

Cornell Mathematics Department TA Training/Development Program at a Glance

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The Mathematics Department provides a range of opportunities for teaching assistants to develop, enhance, and reflect on their teaching skills.

- **New Teaching Assistant Workshop** --Required, intensive, introduction to teaching and teaching duties program. Includes four day preterm workshop, early-in-the-term student feedback, individual in-class observation and consultation with director of program.
- **Preparing Future Faculty**—Graduate students explore wide range of academic institutions and prepare for their academic job search by giving talks at nearby colleges and universities
- **Mentoring Program**-- Pairs new TAs with experienced TAs with similar duties. Mentor pairs observe each other's courses, and meet at least four times throughout the term to discuss teaching strategies and challenges presented by the material.
- **Math 500, College Teaching**--an elective a six-week one-credit course for graduate students interested in learning more about teaching mathematics.

Math 500—College Teaching

This course is a professional development seminar for graduate students in mathematics. As prospective faculty, graduate students need to balance their development as both teachers and researchers. This course examines issues in teaching and learning in undergraduate mathematics, techniques for documenting professional development in both teaching and research.

Texts and materials –Fall 2002

Teaching Mathematics in Colleges and Universities: Case Studies for Today's Classroom, Solomon Friedberg et al., AMS/MAA

Schedule of topics:

Concepts and Peer Instruction-- ideas from undergraduate physics instruction.

Postdoc Panel-- Post Docs-- What are they? Should you apply?

Video Recall –Why video tape your class?

Reasoning and Proof—everyday versus mathematical language.

Writing a CV—documenting progress in teaching and research

Alternatives to Lecturing--Discussions, Writing assignments, Cooperative Learning, Project-oriented calculus

Mentoring Program

- Elective program matches teaching assistants new to a job, with TA who has experience with that job.
- Mentors /new TA partner meet regularly throughout the term to discuss:
 - Planning class presentations
 - Grading issues
 - Goals for student learning
- Mentor pairs discuss lesson plans for and observe each others' classes and to discuss
 - the decision making process that goes into lesson planning
 - decisions made during class, or while grading a problem set
 - classroom management

New Teaching Assistant Workshop

DAY ONE

- Introductions
- Ideas about teaching--How we learn, how we teach
- Sample recitations by experienced TAs
- Sample grading assignment

DAY TWO

- Effective lecturing and active learning
- How to give a recitation
- How to be a grader
- How to be professional
- Interacting with others--TAs, professors, students

DAY THREE

- Micro Teaching with video taping and peer feedback
- Case Studies: managing the classroom, getting student feedback, follow-up and evaluation

DAY FOUR

- Review of micro teaching videos --10-15minute individual consultations

THREE WEEKS LATER

- Sample Exam Grading
- How to grade accurately, consistently, fairly, positive communication
- Individual classroom observation and consultation
- Student feedback and how to use it—Nuts and Bolts Questionnaire

WEEK 12

- End of term student evaluations/feedback

NEW INITIATIVES 2003

Improving Calculus: Instruction Developing Concepts Through Good Questions-- recent NSF award DUE0231154 for a materials development project in which

Graduate teaching assistants will be part of the team of mathematicians at Cornell to

- Create concept driven questions for first term calculus that can be used to help students develop strong conceptual understanding
- Use these materials to devote more time and attention to concepts in class
- Use these materials along with peer instruction to help students articulate and clarify conceptual understanding
- Provide a feedback mechanism for instructors to regularly monitor students' mastery and understanding of concepts.

The materials and the materials development process are designed to enhance teaching assistant development by giving graduate student instructors tools

- to raise the visibility of the key concepts
- to facilitate student peer-to-peer discussion of concepts
- to connect calculus concepts to what students know and understand about their world.

Preparing Future Faculty Program

- Goal—to broaden graduate students' knowledge of the variety of academic institutions, their missions, faculty and students
- Provides funding to send graduate students to area colleges.
- Visit includes:
 - Undergraduate level talk
 - Opportunity to interact with the faculty and students on informal level
- Improve contacts and connections between Cornell and nearby colleges and universities
- Participating institutions
 - Ithaca College
 - Wells College
 - Hobart and William Smith College
 - SUNY Cortland--State University of New York
 - Hamilton College
 - Rochester Institute of Technology
- Fall 2002 presentations

Christian Benes –*An introduction to randomness or How knowing probability can help you save money!*, Hamilton College

Kristen Camenga - *A TALE OF TWO PROOFS (The four color theorem)*, SUNY Cortland

Noam Greenberg - *Paradoxes and the Foundations of Mathematics: How to Escape the Serpent's Tongue*, Hobart and William Smith College

Fernando Schwartz - *What is curvature?*, Rochester Institute of Technology

Texts and Materials Used

Handbook for Teaching Assistants at Cornell, Center Learning and Teaching, August 2002

Handbook for Mathematics Teaching Assistants, Thomas Rishel, <http://www.maa.org/pfdev/tahandbook.html>

Teaching Mathematics in Colleges and Universities: Case studies for Today's Classroom, Solomon Friedberg et al., CBMS Issues in Mathematics Education Volume 10, AMS, 2001