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ACS Chemistry for Life®

We will start momentarily at 2pm ET

Slides available now! Recordings will be available to ACS members after two weeks

http://acswebinars.org/surviving-grad-school

Have Questions?

ACS Chemistry for Life®

"Why am I muted?"
Don't worry. Everyone is muted except the presenter and host. Thank you and enjoy the show.

Type them into questions box!

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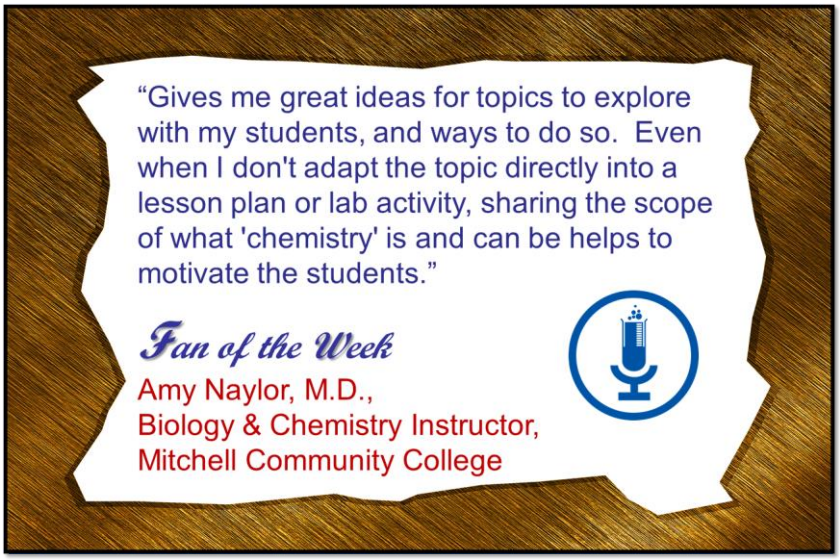

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Join us for part 2 of the Grad School Doubleheader!

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"ACS Webinets™ are 2 minute segments that bring you valuable insight from some of our most popular full length ACS Webinars®"

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Thursday, May 15, 2014

"From Batteries to Biological Machines - Crystallography Frontiers"

Cora Lind-Kovacs, American Crystallographic Association
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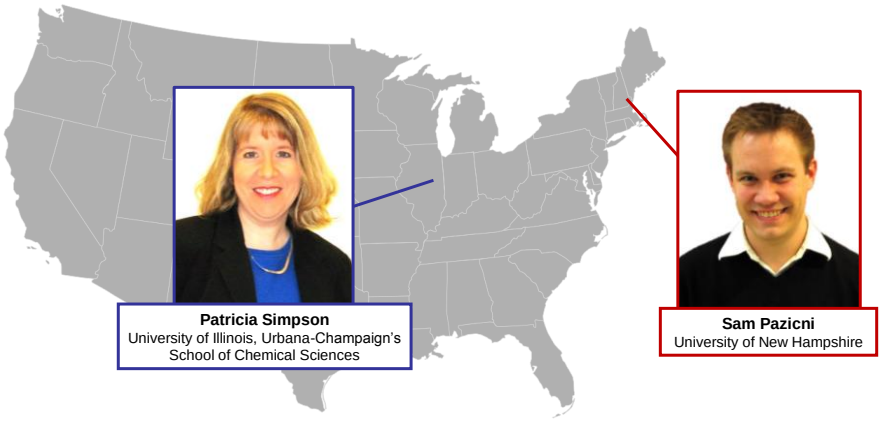
Surviving and Succeeding in Grad School



Patricia Simpson
University of Illinois, Urbana-Champaign's School of Chemical Sciences

Sam Pazicni
University of New Hampshire

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Surviving and Succeeding in Grad School

08 May 2014

American Chemical Society

Surviving and Succeeding in Graduate School

- How is graduate school different than undergrad?
- What should I do before I go there?
- What happens when I get there?
- How do I choose a research advisor?
- What kind of experiences will I have? What kind of experiences should I have?
- What does it take to succeed in graduate school?

I am but one person… with one set of opinions on these issues.

That is why we have these wonderful folks!

Prof. Kim Linenberger
Department of Chemistry and Biochemistry,
Kennesaw State University

Ms. Whitney Kellett
Ph.D. student,
Purdue University

Which of the following best describes you?

- I am entering graduate school this fall, having just finished my undergraduate studies.
- I am entering graduate school this fall after taking time off between after my undergraduate studies.
- I am currently finishing my undergraduate studies and will take time off before graduate school.
- I am a current undergraduate looking forward to graduate school in the future.
- I am currently in graduate school.

The Grad School Journey

IT'S GOING TO BE LIKE A REALITY TV SHOW!

- lots of young people from all over the world converging on a single chemistry department
- many will live together
- competing in a game of wit, skill, and tenacity
- there will be tears, laugher, sadness, and swearing
- typically, the most stubborn "contestants" win

Image Credit: http://introtomedia.edublogs.org/2011/08/10/reality-tv-portraying-mythof-america

The Biggest Differences

- **undergraduate**
  - you play the "credit game"
  - you have courses and grades as motivators
- **graduate school**
  - It's a very individual process - no student takes the exact same journey as another student
  - at times, ***you*** are your only motivator
  - your intellectual progress is monitored by a committee; the "credit game" is over

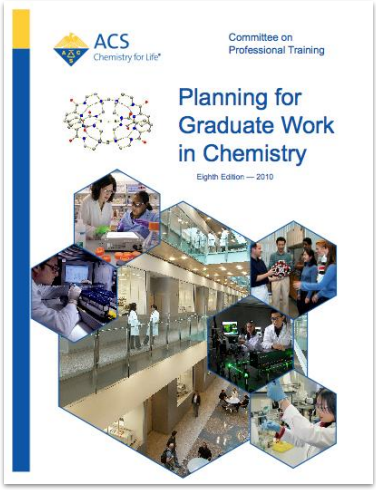
Experiences to have before graduate school

- chemistry coursework
  - 2 semesters of general chemistry with laboratory
  - 2 semesters of organic chemistry with laboratory
  - 2 semesters of physical chemistry with laboratory
  - 1-2 semesters of analytical chemistry with laboratory
  - 1-2 semesters of inorganic chemistry with laboratory
  - 1 semester of biochemistry
- other coursework
  - physics, calculus
  - depends on to what graduate program you aspire

Experiences to have before graduate school

- practice with both written and oral communication skills
- gain comfort/proficiency with software
  - Microsoft Excel, Powerpoint, Word (or similar)
  - Origin or Igor Pro (data graphing software)
  - ChemDraw (chemical structure drawing software)
  - EndNote or RefWorks (citation tools)
- gain skill with search engines like SciFinder, WebofScience, and PubMed

Planning for Graduate Work in Chemistry



this publication contains a wealth of information!

Just “Google” the title and you’ll find it!

The Grad School Journey

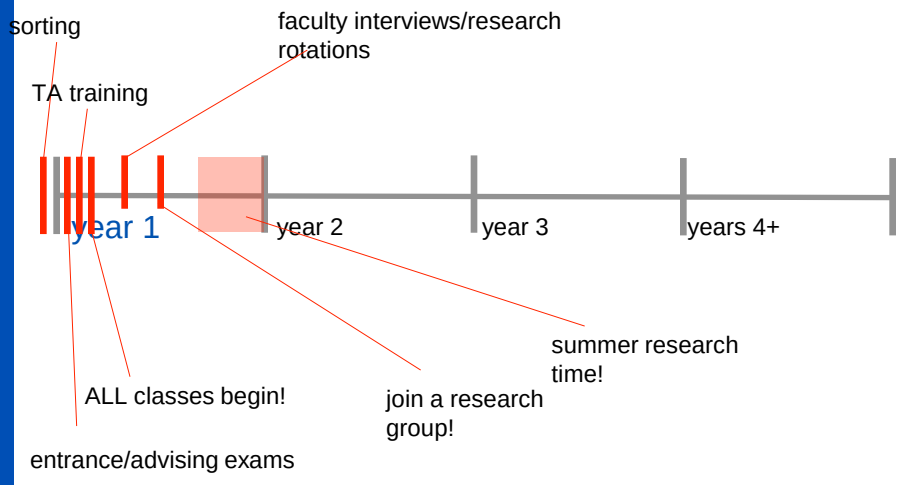
indoctrination. a whole lot of new will be coming at you from every direction. don’t worry, everyone else feels exactly like you do.

year 1 | year 2 | year 3 | years 4+

a time for intense study and reflection. rely on your strengths; recognize and confront your weaknesses.

learn to manage your time. work hard *most* of the time; work smart *all* of the time.

The Grad School Journey



On being a teaching assistant...

Graduate Students' Teaching Experiences Improve Their Methodological Research Skills

David F. Feldon,[1]* James Peugh,[2] Briana E. Timmerman,[3] Michelle A. Maher,[4,5] Melissa Hurst,[4] Denise Strickland,[4] Joanna A. Gilmore,[6] Cindy Stiegelmeyer[7]

Science, technology, engineering, and mathematics (STEM) graduate students are often encouraged to maximize their engagement with supervised research and minimize teaching obligations. However, the process of teaching students engaged in inquiry provides practice in the application of important research skills. Using a performance rubric, we compared the quality of methodological skills demonstrated in written research proposals for two groups of early career graduate students (those with both teaching and research responsibilities and those with only research responsibilities) at the beginning and end of an academic year. After statistically controlling for preexisting differences between groups, students who both taught and conducted research demonstrate significantly greater improvement in their abilities to generate testable hypotheses and design valid experiments. These results indicate that teaching experience can contribute substantially to the improvement of essential research skills.

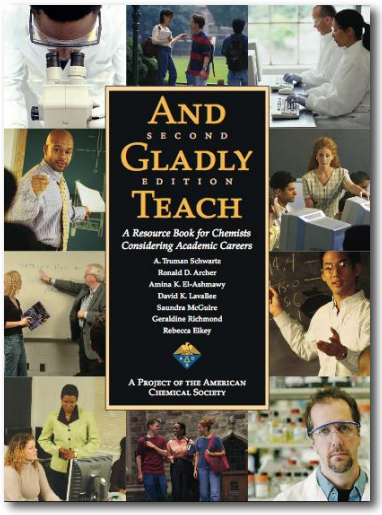
Academic culture in doctoral research universities' STEM (science, technology, engineering, mathematics) programs typically values research activity over teaching (*1*, *2*). Faculty commonly believe that research activities enhance teaching quality but disbelieve that teaching similarly enhances research skills (*3*, *4*). These beliefs influence not only the professional priorities of STEM faculty, but also the guidance teaching in a context that requires students to effectively conceptualize research and solve problems through inquiry (for example, frame testable hypotheses, design valid experiments, or draw appropriate conclusions based on data), instructors must practice these skills themselves as they reason through these problems in order to provide appropriate guidance to their students. When students are trying to solve different problems, (*7*). In contrast, a research assistantship in a laboratory probably provides fewer, relatively similar projects that are based on the research agenda of the lab or principal investigator. Further, many high-level research design issues are likely to be resolved without requiring the research assistant to make substantive contributions to, for example, specifying research questions or determining methodology. For graduate students new to a lab, it is likely that the funded grant proposal supporting their work was written and submitted before their arrival.

Additionally, when learners are required to articulate their reasoning processes substantial evidence indicates that they develop more elaborate and effective schemas for problem-solving that facilitate performance on both typical and new problems (*8*, *9*). Therefore, when instructors explain their own research processes to guide their students (*10*) they are further reinforcing their own learning. Research assistantships do not necessarily require extensive self-explanation (*11*).

Several small, qualitative studies report benefits of teaching for graduate student participants' research development. One found that 21 of 27 teaching assistants leading undergraduate labs reported positive benefits to their research skills as a result of their teaching experiences (*12*). Another found that 33% of research advisors supervising participants in a National Science Foundation (NSF) GK-12 program (*13*) directly attributed improvements in participants' research

Science (2011) **333**, 1037- 1039

And Gladly Teach



a brief yet comprehensive guide to preparing for and securing a faculty position at a college or university

has some great information on being a teaching assistant!

The Research Mentor

- a critical decision!
- don't decide on prestige alone

(or at all)…

  - does your personality mesh with your mentor?
  - does your mentor's management style mesh with your work habits?
  - does your mentor appreciate your goals and aspirations?
  - can you ***learn*** from your mentor?
  - how does your mentor define "success"?

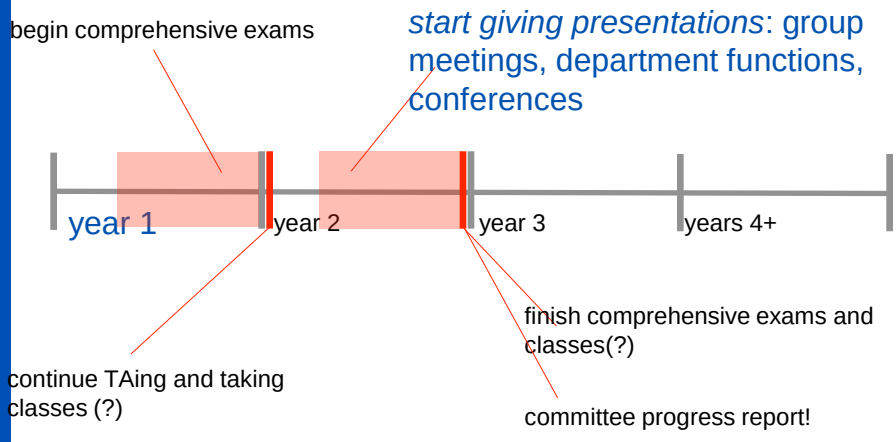
The Grad School Journey

you're not new anymore. time to start becoming self-motivated and a little more independent!

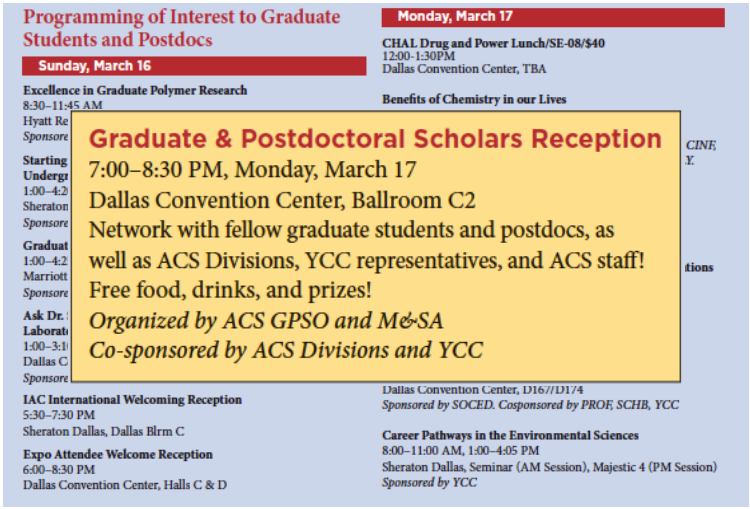
transition your learning. classes are almost done; time to learn for the sake of learning and discovery

assess and reflect. you should be progressing and growing. are you? are you overcovercoming weaknesses?

The Grad School Journey



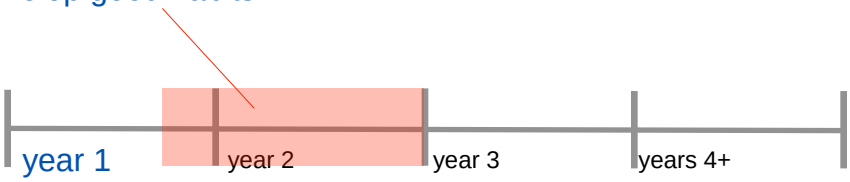
Attending ACS Meetings



Gordon Research Conferences and Seminars

The Grad School Journey

RESEARCH!
develop good habits...



- keep your lab notebook detailed, up-to-date, and indexed
- write up each of your experiments as a full report (methods, results, and conclusions!)
- keep a literature notebook - one page summaries of any publication you read
- build a bibliography (using Endnote, RefWords, etc.)

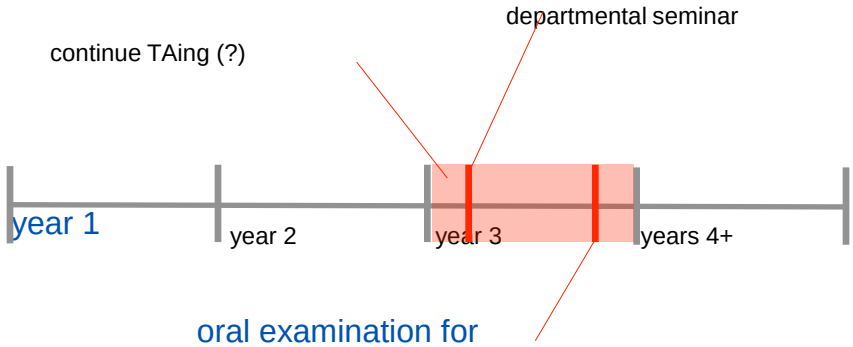
The Grad School Journey

a turning point. time for your mentors to assess your progress and your strengths/weaknesses

begin to take charge of your research. come up with your own ideas and directions. become the expert!

push yourself. the excitement has worn off… but you're not that close to being done

The Grad School Journey



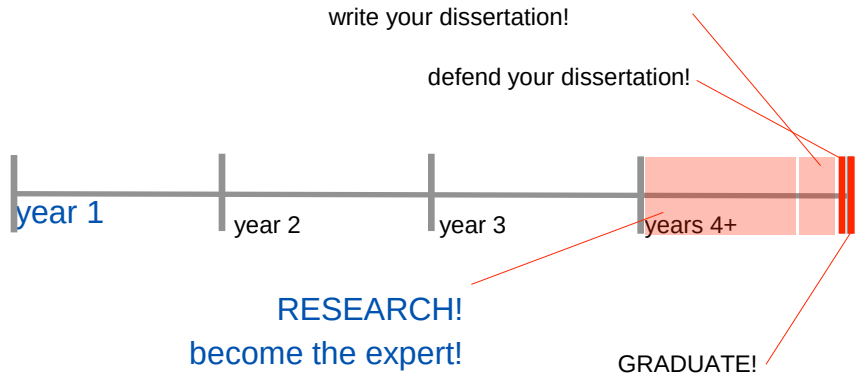
The Grad School Journey

own your research. learn to communicate and promote your work: publishing, presenting talks and posters, write and defend your dissertation

you're the expert. mentor a younger grad student or an undergrad; become the *sensei*

prepare for life after graduate school. engage in professional development activities to supplement your scientific training

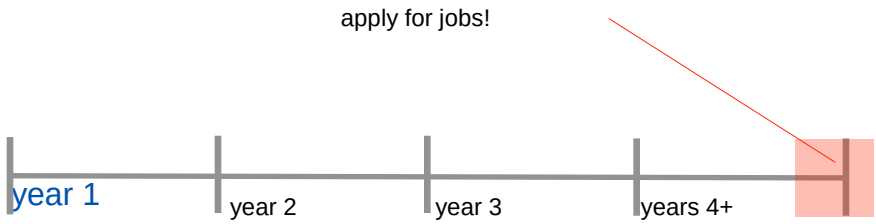
The Grad School Journey



gain the skills necessary to be successful in future pursuits

The End!!

… or is it?

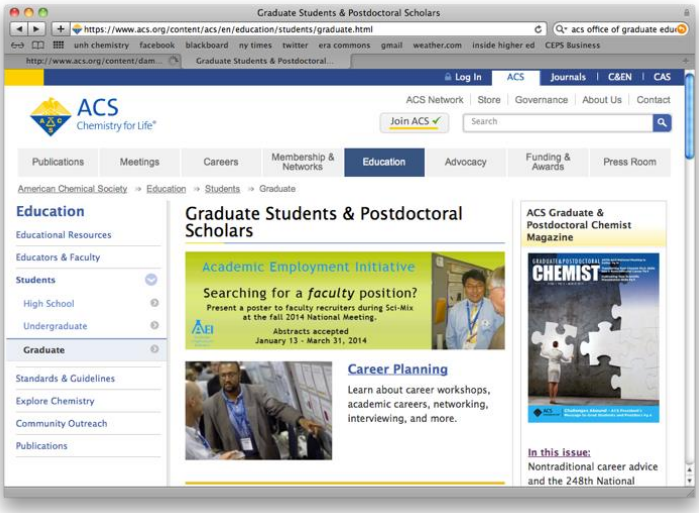


- how can your mentor and institution help with this?
- get to know other members of the faculty (not just those on your committee)
- NETWORK at meetings/conferences and online!!
- **take advantage of what the ACS has to offer!**

What do you want to do after graduate school?

- proceed directly to an industrial job
- proceed directly to a teaching-oriented faculty position
- obtain post-doctoral training and, eventually, an industrial or academic job
- pursue training outside of the lab (policy, journalism, etc.)
- I'm not sure!

ACS Resources for Grads



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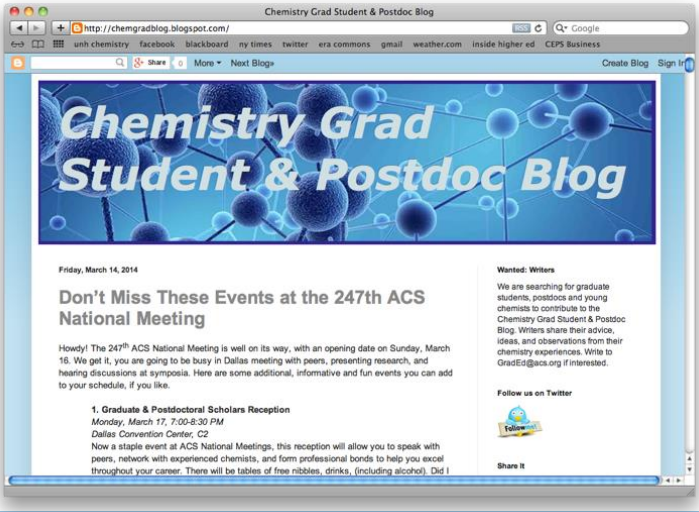

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ACS Resources for Grads

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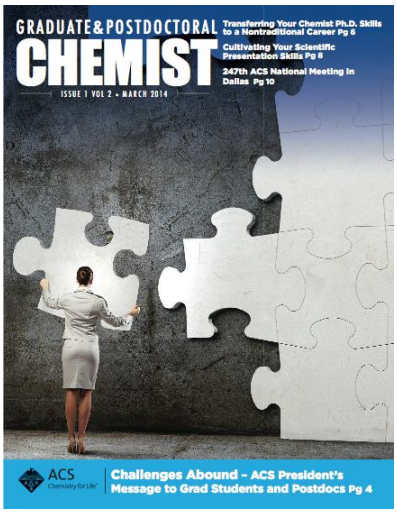

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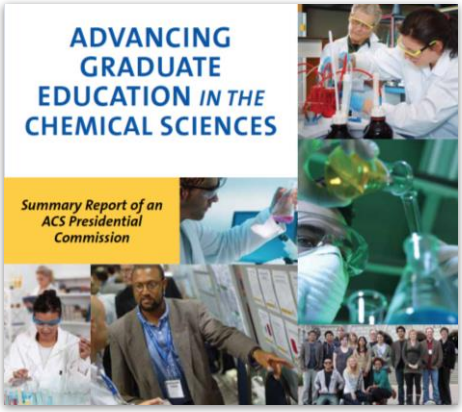

http://www.acs.org/content/acs/en/about/governance/acs-presidential-commission-on-graduation-education-in-the-chemical-sciences.html

http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2013_02_01/caredit.a1300008

http://cen.acs.org/articles/91/i9/Just-Another-Report.html

Enjoying Success

- Your graduate cohort will have entered on equal footing
  - the ***tenacious*** will not give up
  - the ***reflective*** will quickly recognize weaknesses and work to strengthen them
  - the ***swashbucklers*** will gain independence quickly
  - the ***good communicators*** will "own" their work
  - those with ***flexibility*** and ***good time management*** will work smart and hard
  - the ***self-motivated*** will do all of the above while the research mentor is out of town
  - those that ***enjoy Science*** will do all of the above with a smile on their face… most of the time!

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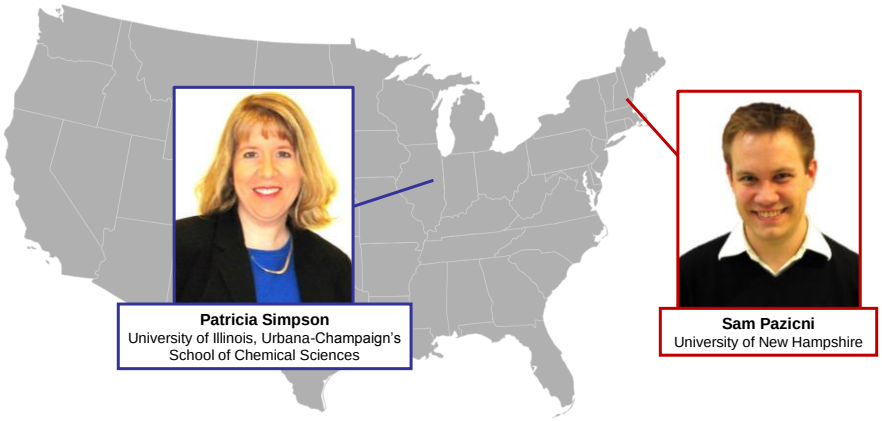

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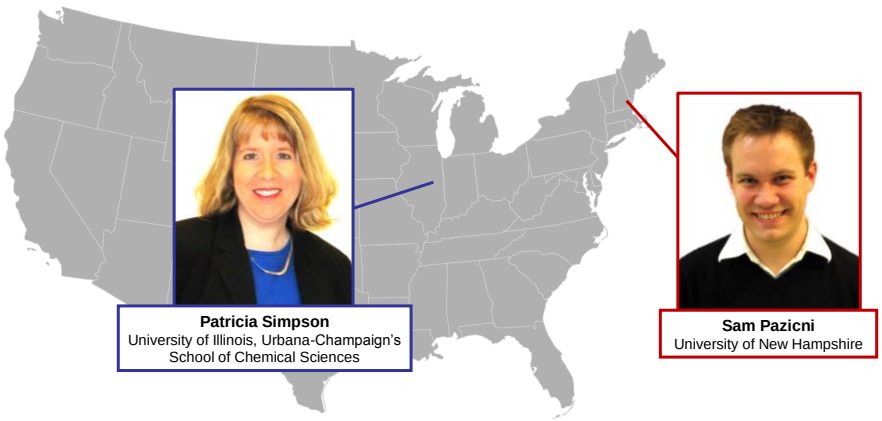

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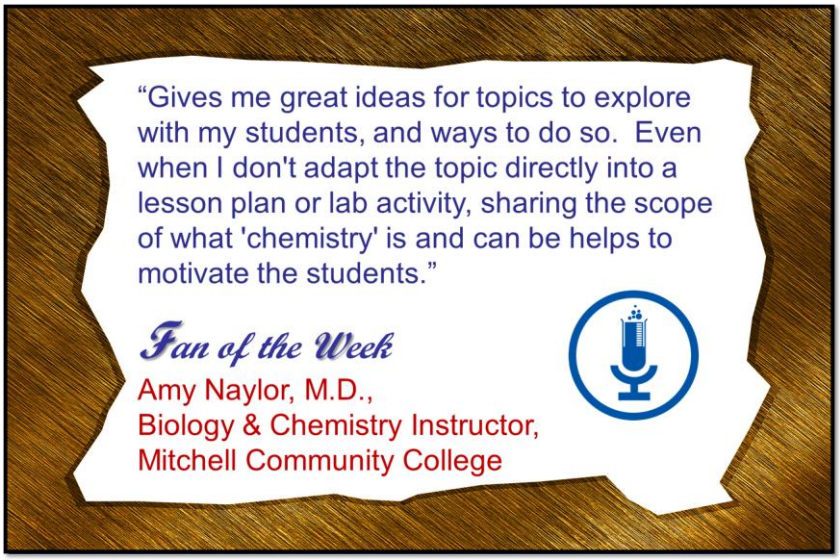

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