

# STEERing a Systemic Path to Improved College STEM Teaching

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AAC&U Transforming STEM Higher Education

"Back to Broken?"

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Arlington, VA



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# Systemic Transformation of Education Through Evidence Based Reforms (STEER)

- A National Science Foundation Funded Project



## STEEReadershipTEAM

Bob Potter (Chemistry and Director, Coalition for Science Literacy, Sr. Associate Dean Arts and Sciences) PI

Ruthmae Sears (Mathematics, College of Education, Associate Director Coalition for Science Literacy)

Scott Campbell (Chemical Engineering)

Tim Henkel (Integrative Biology and Director of Center for Innovative Teaching and Learning (CITL))

Hikmat BC (Physics, Associate Dean of Mathematics and Science Hillsborough Community College) CoPI

Catherine Beneteau (Mathematics and Statistics)

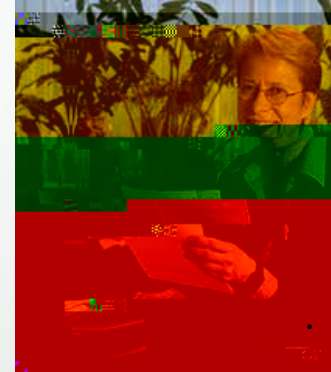
Peter Stiling (Integrative Biology) CoPI

Mary Goodwin (Physics) CoPI

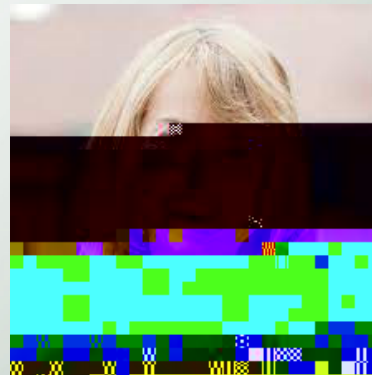
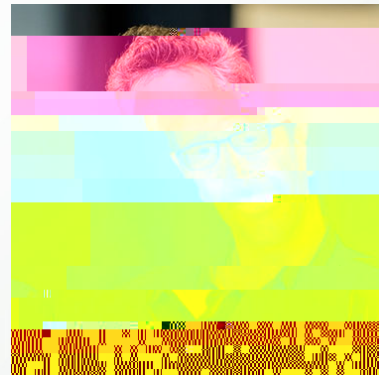
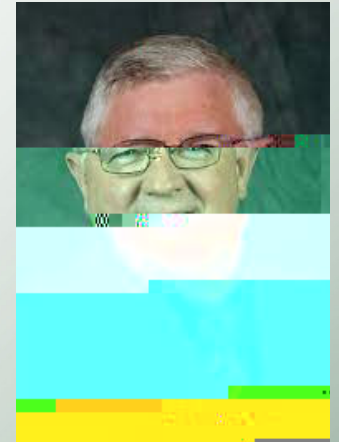




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# Course Redesigns:

- Departmental: chair recommends tenured faculty and course, supported with TA and experienced mentor faculty
- Individual or team:

# STEERING Online Success BOSSTEM





## Teaching Assistants Training

- Capitalizing on the potential for TAsto improve STEM students success
- Resources and professional development provided for all new science laboratory teaching assistants (380 total over the grant period)
- Pre term: Three half day workshops reflecting on evidence based and inclusive teaching strategies (active learning/EBT classroom environment, classroom management, assessment, implicit bias, inquiry based laboratory facilitation, questioning strategies, student wellness support and laboratory safety).
- Followed up with half day workshops in fall and spring (focus on what students say they need)

Teacher Beliefs about Effective Science Teaching (TBEST)  
Questionnaire (Smith, Smith, & Banilower, 2014)

Classroom Management Scenario (The Academy for Teaching  
and Learning Excellence 2015)

Gallery walks – Participant shared ideas of

# Sample Activities



# Significant Results

- Involvement
  - 90% of introductory STEM courses use EB Approaches with more students being successful
  - 47% (175/369) of faculty in the College of Engineering and School of Natural Science and Mathematics were involved with at least one STEER Initiative and 26% engaged in more
  - All ranks involved at USF: 52 professors, 40 associate professors, 20 assistant professors and 63 instructors
  - At HCC: 49% (44/85) have taken part in at least one initiative.
  - "The project has had a major change in instructional practice in STEM at both USF and HCC" external evaluators report Horizon Research
- Student Success:
  - Over the project period STEM degrees in Engineering, Mathematics and Sciences increased by 551 from 2,026 (34% of total degrees) to 2,577 (38%), a 27% increase in STEM degrees
  - STEM degrees to underrepresented groups have increased by 185, (796 total degrees) increasing from 30 to 31% of STEM degrees in our target areas.

# Lesson Learned

- Resources are essential for success (incentives work!)
- Knowledgeable, dedicated, and diverse leadership is necessary (provides more and better ideas and reaches and influences different constituencies)
- Leadership

# Thank you for coming!

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