

# NICK KONZ

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## EDUCATION

**Duke University** | Durham, NC

Expected December 2025

Ph.D. in Electrical and Computer Engineering (Machine Learning Specialty) Cumulative GPA: 4.000/4.000

### Relevant Coursework

Introduction to Deep Learning, Advanced Topics in Deep Learning, Engineering Deep Neural Networks, Vector Space Methods

**University of North Carolina** | Chapel Hill, NC

Graduated May 2020

B.S. in Astrophysics and B.A. in Mathematics Cumulative GPA: 3.914/4.000 Earl Nelson Mitchell Scholar in Physics

Honors: Highest Honors and Highest Distinction Phi Beta Kappa Honors College Member

### Relevant Coursework

Computer Science Numerical Techniques, Physical Modeling

Mathematics Multivariable and Vector Calculus, Ordinary Differential Equations, Partial Differential Equations

Linear Algebra, Real Analysis, Complex Analysis, Probability

Mathematical Methods I & II, Fourier Analysis

## RESEARCH EXPERIENCE

**Mazurowski Lab** | Duke University Dept. of Radiology | Durham, NC

2021 - PRESENT

Graduate Research Assistant

Ph.D. research in deep learning with a focus on medical image analysis. Specific fields include anomaly detection, domain adaptation and style transfer. Model conception and development, codebase development and experimentation (Python/PyTorch), and paper publication.

**Reichart Lab/SkyNet Robotic Telescope Network** | UNC-CH Dept. of Physics and Astronomy | Chapel Hill, NC

2017 - 2020

Research Assistant

Undergraduate research and thesis work of statistical computational methods for astronomy. Included the continued development and deployment of the TRK (Trotter-Reichart-Konz Regression) and RCR (Robust Chauvenet Rejection) statistical modeling suites. Codebase development, end-to-end web interface development, and writing associated papers and documentation for publication.

Robert Shelton Award for Outstanding Research (2019) NC Space Summer Research Grant (NASA) (2019)

## TEACHING EXPERIENCE

**Duke University** | Durham, NC

2022

Graduate Teaching Assistant

ECE 685D/COMPSCI 675D: Introduction to Deep Learning.

**UNC Chapel Hill** | Chapel Hill, NC

2017 - 2018

Undergraduate Teaching Assistant

PHYS 119 (Introductory Electromagnetism), MATH 528 (Math. Methods for the Physical Sciences), and MATH 233 (Multivariable Calculus).

**ERIRA (UNC Chapel Hill/Green Bank Radio Observatory)** | Chapel Hill, NC

2017 - PRESENT

Educator/Coordinator

One of the educators of participants in ERIRA, a yearly week-long intensive radio astronomy research program led by Dr. Daniel Reichart of UNC Chapel Hill. Participant of the 2017 session.

## SELECT PUBLICATIONS

Full list at [scholar.google.com/citations?user=a9rXidMAAAAJ&hl=en](https://scholar.google.com/citations?user=a9rXidMAAAAJ&hl=en).

1. **Konz, N.**, et al. "The Intrinsic Manifolds of Radiological Images and their Role in Deep Learning." *The International Conference of Medical Image Computing and Computer Assisted Intervention (MICCAI)*, **2022**.
2. Swiecicki, A., **Konz, N.**, et al. "A generative adversarial network-based abnormality detection using only normal images for model training with application to digital breast tomosynthesis." *Scientific reports* 11.1: 1-13, **2021**.
3. Maples, M. P., Reichart, D. E., **Konz, N. C.**, et al. "Robust Chauvenet Outlier Rejection." *The Astrophysical Journal Supplement Series* 238.1: 2, **2018**.

## GENERAL TECHNICAL SKILLS

<b>Technological:</b>	Machine Learning and Deep Learning, Algorithms, Numerical Methods, Monte Carlo Methods
<b>Analytical:</b>	Statistical Modeling, Data Analysis, Bayesian Analysis, Software Documentation and Publishing
<b>Specific Computer Skills:</b>	PyTorch, C++-to-Python Wrapping

## SPECIFIC COMPUTER SKILLS

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<b>Proficient with:</b>	Python (5 yrs.), C++/C (3 yrs.), L <sup>A</sup> T <sub>E</sub> X (5 yrs.)
<b>Experienced with:</b>	JavaScript, HTML/CSS (2 yrs.), Vim, Unix, Microsoft Excel
<b>Familiar with:</b>	Wolfram/Mathematica Language

## RESEARCH GRANTS AND SCHOLARSHIPS

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**NC Space Summer Research Grant** | Chapel Hill, NC 2019  
*NASA/NC State*

Each year, NC Space Grant awards Undergraduate Research Scholarships to students who are pursuing careers in science, technology, engineering and mathematics (STEM) fields that support NASA's Mission Directorates. This competitively awarded program engages the future STEM workforce in basic and/or applied aerospace-related research projects and facilitates the development of mentor relationships between students, faculty and the NASA community. (For my work with Prof. Daniel Reichart.)

**Earl Nelson Mitchell Scholarship in Physics** | Chapel Hill, NC 2018 - 2020  
*UNC Department of Physics and Astronomy*

Recommended for this scholarship by faculty in the department in recognition of outstanding academic record; The Earl Nelson Mitchell Scholarship was an estate gift to the University, with a provision to establish a scholarship to an outstanding junior or senior majoring in Physics or Astronomy.

**NC Space Spring Research Grant** | Chapel Hill, NC 2018  
*NASA/NC State*

The NC Space Grant Undergraduate Scholarship Program is a competitive scholarship program funded by NASA with the goals of: increasing participation in STEM-related research and careers by students, establishing relationships with a faculty member and a NC Space Grant Undergraduate Research Scholar or Graduate Fellow, and interacting with faculty/other scholars to learn more about the STEM discipline and current research projects and opportunities. (For my work with Dr. Daniel Reichart.)

## AWARDS & HONORS

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**Judges' Choice Award** | Durham, NC 2022  
*Pratt School of Engineering, Duke University*

For my research poster "The Intrinsic Manifolds of Radiological Images and their Role in Deep Learning" at the Pratt School of Engineering Fall 2022 poster session.

**Benjamin Swalin Orchestra Award** | Chapel Hill, NC 2020  
*UNC Department of Music*

This award was established in 2000 in honor of Maestro Swalin, former conductor of the UNC Symphony Orchestra and subsequently Music Director of the North Carolina Symphony for 33 years. The award is given to graduating seniors who have made significant contributions in artistry and leadership to the UNC orchestra program during their undergraduate years. The recipients are determined by the orchestra director.

**Robert Shelton Award for Outstanding Research** | Chapel Hill, NC 2019  
*UNC Department of Physics and Astronomy*

This award recognizes outstanding academic performance as a major in the department, and is the highest level research award given by the department.

**Most Innovative Hack** | Chapel Hill, NC 2018  
*HackNC Hackathon (UNC Chapel Hill)*

A member of the five-person team that created the project "Simulating the Spread of Ideas with Epidemiology" in 24 hours at the 2018 HackNC Hackathon, for which we won the award of "Most Innovative Hack" (see "Other Projects").

**Dean's List** | Chapel Hill, NC 2016-2020  
*UNC Chapel Hill*

Every semester of my undergraduate coursework.

## RELEVANT COURSEWORK

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<b>Duke University</b>	
Machine Learning & Computer Science:	<i>Deep Learning, Advanced Topics in Deep Learning, Engineering Deep Neural Networks, Vector Space Methods</i>

ORGANIZATIONAL MEMBERSHIP

<b>Effective Altruism (Arete Fellowship)</b>   Chapel Hill, NC <i>Member (UNC Chapel Hill)</i>	2020 - PRESENT
<b>Phi Beta Kappa Academic Honor Society</b>   Chapel Hill, NC <i>Member (UNC Chapel Hill)</i>	2018 - PRESENT
<b>UNC Math Help Center</b>   Chapel Hill, NC <i>Volunteer Tutor</i>	2018 - 2020
<b>Annual Math Counts Competition</b>   Chapel Hill, NC <i>Volunteer Grader</i>	2018 - 2020
<b>American Physical Society</b>   <i>Member</i>	2018 - PRESENT
<b>Society of Physics Students (ΣΠΣ)</b>   Chapel Hill, NC <i>Member (UNC Chapel Hill)</i>	2017 - PRESENT
<b>UNC Honors College</b>   Chapel Hill, NC <i>Member</i>	2016 - 2020
<b>UNC Symphony Orchestra</b>   Chapel Hill, NC <i>Co-principal French Horn</i>	2016 - 2020
<b>UNC Wind Ensemble</b>   Chapel Hill, NC <i>Co-principal French Horn</i>	2016 - 2017

SPOKEN LANGUAGES

1. English (native language)
2. Portuguese (elementary proficiency)