

Collin McLeod

Education

- August 2020 - Present **University of Pittsburgh** *Pittsburgh, PA*, PhD, Physics.
- Worked under advisor Dr. John Hillier
 - Expected completion circa 2025
- August 2015 – May 2020 **University of Oklahoma** *Norman, OK*, Honors Bachelor of Science in Mathematics, Bachelor of Science in Astrophysics.
- Cumulative GPA: 3.89/4.0 (Summa Cum Laude)
 - Double Major in Astrophysics (B.S.) and Mathematics (B.S.)
- Awards and Honors, August 2015 – October 2019.*
- National Merit Scholar, 2015
 - President's Honor Roll Fall 2015, Fall 2016, Fall 2018, Spring 2019
 - Dean's Honor Roll Spring 2016, Spring 2017, Fall 2017, Spring 2018

Research Experience

- August 2020 – Present **Graduate Student Researcher** *University of Pittsburgh*, Advisor Dr. John Hillier.
- Investigated properties of supernovae using the radiative-transfer code CMFGEN.
 - Modified CMFGEN to include molecular emission bands and fully consistent molecular chemistry.
- July 2018 – August 2020 **Undergraduate Research Assistant** *University of Oklahoma*, Advisor Dr. Karen Leighly, collaborated with OU graduate student Alex Kerr.
- Investigated methods for characterizing quasar emission line properties: Principal Component Analysis, Nonnegative Matrix Factorization, Variational Autoencoders (VAE).
 - Implemented new techniques for emission modeling in the quasar spectral synthesis code *SimBAL* (in Python), developed by Dr. Karen Leighly and others.
 - Collected and processed a sample of 20603 quasar spectra from Sloan Digital Sky Survey Data Release 14 for emission line analysis.
- May 29 – July 31, 2018 **Research Experience for Undergraduates** *University of Oklahoma*, REU advisor Dr. Karen Leighly.
- One of 17 undergraduates chosen to participate in OU's Research Experience for Undergraduates.
 - Utilized the spectral synthesis code *SimBAL* to analyze the outflow properties of quasars with broad-line Phosphorus V absorption.
- January – May 2016 **First Year Research Experience** *University of Oklahoma*.
- Participated in the OU Honors College's First Year Research Experience (FYRE) program, with Dr. Brad Waller and OU graduate student Robert Hardisty.
 - Used Gaussian mixture models to categorize facies in 3D seismic data.
 - Developed code in Fortran95 and Java to fit Gaussian models to seismic measurements.

Presentations

June 1-3, **236th Meeting of the American Astronomical Society Virtual.**

- 2020
 - Presented poster *Investigating Quasar Emission-Line Variance Using a Variational Autoencoder*

June 24-27, **AstroInformatics 2019 Conference Pasadena, CA.**

- 2019
 - Presented poster *Autoencoders and Quasar Emission Lines: Using New Techniques to Solve an Old Problem* (only undergraduate to present a poster or talk).

Other Experience

June 2017 – **FedEx World Hub Material Handler**, Memphis, TN, Manager Kenneth Robinson (k-j.robinson@fedex.com).
January 2020

- Worked as part of a team routing packages to their correct destinations.

Skills.

- Experienced using \LaTeX , Python (including the TensorFlow machine learning library), Java, Fortran
- Familiar with Windows and Linux operating systems