



THE UNIVERSITY OF
TOLEDO

1872

Dept. of Physics & Astronomy



Teaching Undergraduate Physics in an Open Enrollment University



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Department Data

- 20 Tenure/TTrack Faculty
(+4 search)
- 2 Visiting Faculty
(+2 search)
- 8 Part-time Instructors
(includes emeritus faculty)
- 12 Research Faculty
- 9 Research Postdocs
- 54 Graduate Students
- 63 Undergraduate Majors
- 6 Technical Staff
- 3 Administrative Staff



Research Areas



- Astronomy/Astrophysics
- AMO Physics
- Biological Physics
- Computational Physics
- Condensed Matter
- Materials Science
- Medical Physics
- Photovoltaics

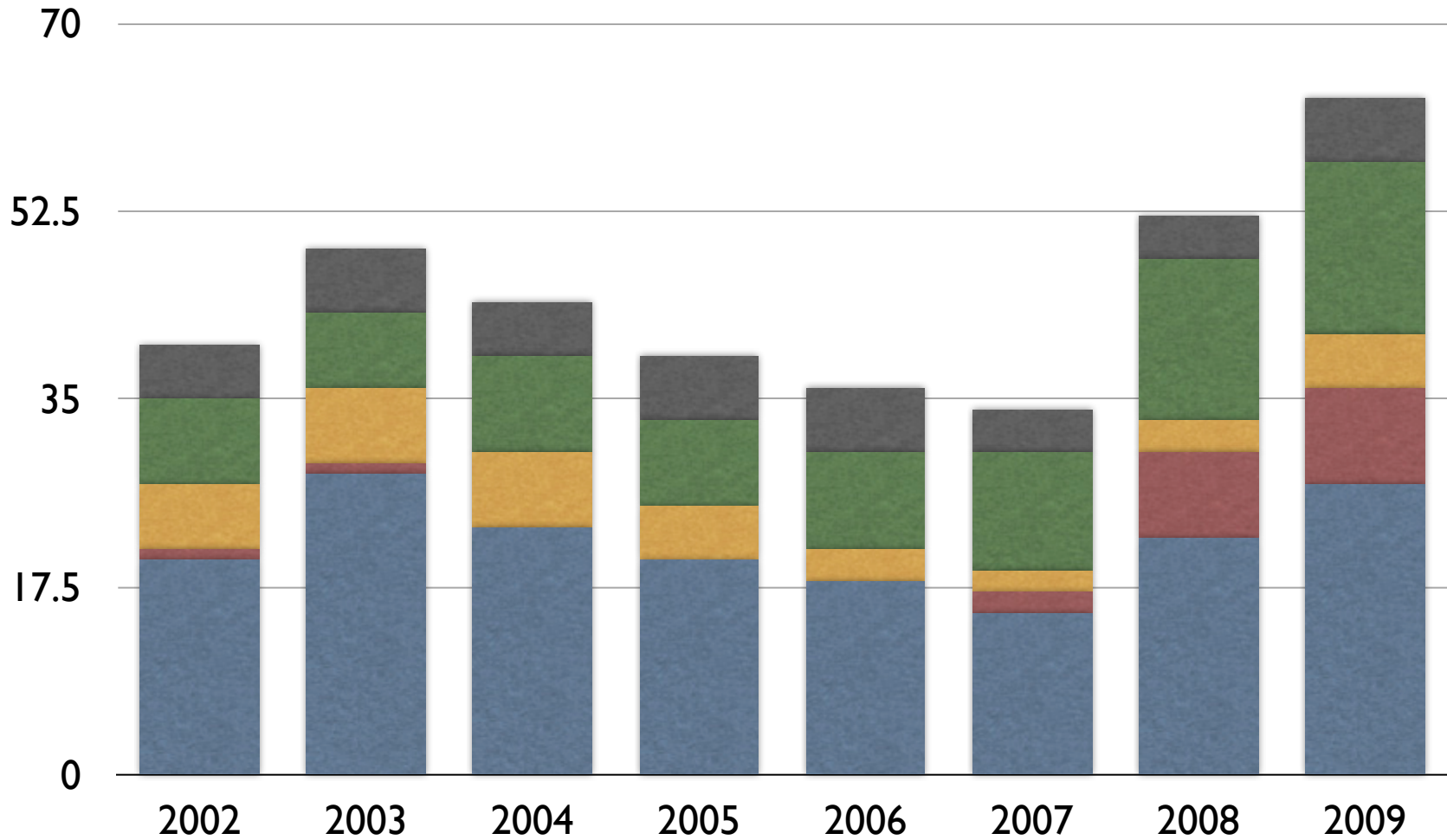


Undergraduate Degrees

- B.A. Physics
- B.A. Astronomy
- B.S. Physics:
 - *Applied Physics*
 - *Astrophysics*
 - *Biomedical Physics*
 - *Physics*
- Minors in:
 - *Physics*
 - *Astrophysics*
 - *Renewable Energy*



Total Number of Undergraduate Majors



BS (Physics)

BA Astronomy

BS (Applied Physics)

BA Physics

BS (Astrophysics)

Key Challenges

- Large proportion of “non-traditional students”; many first-generation college; many from rural or inner-city schools
- Wide range of levels of student preparation (open enrollment); need to tailor individual tracks
- Growing demand for algebra-based course (pre-med, pre-PT, pharmacy, life sciences, less prepared science majors)
- Large service load; example - e.g., intro astronomy courses widely taken by education majors (opportunity!)
- Attrition in first/second year (placement)
- Smaller number of majors and faculty size places limits on ability to offer large range of specialty courses for multiple tracks (how do we customize without adding new courses?)
- Resources (faculty, staff, teaching space, TA’s, etc)

Intro Physics Courses

- Honors Physics for Scientists & Engineers (2 sem) - we put our majors here
- Physics for Scientists & Engineers (2 sem)
- General Physics (2 sem - algebra/trig)
- Technical Physics (2 sem - algebra)
 - Engineering Technology students
- Intro to Physics (1 sem - pharmacy)
- General Education courses (1 sem)
 - Jurassic Physics
 - Music & Sound
 - Color & Light
 - World of Atoms
 - Physics of Everyday Life

Undergraduate Research

- Connects students to department and faculty; provides extra challenges the best students
- Strongly encouraged to be involved in research as early as possible
- Research results in published papers and senior thesis projects
- Annual prize for best undergrad research awarded at undergrad research symposium
- Special undergrad research colloquium held each year in fall
- Strong REU program (18+ years)

SPS

- Active group; SPS lounge in department
- Annual budget provided by department
- Social activities (game/movie nights, geocaching, picnics, etc.)
- Outreach activities (local schools, star parties, local science museum, recruiting)
- Special events (Rube Goldberg, solar car)

Example Curriculum Change

- PHYS 1910: Frontiers of Physics & Astronomy
- Team-taught by physicist and astronomer
- Introduces majors to department earlier, connects with advisors and research options
- Motivates with current topics, many self-selected by students
- Includes discussions of career options
- Semester project, written and oral

Institutional Mission

- Recent strategic investments by university in two key research areas in department (photovoltaics and astrophysics) have had major impact on research level, and also on number and quality of majors attracted to program
- Undergraduate Minor in Renewable Energy (interdisciplinary) has just been added, along with Professional Science Masters in Photovoltaics

Other Efforts

- Single advisor for all majors; senior exit interviews
- Internal scholarships
- University-wide Office of Undergraduate Research (offers funding for students during year and summer; competitive proposal selection)
- Diversity efforts (IDEAL, AWIS, WISE,)
- Postsecondary option for local HS students; Dual-credit options offered in regional HS (new)
- Summer physics camp for HS students (tied to REU)