

# **NSF Research Centers: An Opportunity for Catalyzing Change in Doctoral Education**

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# Outline of session

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- **Current issues in doctoral education**
- **Professional development activities for graduate students**
- **Example of professional development workshop delivered by the Center for Adaptive Optics**
- **Doctoral studies within NSF research centers**
- **Discussion (20-30 minutes)**
- **Summary of our discussion (15 minutes)**

# National concerns about doctoral education

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- Graduate students are not getting the training that they want or need.
- They don't clearly understand how to navigate the doctoral process.
- Needs more diversity. Particularly women and underrepresented minorities.

Great resource: “Re-envisioning the Ph.D.”

<http://www.grad.washington.edu/envision/index.html>

# Some recommendations for meeting training needs

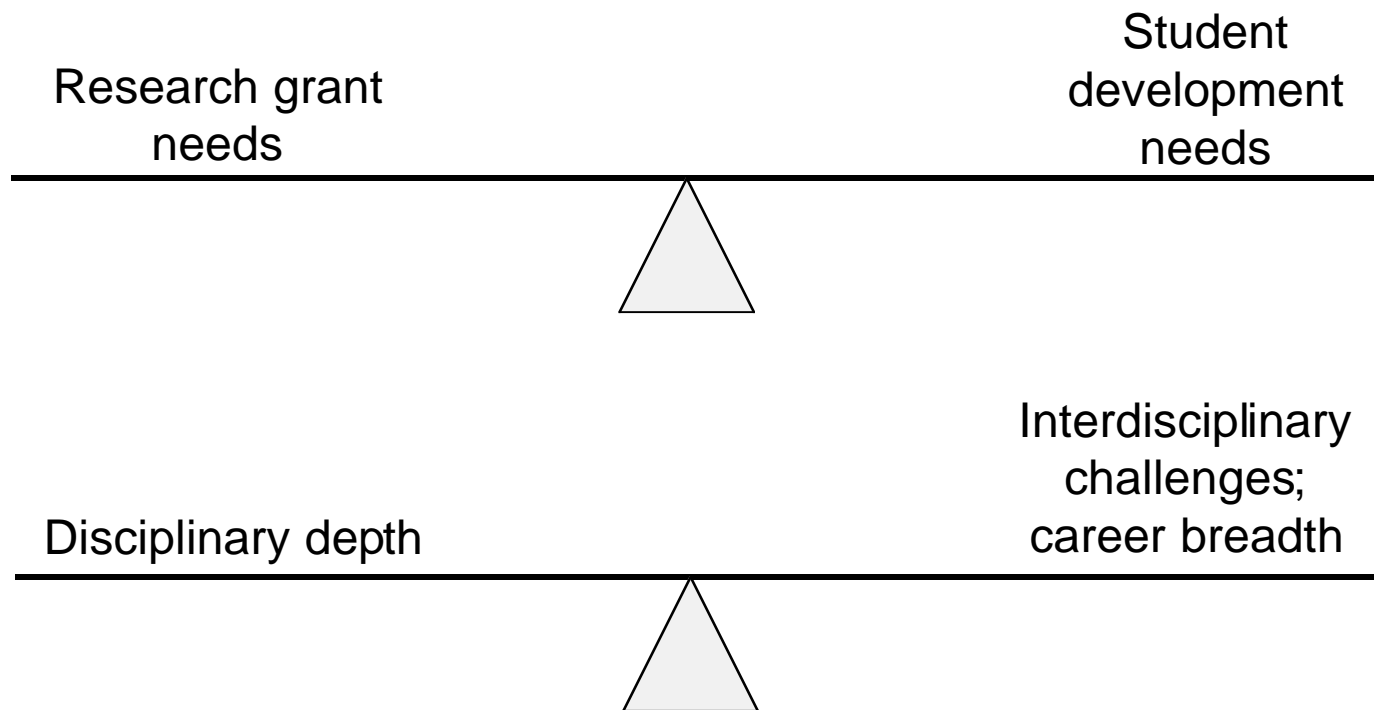
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- **Adequate mentoring (broad careers, multiple mentors, mentor training, community, etc.)**
- **Exposure to wide variety of career options**
- **Better teaching preparation for variety of settings, and using research-based pedagogical tools**
- **More connected to needs of society and global economy**
- **Balance between disciplinary depth and interdisciplinary challenges**

# Challenge: Finding the balance

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How do we balance the needs and keep degree completion time to 4-5 year?

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# Developmental activities a center might provide to graduate students

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- **Mentoring of graduate students (beyond existing)**
- **Preparation for teaching**
- **Professional development, for example**
  - **Ethics**
  - **Career development**
  - **Management, leadership training**
- **Working in teams, interdisciplinary work, collaboration**

# What are our center models for delivering these elements?

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- **Comprehensive center programs**
  - **Defined, ongoing program, with formal entry and exit**
- **Stand-alone elements on teaching, ethics, career development, etc.**
  - **workshops**
  - **institutes**
  - **retreats**
  - **short courses**
- **In-between? Other?**

# **An example from the Center for Adaptive Optics**

**A workshop integrating teaching preparation,  
community building, communication, interactions  
with community, and technical information.**

**(Stand-alone element)**



# “Integrating Research and Education” a professional development workshop



4-day workshop for ~30 CfAO graduate students and postdocs.

## Components:

- Using inquiry to teach science (75% of workshop)
- Community building and amplifying graduate student voice. “What can the CfAO do for you?”
- Technical facilities tour
- Community Partnerships
- Science Community Posters



# **“What can the CfAO do for you?”**

## **Discussion (25 grads/postdocs)**

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Small groups discussed this question at the workshop, then reported back to the larger group. Responses from the participants:

- **Workshops for graduate students and postdocs only**
- **More education training (“We don’t know what we don’t know”)**
- **Mini-grants to visit other center sites**
- **Bring the content of this conference (education workshop) to advisors**
- **Assure that EHR time is not added on to work load**
- **More problem solving at Summer School**
- **How to collaborate without advisors**

## **“Support” is needed in a variety of ways**

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**Advisor/graduate student relationship is intense; time for graduate students to develop independently can be very positive:**

*“Isolation (from email, advisors, etc.) was useful—it seemed to help us focus.”*

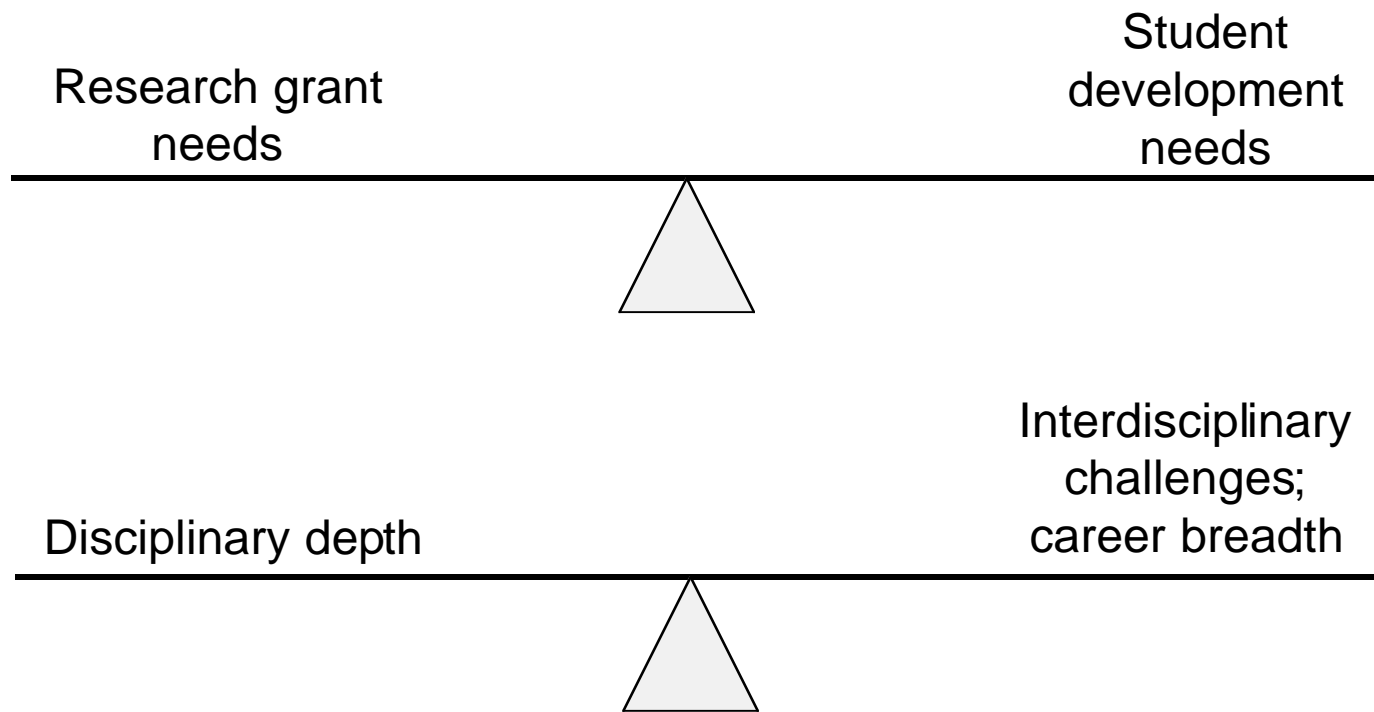
*“The collaborative, non-competitive feel of this conference is wonderful! I would like to continue to approach my research in this confident, friendly way.”*

**Valuing graduate students:**

*“I felt profoundly empowered and validated by this experience.”*

*“It was obvious that the CfAO put a great deal of work into educating grads/postdocs. It feels great to be appreciated/respected.”*

# They want more, they need more. How do we balance it?



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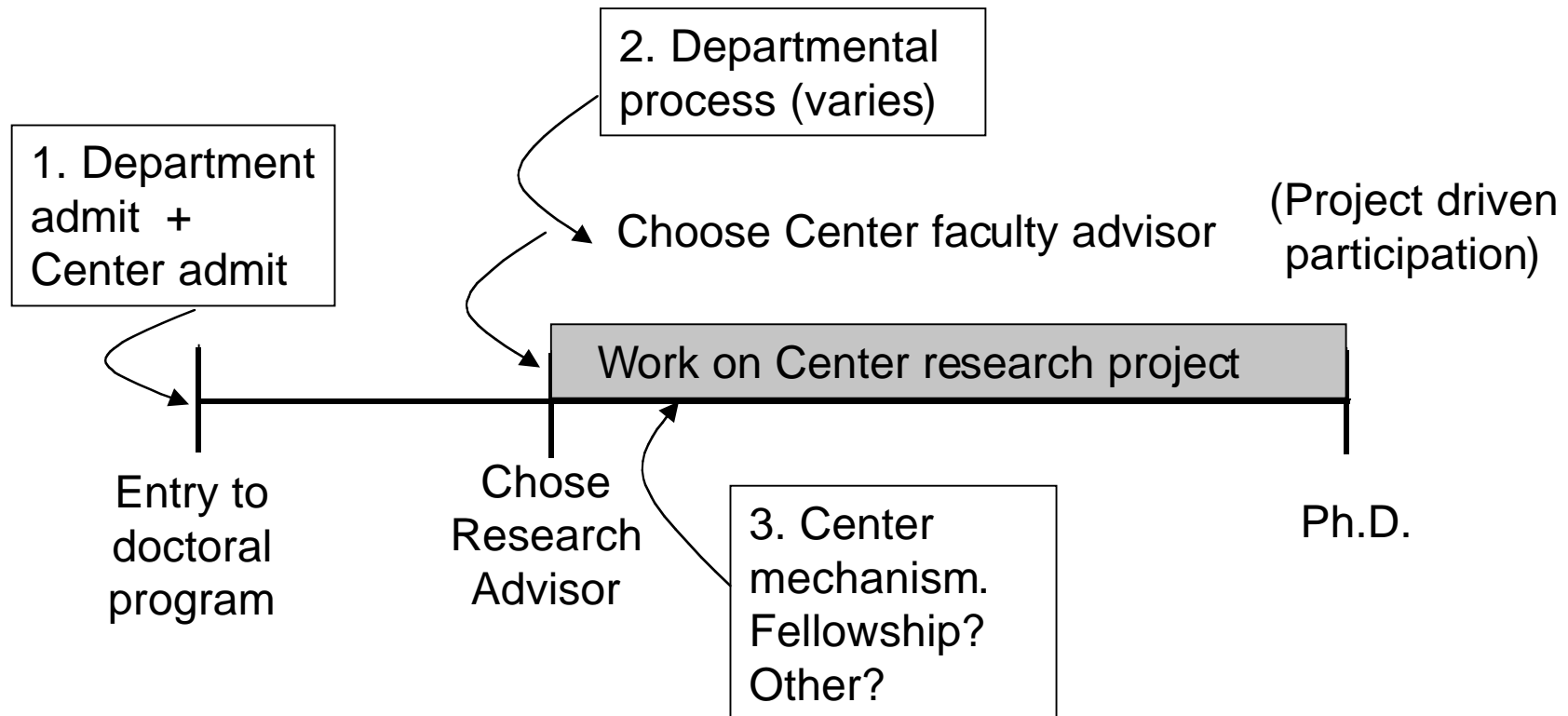
# NSF Research Centers

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- **Not departments, do not grant degrees**
- **Can try high-risk, innovative ideas**
- **Multi-institutional**
- **Interdisciplinary**
- **Have cohorts of graduate students from different departments and institutions**
- **Limited life (STC's; others?)**

# Pathways for graduate students to become part of centers



# Discussion questions

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- **Pathways to centers: What is your center mechanism?**
- **What are the advantages and disadvantages of the various models for delivering developmental activities through centers?**
  - **Models: comprehensive, stand-alone elements, other**
  - **Consider: pathways into center, balancing needs, specifics of NSF centers, best bet for success/impact**
- **What would help center education directors to deliver more developmental activities to graduate students without adding time to degree (or increasing their workload)?  
Policy? Report? Data?**