National call for STEM teachers

“over the next 10 years...we want to prepare 100,000 new teachers in fields of science, technology and engineering and math.”

-- 2012 State of the Union

Few STEM departments actively engage in the recruitment and professional preparation of teachers

---- National Task Force on Teacher Education in Physics
Opportunity for RIT
Undergraduate Learning Assistants

- Increased # K-12 STEM teachers
  better teachers, disciplinary expertise

- Improved learning in RIT classrooms
  Feeds Nazareth Partnership brings new students to RIT

- Supports development of new pedagogies
  Faculty scholarship
  Discipline-based education research
Learning Assistants (LAs) mentored STEM undergraduates in RIT classrooms who facilitate student-centered activities.
More STEM Majors Pursue Elem. Ed. Careers

Data from Colorado University, Boulder
Learning Assistant (LA) Program

**Practice:** LAs facilitate student-centered activities; promote argumentation, discourse

**Pedagogy:** science education theory and practice coursework

**Content:** Regular meetings with faculty mentor (instructor)
LAs make better future STEM teachers

Observations of high school teachers in Colorado
Improves RIT Classrooms

Mean Scores (%)

General Physics Concepts

No LAs

LA Assisted Course
Improves RIT Classrooms

- General Physics Concepts:
  - No LAs: Mean Scores
  - LA Assisted Course: Higher Mean Scores

- Upper level physics:
  - No LAs: Mean Scores
  - LA Assisted Course: Higher Mean Scores
  - Trained LAs: Even higher Mean Scores
Feeds RIT/Nazareth Partnership

Students enter RIT STEM program

RIT students enter LA program

Pursue interest in teaching career through Naz, NTID coursework

Enter Naz MS.Ed. Program
Attracts new students to RIT

Supports efforts to reform classroom

Self-affirming student support

Discipline-based Education Research

In-service teacher prep programs

Feeds K-12 outreach
Discipline Based Education Research (DBER)

• rigorous study of issues involving postsecondary student performance

• applies methods and theories of cognition & learning in new contexts

• research questions require disciplinary expertise
Why DBER at RIT?

• Institute
  – directly affects primary mission of undergraduate education
  – *interdisciplinary* research program
  – places RIT squarely into addressing area of national importance

• College
  – facilitates culture of research-based evaluation & assessment
  – develops pipeline to COS/Nazareth dual degree program

• Departments
  – builds on & supports existing DBER research
  – creates pedagogical innovations, direct applicability to classroom
  – facilitates curriculum assessment, development
Next steps: Funding the LA Program

- Howard Hughes Medical Institute: $500K ✓
- NSF Robert Noyce Teacher Scholarship: $300K ✓
- NY Carnegie Foundation 100Kin10: $22M
- Disciplinary Societies: American Physical Society “PhysTEC,” American Chemical Society “CTEC”
Institutions that consider the preparation of STEM teachers an integral part of their mission must take concrete steps to fulfill that mission... *Without exception*, all of the most active programs have champions personally committed to teacher education.

*I need other champions*

(by March 26th)

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