

# Physics Learning Assistants at Georgia State University

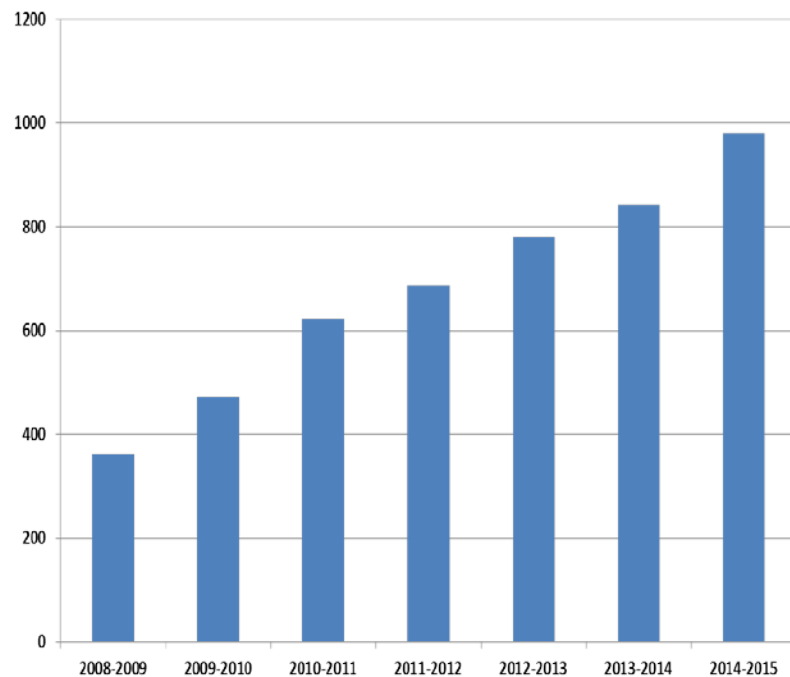
STEM Initiative Goal:  
Enhancing the Undergraduate  
Experience

**Brian D. Thoms – Physics & Astronomy**

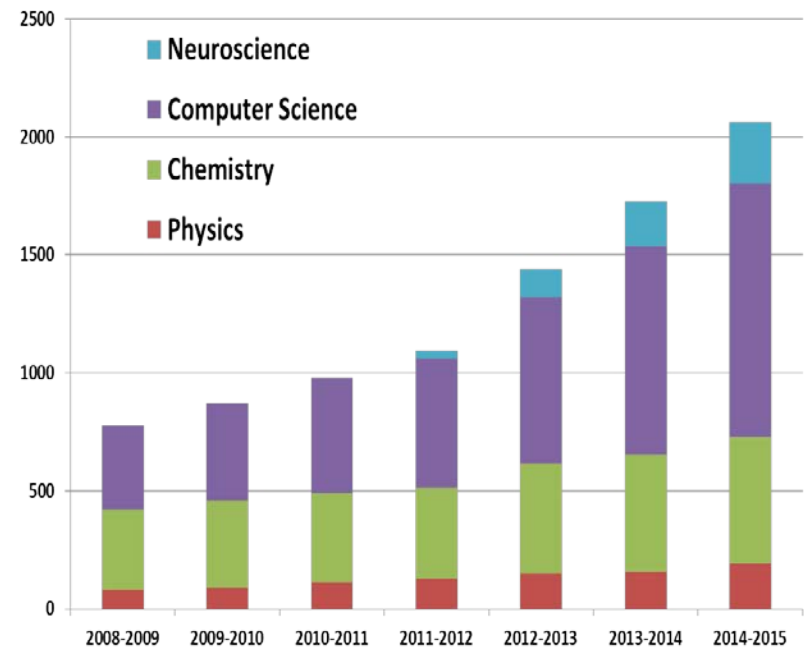
# Calculus-Based Physics Courses

- 50% Computer Science majors, 20% Chemistry majors, 10% Physics majors.
- Three hours of lecture plus one three hour laboratory per week.

Calculus-based Physics Enrollments



Increase in Majors That Take Calculus-based Physics



# Principles of Physics Course Redesign

- \* Three-hour traditional experiments led by
- \* Graduate Teaching Assistants

Confirmation of Theory



One-hour tutorial led by Undergraduate Learning Assistants

Two-hour inquiry-based experiments led by Graduate Teaching Assistants



LA's job

- To facilitate group discussion
- To ask leading questions
- To help students to work through difficulties in their own thinking

- Prompt thinking as a group
- Make predictions
- Test their predictions to discover underlying ideas

# Undergraduate Learning Assistants (UC Boulder model)

- Chosen from successful students in previous semesters
- Univ. of Washington Tutorials: research-based instructional strategy
- Practice tutorials as a group each week
- Professor models role of LA during practice session
- LAs take a physics pedagogy course the first time they are an LA
- LA leads 3 tutorial sections each week and is paid \$1120/semester
- To continue as LAs they must move down path to becoming teachers
- Proven technique to produce more high school physics teachers

# Force Concept Inventory Results

	N	FCI Pre (%)	FCI Post (%)	$\langle g \rangle$
Phys2211 w/ Traditional Labs	218	36.3	54.8	0.30
Phys2211 w/ Redesigned Labs	227	36.6	61.0	0.40

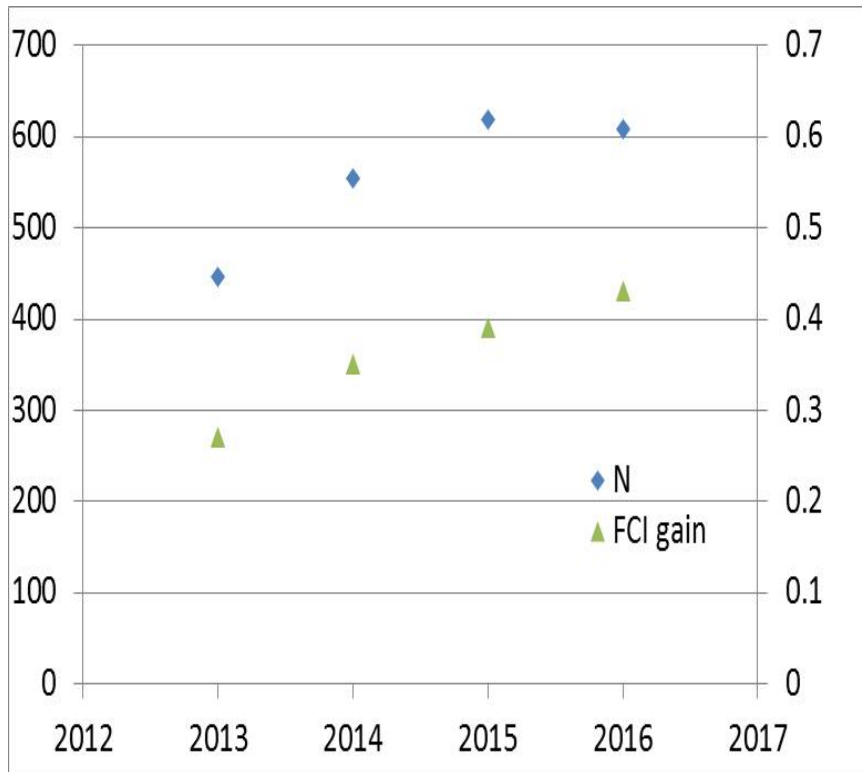
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# The Effect on Success Rates and Withdrawal Rates

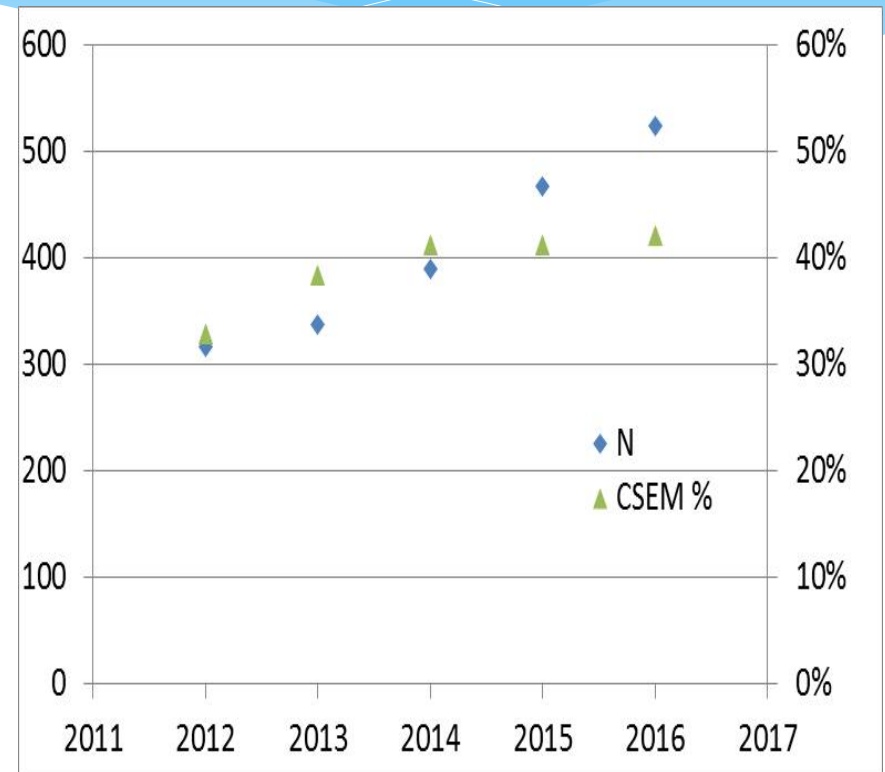
	<b>N</b>	<b>GPA</b>	<b>ABC</b>	<b>DWF</b>	<b>W</b>
Phys2211 w/ Traditional Labs	421	3.12	86.0%	14.0%	8.8%
Phys2211 w/ Redesigned Labs	521	3.29	91.2%	8.8%	4.6%

	<b>N</b>	<b>GPA</b>	<b>ABC</b>	<b>DWF</b>	<b>W</b>
Phys2212 w/ Traditional Labs	325	3.00	85.8%	14.2%	6.2%
Phys2212 w/ Redesigned Labs	399	3.08	90.7%	9.3%	3.8%

# Enrollments and Assessments



Phys2211 – Principles of Physics I



Phys2212 – Principles of Physics II



# New Addition: Active Learning Laboratory

