

Bridging the Gap to Graduate  
Work

“Engaging Young  
Mathematicians”

August 12–13, 2005

Washington, DC

Judy L. Walker  
University of Nebraska

**Question:** How do we ensure that students successfully navigate the transition from undergraduate studies to graduate school?

**Answers:**

1. Produce strong, confident undergraduate mathematics majors
2. Provide a summer “bridge” program (if/when appropriate)
3. Create a graduate program in which students will succeed

# Nebraska Undergraduates

From our 2000 Academic Program Review external review team report:

*This department nurtures its undergraduates and has the most impressive collection of majors we have ever seen . . . .*

- Standard (big) stuff:
  - Opportunities for research (REU, UCARE, MCTP)
  - Financial support (Scholarships, Research support, Math Resource Center, MathLab, Undergraduate TAs)
  - Undergraduate lounge/computer lab
  - Honors courses
  - Clubs (ΠME, WUMN)

- Little stuff:
  - Open atmosphere with faculty
  - Close-knit group of majors
  - Interaction with graduate students
  
- Other stuff:
  - Encourage conference attendance and participation
    - \* At Nebraska (Regional Workshop in the Mathematical Sciences, Nebraska Conference for Undergraduate Women in Mathematics)
    - \* At other places (PME Conferences, Rose-Hulman Undergraduate Math Conference, various MAA-sponsored undergraduate conferences, MathFest, Joint Meetings)

# Summary of Nebraska Undergraduates

- Many of our majors are “refugees” from other departments or double-majors who choose math as their “home” department.
  - We’re perceived as friendlier.
  - Students get interested when they take honors versions of service courses (calculus, linear algebra) required by their original majors; also through our honors seminar “Joy of Numbers” .
- As undergraduates, they know graduate students and therefore have some idea of what to expect in graduate school.
- As undergraduates, they are already exposed to the profession as a whole.

# Summer Bridge Programs

- EDGE Program for Women
  - “*Enhancing Diversity in Graduate Education*”
  - “designed to strengthen the ability of women and minority students to successfully complete graduate programs in the mathematical sciences”
- Other programs for which students who have graduated are eligible
  - Director’s Summer Program at NSA
  - IAS Program for Women
  - Park City Mathematics Institute

# Nebraska IMMERSE

*Intensive Mathematics: a Mentoring,  
Education and Research Summer Experience*

- Funded by NSF through Nebraska's MCTP grant
- Two interweaving components:
  - one strengthens the preparation of students who are about to enter their first year of graduate study in mathematics ( “pre-grads” ) – 6 weeks
  - one develops the teaching, research, and mentoring skills of graduate students and early-career faculty – 8 weeks

- Two courses
  - Algebra and Analysis
  - Structured around reading research papers
  - Taught by “early-career faculty” from non-PhD-granting institutions
  - Problem sessions run by graduate students
  
- Guest speakers
  
- Panel discussions
  
- Workshops

# What's in it for you?

## **If you're at a non-PhD-granting institution:**

- Encourage your students who are headed to graduate school to apply to be pre-grads
  - \$3,000 stipend, room, board, travel
- Encourage your pre-tenure faculty to apply to be early-career faculty
  - \$10,000 stipend, room, board, travel
  - \$7,500 payment to home institution to provide release time

## **If you're at a PhD-granting institution:**

- Encourage your incoming graduate students from non-PhD-granting institutions to apply to be pre-grads
- Encourage your PhD graduates who are now at non-PhD-granting institutions to apply to be early-career faculty

# Nebraska's Graduate Program

- Philosophy: “Friendly”  $\neq$  “Weak”

*You're here to succeed, and we're here to help you do that.*

- 79 full time graduate students

- 37 (47%) women

*Being a female student in this department is nothing unusual . . . I don't feel the pressure of having to represent my entire gender as an isolated female in a sea of male mathematicians.*

- 55 PhDs in last 10 years

- 20 (36%) to women

- 41 (75%) to US citizens

- Travel funds for graduate students
- Peer Mentors
- Mathematical Landscapes Seminar
- Intro to Teaching Seminar
- Qualifying Exam Workshops
- Graduate student and faculty offices interspersed
- Parties
- Graduate students teach (!)

## Some Open Questions

- What are we trying to accomplish with graduate exams? Are we doing that effectively? Is there a better way?
- Would it be good to get graduate students involved in research sooner? Why or why not? If “yes”, how do we do that? If “no”, how do we ensure that students don’t burn out before they get to the good stuff?