

# Nick Reilly

PHD CANDIDATE - PHYSICS AND ASTRONOMY

☎ 630-649-4133 | ✉ nickreilly@fastmail.com | 📠 nick-reilly-853144291 | 📞 0000-0003-1491-8448

## Education

### University of Rochester

PHD. IN PHYSICS

Thesis Title: *Precision Calibration and Image Quality Analysis of MWIR Detectors for the Near-Earth Object Surveyor Mission*

Rochester, NY

2017 - 2024

### University of Rochester

M.A. IN PHYSICS AND ASTRONOMY

Rochester, NY

2015 - 2017

### Bowling Green State University

B.S. IN PHYSICS, GRADUATED CUM LAUDE

Bowling Green, OH

2009 - 2013

## Research

### Infrared Detectors for Space Astrophysics-University of Rochester

GRADUATE RESEARCH ASSISTANT

Rochester, NY

Dec 2019 - Present

- Wrote an analysis pipeline for calibration and analysis of detectors for NEO Surveyor.
- Modified an existing routine for Modulation Transfer Function measurements for HgCdTe devices, and validated with standard datasets.
- Presented updates as needed to the entire detector working group for the Near-Earth Object Surveyor Mission.
- Installed Hawaii-XRG HgCdTe detectors into cryogenic vacuum test dewars.
- Managed cooldowns using liquid and solid nitrogen, and liquid helium.
- Maintained and fixed laboratory equipment when required.
- Designed and fabricated custom equipment using the in house machine shop and 3D printers.

### Oakes Lab-University of Rochester

GRADUATE RESEARCH ASSISTANT

Rochester, NY

Jan 2017 - Dec 2019

- Developed cell motility assay specific for CD4+ T Cells to investigate amoeboid migration mechanics.
- Built an image analysis algorithm to track cells and calculate multiple migration metrics for multi-field, timelapse images.
- Tested modified influenza viruses to and their influence of the traction stresses generated by colonies of cells throughout duration of infection.
- Completed biophysical assays with collaborators, requiring implementation of traction force microscopy, micropatterning, and photoablation.

### Guo Lab-University of Rochester

GRADUATE RESEARCH ASSISTANT

Rochester, NY

Apr 2016 - Dec 2016

- Collaborated in the design process for a new clean room facility.
- Worked with ultrashort (fs) pulsed lasers for molecule ionization experiments.
- Supported other students and postdocs on surface experiments, including hydrophobic and hydrophilic metals and plastics without coatings.

### Sun Group-Bowling Green State University

UNDERGRADUATE RESEARCH ASSISTANT

Bowling Green, OH

Jan 2010 - Dec 2013

- Assisted construction of the Sun lab, calibrating optical equipment, electromagnets, and a chemical synthesis bench for nanostructure production.
- Made Ultra-small Lead Sulfide Quantum dots using low cost wet chemistry techniques.
- Participated in the production of Lead Sulfide nanosheet synthesis, and their characterization.
- Developed a procedure for a dip coating machine that efficiently made thin films of quantum dots and nanosheets.

## Teaching

### University of Rochester - Dept. of Physics and Astronomy

TEACHING ASSISTANT

Rochester, NY

Aug 2015 - May 2016

- Lead workshops, graded, and maintained office hours for undergraduate mechanics for non-physics majors.

## Professional

### Newell Rubbermaid - Writing Division

LABORATORY TECHNICIAN

Downers Grove, IL

Feb 2014 - Apr 2015

- Provided primary support for safety and heavy metal analysis across multiple product lines.
- Operated many custom writing system testing equipment, including write test machines, X-Ray, X-Ray Fluorometer, Rheometer, Abrator, Spectrodensimeter, among many others.
- Modified existing standard operating procedures to include new industrial testing and safety standards.
- Started an initiative to automate some basic testing using LabView.

## ASL Audio

AUDIO ENGINEER

Bowling Green, OH

May 2011 - Dec 2013

- Assembled PA systems for all size events, including events through Bowling Green State University, town festivals, sporting events, and philanthropic events
- Ran the board for many different types of production events
- Experienced in performance aspect including artist for a large campus event

## Academic Service

### Diversity, Equity, and Inclusion Committee

Dept. of Physics and Astronomy

STUDENT MEMBER

Jun 2020 - Present

- Worked with fellow students and faculty to create a new DEI committee in the Physics and Astronomy Department.
- Collaborated with peers to institute new policies to promote DEI within the department.
- Pushed the APS Bridge implementation at the University of Rochester to be more supportive of their students, and advocated for an increase in number of students per year admitted.

### Rochester Museum and Science Center

Rochester, NY

ASK-IT VOLUNTEER

Apr 2021 - Present

- Assisted with day-to-day activities to keep the museum functional.
- Developed new presentations for the Science on the Sphere for use during their daily operations.
- Supported the Climate Action Days initiative by writing and presenting a program covering climate change and technology development supporting a cooler Earth.
- Presented at several of the "After Dark" events, primarily for adults, to discuss topics such as the JWST launch, the eclipse, climate change, and the search for life.

## Skills

<b>Laboratory</b>	Cryogen transfer, optical equipment calibration, cell culture, wet lab chemistry, microscopy, basic electronics
<b>Data Processing</b>	Large image sequences from IR detectors and fluorescent, confocal, and TIRF microscopes, multiprocessing
<b>Programming Languages</b>	Python, Mathematica, Matlab, $\text{\LaTeX}$ , linux kernel module development
<b>3D Modeling and Design</b>	Fusion360, OnShape, light machining (mill, lathe, 3D printers)
<b>Operating Systems</b>	Linux (Ubuntu, Debian, etc), MacOS, Windows, TrueNAS

## Honors & Awards

2017	<b>Helmsley Fellowship</b> , Award to attend Quantitative Imaging and Analysis Course	CSHL, NY
2013	<b>J. Robert &amp; G. Overman Scholarship</b> , Outstanding Senior in Math or Physics	Bowling Green, OH
2011	<b>Timothy F. Smith Scholarship-Outstanding Greek Man of the Year</b> , Applauding Excellence Ceremony	Bowling Green, OH
2009	<b>Sidney A. Ribeau President's Leadership Academy</b> , Four year leadership development scholarship	Bowling Green, OH
2005	<b>Eagle Scout</b> , Advanced Rank in the Boy Scouts of America	St. Charles, IL

## Relevant Publications

**Nick Reilly**, et al. "Measurement of the Modulation Transfer Function for the Mid-Infrared channel HgCdTe Detectors for the Near-Earth Object Surveyor Mission," *in preparation*

**Nick Reilly**, et al. "Testing results from pathfinder HgCdTe infrared detectors for the Near-Earth Object Surveyor mission," *Proc. SPIE, X-Ray, Optical, and Infrared Detectors for Astronomy X*, 121912A (29 August 2022); <https://doi.org/10.1117/12.2629687>

Zengilowski, Gregory R, Craig W McMurtry, Judith L Pipher, **Nick Reilly**, et al. "Modulation Transfer Function Measurements of HgCdTe Long Wavelength Infrared Arrays for the Near-Earth Object Surveyor." *Journal of Astronomical Telescopes, Instruments, and Systems* 8 (2022): 23. <https://doi.org/10.1117/1.jatis.8.1.016002>.

Gregory R. Zengilowski, ..., **Nick Reilly**, et al. "Status update on the NEO surveyor detector development," *Proc. SPIE, X-Ray, Optical, and Infrared Detectors for Astronomy X*, 121911V (29 August 2022); <https://doi.org/10.1117/12.2629660>

Zengilowski, Gregory R., ..., **Nick Reilly**, et al. "Blooming in H2RG Arrays: Laboratory Measurements of a Second Brighter-Fatter Type Effect in HgCdTe Infrared Detectors." *Journal of Astronomical Telescopes, Instruments, and Systems* 7, no. 02 (June 4, 2021). <https://doi.org/10.1117/1.jatis.7.2.026002>.

Zengilowski, Greg, Craig W. McMurtry, Judith L. Pipher, **Nick Reilly**, et al. "Signal Nonlinearity Measurements and Corrections in MWIR and LWIR HgCdTe H2RG Arrays for NEO Surveyor." In *X-Ray, Optical, and Infrared Detectors for Astronomy IX*, edited by Andrew D. Holland and James Beletic, 123. Online Only, United States: SPIE, 2020. <https://doi.org/10.1117/12.2563138>.

## Additional Publications

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- SR Barger, **NS Reilly**, et al. (2019). Membrane-cytoskeletal crosstalk mediated by myosin-I regulates adhesion turnover during phagocytosis. *Nature Communications*. DOI:10.1038/s41467-019-09104-1
- EC Reilly, KL Emo, PM Buckley, **NS Reilly**, et al. (Submitted 2019). TRM Integrins CD103 and CD49a Differentially Support Adherence and Motility After Resolution of Influenza Virus Infection.
- L Rathbun, E Colicino, S Coyne, **NS Reilly**, et al. (Submitted 2019). Cytokinetic bridge triggers *de novo* lumen formation *in vivo*.
- DJ Fowell, NRJ Fernandes, **NS Reilly**, et al. (Submitted 2019) Fibronectin manipulation exacerbates T cell accumulation and enhances cytokine production in the inflamed skin.
- NS Reilly**, M Wehrung, RA O'Dell, L Sun (2014). Ultrasmall Colloidal PbS Quantum Dots. *Materials Chemistry and Physics*. DOI:10.1016/j.matchemphys.2014.04.026
- GB Bhandari, K Subedi, Y He, Z Jiang, M Leopold, **NS Reilly**, et al. (2014) Thickness-controlled synthesis of colloidal PbS nanosheets and their thickness-dependent energy gaps. *Chemistry of Materials*. DOI:10.1021/cm502524z

## Conference Presentations

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### SPIE Astronomical Telescopes + Instrumentation

Montreal, Canada

POSTER PRESENTATION

2022

- Testing results from pathfinder HgCdTe infrared detectors for the Near-Earth Object Surveyor mission

### Immunology Symposium

URMC- Rochester, NY

POSTER PRESENTATION

2019

- 2019- Ligand Availability, and not  $\alpha_V\beta_3$  Integrin Expression Regulates Th1 Cell Migration

### Immunology Symposium

URMC- Rochester, NY

POSTER PRESENTATION

2018

- 2018-  $\alpha_V/\beta_3$  Integrin Expression Regulates CD4+ T Cell Migration Phenotypes

### Immunology Symposium

URMC- Rochester, NY

POSTER PRESENTATION

2017

- 2017- Quantifying LFA-1 Driven Surface Interaction Dynamics in Spreading CD8+ T Cells

### American Society for Cell Biology

San Diego, CA

POSTER PRESENTATION

2017

- 2017- Effect of influenza infection on epithelial monolayer integrity