

RAJEE GANESAN

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EDUCATION

CARNEGIE MELLON UNIVERSITY

Second Year Ph.D. Student in Department of Biology

**Pittsburgh, PA
Exp. 2026/2027**

UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL

Bachelor of Science in Quantitative Biology, Minors in Data Science and Statistics [*Cum Laude, Dean's List*]

**Chapel Hill, NC
May 2022**

Relevant Coursework: *Italics indicate graduate level coursework*

- **Bioinformatics:** *Bioinformatics Data Practicum Genomics and Epigenetics of the Brain, Modeling Evolution*, Bioalgorithms, Biostatistics, Computational Sociology, Analysis of Functional Genomics Experiments
- **Computer Science:** *Practical Computing and Data Analysis*, Object-Oriented Design, Data Structures
- **Biology:** *Advanced Genetics*, Cell Biology, Molecular Biology, Evolutionary Genetics
- **Mathematics & Physics:** Vector Calculus, Decision Sciences, Statistics II, Mechanics, Electricity and Magnetism

EXPERIENCE

Carnegie Mellon University, Departments of Biology, Computational Biology

Pittsburgh, PA

Ph.D. Student in Pfenning Lab, Rotation Student in Pfenning, Ettensohn, and McManus Labs

July 2022-Present

- Executing projects that use computational approaches to study vocal learning and convergent evolution at a single cell level in order to uncover variants affected in pathways related to speech for experimental validation.
- Evaluated gaps in ongoing research and designed feasible projects to contribute meaningfully to the field.
- Developed an internal pipeline using Bash scripting and public tool integration that determined 3'/5' bias in RNA sequencing was not indicative of mRNA decay, computationally disproving the common hypothesis.
- Executed experimental analysis on urchin developmental stages and prepared a dozen samples for external sequencing.
- Regularly compiled, organized and presented research updates and findings at departmental and large group conferences.

Furey Lab, UNC Department of Medicine

Chapel Hill, NC

Senior Research Intern

Aug 2019 – Apr 2022

- Implemented a bioinformatics pipeline using Perl, Bash and Python scripting in a supercomputing environment to identify sites of allelic imbalance in Crohn's disease patients to better understand potential variants to treat using gene therapies.
- Designed, implemented and troubleshoot pipeline testing guanine quadruplex formation in stimulated IL 10 KO macrophages.
- Completed and presented major Honors Thesis with results revealing regional correlation to disease-related genes.
- Mentored and managed two undergraduate students through reimplementing of the pipeline for alternative datasets.

Watts Lab at National Institutes of Environmental Health Sciences, National Institutes of Health

Durham, NC

Scholars Connect Program Research Fellow

June 2021- April 2022

- Developed computational methods using R, Bash and Python scripting to accurately identify regions forming quadruplexes, and integrated experimental results confirming a correlation between these regions and polymerase pausing/gene expression.
- Created and delivered communicative research presentations biweekly and quarterly at internal and external meetings.

Meyer Lab at Cold Spring Harbor Laboratory

Cold Spring, NY

Summer Research Intern

May 2021 – Aug 2021

- Integrated single-cell RNA-seq and ATAC-seq data to study AIRE expression in medullary thymic epithelial cells, proving that alterations in open chromatin drove autoimmune regulation in these cells, regulating self-reaction.
- Created and presented a final talk at the CSHL symposium to the department and invited guests.
- Delivered final report detailing findings and outlining next steps for full-time employees of the lab in lieu of results.

Carolina Housing

Chapel Hill, NC

Residential Computing (IT) Consultant

Aug 2020 – May 2021

- Utilized ServiceNow to problem-shoot digital tickets pertaining to network issues, including ethernet and internet, hardware issues, and other general technical issues for an undergraduate population of ~1000 students.
- Collaborated with a team of 45 other consultants to diagnose and solve student software and hardware issues.

UNC Division One Baseball

Chapel Hill, NC

Data Analyst

Dec 2019 – Dec 2020

- Collaborated with 18 analysts to develop game insights using R, assessing likelihoods of certain pitches in various situations.
- Created easy-to-read scouting reports for upcoming opponents by compiling and organizing data for coaches and players.

**Colbert Lab at NIAMS, National Institutes of Health
Translational Pediatrics Branch Summer Research Intern**

**Bethesda, MD
May 2019 – Aug 2019**

- Analyzed genome wide protein expression assessed by broad proteomic analysis from peripheral blood in Juvenile Dermatomyositis patients, utilizing a variety of computational softwares including R, JMP and Ingenuity Pathway Analysis.
- Organized and presented results regularly at internal meetings and delivered the final poster for NIH's Summer Poster Day.

**Ley Lab at La Jolla Institute for Allergy and Immunology
Research Intern**

**La Jolla, CA
Jan 2019 – June 2020**

- Experimentally used fluorescent and confocal microscopy in conjunction with antibody staining and image analysis software to study the biophysics of neutrophil motor function and leukocyte rolling.
- Developed understanding of research design, experimental troubleshooting, technical and protocol writing.

**Zaniac Parkside
STEM Head Instructor, Administrative Assistant**

**Cary, NC
June 2017 – May 2021**

- Developed, taught and implemented curriculum for students from grades K-8 on a variety of STEM topics.
- Led instructional team of 15-20 employees and performed administrative duties, such as onboarding and scheduling.

PUBLICATIONS

- **Rajee Ganesan**, Terrence S. Furey. (2022) Impact of guanine quadruplex formation on transcription and open chromatin regions in stimulated IL 10 KO macrophages. [10.17615/4vg8-aj33]
- Marki A, Buscher K, Lorenzini C, Meyer M, Saigusa R, Fan Z, Yeh YT, Hartmann N, Dan JM, Kiosses WB, Golden GJ, **Ganesan R**, Winkels H, Orecchioni M, McArdle S, Mikulski Z, Altman Y, Bui J, Kronenberg M, Chien S, Esko JD, Nizet V, Smalley D, Roth J, Ley K. Elongated neutrophil-derived structures are blood-borne microparticles formed by rolling neutrophils during sepsis. J Exp Med. 2021 Mar 1. [10.1084/jem.20200551.]

TEACHING

- BIOL 03133, Neurobiology of Disease [Teaching Assistant, Instructor: Daniel J. Brasier, Ph.D.]

PRESENTATIONS

- **Rajee Ganesan**, Joel C. McManus (Feb 2023) "Predicting RNA decay rates based on 3'/5' bias in RNA-sequencing data" [Talk]
- **Rajee Ganesan**, Andreas Pfenning (Nov 2022) "Vocal learning cell type associations in zebra finch snRNA-seq data" [Talk]
- **Rajee Ganesan**, Terrence S. Furey. (April 2022) "Impact of guanine quadruplex formation on transcription and open chromatin regions in stimulated IL 10 KO macrophages". Department of Biology Honors Thesis Symposium. [Talk]
- **Rajee Ganesan**, Jason A. Watts. (April 2022). "Guanine quadruplex formation is associated with tonicity-responsive gene expression." NIEHS Scholars Connect Program Final Symposium [Talk].
- **Rajee Ganesan**, Hannah Meyer. (August 2021) "Integrative Analysis of single cell expression and chromatin states in Medullary Thymic Epithelial Cells". Cold Spring Harbor Laboratory Summer Interns' Final Symposium [Talk]
- **Rajee Ganesan**, Jason A. Watts. (July 2021) "Guanine-Quadruplex Formation Regulates RNA Polymerase II Pausing and Gene Expression". NIEHS Scholars Connect Program Quarterly Poster Session [Poster]
- **Rajee Ganesan**, Terrence S. Furey. (October 2020) "Allelic Imbalance Analysis in Colonic Tissue in Crohn's Disease". BIOL395 Final Research Course Presentation. [Poster]
- **Rajee Ganesan**, Terrence S. Furey. (October 2020) "Allelic Imbalance Analysis in Colonic Tissue in Crohn's Disease". State of North Carolina Undergraduate Research & Creativity Symposium. [Poster]
- **Rajee Ganesan**, Angélique Biancotto, Foo Cheung, Terrance O'Hanlon, Yan Huang, Kamelia Zerrouki, Melissa de Los Reyes, Saifur Rahman, Kerry A. Casey, Frederick W. Miller, Raphaela Goldbach-Mansky, Lisa G. Rider, and Hanna Kim. (August 2019) "Novel Serum-Based Proteomic Analysis in Juvenile Dermatomyositis (JDM)". NIEHS Autoimmune Presentation. [Talk]
- **Rajee Ganesan**, Angélique Biancotto, Foo Cheung, Terrance O'Hanlon, Yan Huang, Kamelia Zerrouki, Melissa de Los Reyes, Saifur Rahman, Kerry A. Casey, Frederick W. Miller, Raphaela Goldbach-Mansky, Lisa G. Rider, and Hanna Kim. (August 2019) "Novel Serum-Based Proteomic Analysis in Juvenile Dermatomyositis (JDM)". NIH Poster Day Presentation. [Poster]

OUTREACH & STUDENT ORGANIZATIONS

- UNC Tau Iota Chapter of Beta Beta Beta National Biological Honors Society | Member [AUG 2020 - MAY 2022, CHAPEL HILL, NC]
- UNC Office of Undergraduate Research | Research Ambassador and Mentor [AUG 2021 - MAY 2022, CHAPEL HILL NC]
- UNC Daily Tar Heel | Opinion Editor and Science Columnist [AUG 2019 - MAY 2022, CHAPEL HILL, NC]
- UCSD Undergraduate Bioinformatics Club | Board Member [SEPT 2018 - JUNE 2019, SAN DIEGO, CA]
- UNC Hospitals | Junior Volunteer Leader [JUNE 2015 - MAR 2020, CHAPEL HILL, NC]

SKILLS

Computational - *Languages*: Python, R, Bash, Java, SAS; *Tools*: JMP, Jupyter Notebooks, Vim, RMarkdown, ImageJ, Imaris, Slidebooks, ZEN, Job Managers (SLURM), Microsoft Office Products

Experimental - Research Project Design, Scientific and Technical Writing, Conference Presentation, Scientific Literature Research Antibody Staining, Fluorescence and Confocal Microscopy, Cell and RNA isolation, Sequencing preparation