

Reforming Graduate Physics at Oregon State University: Curriculum & Professional Development

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OSU PHYSICS AT A GLANCE:

FACULTY		
Research Field	Faculty FTE	Total
Cond. Matter/Materials	4 Exp, 3 Comp	7
Optics/Materials	4 Exp, 1 Comp	5
Physics Education	2.5	2.5
Nuclear	0.5 Th, 0.5 Comp	1
Active interdisciplinary collaborations with Chemistry, Biophysics, Engineering, Atmospheric Sciences and Science & Math Education		
Instruction only	2	2
STUDENTS		
	Male	Female
Graduate Students PH+Interdisc (PH only)	34 (31)	7 (6)
Undergraduate Majors (Jr+Sr)	31+33	≈ 10%
Non-majors (Intro & service)	approx. 1550/yr	
DEGREES		
Degree	Yr. to deg	#/year
Ph.D. (Physics)	6.03	4.25
M.S. (Phys. & Appl. Physics)	2.81	2.81
B. S.	4.46	17.7
A recent trend is that the terminal M.S. degree is a target degree. The Professional Science Masters in Applied Physics is partly responsible. (Data: 2000-2007)		

SUMMARY:

A 2007 internal Graduate Task Force evaluated the physics graduate experience at OSU, considering the constraints of a small department with a large service component. Broadly, the recommendations were to (I) keep departmental research focus tight to preserve critical mass, (II) reduce the curricular core, (III) modularize the solid state and optics specialty courses, (IV) formalize & advertise professional development opportunities, and (V) ensure early entrance to research.

CURRICULUM:

- The **required courses are reduced** to 15, with 3/quarter considered a manageable load that allows a student to complete coursework in less than 2 years *and* enter research early. (three 11-week quarters = 1 academic year)
1 q. adv. Math; 3 q. QM; 3 q. E&M; 1 q. Nonlin. Dyn.; 2 q. Stat.Mech.
1 q. adv. QM; 3 q. Sol.St. or Optics (research specialty); 1 q. breadth elective.
- 5-week modular solid state and optics specialty courses** devoted to specific topics. Except for two introductory modules, course order is irrelevant. This will allow students to select from a rotating menu of courses, giving both more flexibility and more depth if desired. This arrangement should freeing research time in some early quarters, and provide better preparation for research.

PROFESSIONAL DEVELOPMENT HIGHLIGHTS:

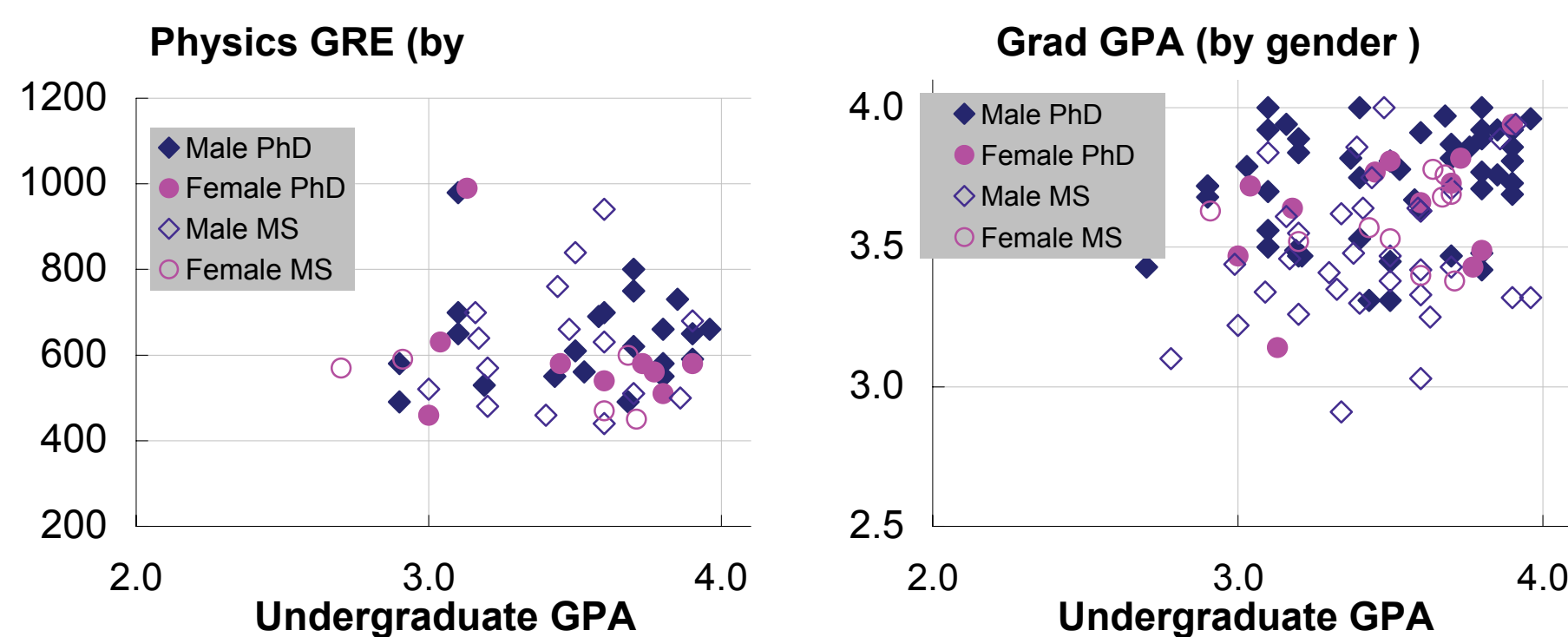
- TA training** is on-going throughout the students' careers. A 3-day summer orientation focusing on survival is followed by a weekly 1-hr seminar in the Fall term. TAs learn how to engage students, critique one another in presentation of problems, and also discuss pedagogy, grading, and conflict resolution. The Winter and Spring terms offer optional 1-hr teaching seminars that explore aspects of Physics Education Research and deeper discussion of pedagogy. These are optional, and well-attended. Weekly TA meetings during the year focus on details of the upcoming material and complement a student mentor program.

<http://www.physics.oregonstate.edu/gradorientation>

http://www.physics.oregonstate.edu/~tate/COURSES/ph607_TASem.html

<http://www.physics.oregonstate.edu/TAsources>

- A 1-hr **Communications seminar** is required. Students make 10-minute talk presentations, discuss written, oral & professional/social etiquette, resumes, and job interviews. <http://www.physics.oregonstate.edu/~wwarren/COURSES/ph607/>
- A 1-hr **Research seminar** is required. Students learn about departmental research, discuss research procedure & ethics, research expectations, and job prospects.



Women tend to have lower PH GRE scores than men, but their graduate GPAs are the same. They are more likely to finish the Ph.D.