



# Developing Student Leadership Skills in Academic Laboratory Safety

Kali Serrano  
August 19th, 2018

**UNIVERSITY OF ILLINOIS** AT URBANA-CHAMPAIGN



# Outline

---

1. Motivation for change in academic safety culture
2. Joint Safety Teams: A bottom-up approach
3. JST Workshop: Developing safety leaders within ACS
4. Evaluation of workshop success and future directions



# Outline

---

1. Motivation for change in academic safety culture
2. Joint Safety Teams: A bottom-up approach
3. JST Workshop: Developing safety leaders within ACS
4. Evaluation of workshop success and future directions



# Unique Challenges of Academic Labs

1964 chemical education paper compares industry vs. academic lab environments

- “It is not current practice to require that a proposal to do laboratory research contain a statement on safety considerations”
- “Since in sponsoring research the agency incurs little legal or financial liability, safety is someone else’s problem”
- “Safety should not be approached through a search for liability”
- “If a serious accident occurs at a university, there is plenty of responsibility to share; neither advisor nor department head nor dean can (or does) tell himself they weren’t responsible”
- Many of these issues are still relevant today



Safety Considerations in Research Proposals. *J. Chem. Educ.* **1964**, *41*, A785



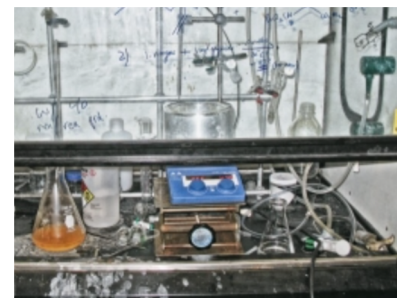
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



# Academic Lab Safety in Recent Years

First criminal case resulting from an academic laboratory accident

- A 2008 tert-butyllithium laboratory fire resulted in the death of the UCLA researcher Sheri Sangji
- Prosecutors charged the university system and Prof. Harran with felony violations of the California labor code
- Settlement dropped charges in 2012 in exchange for implementation of a new safety program at all 10 UC campuses
- Led to a legally imposed responsibility of top-down leadership for the first time in an academic institution



<http://cen.acs.org/articles/90/i33/California-Deal-Tightens-Lab-Safety.html>



UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

# Changing the Culture

How do you enforce top-down safety where legally enforced programs are not yet present?

- Unique partnership in 2012 between the Dow Chemical Company and two departments at the University of Minnesota
- Joint Safety Team (JST) initiative was driven by graduate student and postdoctoral associate laboratory safety officers
- Resulted in enthusiastic adoption of improved safety practices and noticeable improvements in the culture in both departments
- This model is in contrast to typical “top-down” approaches that are led by faculty and administrators



[www.jst.umn.edu](http://www.jst.umn.edu)

## Safety Moment Collection

of the Joint Safety Team at the University of Minnesota,  
Department of Chemistry and Department of Chemical  
Engineering and Material Science.

JOURNAL OF  
CHEMICAL EDUCATION

Commentary  
[pubs.acs.org/jchemeduc](http://pubs.acs.org/jchemeduc)

### Student Involvement in Improving the Culture of Safety in Academic Laboratories

Kathryn A. McGarry,<sup>1</sup> Katie R. Hurley,<sup>1</sup> Kelly A. Volp,<sup>1</sup> Ian M. Hill,<sup>1</sup> Brian A. Merritt,<sup>2</sup> Katie L. Peterson,<sup>1</sup> P. Alex Rudd,<sup>1</sup> Nicholas C. Erickson,<sup>1</sup> Lori A. Seiler,<sup>1</sup> Pankaj Gupta,<sup>3</sup> Frank S. Bates,<sup>1</sup> and William B. Tolman<sup>1\*</sup>

<sup>1</sup>Department of Chemistry and <sup>2</sup>Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, Minnesota 55455, United States

<sup>3</sup>Dow Chemical Company, Midland, Michigan 48674, United States

#### Supporting Information

**ABSTRACT:** An effective way of addressing the need for an improved culture of safety in research-intensive science departments is described, which involves enabling leadership by graduate student and postdoctoral associate laboratory safety officers (LSOs). In partnership with The Dow Chemical Company, LSOs from the Departments of Chemistry and Chemical Engineering and Materials Science at the University of Minnesota formed a Joint Safety Team. With helpful input from Dow, the team has played a key role in improving the culture and practice of safety in both departments, providing support for use of this model for insulating safety as a core value and an integral part of academic life.

**KEYWORDS:** Graduate Education/Research; Safety/Hazards; Collaborative/Cooperative Learning; Laboratory Management; TA Training/Orientation

Student Involvement in Improving the Culture of Safety in Academic Laboratories. *J. Chem. Educ.* **2013**, *90*, 1414



UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

# Outline

---

1. Motivation for change in academic safety culture
2. Joint Safety Teams: A bottom-up approach
3. JST Workshop: Developing safety leaders within ACS
4. Evaluation of workshop success and future directions



# Joint Safety Teams

The program at UMN has served as inspiration and resource for many other student safety teams across the country

- Many universities are now adopting single or multi-department safety groups that are organized by students
- They need widespread participation to be effective
- Usually they have a hierarchical nature but students need freedom to design their own leadership structure to create ownership
- Components include: Committees and officers, safety moments, safety posters, announcements, lab walkthroughs, safety workshops, monthly meetings of representatives from all labs, evaluation of university-required trainings, collaborations between different expert groups, mental health and well-being



Student Involvement in Improving the Culture of Safety in Academic Laboratories. *J. Chem. Educ.* **2013**, 90, 1414



UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



# Let's Stop and Think

---

## Why are these programs becoming so popular?

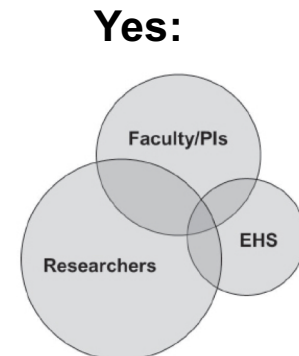
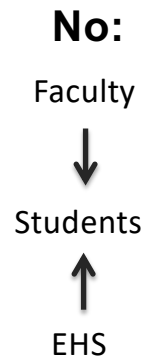
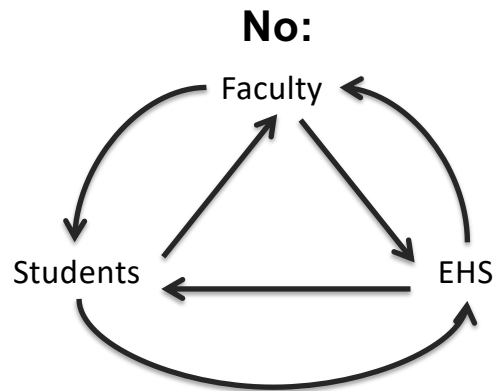
- Emphasis on individual accountability and developing positive and proactive culture
- Non-punitive reporting systems
- Helps students be introspective about their research methods
- Pressure for all faculty to appoint a safety officer and be supportive of lab safety
- Student-led and mostly student-enforced, requires minimal attention from faculty
- Fills in gaps from online safety training
- Platform for students to express safety concerns to faculty besides their own PI
- Helps students think of safety in a fun way if the department sponsors events (welcome BBQ, safety week, etc.)



# Making a Positive Safety Culture Everywhere

There are many different routes to a safe research culture

- Some institutions function very well with top-down leadership from PI's or EH&S
- For those that don't, maybe try bottom-up leadership with student safety teams
- Goal is to catalyze change where everyone feels responsible and accountable for safety
- When enough people think it's important, everyone will



# Outline

---

1. Motivation for change in academic safety culture
2. Joint Safety Teams: A bottom-up approach
- 3. JST Workshop: Developing safety leaders within ACS**
4. Evaluation of workshop success and future directions



# A Platform for Training Future Leaders

ACS workshop through DCHAS was proposed to support the JST movement

- Held for the first time at the National ACS Meeting in New Orleans, LA on March 18th
- The purpose of this workshop was to develop individualized plans for the creation or improvement of student safety programs
- Other key topics included hazard assessment, risk management, and safety management practices
- Michail Vlysidis from the University of Minnesota served as the co-host
- 19 total attendees from 14 different universities

## SPRING 2018 ACS WORKSHOP:

### *Developing Graduate Student Leadership Skills in Laboratory Safety*

SUNDAY, MARCH 18 • 3:00 – 6:00 PM



KALI A. SERRANO



MICHAIL VLYSIDIS

Recently, several research-intensive chemistry departments have instituted Lab Joint Safety Teams (JSTs) and similar programs to support graduate student empowerment around laboratory safety issues. This year, we will offer a pilot workshop on Sunday March 18th from 3:00 – 6:00 PM at the Spring National American Chemical Society Meeting in New Orleans, LA.

This 3 hour workshop will be led by two PhD students with extensive safety program experience. It will describe these efforts at the University of Illinois and University of Minnesota as well as literature from the ACS and the National Academy of Sciences that describes the opportunities and challenges of safety culture in the academic environment. These topics will be followed by discussion of practical steps graduate students can take at their institution to support improved safety cultures. The workshop is sponsored by the ACS Committee on Chemical Safety and ACS Office of Graduate Education, with technical support provided by leadership of the ACS Division of Chemical Health and Safety. Participants will be awarded a "Graduate Student Safety Leader" certificate.

#### SPACE IS LIMITED!

Priority registration deadline: February 10th, 2018

Register today for only \$25: [dchas.org/workshop-registration-page](https://dchas.org/workshop-registration-page)

For more information: [jstworkshop@dchas.org](mailto:jstworkshop@dchas.org)



UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN



# A Platform for Training Future Leaders

ACS workshop through DCHAS was proposed to support the JST movement

- Held for the first time at the National ACS Meeting in New Orleans, LA on March 18th
- The purpose of this workshop was to develop individualized plans for the creation or improvement of student safety programs
- Other key topics included hazard assessment, risk management, and safety management practices
- Michail Vlysidis from the University of Minnesota served as the co-host
- 19 total attendees from 14 different universities



# Workshop Content

## Topic 1: Risk Management

- Importance of risk management in academic research
- Basic concepts: hazard assessment, hierarchy of controls, accident causation, further readings
- Group activity to perform assessments

## Topic 2: Academic Safety Culture

- Safety culture defined
- Recommendations from Safe Science to institutions
- Group activity on the challenges and opportunities for different stakeholders to affect safety culture change

## Topic 3: Student Safety Teams

- Examples of safety teams across the country
- Discussion of different types of programs
- Development of individual plans for the creation or improvement of teams at their own institutions

### Developing Leadership Skills in Academic Laboratory Safety



#### Agenda

3:00 – 3:30	Introductions	<ul style="list-style-type: none"><li>• Introductions</li><li>• Pre-survey</li><li>• Overview of agenda and goals</li></ul>
3:30 – 4:00	Topic 1	<ul style="list-style-type: none"><li>• Risk management: understand hazard assessments and how to minimize risk at each step of laboratory research</li></ul>
4:00 – 4:30	Topic 2	<ul style="list-style-type: none"><li>• Academic safety culture: identify challenges and opportunities for developing “stage three” safety management</li></ul>
4:30 – 4:45	Break	<ul style="list-style-type: none"><li>• Make sure that you signed in and have registered for the workshop online at <a href="https://dchas.org/jst-workshop/">dchas.org/jst-workshop/</a></li></ul>
4:45 – 5:30	Topic 3	<ul style="list-style-type: none"><li>• Student safety teams: develop individualized plans for creation or improvement of laboratory safety programs</li></ul>
5:30 – 6:00	Conclusions	<ul style="list-style-type: none"><li>• Workshop summary</li><li>• Post-survey</li><li>• Certificates and group picture</li></ul>

Fall 2018 Workshop: Serrano, Tyler

[jstworkshop@dchas.org](mailto:jstworkshop@dchas.org)



UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

# Workshop Success

Pre- and post-surveys were used to evaluate the workshop

Purpose of the surveys:

1. What are the participant's initial impressions on chemical safety?
2. Was the participant satisfied with the workshop?
3. How does learning about terminology and safety programs affect various self-evaluations?



# Outline

---

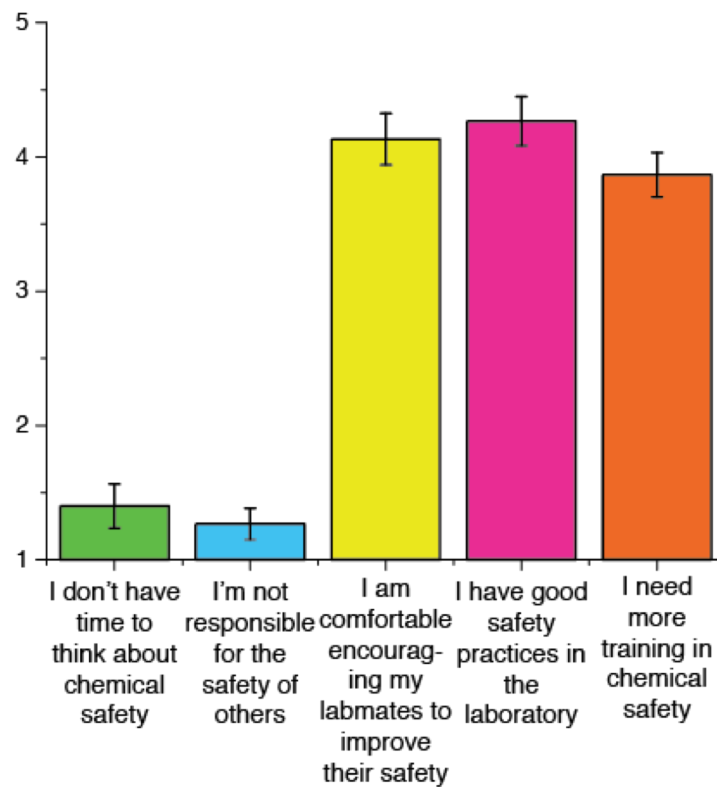
1. Motivation for change in academic safety culture
2. Joint Safety Teams: A bottom-up approach
3. JST Workshop: Developing safety leaders within ACS
4. Evaluation of workshop success and future directions



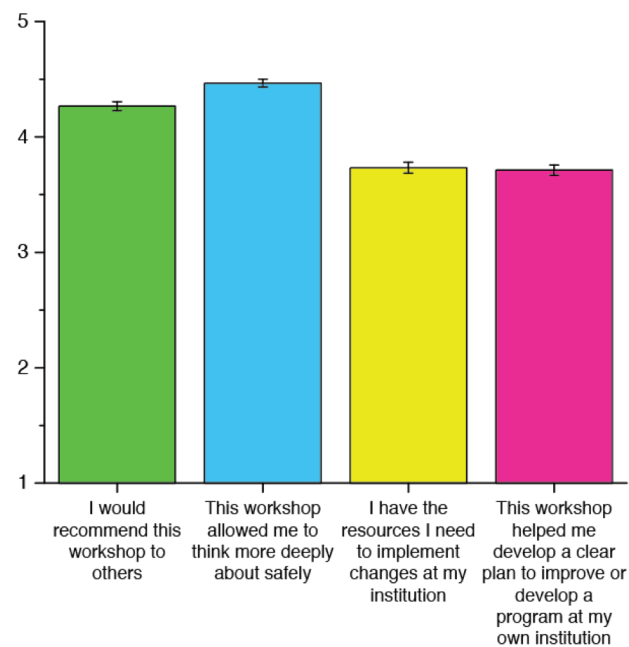
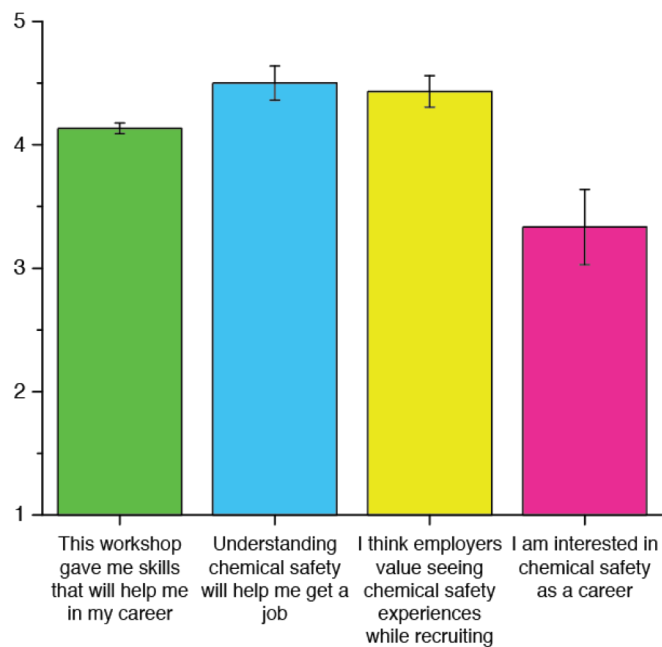


## Pre-Survey: An Audience of Motivated Students

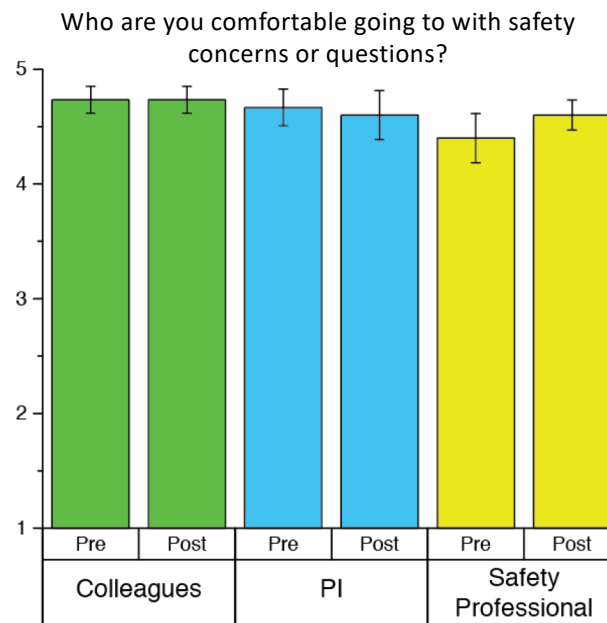
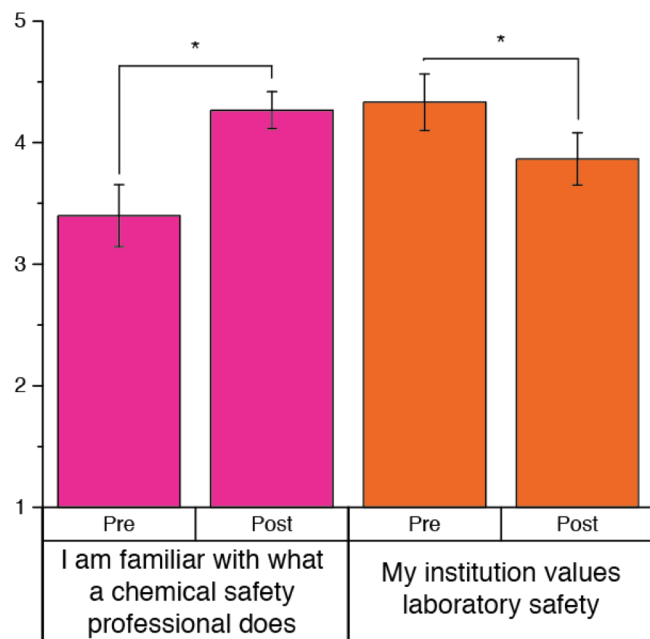
---



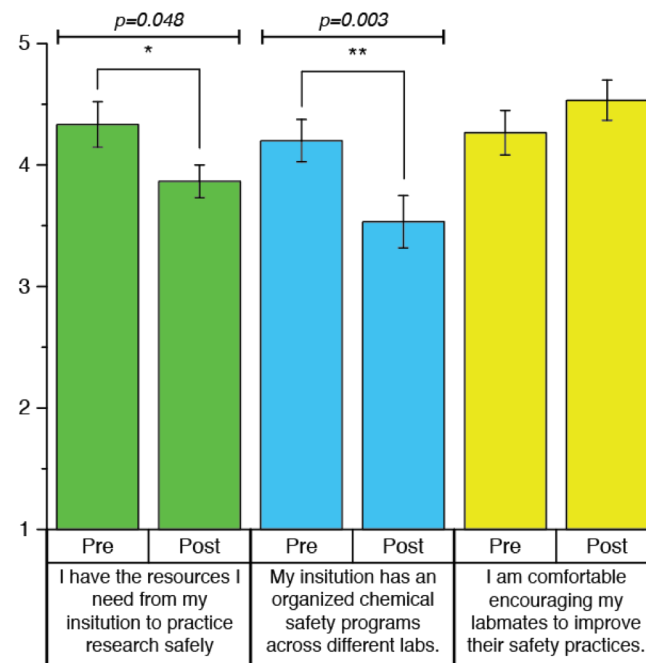
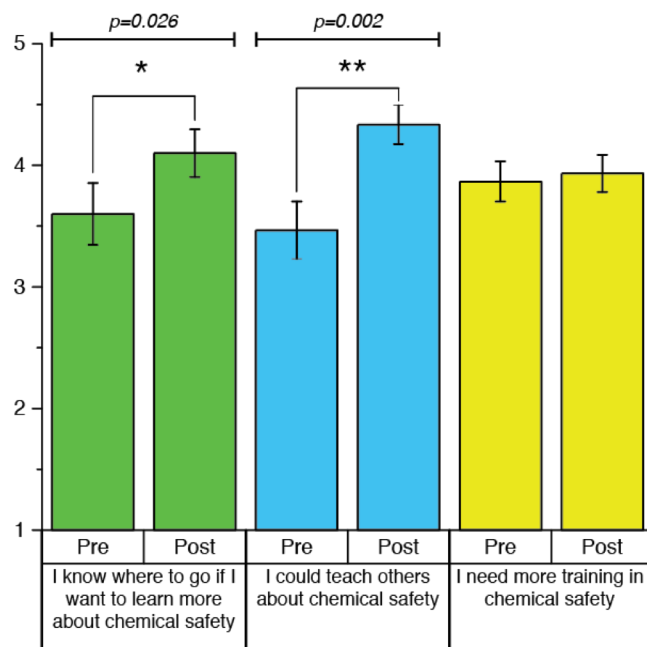
## Post-Survey: Workshop Valued By Students



## Before/After Comparisons



## Before/After Comparisons





# Future Directions

- Workshop is being offered again at Fall ACS
- Open communication between JST leaders will help facilitate sharing of resources and program ideas
- How can ACS support JSTs? Current Ideas:
  - Webinar about JST development
  - Development of materials: editable posters, flyers, stall moments, summary of literature, etc.
  - Leadership development and training (e.g. workshops, programming, webinars, online training, etc.)
  - Networking opportunities (JST coffee break or social)
  - Online interface to share materials



**FALL 2018 ACS WORKSHOP**  
***Developing Graduate Student Leadership Skills in Laboratory Safety***

**SUNDAY, AUGUST 19 • 3:00 – 6:00 PM**

Laboratory safety teams, also commonly called Joint Safety Teams (JSTs), have emerged in research-intensive science departments across the country as an effective way to improve the culture of safety. In addition, these programs empower graduate students to develop chemical safety leadership skills that will prove useful for future employment. This three-hour workshop will be led by two PhD students with extensive safety program experience from the University of Illinois at Urbana-Champaign. It will describe current programs and research emphasizing the challenges and opportunities of safety culture in the academic environment. The purpose of this workshop is to help develop individualized plans for the creation or improvement of student safety programs. Other key topics include hazard assessment, risk management, safety management practices, and complementary top-down approaches. This workshop will be primarily directed at graduate student issues, but faculty, postdocs, and staff will also benefit and are encouraged to participate.

*This workshop is sponsored by the ACS Committee on Chemical Safety and the ACS Graduate & Postdoctoral Scholars Office, with technical support provided by the leadership of the ACS Division of Chemical Health and Safety. Participants will be awarded a certificate that can be noted on their resume.*

**SPACE IS LIMITED!**  
Register today for only \$25.00  
[dchas.org/2018/04/13/jst-workshop](https://dchas.org/2018/04/13/jst-workshop)  
For more information: [jstworkshop@dchas.org](mailto:jstworkshop@dchas.org)



KALI A. SERRANO



KAITLIN I. TYLER





# Questions?

---



Division of  
**RESEARCH SAFETY**



**ACS**  
Chemistry for Life®



UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN