

# Gregory M. Nero

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GitHub: <https://github.com/gregnero>

## **EDUCATION:**

### ***University of Arizona***

2020 - Current | Tucson, AZ

Optical Sciences, PhD Student

### ***Rochester Institute of Technology***

2016 – 2020 | Rochester, NY

B.S. Imaging Science | Astronomy Minor | American Sign Language and Deaf Cultural Studies Immersion

### ***Hopewell Area High School***

2012 – 2016 | Aliquippa, PA

## **RESEARCH/PROJECT EXPERIENCE:**

### ***University of Arizona College of Optical Sciences***, Graduate Research Assistant

August 2021 – Current | Tucson, AZ

Developing volume holographic gratings for wavelength multiplexed field of view expansion.

### ***University of Arizona College of Optical Sciences***, Graduate Research Assistant

January 2021 – August 2021 | Tucson, AZ

Synthesized, recorded, and characterized advanced volume holograms.

### ***University of Arizona College of Optical Sciences***, Graduate Research Assistant

August 2020 – December 2020 | Tucson, AZ

Contributed to an ongoing optical neural network research project.

### ***Unaffiliated Collaborative Project***, Network Scientist

May 2020 – November 2020 | Remote

Created and investigated coevolving SIR epidemic models.

### ***RIT Center for Imaging Science***, Undergraduate Student Researcher

August 2019 – May 2020 | Rochester, NY

Developed methods for optical matched filtering using computer-generated holography.

### ***Space Telescope Science Institute***, Intern

June 2018 – August 2018 | Baltimore, MD

Worked with a number of professionals at the institute to explore the potential applications of transfer learning and neural networks for astronomical purposes. Proved the ability for neural networks to classify similar images in a set using transfer learning. Presented work at the Space Astronomy Summer Program Symposium. Paper in progress.

### ***RIT Center for Imaging Science***, Undergrad Research Assistant

August 2017 – December 2017 | Rochester, NY

Assisted with research in the Advanced Instrumentation Lab developing code/equipment for the RIT Multi-Object Spectrometer (RITMOS). Responsible for and independently designed the FITS file data-collection pipeline and the flat-field calibration circuit and screen design.

### ***RIT Center for Imaging Science***, Freshman Imaging Project Team Member

August 2016 – May 2017 | Rochester, NY

Conceptualized, designed, and built a motion-capture imaging system.

## **WORK EXPERIENCE:**

### ***Ball Aerospace***, Technical Intern – Optical Engineer

June 2019 – August 2019 | Boulder, CO

Supported and lead efforts to develop technologies, including ultra-stable bonding, picometer actuation, and wave front sensing and control, that will enable future space-based telescope mission objectives. Volunteered time to design and deploy payloads on an atmospheric balloon to collect upper-atmospheric data, including 360-degree video for VR.

***Defense Advanced Research Projects Agency (DARPA), Image Data Technician***

June 2017 – August 2017 | Rochester, NY

Collaborated with a team of students and professionals doing media-forensics related work. Became very familiar with image manipulation techniques in Photoshop, image metadata importance, and the collection of large quantities of ground truth data. Gained exposure to the algorithms responsible for manipulation detection.

***Center for Imaging Science, Stockroom Assistant***

February 2017 – May 2017 | Rochester, NY

Managed, organized, and distributed equipment within the Center for Imaging Science.

**TEACHING EXPERIENCE:**

***James C. Wyant College of Optical Sciences, Graduate Teaching Assistant***

January 2022 – Current | Tucson, AZ

Class: OPTI 280 – Computer Programming Workshop

***James C. Wyant College of Optical Sciences, Graduate Teaching Assistant***

August 2021 – December 2021 | Tucson, AZ

Class: OPTI 471A – Advanced Optics Laboratory

***Center for Imaging Science, Teaching Assistant***

January 2019 – May 2019 | Rochester, NY

Class: Linear and Fourier Mathematics for Imaging

***Center for Advancing STEM Teaching, Learning & Evaluation, Learning Assistant***

January 2018 – May 2018 | Rochester, NY

Class: University Physics I

***Rochester Institute of Technology Academic Support Center, Math and Physics Tutor***

September 2017 – December 2017 | Rochester, NY

Class: Any, upon request

**PUBLICATIONS:**

***Bandwidth optimization for the Advanced Volume Holographic Filter***

Alcaraz, Pedro Enrique, Gregory Nero, and Pierre-Alexandre Blanche. "Bandwidth optimization for the Advanced Volume Holographic Filter." *Optics Express* 30.1 (2022): 576-587.

***On-sky performance evaluation of RITMOS, a micromirror-based multi-object spectrometer***

Anton Travinsky, Dmitry Vorobiev, Kathleen Oram, Gregory M. Nero, Zoran Ninkov

Proc. SPIE 10702, Ground-based and Airborne Instrumentation for Astronomy VII, 107021N (6 July 2018);

doi: 10.1117/12.2313690

**CONFERENCE/EVENT PARTICIPATION:**

***University of Arizona Optics and Photonics Winter School and Workshop 2020***

2020 | Tucson, AZ

Poster session.

***Optical Matched Filtering with Computer-Generated Holography***

***233<sup>rd</sup> American Astronomical Society Meeting***

2019 | Seattle, WA

Poster session.

***Exploring Space with Neural Networks***

Nero, Peek, Kendrew, Jones

***The Third Global Women of Light Symposium (WiSTEE Connect + OSA)***

2018 | Washington, DC

Volunteer

***Center for Advancing STEM Teaching, Learning & Evaluation Symposium***

2018 | Rochester, NY

Poster session.

***Creating and Evaluating an Educational Video on Moment of Inertia***

Nero, Poirier, Chabot, Lusignan

***OSA IONS Conference***

2017 | Rochester, NY

Poster presentation for Freshman Imaging Project

## ***Imagine RIT Innovation Festival***

2017 | Rochester, NY

Poster and demonstration for Freshman Imaging Project

## **EVENT PLANNING:**

### ***Laser Fun Day 2021***

February 2021 – April 2021 | Tucson, AZ

Tech-team member.

### ***University of Arizona Optics and Photonics Winter School 2021***

August 2020 – January 2021 | Tucson, AZ

Student committee lead.

### ***hack.tiff***

July 2018 – January 2020 | Rochester, NY

Primary event coordinator for the Chester F. Carlson Center for Imaging Science's first image-processing hackathon.

## **TECHNICAL SKILLS:**

C++ | Python | MATLAB | Git | Jupyter | R | OpenCV | Adobe Photoshop | Unreal Engine | NetworkX  
igraph | WordPress | LaTeX

## **HONORS:**

### ***University of Arizona***

Joseph W. Goodman Graduate Student Endowed Scholarship in Optical Sciences

### ***Rochester Institute of Technology***

Summa Cum Laude | Chester Carlson Scholar | RIT Founder's Scholarship | Hughes Scholarship

Undergraduate Research Scholar | Nathaniel Rochester Society Scholar | John Wiley Jones Scholar

Goldwater Nominee

## **SERVICE:**

### ***The University of Arizona Student Optics Chapter***, Treasurer

August 2020 – Current | Tucson, AZ

### ***Imaging Science Club***, President

May 2019 – May 2020 | Rochester, NY

### ***RIT Improv***, Vice-President

May 2019 – May 2020 | Rochester, NY

### ***College of Science Student Advisory Board***, Imaging Science Representative

September 2017 – May 2020 | Rochester, NY

### ***Imaging Science Club***, Treasurer

July 2018 – May 2019 | Rochester, NY

### ***RIT Mental Graffiti***, (RIT slam poetry group) Treasurer

January 2017 – May 2018 | Rochester, NY

### ***RIT Newman Center***, (Religious group) Volunteer and Choir Member

September 2016 – December 2018 | Rochester, NY

## **Class List:**

### ***University of Arizona***

Electromagnetic Waves, Optical Design and Instrumentation I, Linear Systems Fourier Transforms, Diffraction and Interferometry, Optical Physics and Lasers, Imaging Physics and Devices, Computational Imaging

### ***Rochester Institute of Technology***

Imaging Detectors, Complex Networks, Observational Astronomy, Harmonica and the Blues, Financial Fitness, Rock Climbing, Imaging System Analysis and Modeling, Wines of the World, Cultural Anthropology, Extragalactic Astrophysics and Cosmology, Differential Equations, Image Processing and Computer Vision I and II, Interactions Between Light and Matter, Physical Optics, University Astronomy, Geometric Optics, Radiometry, Introduction to Creative Writing, Modern Physics I, STEM Education: Research and Practice, Fundamentals of Color Science, Linear and Fourier Mathematics for Imaging, Probability and Statistics for Imaging, University Physics I and II, Calculus I, II,

and III, Introduction to Computing and Control, Intermediate American Sign Language I, Beginning American Sign Language I and II, Vision and Psychophysics, Introduction to Imaging and Video Systems, Introduction to Philosophy

**PERSONAL PROJECTS:**

*Modelling Experiences with Geometry, Emotions and Feelings*

Developing a geometric model to express experiences using emotions and feelings.