Introducing Astronomy Education into High School Physics Curriculum Through the Use of the University of North Dakota Observatory

Caitlin Nolby

Space Studies Department, UND

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Introduction

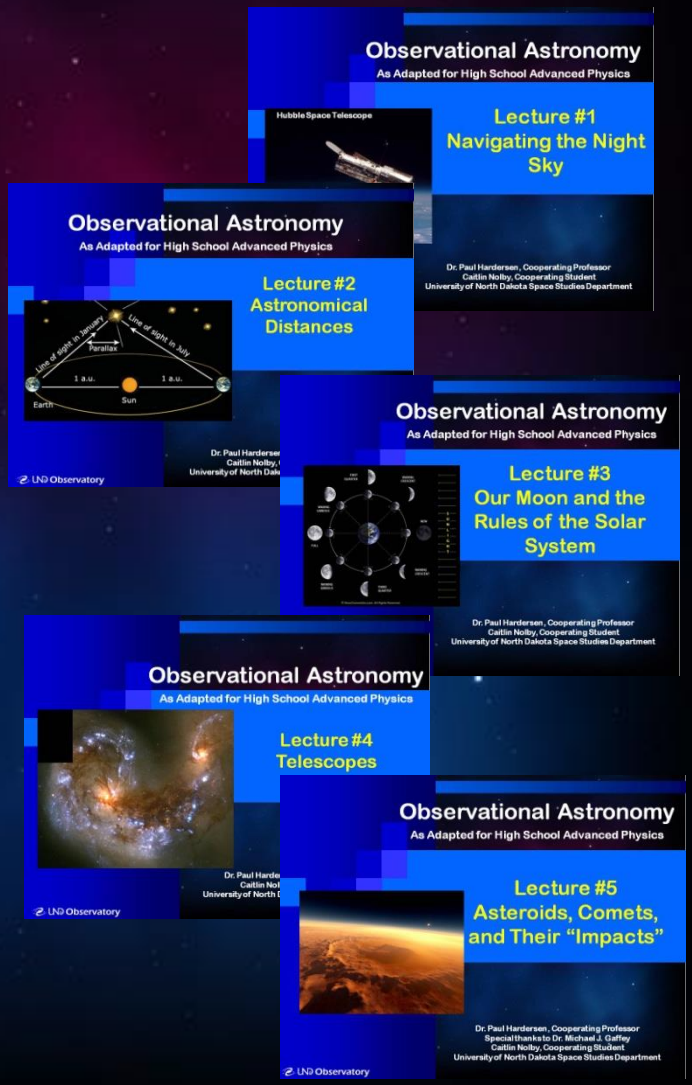
- Developed and taught a two week astronomy course to physics students at Grand Forks Central High School from April 16-27, 2012
- Along with in-class demonstrations, presentations, and activities, students were given the opportunity to visit the UND Observatory and the John D. Odegard School of Aerospace Sciences

Why do it?

- Programs like this do exist – just not in North Dakota
- UND Observatory = the only one in the state
  - Part of Mission of UND Observatory = Serving as educational resource
- Most science teachers have little to no training in astronomy (Beare et al., 2003)
- Astronomy is not a focus in local high school curriculum

First Week (April 16th – 20th)

- #1: Navigating the Night Sky
  - Celestial Coordinate Systems
  - Constellations
  - Seasons
- #2: Astronomical Distances
  - Solar System Distance Scale with the Sun as 7 cm diameter ball
  - Bill Nye the Science Guy video
  - Redshift and receding galaxies



First Week (April 16th – 20th)

- #3: Our Moon and the Rules of the Solar System
  - Kepler's Laws
  - Lunar Phases demonstration
  - Eclipses
- #4: Telescopes
  - Different Types and characteristics
  - Overview of Observatory
  - Remote Observing

First Week (April 16th – 20th)

- #5: Asteroids, Comets, and Their "Impacts"
  - Formation of Solar System
  - Craters and Energy
  - Activity with Chicxulub Crater and Size of Asteroid that caused the extinction of the dinosaurs

April 20th – Visit to UND Observatory

#1

#2

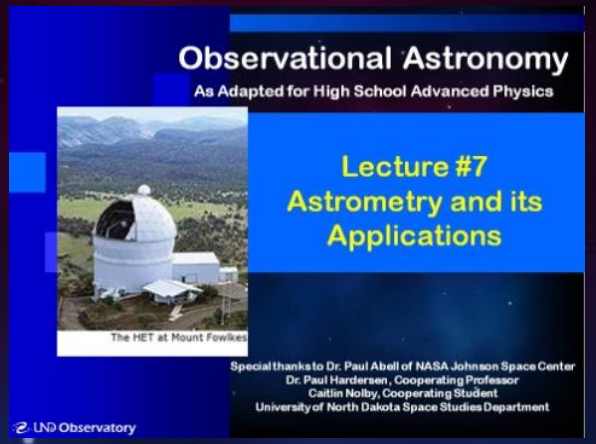
#3

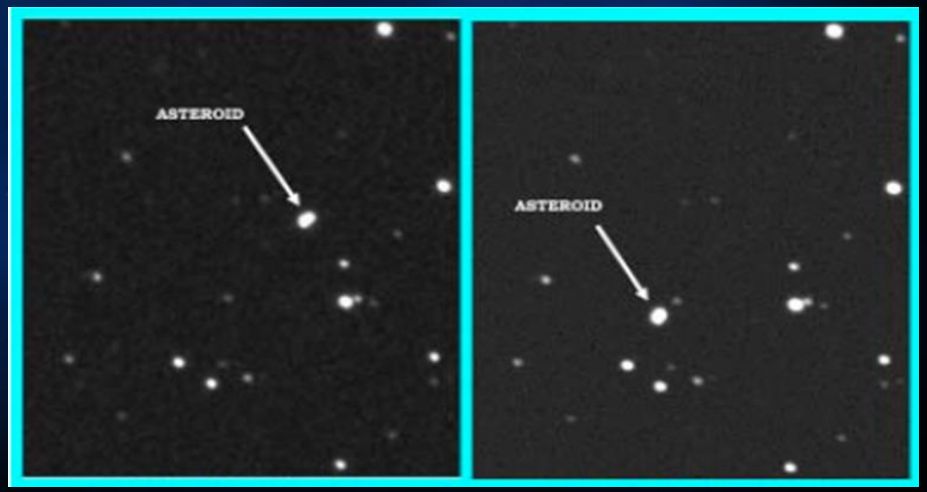
Second Week (April 23rd – 27th)

- #6: Computer Lab Day
  - Wrote “scripts” for remote observing of an asteroid
  - Explored Simulated ACP Observatory Control Software
  - Learned how to search for Information about solar system objects using databases

Second Week (April 23rd – 27th)

- #7: Astrometry and Its Applications
  - Impacts in Modern Society
  - Understanding CCDs (Cameras) and Images
  - Activity with images of asteroids and mission to an asteroid

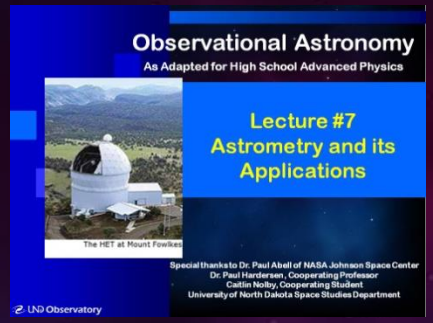


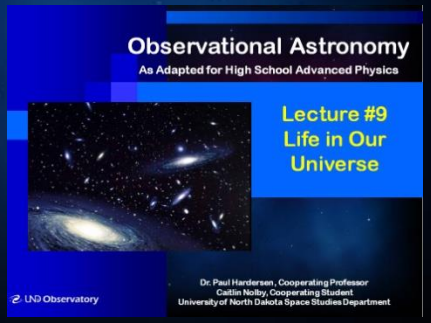


April 25th: Visit to UND Aerospace

Second Week (April 23rd – 27th)

- #9: Stars
  - Stellar Formation
  - Classification
  - Star Life Cycle
- #10: Life in Our Universe
  - Big Bang
  - Life on Earth
  - NASA Missions out of our solar system
  - Kepler Search for Exoplanets





Goals

- Better prepare students for college astronomy courses
- Make UND Observatory more visible
- Evaluate student enjoyment, progress, and overall perception of the course for future improvements
- Make astronomy education an option for high school students throughout North Dakota