

DEPARTMENT OF PHYSICS, ASTRONOMY, GEOLOGY, AND ENVIRONMENTAL SCIENCE

Department of Physics, Astronomy, GIS, Geology, and Environmental Science
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Welcome

Welcome to the Department of Physics, Astronomy, GIS, Geology, and Environmental Science (PAGGES).

We take pride in offering distinctive, hands-on learning experiences that prepare our students for dynamic careers in science. Our department is founded on the belief that students learn best by actively engaging in the same kinds of work performed by physicists, astronomers, geologists, and environmental scientists.

Our department is home to two outstanding public resources: The **Clarence R. Smith Mineral Museum**, featuring a world-class collection of rare minerals and fossils from around the globe. The **Ward Beecher Planetarium**, equipped with a 40-foot projection dome, a Chronos GOTO star projector, and a SciDome HB 4K full-dome digital projection system.

Both the museum and planetarium are free and open to the public and are partially operated and maintained by our students—providing excellent opportunities for hands-on learning and outreach experience.

Our students benefit from access to advanced laboratory and field research equipment. Highlights include:

- **Surface analysis tools** such as an atomic force microscope and x-ray photoemission spectrometer
- **Semiconductor development instruments** like a photolithography mask aligner, magnetron sputtering deposition system, and a HeCd laser photoluminescence spectrometer
- **Optics research tools**, including a Vibrant OPOTek optical parametric oscillator and pulsed YAG lasers for nonlinear optics studies
- **Environmental analysis systems** like an ICP spectrometer, ion and gas chromatography systems, a laser particle size analyzer, and a wide array of bench-top instrumentation

Students also make use of the **Ohio Supercomputer Facility** to simulate solid-state physical systems and learn to work with astronomical imaging data from ground- and space-based telescopes. Others become skilled in using advanced field instruments for remote sensing and geophysical analysis. Field tools include:

- DJI Matrice 600 drone with infrared and optical imaging
- Ground penetrating radar
- Handheld X-ray fluorescence analyzer
- 24-channel refraction seismograph
- Earth resistivity tools
- Proton magnetometer

- High-resolution GPS and total station surveying equipment

Additionally, our department maintains a dedicated **endowment fund** to support student research assistant positions. We actively involve students in faculty-led research projects, planetarium programming, and museum operations, and we welcome conversations with prospective students about these exciting opportunities.

Departmental Mission Statement

The Department of Physics, Astronomy, Geology, and Environmental Sciences is committed to delivering a high-quality educational experience by actively engaging undergraduate students in meaningful research. This approach reflects our core philosophy of *learning through research*. We aim to expand the department's research presence, support the academic development of undergraduates through rigorous coursework, and foster strong connections between the scientific community, the public, and the University through dynamic outreach initiatives.

Our courses are designed with the following goals in mind:

- To provide comprehensive training in the physical sciences for students preparing for graduate studies, careers in industry, roles in regulatory compliance, or teaching at the secondary level.
- To offer foundational instruction for engineering and pre-professional students.
- To introduce non-science majors to the principles, methods, and real-world applications of the physical sciences in today's society.

Detailed information about degree requirements, sample four-year plans, and curricula for the **Bachelor of Arts** and **Bachelor of Science** programs can be found under the *Programs of Study* tab. Students can complete either degree in eight semesters by maintaining an average course load of 15 credit hours per term.

Program Directors / Coordinators

- **Ward Beecher Planetarium Director/Astronomy Program Coordinator:**
Dr. Patrick Durrell (email: prdurrell@ysu.edu) (330) 941-7107
- **Geology Undergraduate Program Coordinator:**
Dr. Beej Spieler (email: bjspieler@ysu.edu (wgsturrus@ysu.edu)) (330) 941-2293 Moser Hall Room 2075
- **Environmental Science Undergraduate/Graduate Program Coordinator:**
Dr. Felicia Armstrong (Email: fparmstrong@ysu.edu) (330) 941-1385