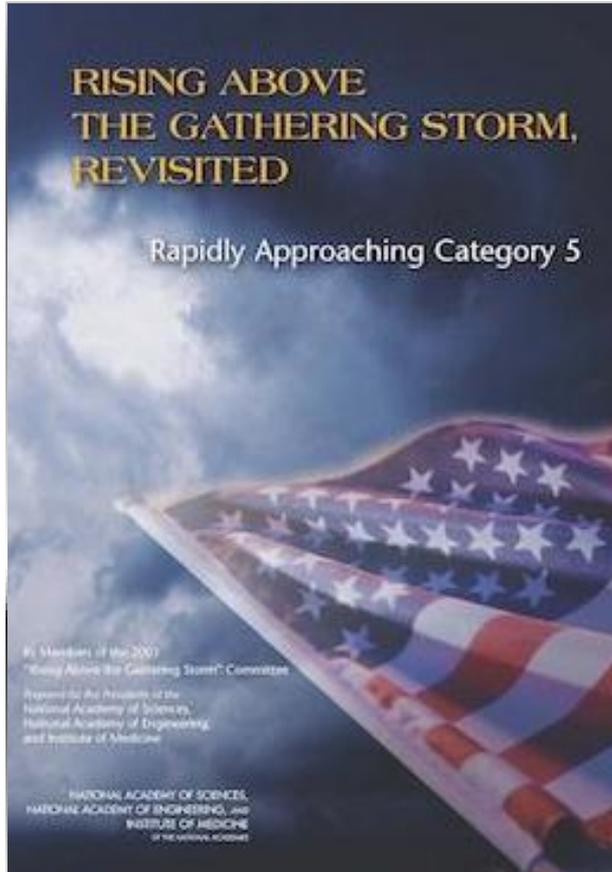


The Importance of Mentoring for Student Success in the Sciences

Julia Cherry
University of Alabama
June 5, 2012

Careers in science, technology, engineering and math (STEM) are important for the economy & society.



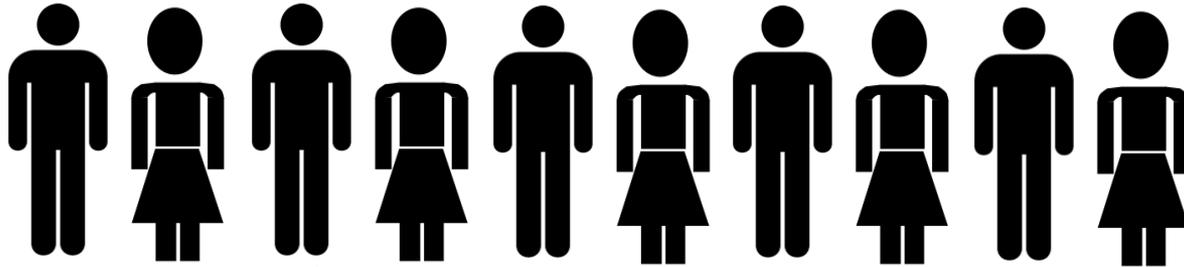
Innovation, competition in a global market

Many students lose interest by 4th grade

- Gender and race gaps emerge in high school & college.

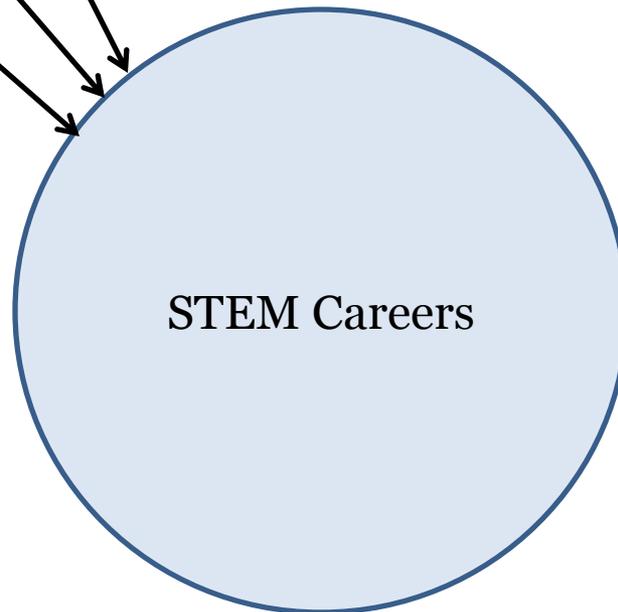


The quality of the pool of future scientists determines the quality of future scientific research.

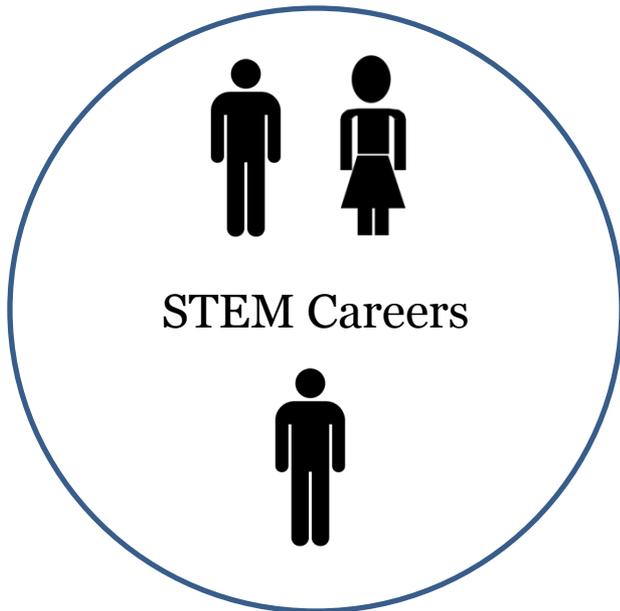


Recruitment: ~23% of
undergrads declare a
STEM major

Twice as many
males as females



Retention and Success



Degree	Same STEM Field	Other STEM Field	Non- STEM Field
B.S.	23%	6%	71%
M.S.	53%	10%	37%

Source: NSF Survey, 1995

“The Leaking Pipeline”

(Hanson 1996)



Pool of potential scientists



STEM Fields



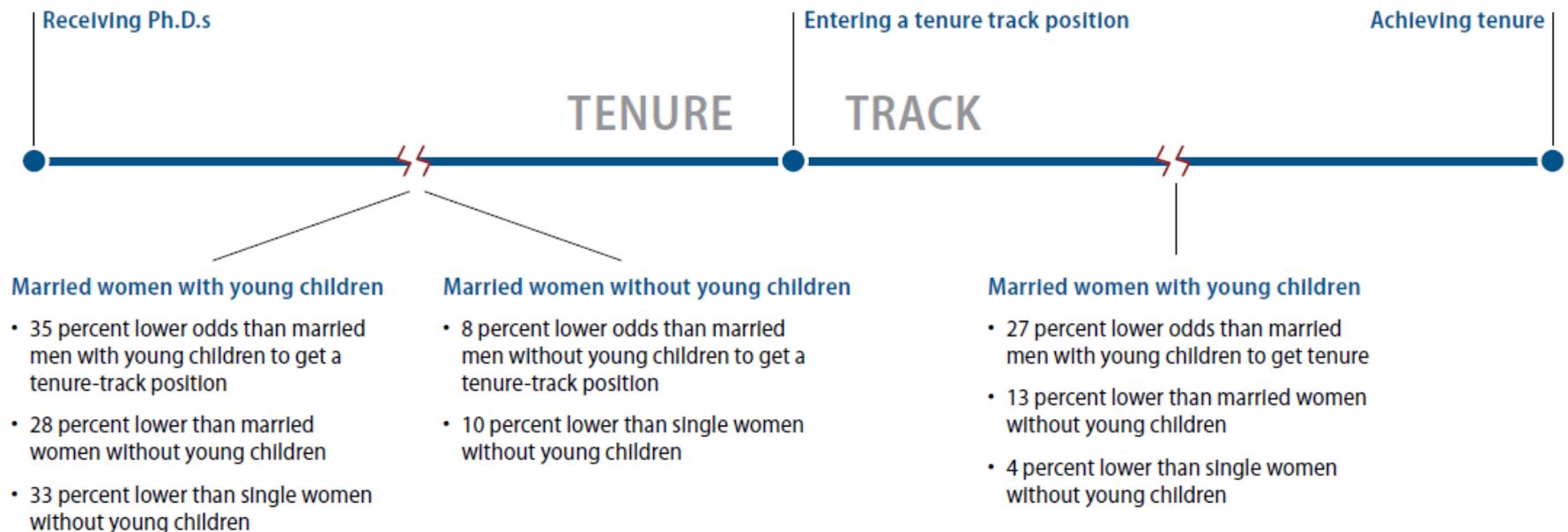
STEM careers

Long-term participation in science careers is unequal between genders and among races.

For example: Despite earning just over 50% of Ph.D.s in the life sciences, women are less likely to get a tenure-track position and achieve tenure than men.

Leaks in the pipeline to tenure for women Ph.D.s in the sciences*

Married women with young children are less likely to enter a tenured-track position or become tenured



*Results are based on survival analysis of the Survey of Doctorate Recipients (a national biennial longitudinal data set funded by the National Science Foundation and others, 1981 to 2003) in all sciences, including social sciences. The analysis takes into account discipline, age, ethnicity, PhD calendar year, time-to-PhD degree, and National Research Council academic reputation rankings of PhD program effects. For each event (PhD to TT job procurement, or TT job to tenure), data are limited to a maximum of 16 years. The waterline is an artistic rendering of the statistical effects of family and gender. Note: The use of NSF Data does not imply the endorsement of research methods or conclusions contained in this report. Person-year N for entering tenure track=140,275. Person-year N for achieving tenure=46,883.

How to Stop the Leak?

A Focus on Grad Students

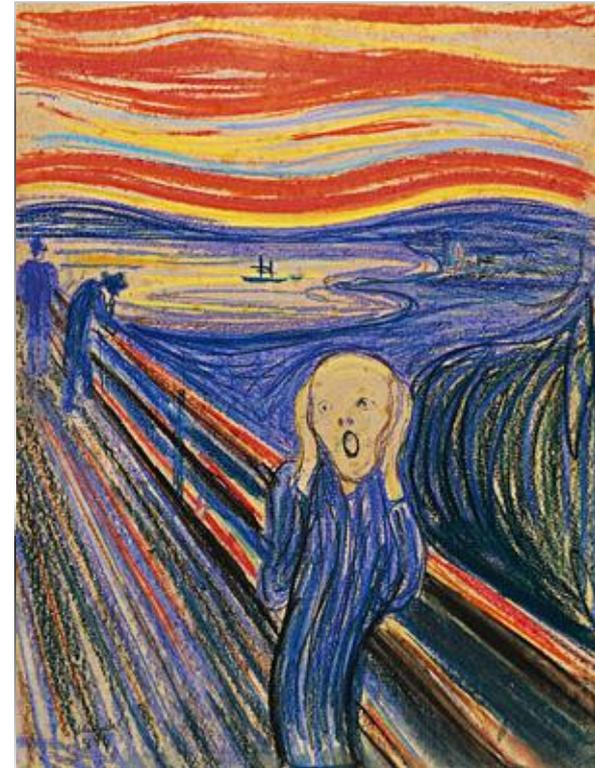
Group 1: Unhappy & unsuccessful

- Heavy work load, constant pressures, and perceived lack of support



- Devalue their education
- Develop strategies to “beat the system”

- Bloom and Bell (1979)



“The Scream” by Edvard Munch

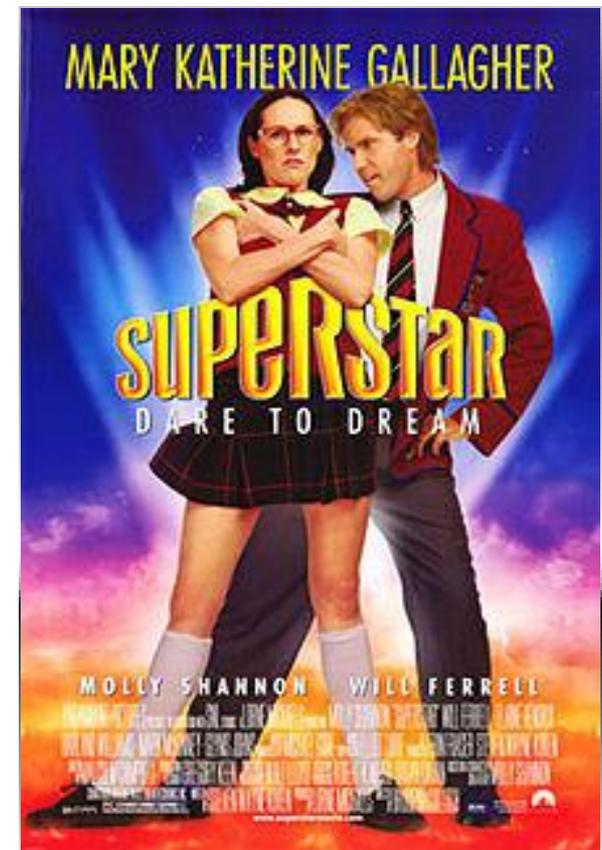
How to Stop the Leak?

A Focus on Grad Students

Group 2: Graduate Superstar!

“...proceed through the program with the minimum amount of difficulty and a maximum amount of quality performance.”

- Bloom and Bell (1979)

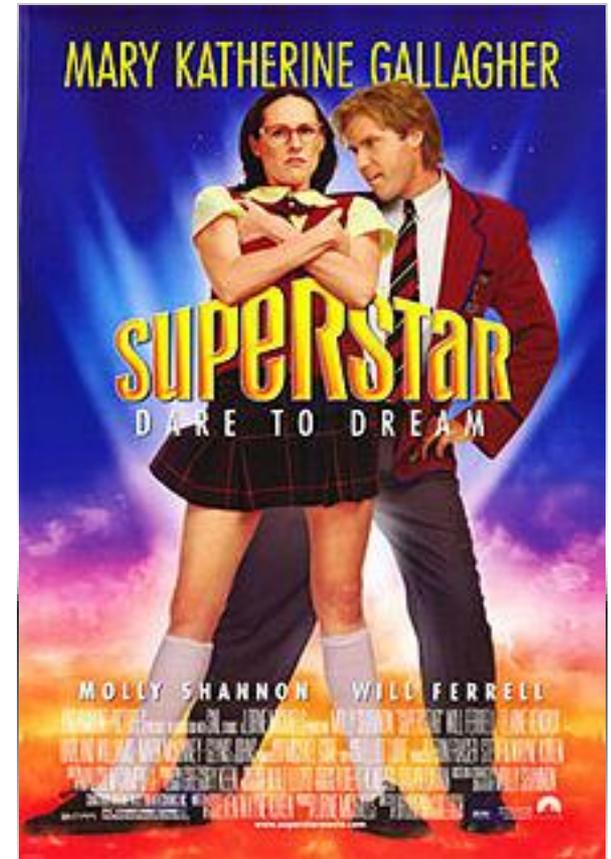


How to Stop the Leak?

Superstar Traits

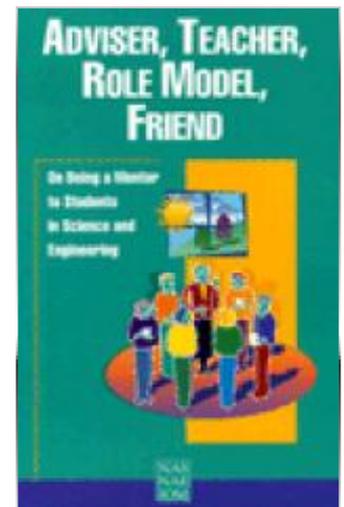
(Bloom and Bell 1979)

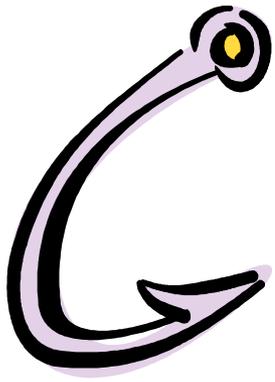
1. Visibility
2. Willingness to Work Hard
3. Reflect Program Values
4. True Interest in Research
5. Develop Relationship with Mentor



The importance of (good) mentors...

- Mentoring recognized as a critical component for success of all students.
 - Instrumental vs. Psychosocial (Kram 1985)
 - Advisor, Teacher, Role Model, Friend (NAS 1997)
- Mutually beneficial process
- Students:
 - Increases success rates
 - Improves quality of education/training
 - Better personal & professional preparation
- Mentors:
 - Improves productivity
 - Provides personal satisfaction





Provide the “Hook” (Besecke & Reilly 2006)

- In addition to parental & family influences or personality traits, what attracts students to research?
- Transforming Experiences!
 - Enriching experiences involving mentors
 - Encourages interest in the sciences
 - Increases likelihood of entering scientific fields
 - May be gender differentiated

The Ideal Mentor

(Ferreira 2006)

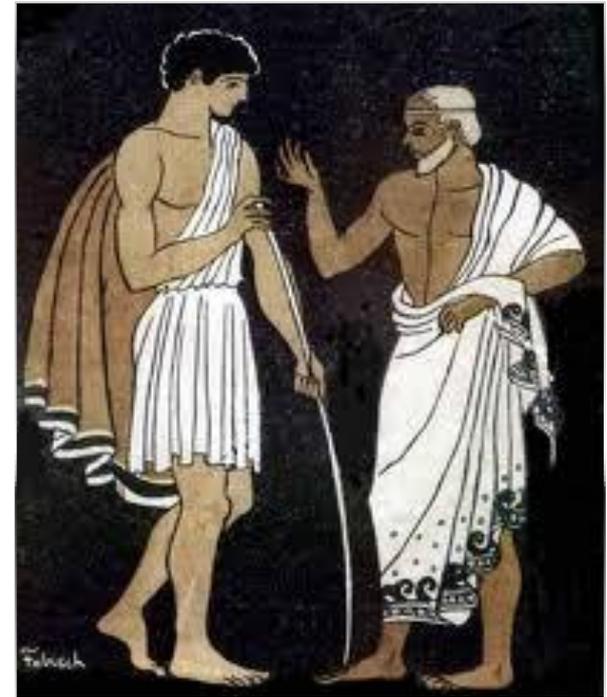
- Provides guidance, feedback, encouragement, & respect for competencies
- Tailors individualized approaches
- Shows interests in personal & professional aspirations
- Remains approachable



The Ideal Mentor

(Ferreira 2006)

- Chemistry: 24% of women and 64% of men reported a high level of mentoring
- Biology: 57% of women and 56% of men
- Dissatisfaction among females increased when female mentors were lacking.
- As male domination in a field increased, gender inequities increased.



“Telemachus and Mentor” by Fabisch

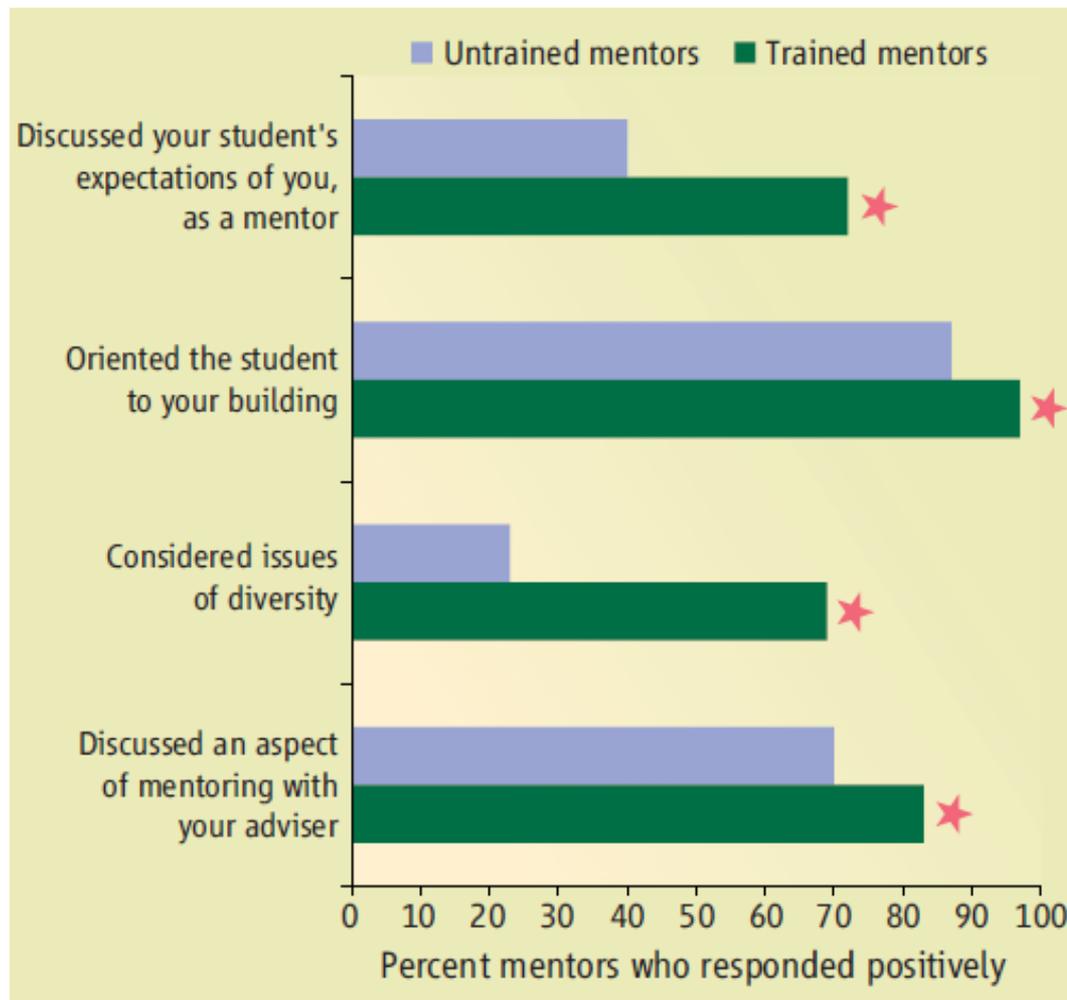
How to improve...



- Recognize individual needs and barriers to success
- Raise awareness among students & faculty
- Engage in open dialogue
- Initiate formal mentoring programs

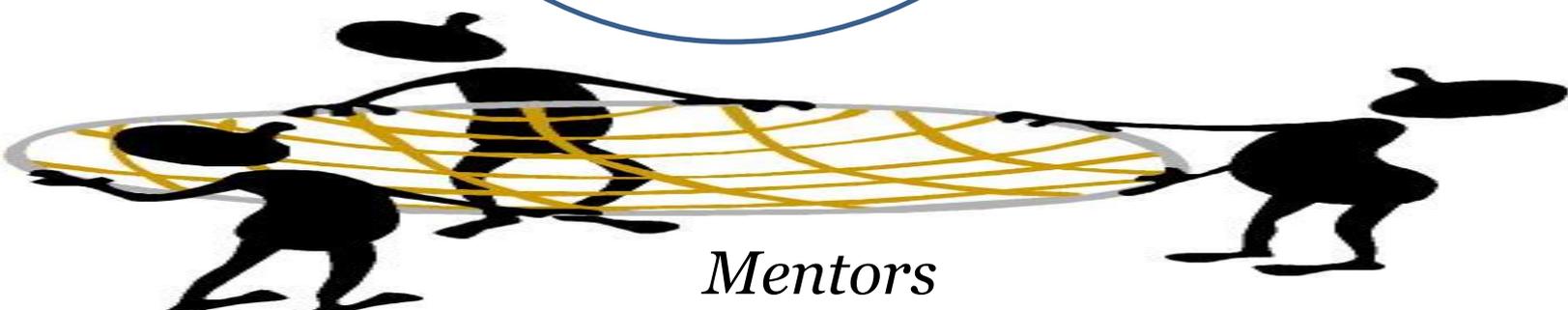
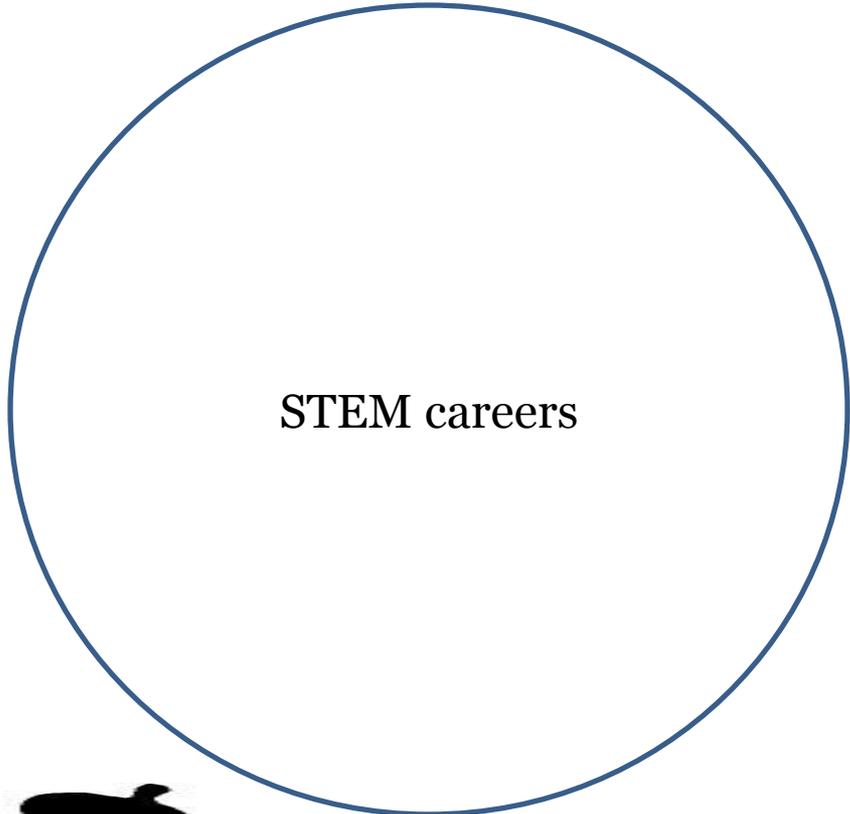
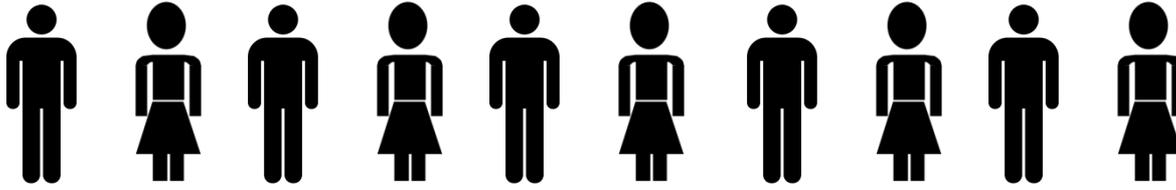
Wisconsin Mentoring Seminar

- Goals: discuss expectations with students, consider diversity issues, discuss mentoring with colleagues.



Conclusions

- “Leaking pipeline” exists, but successful mentoring can reduce attrition.
- Mentoring improves student success and promotes pursuit of science-related careers.
- Mentoring, with recognition of barriers to success, particularly important for underrepresented groups.
- Formal mentoring programs or training beneficial.



Mentors

Thanks to my mentors!

1. David Kesler
2. Laura Gough
3. Karen McKee
4. Julie Olson
5. Catherine Roach
6. Amy Ward

