

Interdisciplinarity and “Convergence” in Doctoral Education

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CGS by the Numbers

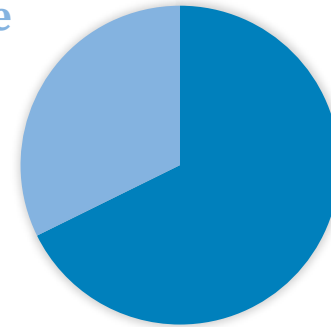
~500

U.S. and Canadian
Member Universities

29

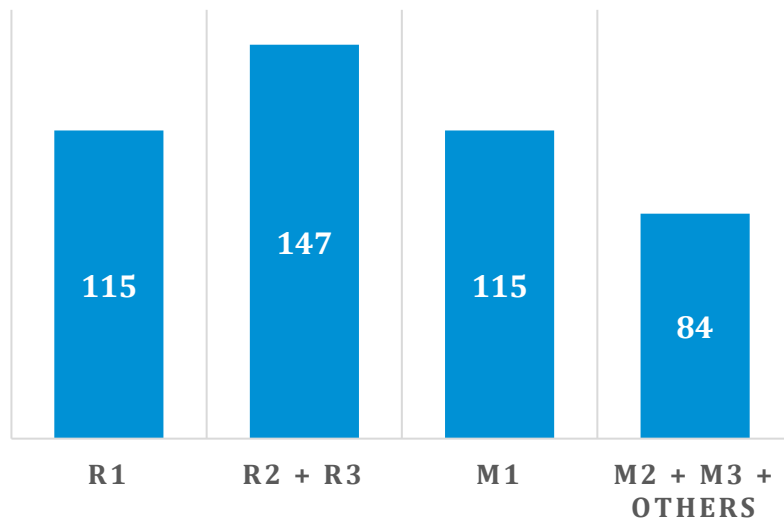
International
Members

Private
32%



Public
68%

CGS Members by Carnegie Classification



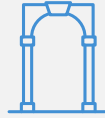
1,849,606 Aggregate Enrollment
(master's & doctoral students)

CGS Members in the U.S. Award

476,616
*master's degrees
annually*

60,823
*doctoral degrees
annually*

**CGS Best
Practice
Initiatives:
*Supporting
the Whole
Student***



**Admissions
and
Recruitment**



**Student
Wellbeing and
Success**



**Completion and
Persistence**



**Diversity and
Inclusion**



**Encouraging
the Next
Generation**



**Career
Pathways**



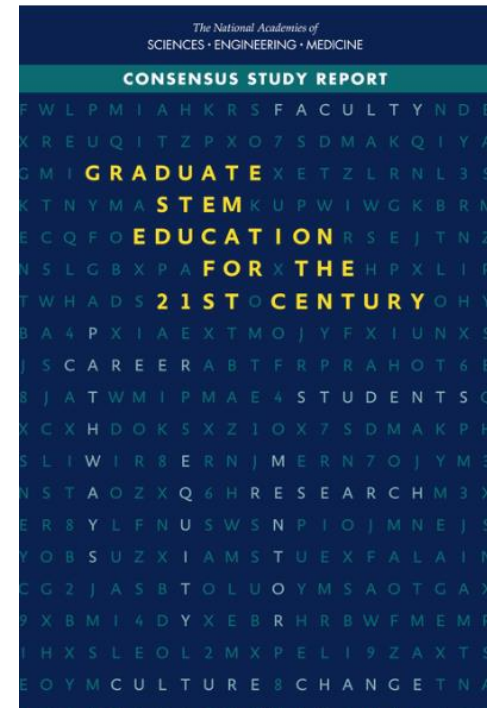
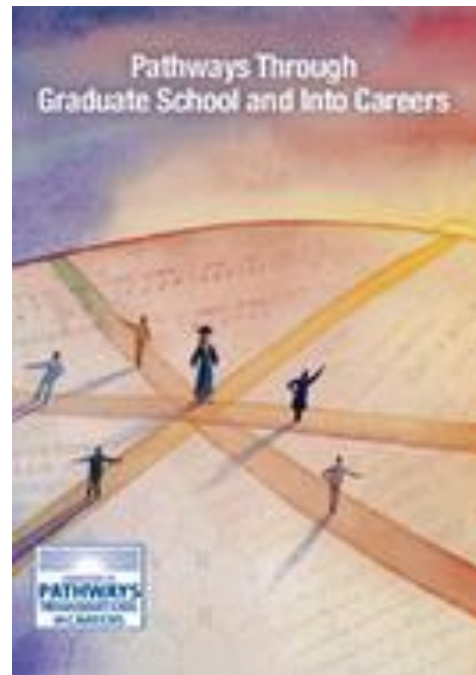
**Professional
Development**



**Preparing
Future
Faculty**

*Two Contexts for Interdisciplinary Graduate
Education in the United States (and
Perhaps Internationally?)*

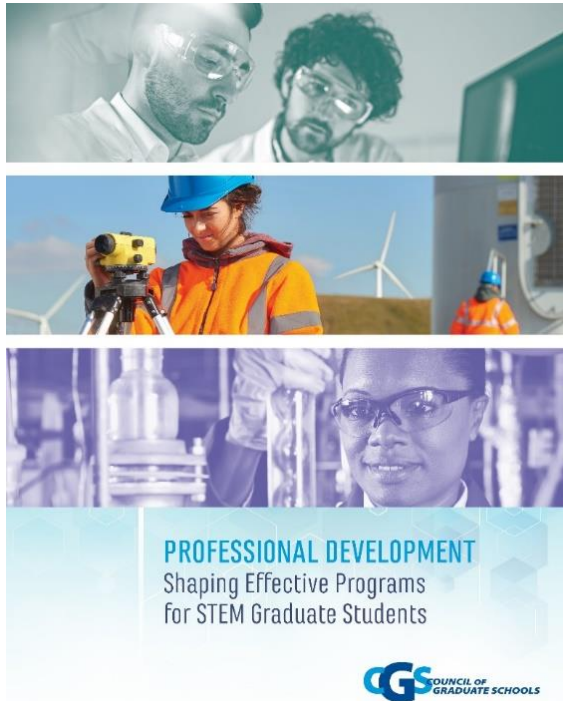
Context 1: Calls for Broader Career Preparation for PhD Students



Working toward Reforms in PhD Education

Goals	Challenges
Broadening conceptions of PhD careers (beyond academia)	Supervisors that don't understand or value non-academic careers; lack of examples/data on careers outside of academia; lack of institutional resources for broader training.
Tracking PhD careers long-term	Costs; maintaining contacts with alumni
Formalizing expectations and opportunities for PhD professional development	Choosing the right structures (embedded within programs or provided centrally or both); costs; assessing outcomes.
Formalizing expectations for mentoring and supervision	Lack of training for mentors; Structures that reward faculty research productivity, but not mentoring and supervision.
Interdisciplinary learning	Disciplinary "silos"; lack of incentives for students and faculty.
Increasing mobility/international experience of degree candidates	<i>In the U.S.</i> , funding structures that make it difficult for students to take leave of absence from faculty advisor's lab; lack of international mindset.

Skills Gaps and Unmet Needs



General Skills

- Writing, speaking, and presentation, including effective PowerPoint.
- **Cross-disciplinary and cross-cultural communication and teamwork.**
- Time management and project management in an experiential context.

STEM-specific

- Analytics, data science
- Statistics and computational ability, especially in working with big data
- Genetics and genomics
- Cognitive computing
- Information Systems that can keep up with the pace of change
- Lab Safety

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Context 2: An interest in “Convergence” on the part of U.S. Funding Agencies

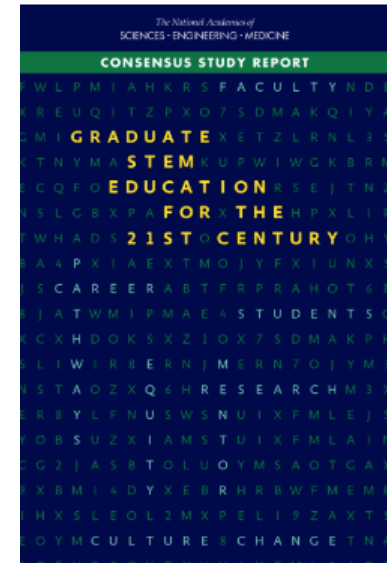
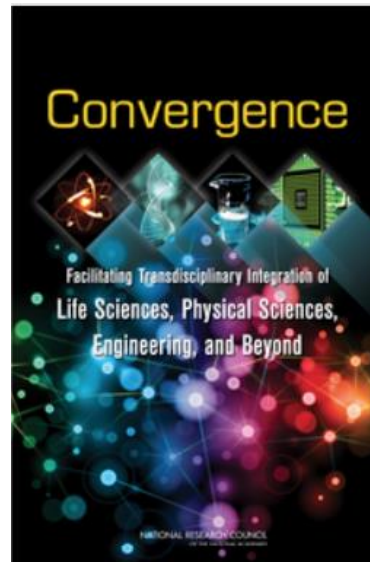
Convergence is “the merging of ideas, approaches and technologies from widely diverse fields of knowledge to stimulate innovation and discovery.” (NSF 2016).

Convergence is characterized by...

- Research driven by a specific and compelling problem.
- Deep integration across disciplines.

Source: National Science Foundation, Dear Colleague Letter, March 2018

Growing Attention to Skills Needed for Convergence



What will it take to prepare today's graduate students for research problems of the future?

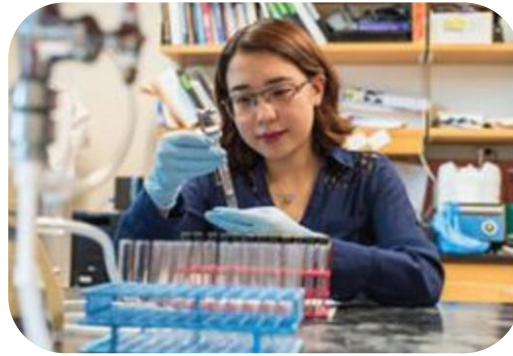
Prepare Students to Cross Boundaries of Sector, Discipline, and Identity

- **Preparation for collaboration across different workforce sectors**, and for multiple career pathways, in a workforce that is rapidly changing.
- **Preparation to work in multidisciplinary teams** with people who approach problems with different methods and knowledge.
- **Ability to problem-solve in diverse groups** (in terms of culture, gender, socioeconomic status, etc.)

Principles for Supporting Interdisciplinarity in Graduate Education



Articulate the Value



Identify and Develop
the Skills



Provide Collaborative
Spaces and
Opportunities

Principles for Supporting Interdisciplinarity in Graduate Education

P&T

Value Interdisciplinarity
in Promotion and
Tenure



Encourage Funding
Agencies to Support
Interdisciplinarity

Contact

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