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History of US Policy Debates over Graduate Education with a Focus on IGERTs

CIRGE
Center for Innovation and Research in Graduate Education

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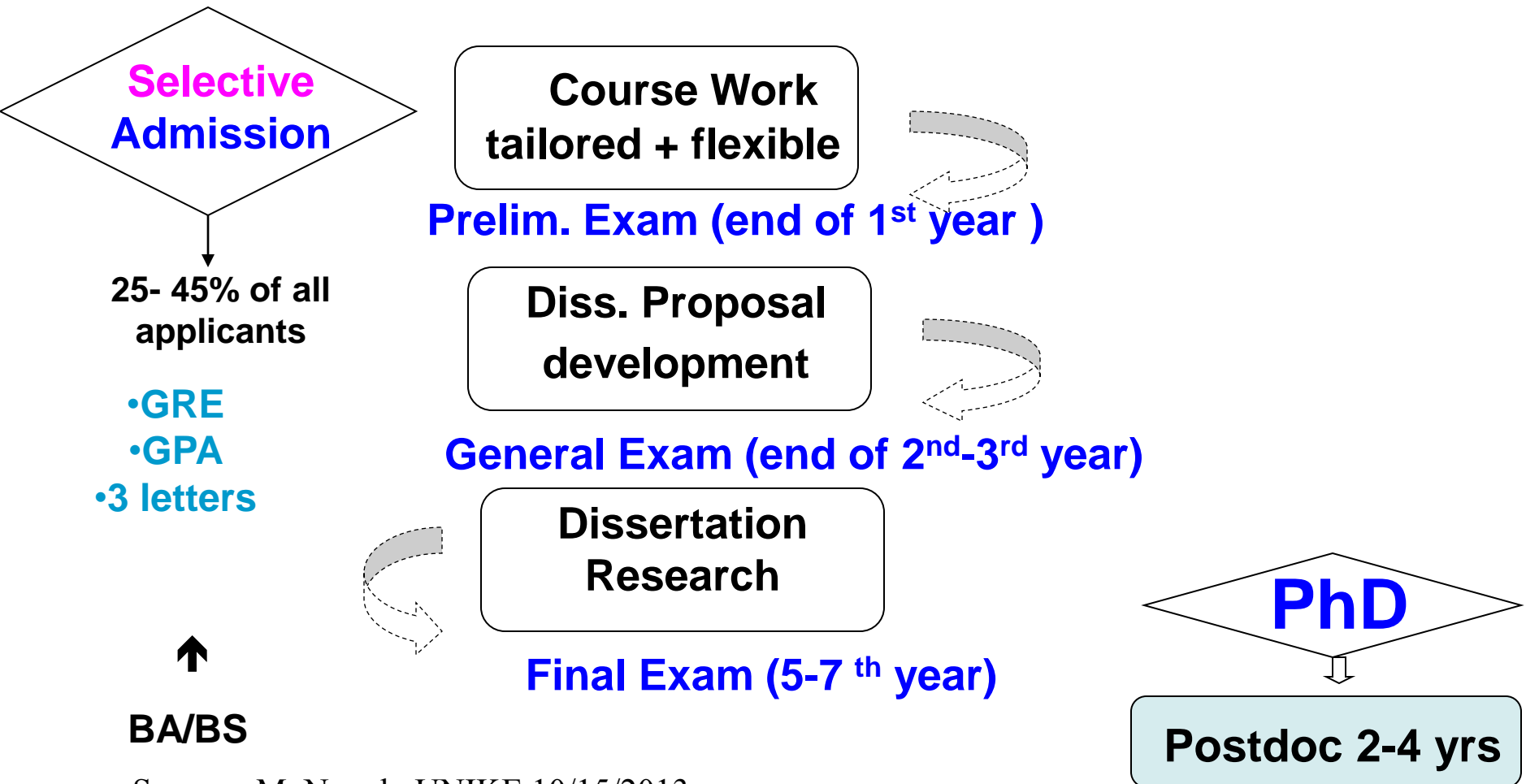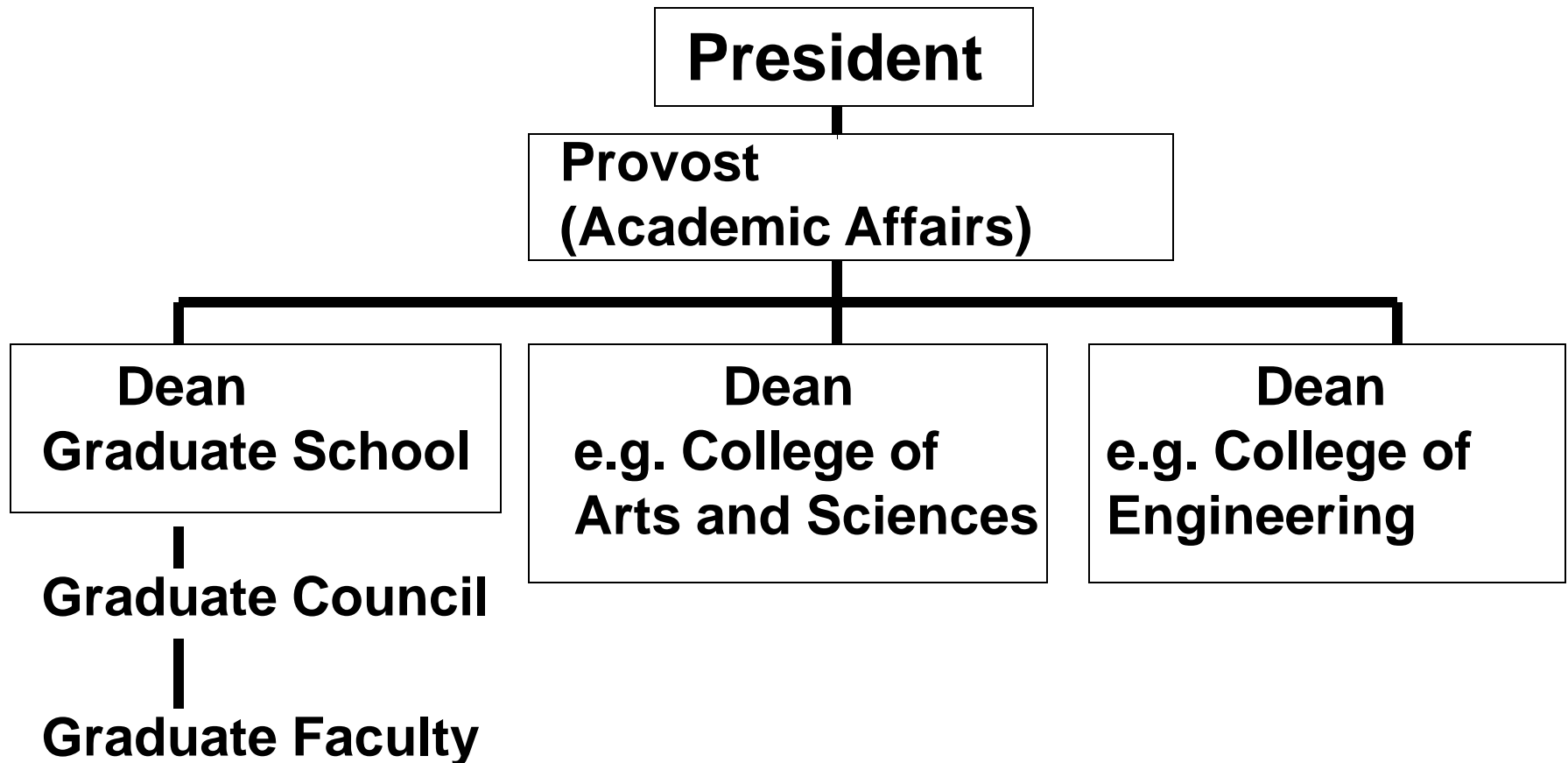Director, CIRGE
University of Washington, Seattle

Overview

1. **The characteristics of US graduate education**
2. **The context of policy debates**
   a. US mechanism of change (not reform) in doctoral education
   b. External influences on change –globalization
3. **Policy topics since 1970**
4. **Responses at many levels**
5. **IGERT- the NSF funded, innovative doctoral program- a national flagship program**
   Characteristics and Challenges
6. **A worldwide policy borrowing?**

Basic Structure of US PhD Programs including Master's Degree on the Way

Selective Admission

Course Work tailored + flexible

Prelim. Exam (end of 1st year)

25- 45% of all applicants

- GRE
- GPA
- 3 letters

Diss. Proposal development

General Exam (end of 2nd-3rd year)

Dissertation Research

PhD

Final Exam (5-7 th year)

BA/BS

Postdoc 2-4 yrs

Source: M. Nerad, UNIKE 10/15/2013

Internal Organization of U.S. University: Example I

President

Provost (Academic Affairs)

Dean Graduate School

Dean e.g. College of Arts and Sciences

Dean e.g. College of Engineering

Graduate Council

Graduate Faculty

Source: M. Nerad, UNIKE 10/15/2013

US Graduate Institutions by Type of Institution in 2005 (*size)*

Institution Type	N of Institution	N of PhDs	% total PhD
Graduate degree granting (MA/MS/PhD)	1,700		
Doctoral degree granting	419	43,354	100%
AAU (major research universities)	61		53%
Universities that annually award >700 PhDs	UC Berkeley UTX- Austin U- Miami U Washington	802 716 711 763 (2012)	

Characteristics of U.S. Graduate Education

1. **Decentralized - No central, federal regulatory system- Doctoral education is extremely decentralized**

2. **Market- driven (supply and labor market demand)**

3. **Structured process with a developmental curriculum**

4. **Many quality assurance mechanisms**

Features of U.S. PhD Programs

- **Professors design the programs within the policies of their fields of study (college) and the central graduate school**
- **Programs are structured, with some required course work and clear benchmarks towards dissertation completion**
- **Programs allow ample students' autonomy and room for self-directed inquiry**
- **Programs are embedded in departments responsible for both undergraduate and graduate education – teaching possibilities and pedagogical thinking**
- **PhD programs –** *are socialization agencies* **- an essential unit which transforms students into independent researchers.**
- **Other campus units support this process increasingly**

Source: M. Nerad, UNIKE 10/15/2013

The Globalization Context

- **Economic theory of the knowledge economy are embraced by governments worldwide.**
- **Innovation and technical changes are seen as means of economic growth.**
- **Graduate education is to educate innovators for many sectors of society.**
- **New knowledge must be disseminated**
- **Governments want World-Class research capacities in order to attract investment and create new jobs.**

Source: M. Nerad, UNIKE 10/15/2013

Effects of Globalization on Graduate Education Worldwide

1. **Increase in PhD production: more women, more international students, more part-time /older students –** more diverse researchers

2. **A change in the mode of research production –** mode 2 (research triangles)

3. **Increase in the importance of transferable/ professional and translational skills-** more skills

4. **Increase in standardization of doctoral education –** allows for mobility

Source: M. Nerad, UNIKE 10/15/2013

Effects of Globalization on Graduate Education Worldwide

5. **Quest for greater accountability- project management skill**

6. **Increased global communication and creation of global networks – scholarly, global networks**

7. **Higher education is responding to market forces faster than before –competition**

8. **Higher education has become commercial and generates revenue- the degree has become a commodity that has value beyond pure knowledge production-competition for students**

Reoccurring US Policy Discussions

(1)

1. **Over-under production of PhDs**
2. **Effectiveness of graduate program: long-time-to degree, low completion**
3. **Reduction in federal and state support for research and financial support of students**
4. **Quality and quality management of doctoral program**
5. **Professional skills development**

Source: M. Nerad, UNIKE 10/15/2013

Reoccurring US Policy Discussions

(2)

6. **Faculty/student relationship**

7. **Increase participation of underrepresented students**

8. **Interdisciplinarity and socially relevant research**

9. **Postdoc appointment**

10. **Career preparedness**

Source: M. Nerad, UNIKE 10/15/2013

Size & Expansion Over Time of the U.S. Doctoral Education System (external influences!)7

U.S. PhDs Awarded 1900-1999
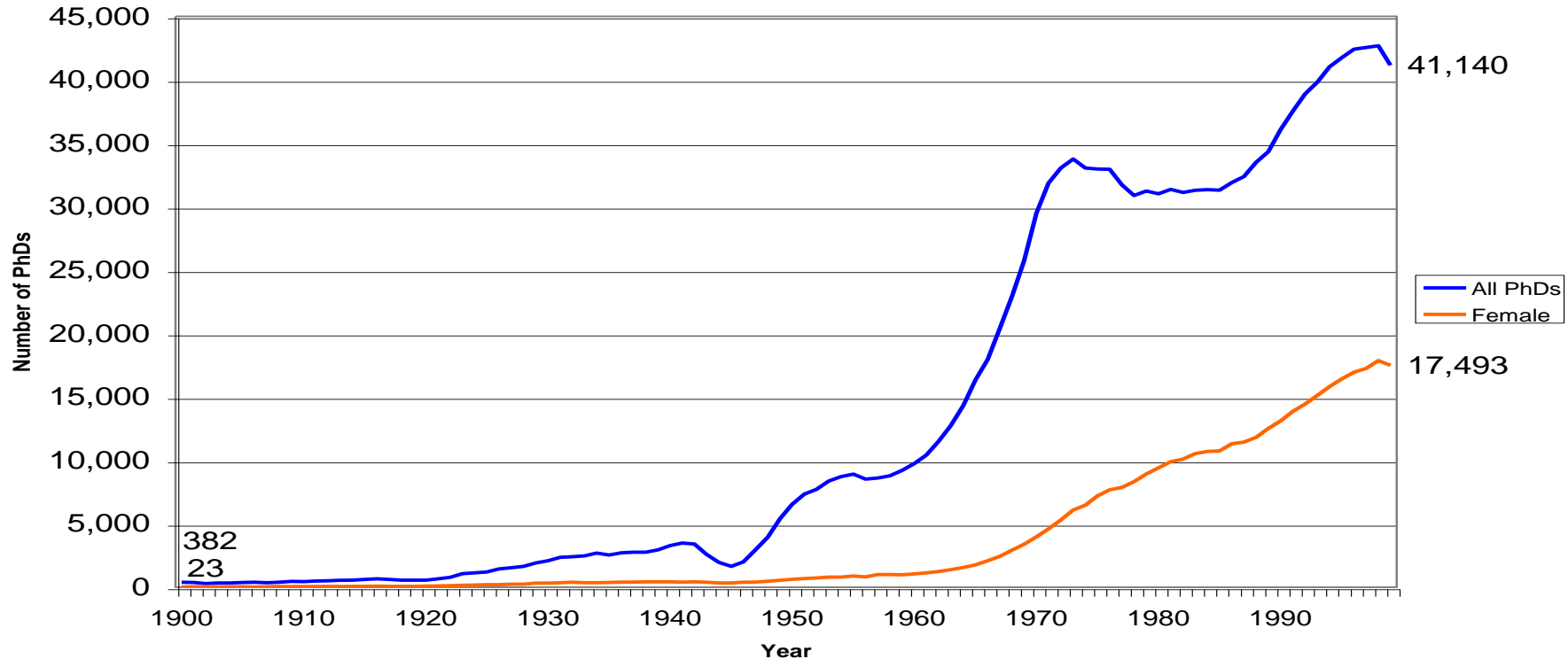
Source: Thurgood, Golladay, and Hill, 2006, *US Doctorates in the 20th Century*

Source: M. Nerad, UNIKE 10/15/2013

US Doctoral Degrees by Citizenship 1967-2005

Source: M. Nerad, UNIKE 10/15/2013
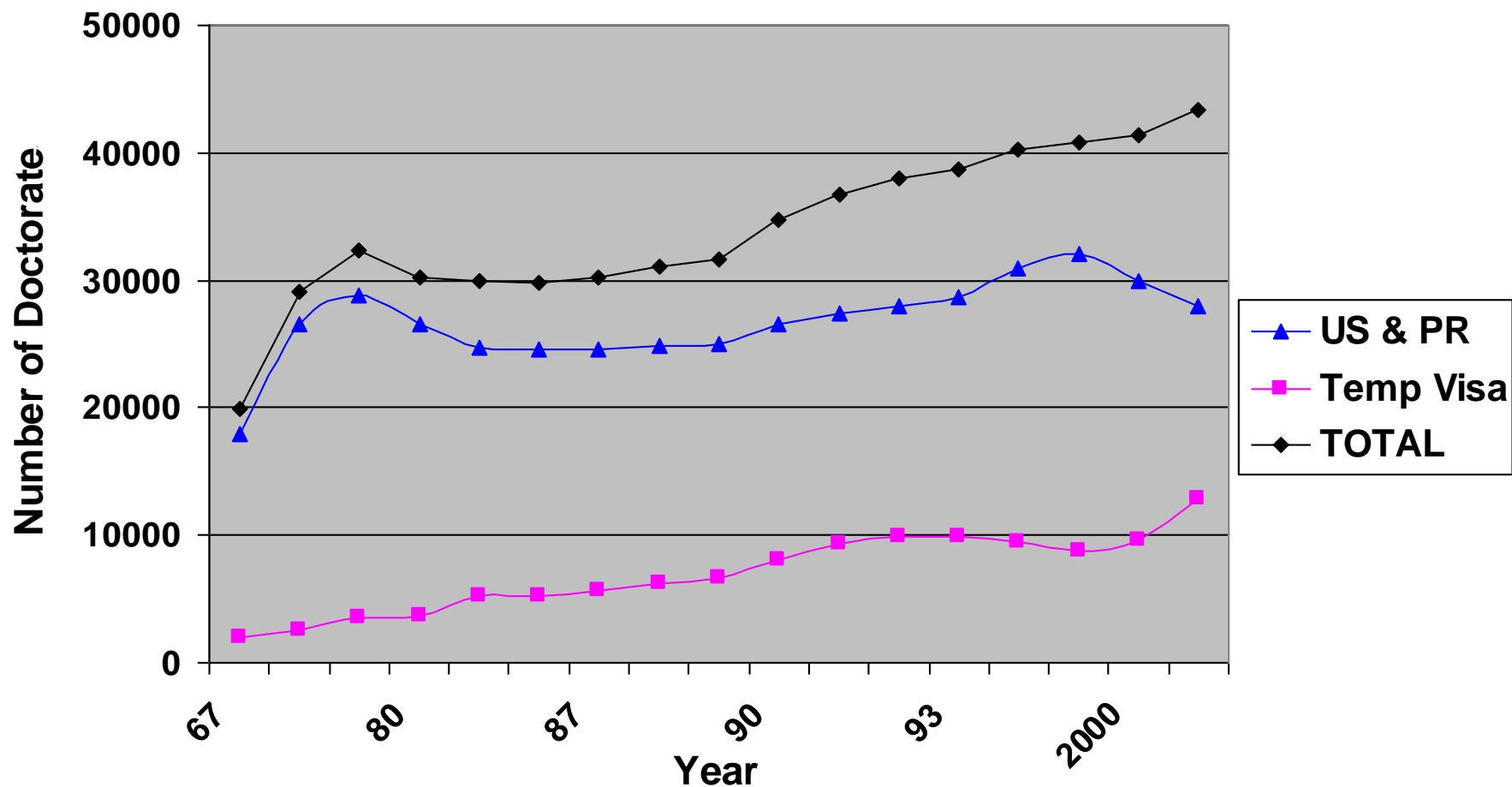
Median Age at Ph.D Completion and Median TTD by Major Fields (2005)
measured time lapsed after BA + stop put

	Median Age	**Median years in Graduate School**
Education	**42.5**	**13 (part-time students)**
Social Sciences	**33.1**	**8.0**
Humanities	**35.2**	**9.6**
Engineering	**31.1**	**7.2**
Physical Sciences	**30.4**	**6.7**
Life Sciences	**31.5**	**7.1**

Source: M. Nerad, UNIKE 10/15/2013

% of Women PhD Recipients by Major Field in US in 1970 and 2005

Field	1970	2005
Physical Science	6%	26%
Engineering	0.4%	18%
Life Science	13%	51%
Social Science	16%	55%
Humanities	23%	51%
Education	20%	67%
Prof./Other	12%	49%
Total	13%	45%

% of International PhD Recipients by Major Field in US in 1974 and 2004

Field	1974	2004
Physical Science	2%	20%
Engineering	2%	29%
Life Science	2%	20%
Social Science	2%	10%
Humanities	1%	7%
Education	1%	5%
Prof./Other	0%	7%
Total	11%	29%

Source.: M. Nerad, UNIKE 10/15/2013

PhD Completion Project (CGS)

Cumulative Ten-Year PhD Completion Rates by Citizenship and Broad Field
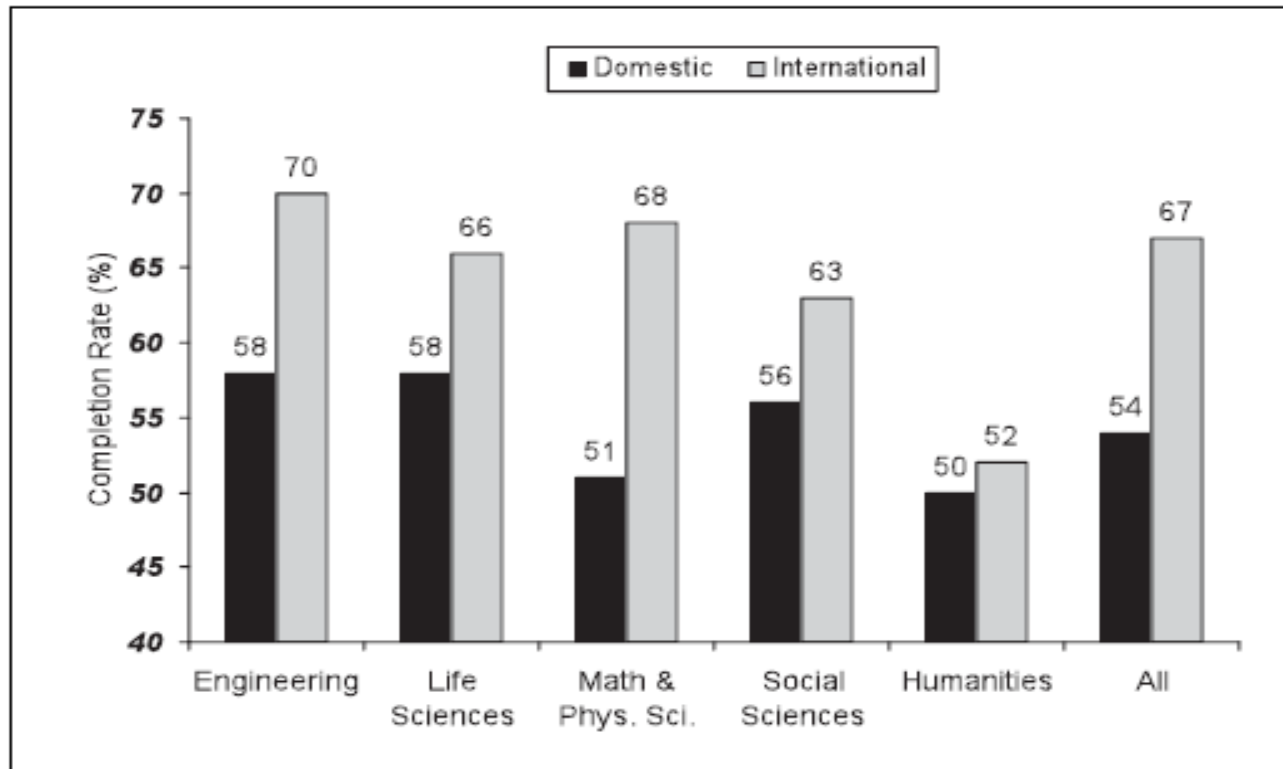
PhD Completion Project: Analysis of Baseline Demographic Data.
Source: Communicator, Council of Graduate Schools, July 2008

Source: M. Nerad, UNIKE 10/15/2013

Quality Assurance in US doctoral education:

an engine for change and a potential for "risk" aversion

Why assessing the quality of doctoral education? From a US perspective

Extrinsic reasons
  1. Accountability towards funders
  2. Effective and efficient use of resources
  3. Comparison with other universities
  4. Establishment of institutional reputation

Intrinsic reasons
  Improvement of quality
        for new program planning
        and to give feedback to programs, faculty, students

Who is undertaking the assessment? Who are the assessors?

Assessment agencies

    1. Non-governmental accreditation agencies assess the institution NOT doctoral programs

    2 Disciplinary professional associations

    3. National Research Council

    4. University faculty committee (Graduate Council)

Evaluators

    1. Professors/ academic staff

    2. current doctoral students

    3. PhD recipients (past students)

What else is assessed at the NRC cyclical research doctoral program assessment?

University Scholarly Infrastructure

- **Library holdings**
- **Laboratory equipment**
- **Computer laboratory**
- **Research and office space for students**
- **Diversity of people (professors, students, staff)**
- **Child–care facilities**
- **Health Insurance**

Doctoral program evaluation – supervising/mentoring

Example"Social Science PhDs—Five+ Years Out (CIRGE, 2008)

AN EXAMPLE
Social Science PhDs—Five+ Years Out
Survey Sample

Survey: April 2005-March 2006,   **Response Rate 45%**
PhD Cohorts: 1995 – 1999
65 US universities (accounted for 63% of PhDs in years surveyed)

	N	(% women)
Anthropology	**432**	**(56.5)**
Communication	**343**	**(52.2)**
Geography	**164**	**(32.3)**
History	**839**	**(43.4)**
Political Science	**701**	**(35.9)**
Sociology	**546**	**(59.2)**
Total	*3025*	*(46.8)*

Social Science PhDs—Five+ Years Out
Quality of Mentoring by Thesis Advisor

	% "Very Satisfied"
Advice with PhD Topic	**55%**
Guidance to finish	**55%**
Overall mentoring	**48%**
Support in career decisions	**51%**
Support in job search	**43%**
Help in publishing	**27%**

Importance of Professional skills training

From

Social Science PhDs—Five+ Years Out
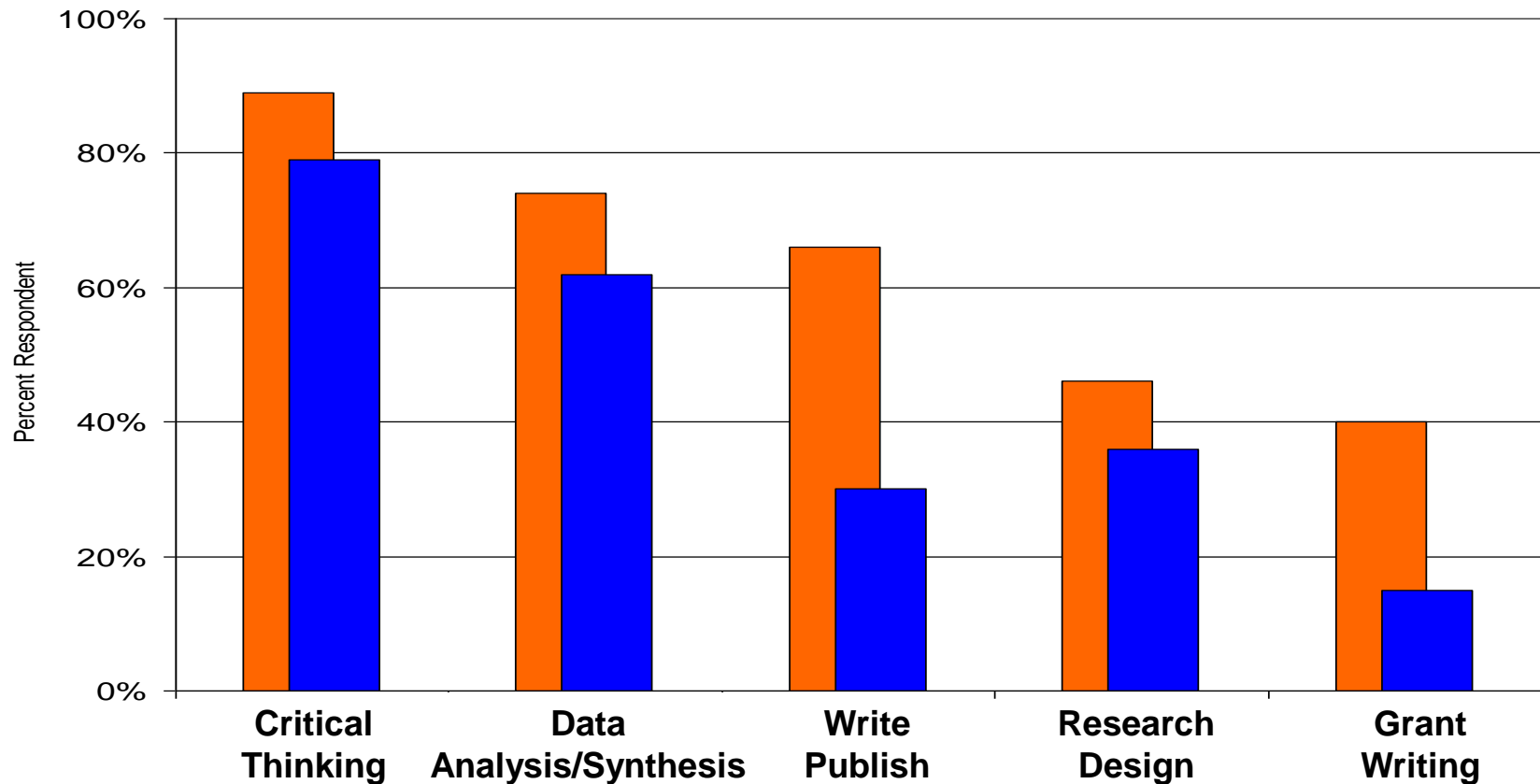
Source: M. Nerad, UNIKE 10/15/2013
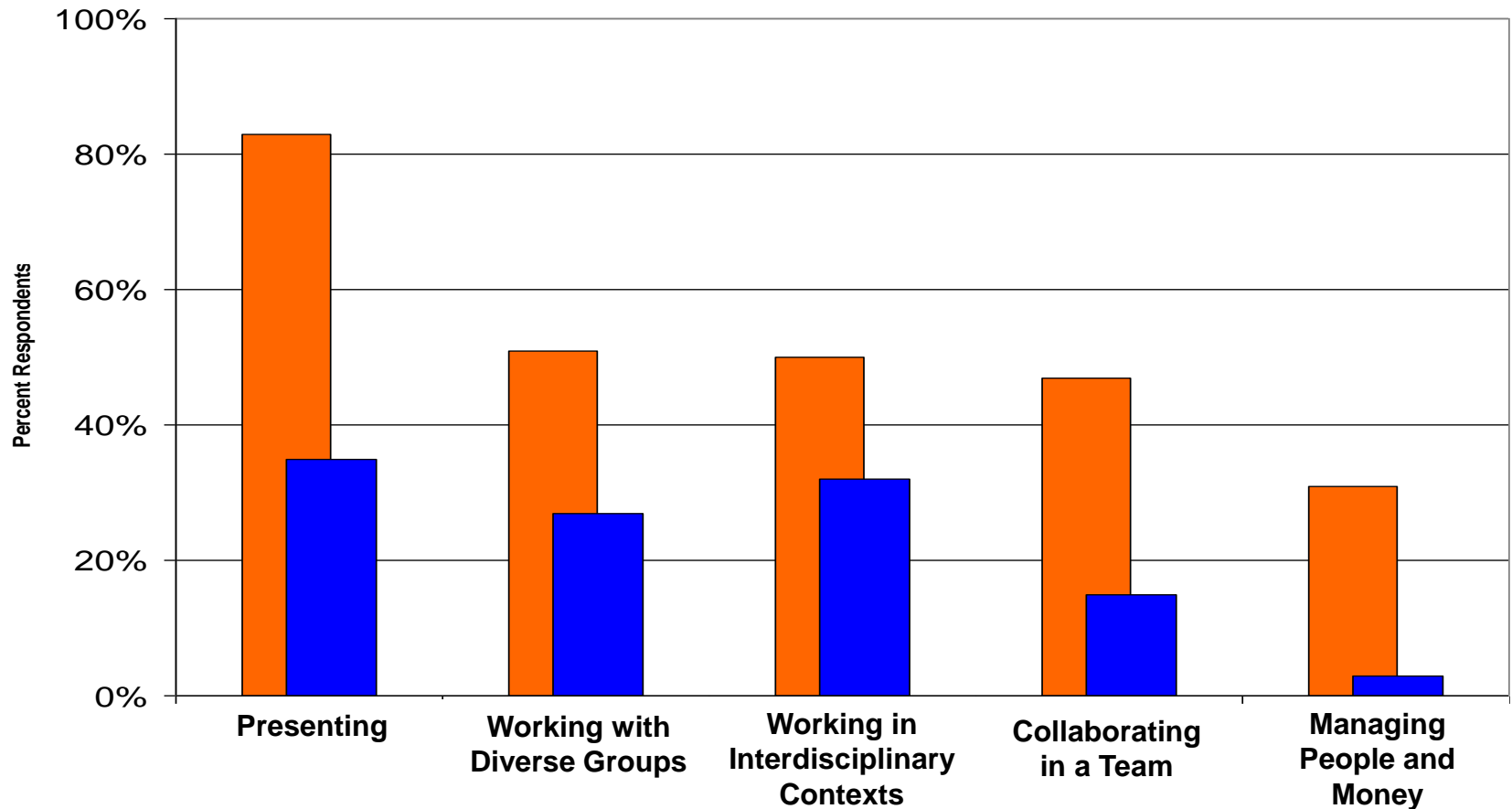
What exactly are professional competencies?

Professional Development Activities for Graduate Students

- **Teaching**
- **Grant writing**
- **Presentation**
- **Publishing**
- **Leadership (time management, organizational understanding, etc.)**
- **Working in teams, collaborating**
- **Working in inter/multi/trans-disciplinary groups**
- **Working with diverse people**
- **Career development, placement support**
- **Preparing for global citizenship**

Importance of Skill at Current Job versus Quality of Training in this Skill During PhD Studies

Source: M. Nerad, UNIKE 10/15/2013

Importance of Skill at Current Job versus Quality of Training in this Skill During PhD Studies

Center for Innovation and Research in Graduate Education (CIRGE), Graduate School & College of Education, University of Washington, Seattle, http://depts.washington.edu/coe/cirge/ 6-25-2008

Source: M. Nerad, UNIKE 10/15/2013

Criticisms of US Doctoral Education (1995)

1. Doctoral students are educated and trained too narrowly

2. They lack key professional skills, such as collaborating effectively and working in teams, have no organizational and managerial skills

3. They are ill prepared to teach

Source: M. Nerad, UNIKE 10/15/2013

Criticisms of US Doctoral Education **(1995)**

4. They are taking too long to complete and in some fields many do not complete their degrees at all

5. They are ill informed about employment outside academia

6. They have a too-long transition period from PhD completion to stable employment (average of 4 years).

Recent and On-going National Projects Aimed at Change in Graduate Education

1. **National Science Foundation**:

   1. **Integrated Graduate Research and Traineeship program (IGERT)** interdisciplinary and socially relevant research

   2. **Alliance for Graduate Education and the Professoriate in STEM fields (AGEP) –**underrepresented groups

2. **Council of Graduate Schools**

   1. **Professional Master's Program**

   2. **Preparing the Future Professors/Professionals**

   3. **PhD Completion Project**

   4. **Responsible Conduct of Research (research ethics)**

3. **Carnegie Foundation for the Advancement of Teaching, Woodrow Wilson Foundation** Carnegie Initiative on the Doctorate

4. **CIRGE –**student voices, career information and program feedback

Response by the US National Funding Agency- National Science Foundation (NSF)

National Science Foundation 1997

- **The Integrative Graduate   Education Research and Traineeship program (IGERT)**

- **Increase of NSF graduate fellowship to $30,000 annual + $5 000 annual for travel**

Source: M. Nerad, UNIKE 10/15/2013

Strategy for Successful Change in Graduate Education

The IGERT has become a success model. It adopted appropriate conditions & tied it to gaining scientific excellence, resources, and reputation

1. It provided substantial multi-year funding

2. It based change in the context of traditional academic prestige and award structure (NSF grant, peer review)

3. It created a voluntary conditions for innovation

4. It appealed to new emerging fields as ideal avenue to train the next generation of scholars

Integrative Graduate Education Research Traineeship (IGERT)

- **The goal of this program is to catalyze cultural change in graduate education through *"collaborative research that transcends traditional disciplinary boundaries"* (National Science Foundation, 2005, p.2).**

- **Over 278 grants at 98 institutions have been awarded since the program was established in 1997 funding over ,6,500graduate students (Brown & Giordan, 2008; Van Hartesveldt & Giordan, 2009).**

Characteristics of IGERT Programs

5-year funding for doctoral programs that are:

1. Theme-based

2. Inter/multi-or transdisciplinary

3. Team-based

4. Include professional and personal skill building into curriculum

5. Prepares for academic and non-academic careers, via connections to outside world

Characteristics of IGERT Programs

6. Connect to outer world via internship

7. Student funding is tied to the program NOT to the professor

8. Access to professionals in the field

9. Emphasis on the learning environment

10. Foster diversity of students

11. International component

12. Become a catalyst for change on campus

Source: M. Nerad, UNIKE 10/15/2013

Further Characteristics of IGERT Programs

- **20-25** Students get PhDs in various traditional departments +

- **5-7** core faculty, + more associate faculty participate

- Team- teaching by professors and students and **plenty of group work**

- **Example:** One chapter is collectively written (Urban Ecology, PSU)

- Annual symposium + professional workshops

Source: M. Nerad, UNIKE 10/15/2013

Example:
Urban Ecology IGERT at UW (2001- 2006)

- **Develop new and innovative planning strategies**
- **Determine how to make settlement of the Puget Sound region sustainable**
- **Increase connection among scholars and organizations in the region interested in urban ecology**
- **Solve real-world, contemporary problems**
- **Involve stakeholders in research and education**
- **Increase awareness of the effects of settling Earth and associated land cover change**

Urban Ecology IGERT at UW (2001- 2006)
Research Goals

- **Conduct interdisciplinary research**
- **Help build the theory of urban ecology**
- **Explicitly study the interface of policy and science**
- **Understand human effects on the environment**
- **Understand drivers of human growth**
- **Apply new technologies to research**
- **Understand the role of team building**
- **Explore theoretical implications of including humans as part of the subject of ecology**

Source: M. Nerad, UNIKE 10/15/2013

Examples of IGERT at University of Washington

Bioresources IGERT

Bioresources IGERT includes a cross-cutting multicultural "sustainable societies" enrichment element woven into the Ph.D. experience.

During the program, student and faculty gain classroom, project, and dissertation-based experiences that allow them to assess the lifecycle implications of technical designs, and to understand natural resources from the perspective of indigenous cultures. The classroom and project work teams IGERT Engineering and Forest Resources students with American Indian Studies (AIS) faculty and students.

Source: Extracted from the Bioresources IGERT website

Astrobiology (UWAB)

UWAB is a diverse and vibrant program that contributes to the young and exciting field of astrobiology through cutting-edge research, a world-class graduate training program, and on-going education and outreach efforts.

Research

UWAB faculty, students, and researchers from many scientific fields collaborate to explore key research areas in the interdisciplinary field of astrobiology. These areas include understanding Earth's past environments and life, exploring life in extreme environments today, and studying the possibilities for life on within our Solar System and on extrasolar planets.

Source: Extracted from the UWAB website

Sustaining Ecosystem Services to Support Rapidly Urbanizing Areas (Portland State University

Program

By organizing the components tightly around the ecosystem services theme, our structure allows doctoral students to build capacity each academic term and meet their disciplinary requirements in two years, while providing exposure to multiple **career opportunities, including those outside the academy.**

IGERT trainees also have the opportunity to enroll in Portland State University's Graduate Certificate in Sustainability to contextualize and broaden their Ph.D. programs…

Source: Extracted from the ESUR website

Hurdles for IGERT programs

1. **Finding a balance between disciplinarity and interdisciplinarity**

2. **Fitting within a traditional university structure**

3. **Sustaining a costly program**

In Search of Successful Future–oriented Doctoral Programs- Policy Borrowing?

1. The German *Graduiertenkolleg* (1990) funded by the DFG the German Research Council and by the Max Planck Gesellschaft.

2. The Australian Cooperative Research Centers (CRC) (1990) funded by the Australian Governement, - to produce employment – ready graduates.

3. The US *IGERT* (1997) funded by the US Research Foundation NSF.

4. The European ITN ?

Thank you!

Center for Innovation and Research in Graduate Education

CIRGE website

http://www.cirge.washington.edu