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# Mini-Symposium: Best practices for REU programs and UNL

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## **Abstract for DBER Group Discussion on 2017-01-26**

### **Authors and Affiliations:**

Mark Griep  
Associate Professor  
Department of Chemistry  
University of Nebraska-Lincoln

### **Title**

Mini-Symposium: Best practices for REU programs and UNL

### **Abstract**

If you want to learn how to run an REU program (or to make your REU program run more smoothly), then this is your opportunity to ask questions. The presentation will begin with 5-min talks from five REU program coordinators. These coordinators run a wide range of programs and have experience ranging from 1 year to 12 years. They will mention things such as how many applicants their program receives, how they review those files, an outline of the non-research portion of their summer program, and what sorts of outcomes they collect so they can report them to NSF. Then, the coordinators will form a panel to answer questions.

**Mini-Symposium:  
Best Practices for UNL REU &  
SRP Programs**

for  
DBER Group's STEM Education Seminar

26 January 2017

# UNL Summer Res. Programs

<u>Summer Research Program</u>	<u>Coordinators</u>	<u>Sponsor</u>
AMO Physics	Lindsey Moore	NSF REU
Applied Plant Systems	Martha Mamo & Don Lee	USDA NIFA
Bioenergy Systems	Paul Blum & Julie McManamey	NSF REU
Biomedical Engineering	Greg Bashford	NSF REU
<b>Chemistry</b>	<b>Mark Griep</b> & Robert Vencil	<b>NSF REU</b>
Integrated Agronomic Systems	John Guretzky	CIC SROP
Internet Security	Byrav Ramamurthy	CIC SROP
Minority Health Disparities	Kim Gocchi Carrasco	NSF REU
Mater. Res. Sci. Eng. Ctr.	Jocelyn Bosley	NSF SROP
Nanohybrid Func'lized Mater.	Ned Ianno	NSF REU
Nanotechn Coord. Infrastruct.	Terese Janovec	NSF REU
<b>Redox Biology</b>	<b>Don Becker</b> & Paula Adams	<b>NSF REU</b>
<b>Sustainability of Civil Infrastruct.</b>	<b>Shannon Bartelt-Hunt</b>	<b>NSF REU</b>
Systems Biol. Plant & Microbiome	Lindsey Moore	NSF REU
Virology	Brande Dicks	USREV

# Today's DBER Speakers

Coordinator	Coord Years	Progr Years	Program
Shannon Bartelt-Hunt	2	2	Sustainability of Civil Infrastructure
Mark Griep	6	6	Chemistry
Don Becker	12	12	Redox Biology

## Outline for Presentations

1. # Applicants for the past few years
2. Applicant review process
3. Outline of program's summer schedule
4. Applicant and outcome information reported to NSF

SUMMER UNDERGRADUATE RESEARCH IN  
SUSTAINABLE RURAL INFRASTRUCTURE IN  
CIVIL ENGINEERING

Shannon Bartelt-Hunt

Associate Professor

Department of Civil Engineering

## APPLICANTS TO THE PROGRAM

- Have run a pilot program in summers of 2015 and 2016 (5 students per summer)
- Received 175 applications for 10 available positions across the two summers
  - 44% were from female applicants
  - 42% were from minorities underrepresented in STEM
- Accepted student demographics
  - **80%** of the students in our summer cohorts were from schools with limited research experiences including Oregon Institute of Technology, University of Portland, Rose Hulman Institute of Technology, Cerritas Community College (CA), Morgan State University, Sacramento State University, University of Texas at Kingsville, and the College of Wooster.
  - **60%** of our student participants are minority students underrepresented in STEM, or first-generation college students.

## APPLICANT REVIEW PROCESS

- Coordinator (me) sends out link to application packages to all mentors
  - I ask that mentors consider our program goals of recruiting  $\geq 50\%$  students with limited research opportunities and  $\geq 50\%$  of students underrepresented in STEM
- Individual mentors select top four applicants for their projects (ranked in order of preference)
- I sent out invitations to top-ranked applicants to ensure that the overall group demographics are balanced



## SCHEDULE OF PROGRAM ACTIVITIES

Date	Topic	Presenter/Organizer
June 6th	Arrival - introduction and office assignments	ALL SRP faculty mentors or their graduate students should meet their SRP students in the CIVE office
June 8th	Introduction to Sustainability of Rural Civil Infrastructure	Randy Peters
June 15th	No meeting	
June 22nd	SRP student presentations (2)	TBD
June 29th	Applying to Graduate School	John Sangster
July 6th	No Meeting - Happy 4th of July	
July 13th	Preparing for Technical Conferences - How to prepare a poster	Yusong Li
July 20th	SRP Student Presentations (3)	Xu Li
July 27th	Graduate Student Panel and poster session (organized by Bioenergy REU)	Bioenergy REU
August 3rd	NSF Graduate Research Fellowship Program	Shannon Bartelt-Hunt
August 9th	Lunch for SRP students and mentors	Shannon Bartelt-Hunt

## DATA REPORTING TO NSF

- Our application for 2017-2010 is still pending!

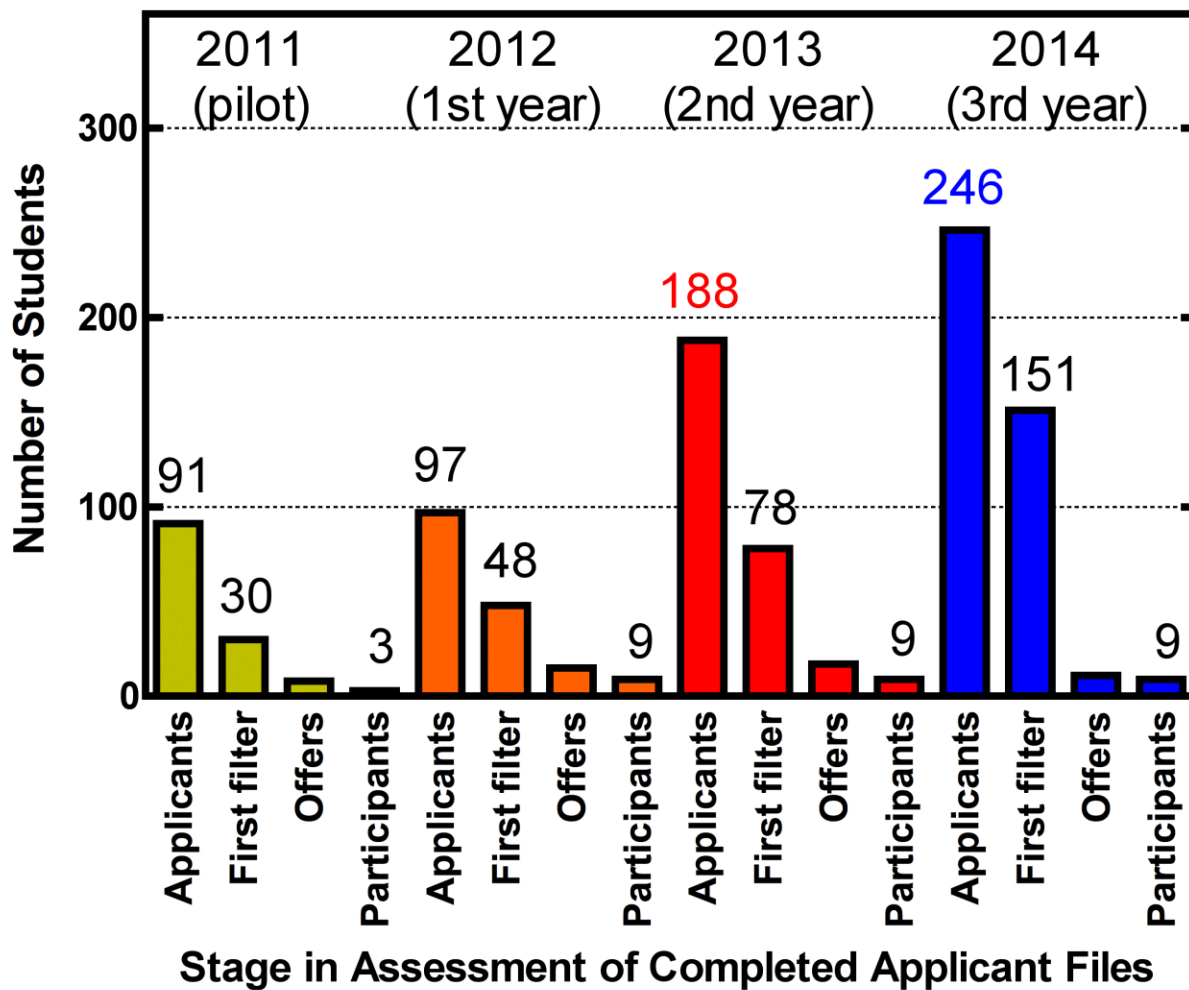
**Welcome**  
to the 2017  
**Summer Research Program**  
**in the Chemistry Department**  
of the University of Nebraska-Lincoln

# 2016 Summer Research Program in the Chemistry Department

Program	No. Participants	Sponsor
REU Chemical Assembly	8 UGs	NSF
HHMI	1 UG	HHMI
REU Ctr Nanohybrid Fxnl Materials	3 UG	NSF EPSCoR
Faculty/Student Pair	1 UG & 1 Faculty	UNL Chemistry
Upward Bound Math/Science (5 half days)	1 HS Student/ 1 SRP UG	US Dept of Education; UNL Chem

# No. Chem Applicants

Number REU Applicants, Offers, Participants



# Evaluating Chem REU Applicants

## First Filter:

GPA > 3.0

major in Biochem, Chem, or ChemEng

enrolled at non-Research University

## Second Filter:

Favor schools that sent us 1 REU student already

Student Plans must include interest in Grad School

First Generation in Family to Attend College

Highest Chem Course (lower is better)

Well written personal statement

Highest Research Experience (lower is better)

Letters of support are not damaging

## Offer Filter:

Student's first choice for faculty mentor (advisor)

At least 60% female and/or URM

# Summer 2017 Participants

Student

Mentor

Advisor

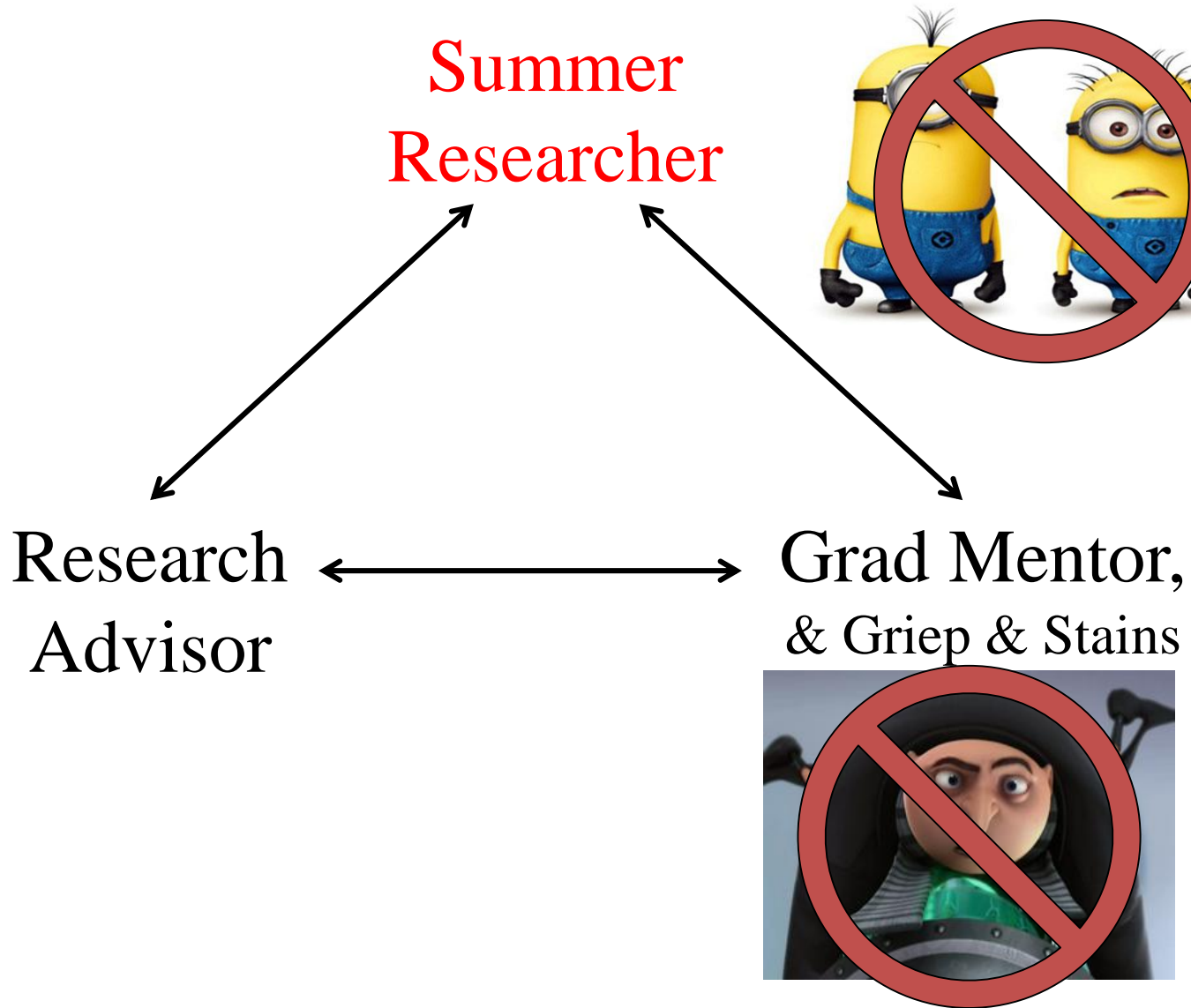
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Jesse

Visiting Faculty Member

Ryan

# Relationship Triangle





# 2017 Schedule

*\*Mandatory Grad  
Studies Event*

<u>Week</u>	Mon	Tue	Wed	Thu	Fri	<u>Week</u>
June 5	<i>*Orientation</i> Welcome <i>Safety</i>	Facility Tours	12p Dept Picnic <i>*6p SRP Picnic</i>		<i>*Ethics</i>	1
June 12	SciComm1		4p Workshop			2
June 19	SciComm2 CommSciPub1 UpwardB 1	UpwardB 2	UpwardB 3 <i>*GradSchWksp</i>	UpwardB 4		3
June 26	SciComm3 CommSciPub2 <i>2pm Tour</i>			<i>6pm Drug Discovery in the Movies</i>		4
July 3	<i>2pm Tour</i>	Independence Day				5
July 10	SciComm4 CommSciPub3 <i>2pm Tour</i>					6
July 17	CommSciPub4 (wUBMS)					7
July 24	SciComm5				SciComm6	8
July 31	Posters Due					9
Aug 7	SciComm7		Chem Poster <i>*SRP Poster</i>	Aug 9		10

# Monday Presentations

Sci Comm 1: Abstracts & purpose statements

Sci Comm 2: Revise abstracts; Authorship considerations

Sci Comm 3: How to design award-winning posters

Sci Comm 4: First look at posters

Sci Comm 5: Poster presentation tips, by a graduate student

Sci Comm 6: Review of final poster drafts

Sci Comm 7: Final oral presentation of posters

Comm Sci Public 1: How to design a PowerPoint presentation

Comm Sci Public 2: Small group exploration of first drafts

Comm Sci Public 3: Pairwise guided-inquiry to learning theories

Comm Sci Public 4: Present research to Upward Bound Students

# UNL NSF REU

## Learning activities:

- (1) research safety
- (2) research ethics
- (3) instrumentation tours (NMR, AFM)
- (4) instrumentation workshops (NMR, AFM)
- (5) research approaches and research methods (including a discussion on scientific authorship)
- (6) communicate research to scientists (ACS Meeting abstract, poster and oral presentations)
- (7) communicate research to the public (develop and give an outreach presentation)
- (8) career awareness through field trips (LI-COR; Hexagon; GeneSeek; Celerion; Teledyne ISCO; GSK)
- (9) graduate school preparation (or college preparation)

# Long-Term Relationship

Our Program's Success Depends on Meeting Our Goals:

REU participants attend graduate school

Long-term relationships with participant schools

Participants publish work and/or attend meetings

Link to me on [LinkedIn.com](#)

# Travel Awards

“Through a competition, half of the REU students will receive a travel grant to present their research at a regional or national ACS meeting.”

## 2018 National Meetings of the ACS

Spring: March 18-22, New Orleans

Abstract submission begins mid-August 2017

Fall: August 19-23, Boston

## 2018 Regional Meetings of the ACS

Central: June 13-16, Toledo OH

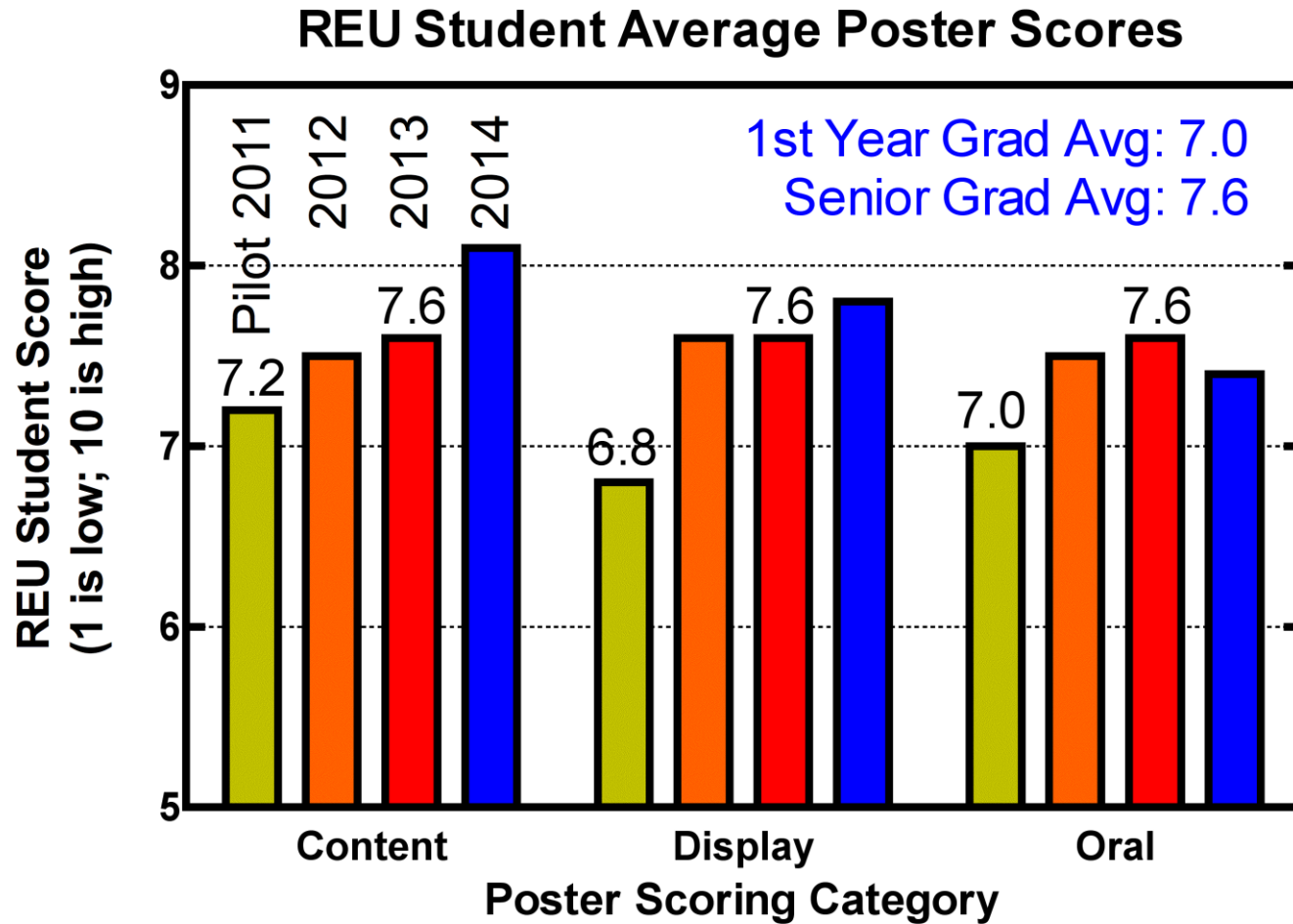
Midwest: Oct 14-16, Ames IA

Middle Atlantic: TBD, TBD

Southeast: Oct 31-Nov 3, Augusta GA

Southwest: Nov 7-10, Little Rock AK

# Reported Outcomes



**Good Luck &  
Let's Break Some Test Tubes**

*Don't forget*

3:30 pm today, Safety Training, room 548

# National Science Foundation Research Experience for Undergraduates



## *NSF REU: Training Site in Redox Biology*

### 10-week program (June - August)

- \$5250 Stipend
- Free On-Campus Housing and Meals

Molecular Medicine

Environmental Biochemistry

Plant Biochemistry



Applications for Summer 2017 are due by  
March 1.





# Research Areas in the Redox Biology Center

**Redox Immunology (Jay Reddy)**

**Mass Spectrometry of Redox Proteins (Jiri Adamec)**

**Redox Metals and Anaerobic Microbiology (Limei Zhang)**

**X-ray Crystallography, Neurodegenerative diseases (Mark Wilson)**

**Proline Metabolism & Redox Enzymology (Donald Becker)**

**Copper and Oxidative Stress (Jaekwon Lee)**

**Plant Cell Death (Julie Stone)**

**Mitochondrial Biology and Diseases (Oleh Khalimonchuk)**

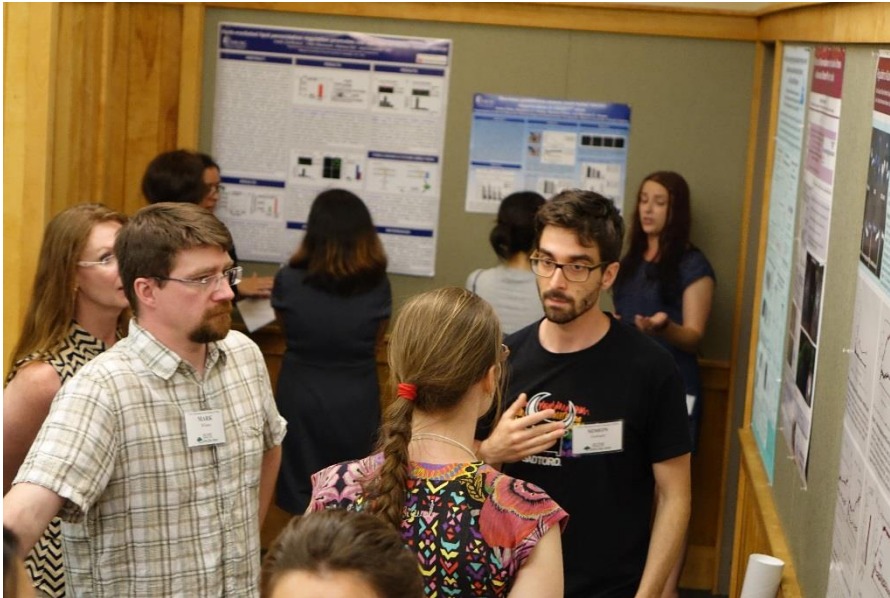
**Pathogenic Bacteria (Greg Somerville, James Alfano)**

**Metabolic Engineering of Antibiotics (Liangcheng Du)**

**Cancer and Neurodegeneration (Rodrigo Franco)**

# NSF REU Activities

- ✓ Social Events
- ✓ Weekly Research seminars
- ✓ Training on Core and Shared Equipment
- ✓ Poster Symposium
- ✓ Lunch Discussion Groups
- ✓ Career Development Seminars



# Summer Program Schedule

## 2016 Timetable

<b>Week</b>	<b>Activity</b>
<b>June 6-10</b>	<b>Orientation, RBC Welcome, Introduction to Mentors and Faculty Labs, Beadle Tour, Safety Training, Welcome Picnic, Ethics Seminar</b>
<b>June 13-17</b>	<b>Research</b>
<b>June 20-24</b>	<b>Research, Life Science Ethics, RBC Seminar, Grad School workshop</b>
<b>June 27-July 1</b>	<b>Research, Innovation Campus Tour, RBC Seminar, GRE workshop, Interim evaluations, Abstracts Due</b>
<b>July 4-8</b>	<b>Research, Mitochondrial workshop, Graduate Faculty Panel,</b>
<b>July 11-15</b>	<b>Research, RBC Seminar, Purpose Statement</b>
<b>July 18-22</b>	<b>Research, Careers in Science, RBC Seminar RBC Ice Skating Social</b>
<b>July 25-29</b>	<b>Research, RBC Seminar</b>
<b>August 1-5</b>	<b>Posters due, Research, RBC Seminar, Research paper due</b>
<b>August 8-10</b>	<b>Student seminars, Program Certificates, Exit evaluations, REU Poster symposium</b>

# Applicant and Outcome Information

## 1. Program Impact

(Results from pre- and post-evaluations)

- research training & development (writing scientific research papers, conducting and recording scientific research, and giving research presentations)
- career paths (career plans, research obstacles, research teams)
- Opportunities for students to present their work

## 2. Research Activities

- Brief description of the student research projects

## 3. Demographic analysis of participants

- Applicant information, outreach, development of human resources in STEM