloud resources.
- Redesigned how AWS accounts are handled by implementing new UI components, writing API calls, and implementing backend server request handling
- Designed UI components using React, backend components with Node.js, and additional processes with AWS Lambda

**Software Engineering Institute, CERT Division**, Carnegie Mellon University Summer 2017
*Data Science / Software Engineering Intern*

- Developed a Python application utilizing Apache Spark to use Latent Dirichlet Allocation to identify trends in malware data.
- Developed a Python program to simulate web traffic and user activity for cyberdefense training environments.

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## SKILLS

**High Performance Computing**

- Experience implementing genomics algorithms on distributed systems
- Over 3.5 million compute hours on HTCondor systems
- Passed AWS Cloud Practitioner Certification Exam

### R Programming

- High level of proficiency, particularly in comparative phylogenomics
- Contributed code to the R programming language
- Author of the SynExtend and froth R packages
- Contibutor to the Biostrings R package
- Implemented neural networks, random forests, and support vector machines from scratch in C and Fortran (with R interfaces)

### C Programming

- Extensive experience writing C extensions for R
- Moderate experince writing C programs for other applications

### Fortran

- Proficiency writing Fortran extensions for R
- Implemented Random Forests from scratch using Fortran and C

### Other Programming Languages

- Professional experience developing with JavaScript, Python, Bash, and PowerShell
- Proficiency with C#, Java, and Haskell

### Foreign Languages

- Conversational proficiency in Japanese and German

### Computer Engineering

- Designed and built a cloud storage system with multiple layers of data redundancy
- Built a computer from scratch on a breadboard with a 6502 microprocessor
- Wrote a 6502 emulator in C
- Wrote a Forth interpreter and OS from scratch in Assembly for the 6502

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