# **Patrick Brown**

Air Force Institute of Technology, Wright Patterson Air Force Base

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### Education

# Air Force Institute of Technology

2019-Present, Master of Science in Applied Physics, Focus: Nuclear and Plasma Physics (In progress)

#### University of New Mexico

2015-2019, Graduated Summa Cum Laude GPA: 3.94 Deans List 2015-2018, Major: Astrophysics, Minor: Mathematics

# **Work Experience**

#### Researcher AFIT/NRL

• 2019-present, Advisor: Dr. John McClory

Research area: Modeling of high energy and high density plasma formation and utilization in NRL Gamble II Responsibilities: Numerically/analytically modelling the high energy and high density plasma simulations within Gamble II

### Research Honors Thesis, University of New Mexico

• 2018-2019, Advisor: Dr. Rouzbeh Allahverdi

Research area: Modeling of Early Matter Domination to obtain the equation of temperature in the very early universe Responsibilities: Forming and numerically/analytically solving the solution to the Boltzmann Equations that govern our theory

# Research Assistant, University of New Mexico

• Fall 2018-Spring 2019, Principal Investigator: Dr. Sally Seidel

Research project: Development of new radiation hard 3D silicon particle detectors

Responsibilities: Performing measurements on sensors to characterize radiation hardness

### Research Assistant, Starfire Optical Range, Air Force Research Laboratory, Kirtland Air Force Base

• September 2018-2019, Principal Investigator: Dr. Robert Johnson

Research project: Develop and demonstrate optical wavefront control technologies

Responsibilities: conducting analysis of sodium beacon laser guide star - Classified

# CERN Internship, AEGIS Experiment, Antiproton Decelerator, Geneva, Switzerland

June 2018-August 2018, AEGIS Project Spokesperson: Dr. Michael Doser

Research project: Antihydrogen Experiment: Gravity, Interferometry, Spectroscopy (AEGIS)

Responsibilities: Testing the feasibility of Compton Scattering to map a beam of non-relativistic antiprotons;

simulating the fluorescent spectrum of  $C_2$  anions; data analysis of Rydberg Positronium experiment

### Research Assistant, Air Force Research Laboratory, Kirtland Air Force Base

• January-May and August-December 2017, Principal Investigator: Dr. Greg Pitz

Research project: Supersonic Cesium Dimer Laser Experiment

Responsibilities: Assisted principal investigator in setting up and conducting the experiment

# Research Internship, Air Force Research Laboratory, Kirtland Air Force Base

May-August 2017, Principal Investigator: Dr. Greg Pitz

Research area: Advanced Laser Division Gas-Laser Program

Responsibilities: Designed, constructed, & conducted experiments on the Cavity Dumped Cesium Based-Pulsed Laser System

# Dan LaPorte/NASA Internship

 June-July 2015, Lab Assistant to Dan LaPorte, Global Hawk Project, Armstrong Flight Test Center, Edwards Air Force Base, Palmdale, CA, Responsibilities: observed installation & testing of the Scanning High Resolution Interferometer Sounder (Scanning-H.I.S.)

## Special Skills

# Computer Programming

Programming skills include:

MatLab, Mathematica, C++, Root, Python, Chicago, Solidworks Computer Aided Design

Security Clearance Yes. Level: Secret

# **Volunteer Experience**

### Air Force Research Laboratory/University of New Mexico Mentorship Program

· Fall 2017-present, Mentor

Responsibilities: Work with first & second year STEM students, assisting with class schedules, academic tutoring, counseling on UNM pathways, advising on AFRL student internship and research opportunities

## University of New Mexico Observatory

January 2018-2019, Volunteer Operator

Responsibilities: Operate telescope and observatory during public events, instruct public & student body on telescope and answer questions

# Homestretch Greyhound Rescue and Adoption

• 2007-2017, Senior Volunteer

Responsibilities: Meet & Greets introducing the public to rescued track dogs, educating the public on the realities and cruelties of Greyhound racing, & counseling prospective adoptors; "Homecoming" days when dogs are taken directly from the racetrack to the adoption facility, receive veterinary evaluations, baths, and temperament evaluations. My focus is usually on the extremely shy and frightened dogs

# First Congregational Church of Santa Barbara

2008-2015, Youth Group activities in support of my church and my community

Events included: 30 Hour Famine, Alzheimer's Walk, Pacific Pride Festival, & Showers of Blessings

Responsibilities: Community outreach, church support, making lunches for homeless shelter, volunteering at Unity Shoppe (free) grocery store, collecting donations for Santa Barbara Food Bank, and fundraising to support our volunteer work

### **Achievements & Scholarships**

- 2018, University of New Mexico I Am STEM Award
- 2018, University of New Mexico Goldwater Nominee
- Awarded Scholarships:

2015-Present, University of New Mexico Amigo Scholarship

2016-2017, Tallant-Cooper Academic Scholarship

2016-2019, George A. Kaseman Academic Scholarship

2016-2019, Van Donge Memorial Scholarship

2011-2015, National Honor Society

### Memberships

- Phi Kappa Phi
- American Physical Society (APS)
- Sigma Pi Sigma
- · Society of Physics Students, University of New Mexico chapter
- · National Society of Leadership and Success

### **Presentations**

- Salt Lake City, October 2018, Development and Characterization of New 3D Radiation Hard Silicon Particle Detectors for the HL-LHC
- CERN, August 2018, Compton Scattering as a Tool for Antiproton Beam Mapping
- CERN, July 2018, C2 Fluorescence Spectroscopy within the AEGIS Experiment
- 2019 University of New Mexico Physics Day, Modeling of Early Matter Domination in the Very Early Universe
- 2018 University of New Mexico Physics Day, Non-Standard Cosmological Histories
- 2017 University of New Mexico Physics Day, Dark Matter as Probe of the Very Early Universe

# **Publications**

- Brown, Patrick and Doser, Michael, Compton Scattering as a Tool for Antiproton Beam Mapping, CERN Summer Research Report, Published on CERN Document Server
- Brown, Patrick and Doser, Michael, Fluorescence Spectroscopy within the AEGIS Experiment, CERN Summer Research Report, Published on CERN Document Server
- Brown, Patrick and Pitz, Greg, Cs-Based Cavity Dumped Pulsed Laser Experiment, Air Force Research Laboratory Technical Memorandum, Classified, Published for Department of Defense use only

## References

- Dr. John McClory: Professor of Nuclear Engineering, Research/Academic Advisor Phone(work): (937)255-3636 ext. 7308 Email: <a href="mailto:john.McClory@afit.edu">john.McClory@afit.edu</a>
- Dr. Rouzbeh Allahverdi: Associate Professor of Astrophysics UNM, Research Advisor Phone(work): (505)401-3711 Email: rouzbeh@unm.edu
- Dr. Greg Pitz: Associate Research Physicist, Air Force Research Laboratory, Kirtland Air Force Base Phone(cell): (505)853-1386 Email: greg.pitz@us.af.mil
- Captain PJ Moran, USAF: Physicist, Air Force Research Laboratory, Kirtland Air Force Base Phone(cell): (443)822-5802 Email: paul.moran.1@us.af.mil
- Dan LaPorte: Retired NASA Instrumentation Physicist, Personal Mentor Phone(cell): (805)314-5326 Email: dandl805@cox.net