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

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  - Learn how to write better abstracts, deliver more engaging presentations, and network to your next dream job. Brush up on your soft skills and set a new career path by mastering what can not be taught in the lab.

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<table>
<thead>
<tr>
<th>Culinary Chemistry</th>
<th>Popular Chemistry</th>
<th>Business &amp; Entrepreneurship</th>
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<td>View the Collection</td>
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- Culinary Chemistry
  - Why does food taste better when it is grilled or what molecular compounds make a great wine? Discover the delectable science of your favorite food and drink and don’t forget to come back for a second helping.

- Popular Chemistry
  - Feeling burdened by all that molecular weight? Listen to experts explain on the amazing side of current hot science topics. Discover the chemistry of cocktails, how viruses have shaped human history, or the molecular breakdown of a hangover.

- Business & Entrepreneurship
  - How do ideas make it from the lab to the real world? Discover the ins and outs of the chemical industry, whether you are looking to start a business or desire a priceless industry-wide perspective.

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- ACS Leadership Development System
- Career Navigator LIVE!
- ChemIDP
- College to Career
- ACS Webinars
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ChemIDP is an Individual Development Plan designed specifically for graduate students and postdoctoral scholars in the chemical sciences. Through immersive, self-paced activities, users explore potential careers, determine specific skills needed for success, and develop plans to achieve professional goals. ChemIDP tracks user progress and input, providing tips and strategies to complete goals and guide career exploration.

https://chemidp.acs.org
Preparing Students for Collaborative Work Beyond Graduation

MARIAN GINDY
Executive Director, Formulation Sciences, Pharmaceutical Sciences, Merck

JORDAN HARSHMAN
Assistant Professor, Chemistry and Biochemistry, Auburn University

ANNE KONDO
Chair, Madia Department of Chemistry, Indiana University Pennsylvania

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Audience Survey Question

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT

What is the highest degree offered at your institution?

• Associate’s degree
• Bachelor’s degree
• Master’s degree
• Doctoral degree
• Not applicable

* If your answer differs greatly from the choices above tell us in the chat!
WHAT YOU WILL LEARN
• What collaborative work involves
• What collaborative and teamwork skills employers expect
• How these skills are acquired

Envision working COLLABORATIVELY

WHAT YOU WILL LEARN
• What collaborative work involves
• What collaborative and teamwork skills employers expect
• How these skills are acquired
What are teamwork skills, exactly?

**Interpersonal Domain**
- Nonverbal Communication, Active Listening, Oral and Written Communication, Empathy, Trust, Assertive Communication, Coordination, Collaboration, Conflict Resolution, Negotiation, Team Monitoring and Evaluation, Situational Leadership

**Cognitive Domain**
- Information and Communications Technology, Literacy, Critical Thinking, Analysis, Decision Making, Problem Solving, Reasoning/Argumentation, Adaptive Learning, Career Orientation

**Intrapersonal Domain**
- Self-Evaluation, Monitoring, Flexibility, adaptability, professional Ethics, Appreciation of Diversity, Productivity, Perseverance, Initiative, Personal/Social Responsibility, Intellectual Interest, Physical and Mental Health


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What students are/should be learning in college

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90% of chemical employers believe these teamwork skills are equally or more important than technical skills

What students are/should be learning in college

“Able to work well with others”
Undergraduate students acquire teamwork skills from completing labs with partners

- True
- False

*If your answer differs greatly from the choices above tell us in the chat!*

Groupwork

Teamwork

https://vibrance.wordpress.com/2007/05/22/dont-push-the-bus/

https://surgery.med.ufl.edu/
True or False: undergraduate students acquire teamwork skills from completing labs with partners.

<table>
<thead>
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<th>Group work</th>
<th>Teamwork</th>
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<tr>
<td>- everybody possesses cognitive skills to solve task</td>
<td>- Different team members possess different cognitive skills, requiring interdependence</td>
</tr>
<tr>
<td>- efficiency permits tasks to be equally divided</td>
<td>- project is divided by expertise</td>
</tr>
<tr>
<td>- conflict typically arises from group members not pulling their weight</td>
<td>- conflict is good (if handled) because can lead to a better product.</td>
</tr>
<tr>
<td></td>
<td>- requires better communication skills from everyone</td>
</tr>
</tbody>
</table>

How we teach these teamwork skills at IUP

- We use Liberal Studies (General Education) courses to teach and have the students reflect on the interpersonal and intrapersonal skills that contribute to teamwork.

- We have the students **practice** and reflect on their teamwork skills by taking a “T-course” (a course within their major that is paired with another course, where related projects must be completed)
  - requires instructors to set up interdisciplinary Teamwork tasks
  - students complete a teamwork-based research project

- In a capstone course, students reflect about what they’ve learned.
“...better-designed opportunities should exist for the development of critical professional skills... to offer specific activities that would enhance students’ ability to:

- Communicate complex topics to both technical and nontechnical audiences...
- Collaborate on global teams...”

— American Chemical Society (2012) “Advancing Graduate Education in the Chemical Sciences”

“Students would be encouraged to create their own project-based learning opportunities—ideally as a member of a team—as a means of developing transferable professional skills such as communication, collaboration, management, and entrepreneurship.


How do students acquire these “soft skills” in their professional growth?

Socialization: Process of developing a professional self, attitudes, values, and skills

1. Anticipatory
Students will become aware of expected behaviors and attitudes in their classroom and research experiences.

2. Formal
Students learn and adopt the “explicit” curriculum and expectations; shape identity and value based on things explicitly communicated to them.

3. Informal
Students learn and adopt the “hidden” curriculum and expectations; shape identity and value based on things implicitly communicated to them.

4. Personal
Students internalize new roles and integrate these with existing identity; shift from student to colleague and define own expectations.

Merton, 1957; Merton, Reader, and Kendall, 1957; Thornton and Nardi, 1975; Weidman, Twale, and Stein, 2001; Austin & McDaniel, 2006; Gardner, 2007
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We tend to focus on our formal components of education...

But a growing evidence base suggest significant growth in soft skills occurs outside of these components.

Merton, 1957; Merton, Reader, and Kendall, 1957; Thornton and Nardi, 1975; Weidman, Twale, and Stein, 2001; Austin & McDaniel, 2006; Gardner, 2007
In your experiences as an undergrad and grad student, how big of a role was teamwork in your primary research project?

- Truly collaborative project; teamwork was huge
- “Divide and Conquer:” everyone had their own piece
- Worked with others only when they or I needed help
- I worked mostly independently
- Not applicable

* If your answer differs greatly from the choices above tell us in the chat!

**RELATED RESOURCES:**

**Employment Information:**
How College Contributes to Workforce Success

**Training Materials:**
Entering Research Curriculum: https://wiscience.wisc.edu/program/entering-research

**Rubrics to Assess Collaborative and Professional Skills:**
Enhancing Learning by Improving Process Skills in STEM (ELIPSS):
https://elipss.com/index.html
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