Christian D. Draper

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Current Position: Lecturer in Physics and Astronomy

Teaching Experience

Philosophy: I believe that students learn best when they are engaged with the material and have repeated exposure to the content. Thus, I expect my students to read before class and in class I present the material with great enthusiasm to show how exciting astronomy is. During class discussion I engage the students using vivid examples, appropriate humor, and real-life application. I also strive to create a safe environment where everyone feels comfortable contributing and facilitate their engagement with student centered-learning activities that encourages them to discuss and practice what they learn. After class, thoughtfully designed homework assignments allow students another opportunity to engage with the material and practice new skills.

Lecturer at Utah Valley University — August 2010–Present

Courses Taught

- **Astronomy 1040 Elementary Astronomy** (65 sections) – An introduction to astronomy with a focus on methods of science and physical laws.
- **Physical Science 1000 Survey of Physical Science** (37 sections) – A brief introduction to basic principles in physics, chemistry, geology and astronomy.
- **Physics 1010 Elementary Physics** (1 sections) – An introduction to physics focusing on physical laws ranging from Newton's laws of motion to simple quantum mechanics.
- **Physics 2020 College Physics II** (3 sections) – An algebra-based look at electromagnetism, optics and modern physics.
- **Physics 2025 College Physics II Lab I** (3 sections) – A lab course demonstrating principles of electromagnetism, optics and modern physics meant to follow Physics 2020 material.
- **Physics 2225 Physics for Scientists and Engineers II Lab 1** (3 sections) – A lab course demonstrating principles of electromagnetism, optics and modern physics meant to follow Physics 2220 materials.

Teaching Method

- **Traditional In-person Lecture** – A course taught face-to-face in a normal classroom environment. Lecture includes multimedia presentations and peer to peer instruction.
- **Hands-on Labs** – A hands on approach demonstrating principles taught in the corresponding lecture, including a brief lecture highlighting the physical principles and explanation of the experiment followed by a hands-on experiment with teacher assistance as needed.

- **Live, Interactive Distance Education** – A course taught in a traditional style with a live class and also broadcast live to satellite locations. Communication is facilitated through cameras on both ends as well as microphones.
- **Large Student Section** – A face-to-face course taught in a large room with hundreds of students. Includes multimedia presentation and peer-to-peer instruction. Requires coordination with multiple instructional assistants.

Student Outcomes

Average Gains

- 48% pre-test, post-test gains for Astronomy

Average Student Course Evaluation of Instructor

- 4.79 out of 5

Typical Student Praise

- "This class is amazing!!! I loved all the power points, projects, and assignments."
- "The consistency of the course and the easy-to-follow/understand instructions of the lessons."
- "Loved the enthusiasm from the teacher!"

Typical Student Criticism

- "Add another star show, if possible. As well as maybe some class sponsored observations."
- "Create a more organized review."
- "I don't like the final assignment of writing a paper, it just doesn't seem like something you would do in a physical science class. I would prefer a standard final exam."

Research Experience

Interests: My current research is focused on searching galaxy voids for dwarf galaxies as a means of probing different dark-matter models. This requires time on large telescopes to find very faint objects at large distances. To further understand the population of galaxies with emission, I am interested in seeing how emission changes in galaxies through time and across different galaxy types. I am also interested in developing a small-telescope research program which would allow students to capture and analyze their own data.

Publications

- Searching for Dwarf H Alpha Emission-line Galaxies within Voids III: First Spectra, Moody, J. Ward; Draper, Christian D.; McNeil, Stephen; Joner, Michael; *The Astrophysical Journal*, Volume 836, Issue 1, article id. 58, 4 pp. (2017).

Research in Progress

- Searching for Dwarf H Alpha Emission-line Galaxies within Voids I: Method and Survey of Void FN8, Draper, Christian D., Moody, J. Ward; McNeil, Stephen; Joner, Michael; Steele, Rochelle; Steele, Jackson. (In preparation)

- Searching for Dwarf H Alpha Emission-line Galaxies within Voids II: Survey of Void FN2, Draper, Christian D., Moody, J. Ward; McNeil, Stephen; Steele, Rochelle; Steele, Jackson. (In preparation)

Doctoral Dissertation to Dr. J. Ward Moody August 2015-August 2019
- Granted access to the 4 m Mayall telescope at Kitt Peak
- Granted time on the 8 m Gemini telescope
- Coordinated research with faculty, graduate students and undergraduates

Research Assistant to Dr. David Neilsen August 2007–April 2011
- Theoretical Research Group – General Relativity
- Programmed in Fortran and C to put Shen's micro-physical equation of state for neutron stars into the in-house GRMHD evolution program

Undergraduate Thesis with Dr. Eric Hintz August 2006–August 2007
- Used 0.4 m David Derrick telescope to acquire data
- Used IRAF to reduce and analyze data

Education

Brigham Young University *Provo, Utah*
Ph.D. in Astronomy August 2015-August 2019
- Graduated August 2019
- GPA 3.97 out of 4.00

Brigham Young University *Provo, Utah*
MS in Physics August 2007-April 2011
- Graduated April 2011
- GPA 3.26 out of 4.00

Brigham Young University *Provo, Utah*
BS in Physics Astronomy June 2000–August 2007
- Graduated August 2007
- GPA 3.45 out of 4.00
- Physics GPA 3.44 out of 4.00
- Minor in Mathematics GPA 3.38 out of 4.00