

Hannah Gallagher

PYTHON DEVELOPER · GRAD STUDENT RESEARCHER · SCIENTIFIC COPYWRITER · PROJECT MANAGER · TECHNICIAN

Rochester, NY, 14610 (Prefer Texts to Cell Phone)

My research interests focus on LiDAR, hyperspectral imaging, lasers, and polarization theory. I am currently a second year grad student in Imaging Science at RIT where I conduct research with hyperspectral imaging and LiDAR of biodiversity in marshes.

Publications

Wetland Delineation from Hyperspectral Imagery Using Hybrid Radiative Transfer and Statistical Models

Submitted and accepted to the IGARS 2026 Technical Program

*Charles Bachmann, Steven Golowich, Nayma Binte Nur, Anna Christina Tyler, Anthony Luby, Timothy Bauch, Nina Raqueno, Julia Hopkins, Deborah Campbell, Renn Staggs, **Hannah Gallagher**, Serena Flint, Andrew Freeman*

IGARS August 2026

Improving performance for gravitational-wave parameter inference with an efficient and highly-parallelized algorithm

Published to Physical Review D with various related papers.

*J. Wofford, A. B. Yelikar, **H. Gallagher**, E. Champion, D. Wysocki, V. Delfavero, J. Lange, C. Rose, V. Valsan, S. Morisaki, J. Read, C. Henshaw, and R. O'Shaughnessy*
Phys. Rev. D 107, 024040 – Published 30 January 2023

Relevant Professional Appointments and Projects

Rochester Institute of Technology

IMAGING SCIENCE GRADUATE STUDENT

- Wetlands ROCX project
- Work with ProSAIL, ARCGIS, Pix4D, and Cloudcompare
- Learned best practices and grant process in scientific fields
- Estimation of biomass of various scales
- Work with radiative transfer codes
- Optica SPIE grad student president
- Imagine RIT volunteer work

Rochester, NY

August 2025 - August 14th, 2026

INDEPENDENT UNDERGRADUATE TO GRADUATE STUDENT CONTRACTOR (CCRG)

- Performed general documentation duties
- RIT Website development
- Hosted a two week webinar for the Einstein Toolkit
- Numerical Analysis grader

Summer 2023/ Fall 2024/ Spring 2025/

Fall 2025/ Spring 2026

ASTROPHYSICS UNDERGRADUATE RESEARCH (CCRG)

February 2020 - June 2022

- Commented on O3 run and APS talk April and O4 planning with GT and RIFT group
- NSF funded project 19 percent efficiency improvement of RIFT ini tutorial for incoming users and maintenance of makefile work using condorq
- Ran, tested, analyzed algorithm development (RIFT Parameter Estimation and waveforms) pertaining to LIGO gravitational wave data (real and fiducial waveforms) in varying levels of complexity as my case and problem is a black hole neutron star stress test case for efficiency. Transitioned from Makefile set ups to more automatic processes
- Matched scientific reviewers to papers for scientific summaries and data releases
- Languages and Software: Python, LaTeX, GitLabs, CondorQ, RIFT, PyTorch

Corning Incorporated

OPTICAL SCIENTIST

Corning, NY

August 17th, 2026-present

- Adaptive Optics

ADVANCED OPTICS RESEARCH AND DEVELOPMENT INTERN

May 2025-August 2025

- Evaluated sensitivity of a wavefront sensor's boundary conditions in lens design and mathematical software
- Performed theoretical work with tours and shadowing for experimental roles
- Completed internal business trips supporting the Northeast division
- Determined business analytics of an internal customer product

Vencore Optical Engineering Intern

Reston, VA

IRAD OPTICAL FIBER INTERN

May 2017 - Aug. 2017

- Simulated the optical systems and models to provide a software efficiency evaluation between Matlab and Python
- Analyzed cybersecurity vulnerabilities
- Waveguide and undersea fiber networks IRAD Scif work.
Learned the fundamentals of fiber optics and optical communication systems via lecture, guided discussion, and reference materials. Topics included waveguide fabrication, properties of light (amplitude, frequency, phase, polarization), power, attenuation, optical signal-to-noise ratio, modulation (OOK, BPSK, DP-QPSK), dispersion, bandwidth, wavelength-division multiplexing, baud rate, and optical amplification (EDFA).
Learned about working in the field of cleared government contracting via a series of brown bag discussions with experienced professionals. Topics include security considerations (SF-86, Financial Disclosure Form, background investigation, polygraph), the proposal process (shaping, market survey, draft RFP, final RFP, proposal volumes), working for the government (COTR presentation), program management (FTE, CPAF/CPFF, ECPs, contract extensions), data analytics [TBD], and presentation skills (elevator pitches, chartsmanship).

Optimax Technician Intern

Webster, NY

QUALITY ASSURANCE MEASUREMENT TECHNICIAN INTERN

Jan. 2016 - May. 2016

- Made rounds and inspected lens and procedures by other manufacturing technicians
- Learned the qualities and procedures of how each lens was fabricated and coated
- Provided analysis and orders on the relevant lenses
- Learned procedures of a optical manufacturing plant
- Gained interest in mass production and workflows

Relevant Presentations and Papers

Imaging Science Masters End Project

[Rochester, NY](#)

AN ANALYSIS OF HYPERSPECTRAL AND LiDAR BASED PROCESSES TO ESTIMATE BIOMASS IN WETLANDS

August 2024 - July 2026

A 21 page study (excluding front matter, appendices, and references) of implementing LiDAR slopes into a radiative transfer code ProSAIL through two datasets of a field campaign (ROCX2025) and Hog Island (2019) to constrain the LIDF fit of the Verhoef algorithm. A complete internal readme was made along with code, and datafiles.

Computational Optics Final Presentation

[Rochester, NY](#)

SIMULATING THE SELF-HEALING PROPERTIES OF AIRY BEAMS

May 2026

An interesting study in the properties of self-healing airy beams through Matlab simulations. Detailing the optical set up of previously implemented techniques to understand the practice of not only optics journal literacy, but implementation of the forefront to explore interesting results.

Radiative Transfer 2 Final Presentation

[Rochester, NY](#)

A THEORETICAL REVIEW AND EXPERIMENTAL APPROACH OF THE RADIATIVE TRANSFER CODE ProSAIL

Dec. 2025

A description of spectra best fitting methods through a spectra simulation software ProSAIL. Results of ultimately finding the LIDF, a leaf droop parameter, in tandem with the GRIT Wetlands project.

Adaptive Optics Internal Presentation

[Fairport, NY](#)

ADAPTIVE OPTICS: INTERNAL PRESENTATION

Aug. 2025

Internal presentation for Corning Inc.

The Silent Strain: How Migraines with Aura Impact the Retina, Optic Nerve, and Overall Health

[Rochester Institute of Technology](#)

REVIEW PAPER FOR GRADUATE HUMAN VISION COURSE

Dec. 2024

19 page review paper on migraines with aura along with other related diseases and disorders. This described how lack of depth perception is correlated with these migraines as well as how affected individuals perform in VR driving simulations.

Rho R Development and Deuterium Correlations

[Laboratory for Laser Energetics](#)

RESEARCH PRESENTATION

Dec. 2022

3D Integrated Modeling for RIT capstone

Center for Computational Relative Gravity

[Rochester Institute of Technology](#)

RIFT UPDATE PROGRESS AND SIMULATIONS; RESEARCH GROUP MEETINGS

June 2021

The Raychaudhuri Equation's Influence and Tensor Algebra Derivations

[Rochester Institute of Technology](#)

INDEPENDENT STUDY PRESENTATION PENROSE-HAWKING SINGULARITY THEOREMS, GEODESICS, TENSORS

May 2018

An independent study at RIT by Dr. Narayanan for an exploration in Einstein notation and metrics.

Fiber Optic Attenuation Implementation and Evaluation

[Chantilly, VA](#)

WAVEGUIDE ANALYSIS: OPTICAL SIGNAL TO NOISE RATIO BRIEFING, SOFTWARE EVALUATION

Aug. 2017

Internal internship presentation

Word Maps and Webscrapping Techniques

[Rochester, NY](#)

BUSINESS ANALYTICS, REVENUE OPTIMIZATION, DATABASE QUERIES

Aug. 2016

2016 Optics Society of America Meeting

[University of Rochester](#)

KEPLERIAN TELESCOPE, TUNNEL DIAGRAMS, IMAGE PARITY

Mar. 2016

Education

Applied Arts and Sciences B.S.

ROCHESTER INSTITUTE OF TECHNOLOGY

Rochester, NY

December 2022

Current Imaging Science M.S.

ROCHESTER INSTITUTE OF TECHNOLOGY

Rochester, NY

Fall 2024-Aug 14th 2026

My research is in using LiDAR and hyperspectral imaging to study biodiversity in marshes and wetlands.

Relevant Coursework and Study

*Rochester Institute of Technology;
University of Rochester*

RELEVANT CLASSES TAKEN DURING UNDERGRADUATE TO GRADUATE RELATING TO THE FIELD

- Computational Optics
- Noise and System Modeling
- Environmental Remote Sensing
- Radiative Transfer 1 and 2
- Radiometry
- Image Processing and DF Methods (Fourier)
- The Human Visual System
- General Relativity-Tensor Algebra
- Topology Independent Study - Topology fundamentals with an emphasis on black holes and general relativity
- Mathematical Methods in Optics - Boundary Value Problems course pertaining to optics
- Interference and Diffraction- Optical Engineering course on the propagation of light
- Mathematical Modeling- Research paper literacy and formulation and presentation of unique natural mathematical research
- Geometrical Optics - Studied the different properties of various lens systems with Code V
- Real Analysis - Applied Math course with heavy emphasis on proofs
- Numerical Linear Algebra- Theoretical math with applications in computer science and proficiency in Matlab packages in matrix processing
- Linear Algebra with Differential Equations- Compact course to solve differential equations with advanced linear algebra