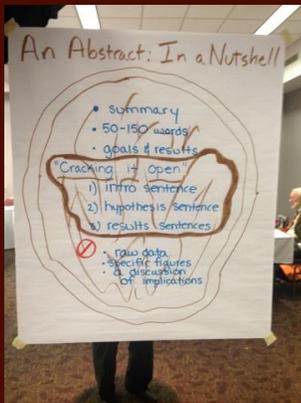




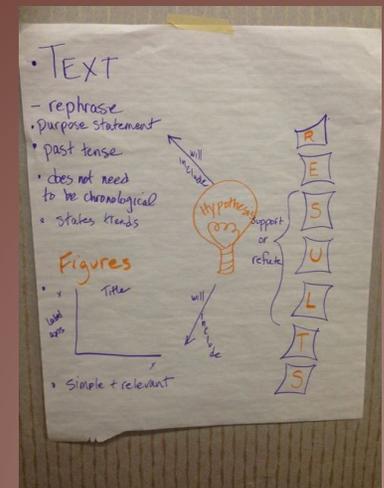
**Stefanie DeVito**

Exploring research outside the lab: Postdocs in  
Science Education Research

# Background



- BS in Biochemistry
- PhD thesis on biochemistry, metabolism, virology
- Postdoctoral Teaching Fellow at the University of Kansas
  - Heading the Biology Dept Course Transformation Initiative



# My story...

- Where I've been
  - Interest in teaching:
    - IND412: Graduate experience in science education
    - Adjunct instructor at St. John Fisher College
  - Interest in improving education
    - Reading literature on methods to improve undergraduate education
    - Presentations and attending workshops at a teaching conference
- Where I am:
  - Teaching postdoc working to improve large intro biology courses
- Where I want to go....
  - Teaching at an primarily undergraduate institution
  - Conduct research on improving undergraduate science education

# Today

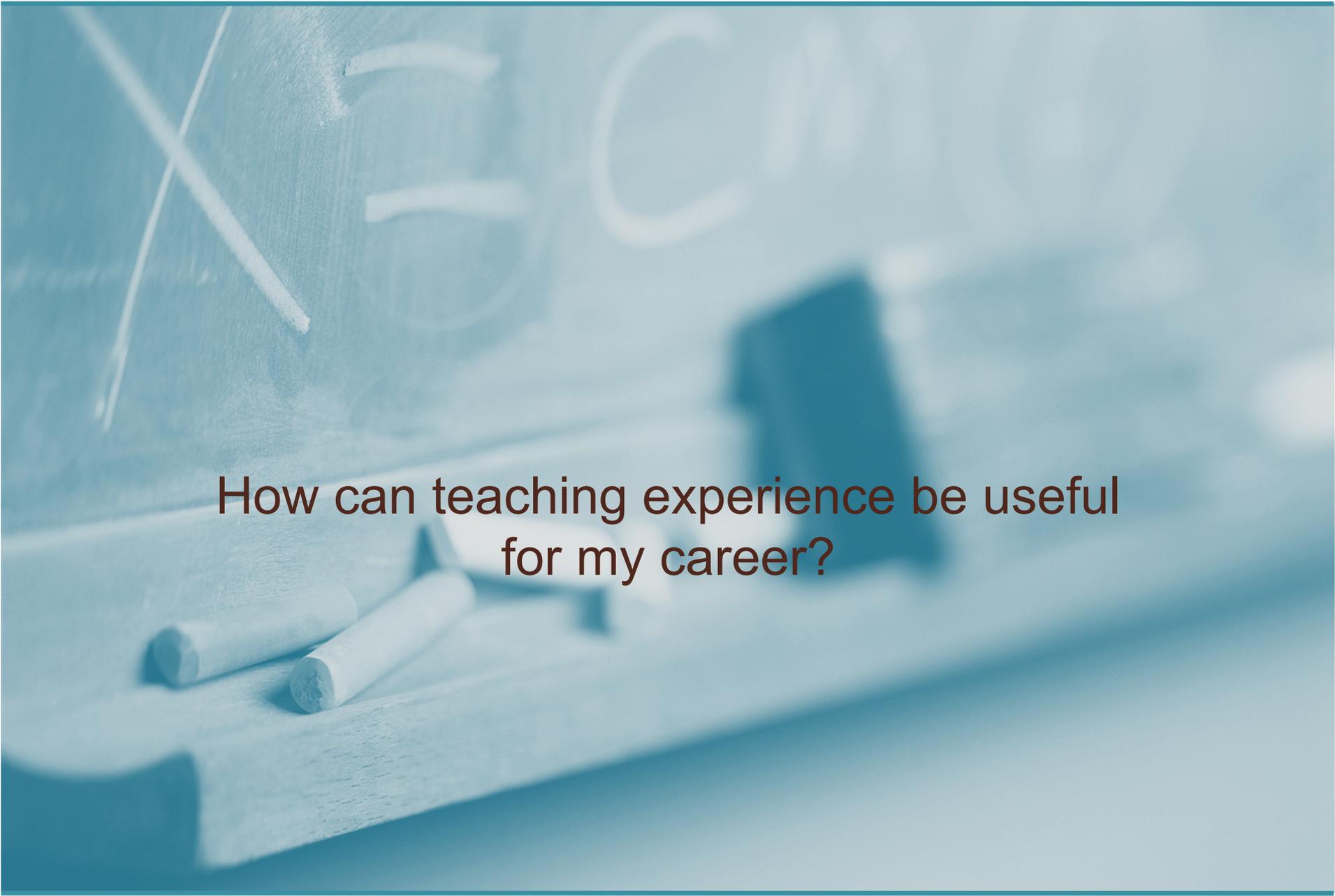
- When and how can teaching experience be useful?
- What is teaching as research?
- What are the different types of teaching postdocs? How can they help me achieve my career goals?
- My story: How I gained teaching experience and interest in education research
- How can you gain teaching experience?

# How I became interested in teaching...

- Graduate Experience in Science Education (IND412)
- Introduces graduate students to:
  - The principles of learning and teaching
  - New methods in education (i.e. active learning, case studies)
  - Communicating science as an instructor at the college-level
- 3hr/week course, typically offered in the spring.
- Final project: A lesson designed around your research or topic of interest

# Adjunct teaching

- Adjunct faculty at St. John Fisher College Dept of Chemistry
  - Organic Chemistry Lab
  - General Chemistry Lab
- Adjuncting a lab is a great way to gain teaching experience on a limited schedule
  - 1 lab/week (~3hr lab), plus grading responsibilities
- Bch208 at U of R

A blue-tinted photograph of a chalkboard. In the foreground, several pieces of white chalk are scattered on a wooden ledge. A piece of white paper is also on the ledge. The background shows a chalkboard with some faint white markings, including a large circle and some lines. The overall scene is a classroom or lecture hall setting.

How can teaching experience be useful  
for my career?

# So you're interested in teaching?

- All faculty positions require some teaching.
  - Most positions require prior teaching experience
- The weight that different schools give to research vs. teaching expectations vary
- It's important to understand the values of the type of school you want to teach so you are properly qualified.

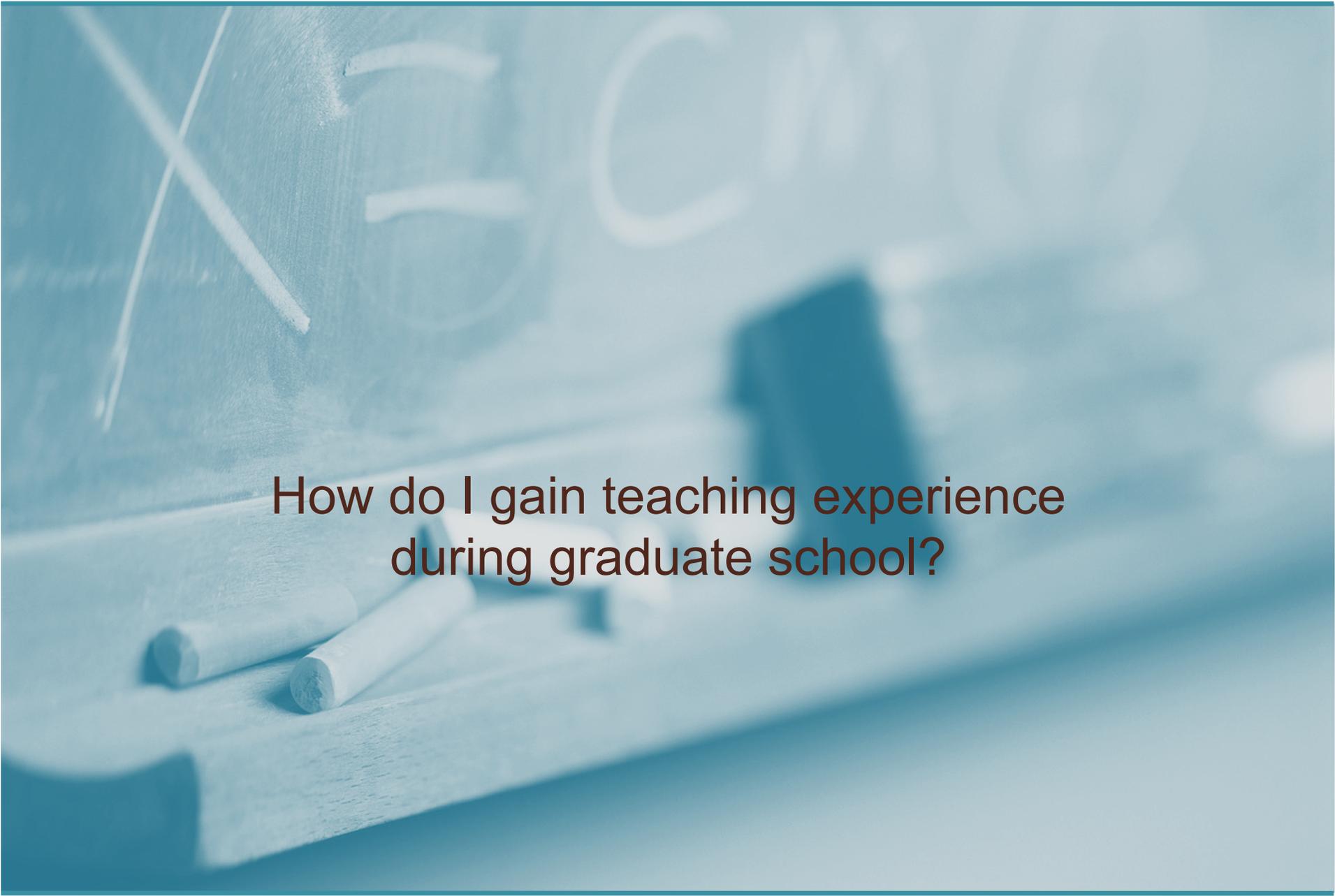
# Career options in teaching

- Teaching experience:
  - Gives you experience for faculty positions, especially for schools who place a high value on experience teaching using modern methods (more than lecturing)
  - If you want to teach at a community college or small undergraduate institution, you will likely need teaching experience

# So you're interested in teaching?

- What are my career options?

	Community College	Small Undergraduate Institution	Large Research Institution
Estimated teaching to research ratio	100% Teaching	Varies from 70% teaching/30% research to 50/50	~10% teaching/ 90% research
Teaching experience and/or demonstration required	A year or more, often at community college level. Teach demo required	A year or more of teaching experience. Teaching demo required.	Very little. Teaching demonstration not always required.
Research Expectations	No research	Some: internally funded research for undergrads. Others expect external funding. Research talk sometimes required.	Full external funding. Research talk expected during interview.

A blue-tinted photograph of a chalkboard. In the foreground, a wooden ledge holds several pieces of white chalk and a piece of paper. The background shows a chalkboard with some faint, illegible markings. The overall scene is educational and academic.

How do I gain teaching experience during graduate school?

# How do I find a adjunct position

- Persistence is key!
  - Talk to people (“network”)
  - Email dept. chairs. Especially in June, August and December
  - Don’t be afraid to go outside your comfort zone!
    - Reach out to biology AND chemistry departments
  - Don’t be discouraged!
    - Schools keep lists of adjuncts, it may take a few semesters for them to need you
  - Think about ALL the area schools!
    - Fisher, Nazareth, RIT, Brockport, MCC, GCC, Geneseo all hire adjuncts!

# What if I can't adjunct?

- Circumstances may prevent you from taking an official adjunct professor position
- Think outside the box!
  - Offer to unofficially teach part of a course
    - Does your PI teach part of a course? Do you have knowledge on a course you once TA'd?
    - Offer to teach a set of labs or lectures!
    - Let the professor sit in and give you advice/feedback
    - Suggest it as being beneficial to them so they don't have to write lectures or quizzes
  - Ask to shadow a professor at a school that places a high value on modern educational practices (MCC, Fisher etc)



# Teaching as Research

# STANYS Conference



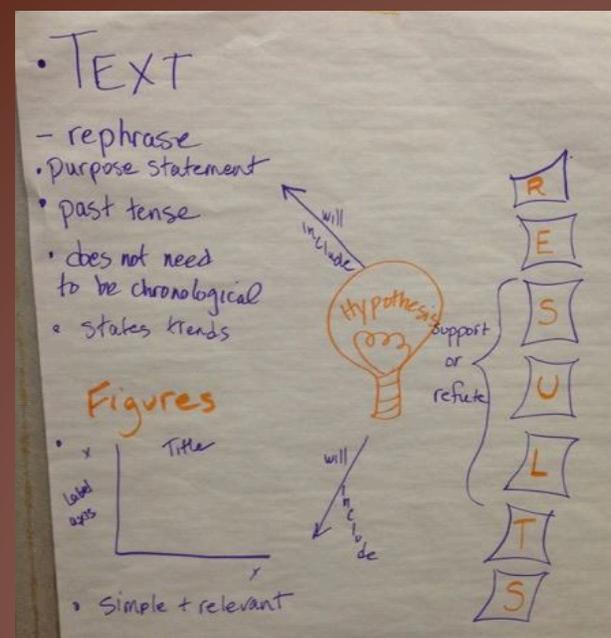
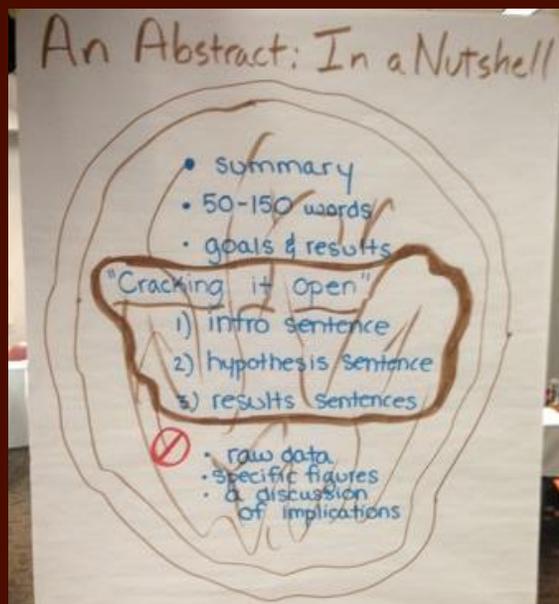
- Science Teachers Association of New York State
- Yearly conference for K-12 science teachers from all over New York, consisting of small workshops
- STANYS selects workshops which
  - Take a new and active approach to teaching specific material
  - Give a update on material from a practicing scientist
- Great way to present creative educational ideas and go beyond just instructing.

# STANYS Conference 2013

- IND412 Final project: A murder/mystery case study in diabetes and glycolysis
  - Presented as a practicing scientist
  - My workshop was an active way to present updated material
  - Take workshop participants through the lesson

# STANYS Conference 2014

- Teaching students how to dissect scientific literature through active learning
  - Use group work to teach students the difference between an abstract, introduction, materials and methods etc.
  - Inspired by my organic chemistry students



# Scholarly research in teaching

- Education Research/Teaching as Research:
  - Designing and implementing innovations in teaching (course design, assessment, online communications etc.)
  - Collecting data demonstrating student learning from new innovations
  - Publishing scholarly articles describing the findings.
- As more schools recognize that modern methods in teaching help them to distinguish their undergraduate programs, they are hiring faculty and postdocs who are capable of assisting them with education research

# Why is education research important?

The University of Kansas

**KU**

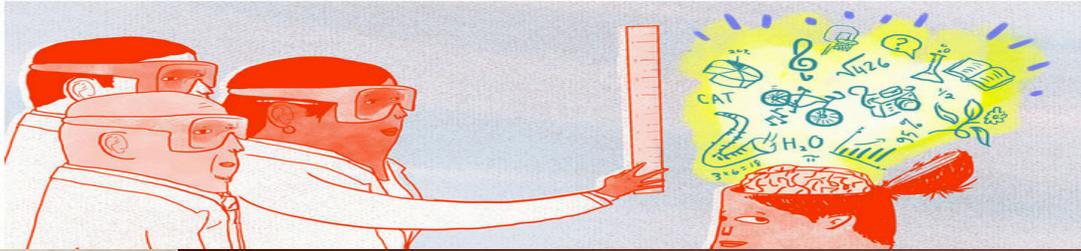
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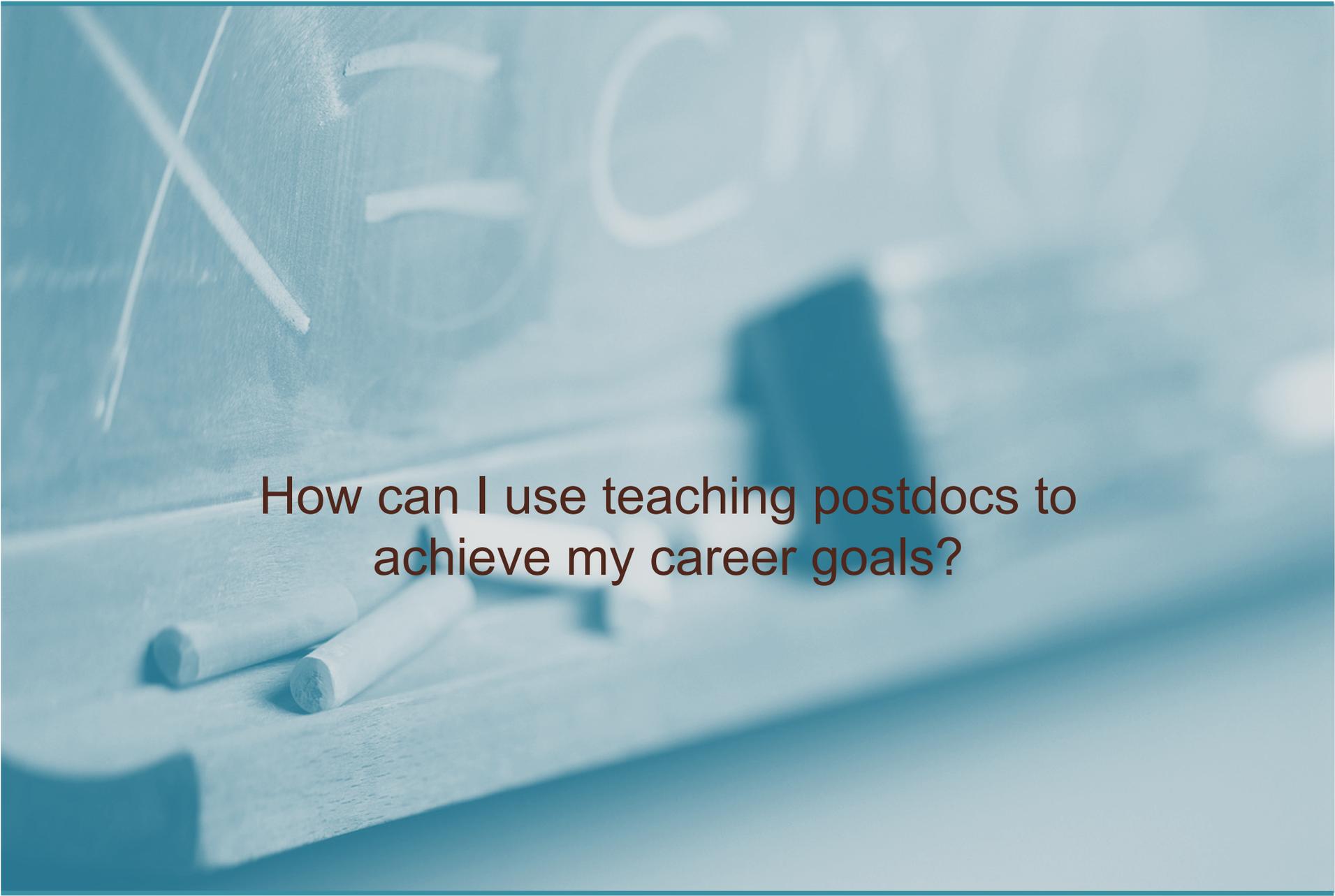
# My story in education research

- I was applying for faculty positions at small schools when I found the posting for Kansas
- My objective: To be a faculty member with a research focus on improving undergraduate science education

# What will I be doing as a postdoc?



- 40%:
  - Develop educational materials to improve student learning
  - Develop tools to demonstrate achievement of learning in large introductory courses
- 20%:
  - Enhance online course resources
  - Develop active learning activities to maximize concept mastery
- 15%:
  - Partner with regular faculty to teach and implement mechanisms for improving student learning and engagement
- 10%:
  - Engage and collaborate with members of other departments working under the same initiative to enhance knowledge of practices
- 10% Contributing to College-Wide Course Transformation Initiative Reports
- 5% Misc.



How can I use teaching postdocs to achieve my career goals?

# Types of Teaching Postdocs

- Two different types: Postdocs in Education Research
  - Beneficial for those with teaching experience who want to move into the field of education research.
  - They go by many names including Postdoctoral Teaching fellowships, Teaching as Research, etc.
  - Purpose: To work on a project that frequently involves curriculum development and/or assessment of a undergraduate STEM course, followed by analysis and publication of the results
    - You will usually not be teaching your own class
    - Typically hired to assist with a NSF grant for a specific project that has already been designed.
  - Typically post openings 1-2 months prior to when the job would start

# Education Research Postdoc Requirements

- Requirements for these jobs often include:
  - PhD in the field of interest
  - Teaching experience in a university/college setting
  - A strong interest or demonstrated experience in biology education research.
  - Demonstrated interest in improving course teaching (aka pedagogical design)
  - Excellent written and verbal communication skills

# Education Research Postdocs

- Examples from past job openings:
  - “...seeking to hire a post-doctoral scholar to contribute to a study of how pedagogical innovations in university STEM classrooms are developed, disseminated, and institutionalized.
  - “...currently recruiting for a postdoctoral research and teaching position in Biology Education. The focus of this position is on formative assessment and feedback in undergraduate STEM classrooms.”
  - “...the new postdoc, funded primarily by a grant from NSF, will be involved in curriculum development, web communications, and assessment of a series of new materials designed to make a genomics research experience accessible to beginning college students.”
  - “This individual will participate in research on problem solving among biology undergraduates... This longitudinal research aims to determine the extent to which undergraduates' problem-solving skills are predictive of success and persistence in science.”

# Education Research Postdocs

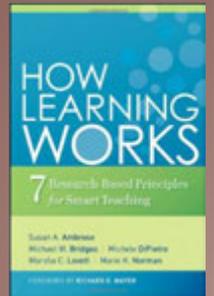
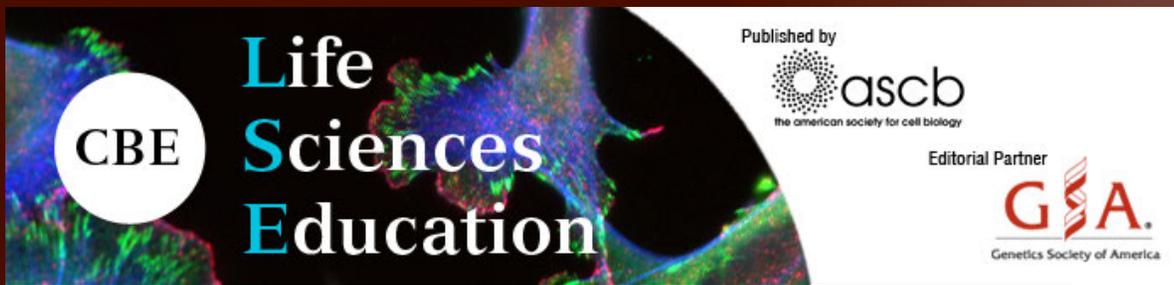
- Links:
- SABER: Society for the Advancement of Biological Research. Has a page for job openings
- <http://saber-biologyeducationresearch.wikispaces.com/>
- Useful job search sites that will include post-docs:
- Chronical of higher education:
  - <https://chroniclevitae.com/>
- Higher ed jobs:
- <http://www.higheredjobs.com>

# Traditional postdocs with teaching experience

- Two different types: Postdoctoral Teaching Fellowships
  - Beneficial for those who want to teach at a small undergraduate school and would like to gain teaching experience during their traditional postdoc
    - This makes you more attractive for a faculty position at a small undergraduate institution that places equal or greater value on teaching than bench research
    - Allows you to spend ~30% of your time teaching a course
    - Amount of faculty support/feedback in your teaching varies from school to school
  - NIH Award: IRACDA Program (Institutional Research and Academic Career Development Awards) aka K12
    - “Combines a traditional mentored postdoctoral research experience with an opportunity to develop academic skills, including teaching, through workshops and mentored teaching assignments at a partner institution”

# How do I learn more about education and education research?

- Can't take a class? Do you want to know more about education and education research without the commitment?
- CBE-Life Science Education
  - <http://www.lifescied.org/>
  - Publications on new methods in teaching Biology at the college level
- How learning works
  - Basic principles of teaching, targeted towards college level learning
- More resources: UR Center for Excellence in Teaching and Learning
  - <http://www.rochester.edu/college/cetl/>
  - List suggested books on education and journals on education research



# How do I learn more about education research?

- University of Rochester Center for Excellence in Teaching and Learning
  - Offers teaching as research fellowships to graduate students
  - Spend 1 semester designing a education research project and the 2<sup>nd</sup> semester implementing your research
  - [http://www.cirtl.net/CoreIdeas/teaching\\_as\\_research](http://www.cirtl.net/CoreIdeas/teaching_as_research)

Questions?