An Overview of the 2014 NSF REU Program, Expectations and Work

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June 9, 2014
PRESESENTATION OUTLINE

- Introductions
- REU Programs
- Project Office and Contact Information
- Project Title and Participants
- REU Site Activities
- Laboratory and Office Usage and Safety Issues
- Overview of 2014 REU Research Projects
2014 REU PROGRAM

- REU Program on Interfaces of Engineered and Natural Systems (IENSe)

- Research Projects address 5 NAE Grand Challenges in Engineering:
  - Provide access to clean water (Project 1)
  - Make solar energy economical (Project 2)
  - Engineer better medicines (Project 3)
  - Reverse-engineer the brain (Project 4)
  - Restore and improve urban infrastructure (Project 5)
PROJECT OFFICE & CONTACT INFORMATION

- **Project Office**
  - 400 Rhodes Hall (RH)

- **Project Director**
  - Dr. Anant R. Kukreti
  - Office: 610 Old Chem
  - Phone: 513-556-4105 (O), (513) 919-5217 (C)
  - anant.kukreti@uc.edu

- **Project Co-Director**
  - Dr. Margaret J. Kupferle
  - Office: 701B Engineering Research Center (ERC)
  - Phone: 513-556-3329 (O), (513) 300-8197 (C)
  - Margaret.Kupferle@uc.edu

- **General Help Contact**
  - **Project Activities, Presentation and Printing Related Help:**
    - Dr. Temesgen Aure
    - Grant Coordinator
    - 620W Old Chem, (513) 556-4864 (O), (513) 476-9906 (C)
    - auretw@ucmail.uc.edu

  - **IT and Computer Help:**
    - Mr. Satish Vuppala
    - IT Support
    - 620U Old Chem, (501) 257-0898 (C)
    - vuppalsh@mail.uc.edu
    - Mr. Mike Sanderson
    - Computer Support
    - 584 & 583 ERC, (513) 502-4689 (C)
    - sandermk@ucmail.uc.edu
**General Help Contact** (Continued)

- **Staff Help:**
  
  Ms. Samantha Burgess  
  Administrative Assistant, CEEMS MSP Project  
  Office: 609 Old Chem  
  Phone: 513-556-6751 (O), (847) 338-4997 (C)  
  E-Mail: burgessa@ucmail.uc.edu

- **Financial Reimbursement, Board/Lodging & Travel Contact**
  
  Mr. Bryan Weng  
  Business Manager, UC CEAS-SEEBME  
  Office: 611D Old Chem  
  Phone: 513-556-0088 (O), 513-345-0842 (C)  
  E-Mail: wengmi@ucmail.uc.edu
2014 REU RESEARCH PROJECTS:

PARTICIPANTS AND MENTORS
Project # 1: “Interaction of Nanoparticles with Microbial Biofilm in Water Treatment Facility Processes”

Student Participants
- Ms. Victoria Sumner, Junior, Chemical Engr., UC; sumnervr@mail.uc.edu; victoria.sumner23@gmail.com; (614) 632-2735
- Ms. Stephanie Palmer, Pre-Junior, Chemical Engr., UC; palmersr@mail.uc.edu; stptink@hotmail.com; (513) 693-2688
- Mr. Dorien Clark, Sophomore, Chemical Engr., UC; clark2d4@mail.uc.edu; clarkdorien04@gmail.com; (859) 644-9235

Area Coordinators (Faculty Mentors)
- Dr. Margaret J. Kupferle, Assoc. Prof., Environmental Engr., Margaret.Kupferle@uc.edu, (513) 556-3329, 701B ERC
- Dr. George Sorial, Head & Prof., Environmental Engr., George.sorial@uc.edu, (513) 556-2987, 701D ERC

Graduate Research Assistant
- Mr. Hengye Jing, Environmental Engr., jinghe@mail.uc.edu, (513) 365-4011 (C), 709 RH
PROJECT TITLES AND PARTICIPANTS

- **Project # 2:** “Electrocatalytic Energy Conversion at the Interfaces of Hybrid Carbon-Bismuth Nanoparticle Assemblies”

  - **Student Participants**
    - Mr. Trevor Yates, Junior, Chemical Engr., UC; yatesto@mail.uc.edu; yatest50@gmail.com; (513) 5081632
    - Mr. Adam McNeeley, Sophomore, Chemical Engr., UC; mcneelaa@mail.uc.edu; kmcneeley@voh.rr.com; (513) 313-0482
    - Mr. William Barrett, Sophomore, Chemical Engr., UC; barretwa@mail.uc.edu; andybarrett95@hotmail.com; 513-404-3942

  - **Area Coordinators (Faculty Mentors)**
    - Dr. Anastasios Angelopoulos, Assoc. Prof., Chemical Engr., anastasios.angelopoulos@uc.edu, (513) 556-2777, 693 RH
    - Dr. Raj Manglik, Prof., Mechanical Engr., Raj.Manglik@uc.edu, (513) 556-5704, 684 RH

  - **Graduate Research Assistant**
    - Mr. Abhinandh Sankar, Chemical Engr., sankarah@mail.uc.edu, (513) 484-2048, 675 ERC
**PROJECT TITLES AND PARTICIPANTS**

- **Project # 3: “A Biological Optoelectronic Nanopore for DNA Sequencing and Stochastic Sensing”**
  - **Student Participants**
    - Mr. Saifuddin Aijaz, Pre-Junior, Chemical Engr., UC; aijazsm@mail.uc.edu; saifuddinmaijaz@gmail.com; (513) 497-0400
    - Mr. Aaron Choi, Sophomore, Computer Sci., UC; choian@mail.uc.edu; aaron.choi8@gmail.com; (513) 349-2359
    - Mr. Davis Sneider, Sophomore, Biomedical Engr., George Washington University; drsneider@gwmail.gwu.edu; davisrsneider@gmail.com; (513) 442-9251
  - **Area Coordinators (Faculty Mentors)**
    - Dr. David Wendell, Assist. Prof., Environmental Engr., wendeldw@ucmail.uc.edu, (513) 556-2482, 732 ERC
    - Dr. Vasile Nistor, Assistl Prof., Biomedical Engr., nistorve@ucmail.uc.edu, (513) 556-2521, 858 ERC
  - **Graduate Research Assistant**
    - Ms. Elizabeth Wurtzler, Environmental Engr., wurtzlem@mail.uc.edu, (513) 556-2482, 713 ERC
PROJECT TITLES AND PARTICIPANTS

Project # 4: “Emulating Human Reasoning for Enhancing Decision Making”

◆ Student Participants

♦ Mr. Adam Katterheinrich, Junior, Aerospace Engr., UC; katterat@mail.uc.edu; adam.katterheinrich@gmail.com; (419) 979-9153.
♦ Mr. Nicholas Nielsen, Pre-Junior, Aerospace Engr., UC; nielsenj@mail.uc.edu; nicknielsen@live.com; (513) 560-0192.
♦ Mr. Tyler Parcell, Sophomore, Computer Engr., UC; parceltb@mail.uc.edu; parcell.tyler@gmail.com; (513) 515-7612

◆ Area Coordinators (Faculty Mentors)

♦ Dr. Kelly Cohen, Assoc. Prof., Aerospace Engr, Kelly.Cohen@uc.edu, (513) 556-3523, Rhodes Hall 735
♦ Dr. Jeff Kastner, Assist. Prof., Dept. of Engr. Edu., Jeffrey.Kastner@uc.edu, (513) 556-0027, 881 RH

◆ Graduate Research Assistant

♦ Mr. Wei Wei, weiw3@email.uc.edu, 513-556-9969, Old Chem 518
Project #5: “Ramp Metering Control in Freeway System”

Student Participants
- Mr. Isaac Quaye, Junior, Aerospace Engr., UC; quayeie@mail.uc.edu; isaacquaye1@gmail.com; (513) 917-8334
- Mr. Jarred Sagaga, Pre-Junior, Computer Sci., UC; sagagajd@mail.uc.edu; jared.sagaga@gmail.com; (650) 438-1391
- Ms. Emma Hand, Sophomore, Civil Engr., UC; handem@mail.uc.edu; emmahand1001@gmail.com; (513) 368-5563

Area Coordinators (Faculty Mentors)
- Dr. Heng Wei, Assoc. Prof., Civil Engr., heng.wei@uc.edu, (513) 556-2599, 792 RH
- Dr. Mingming Lu, Assoc. Prof., Environmental Engr., lumg@ucmail.uc.edu, (513) 556-0996, 797 RH

Graduate Student Mentors
- Mr. Karteek Kumar Allam, Transportation Engr., allamkr@mail.uc.edu, (917) 664-6011, 729 ERC
REU Program Activities

- Overview
- General Research Project Schedule
- REU “Road Map”
- Professional Development – Seminars and Workshops
- Project Meetings
- Reports and Presentations
- Awards
- Skills Workshops
- Enrichment Seminars
- Field Trips
- Workshops, Enrichment Seminar & Field Trip Reports
- Evaluations from Each Participant
- Final Project Meeting
- Activities Beyond Summer REU Program
REU PROGRAM ACTIVITIES: OVERVIEW

CONDUCT RESEARCH

PROFESSIONAL DEVELOPMENT (Training)

- Field Trips
- Research Content & Tools
- Skills To Disseminate
- Understanding Research Process

- Produce Project Deliverables at End of 8 Weeks
- Disseminate Findings in Following Academic Year
REU PROGRAM ACTIVITIES: General Research

Project Schedule

**Weeks 1-2:**
- Complete “Road Map”
- Identify Goals, Tasks, & Schedule
- Conduct Literature Review
- Training on Research Content & Tools
- Learn the Research Process
- Acquire Dissemination Skills

**Weeks 2-7:**
- Complete Literature Review
- Complete Learning about Research Process & Dissemination Skills
- Test, Synthesize, Analyze, and Generalize Results
- Interim Report Presentations

**Week 8: Wrap-Up for Final Deliverables**

**4 Final Deliverables:**
- Technical Paper
- Poster
- PowerPoint Presentation
- Project Summary for NSF
REU PROGRAM ACTIVITIES:
REU “Road Map”

REU Participants
Faculty Mentor (FM)
Graduate Research Assistant (GRA)

Meet on Day 1

Define:
- Expectations
- Time Commitment
- Pre-preparation Training
- Mentorship Format
- Research Process

Contract to Deliver Final Products
REU PROGRAM ACTIVITIES: PROFESSIONAL DEVELOPMENT - SEMINARS & WORKSHOPS

PROFESSIONAL DEVELOPMENT (Training)

- Three Enrichment Seminars
  - Ethics in Engineering Research
  - Taking Research from Lab to Real-World
  - and Graduate Education Opportunities & Application Process

- Research Content & Tools Training Seminars
  - Research Topic Education
  - Use of Lab/Computer Facilities; Lab Safety
  - and Procedures to Test, Analyze, Interpret, and Report Results

- Eight Skills Workshops
  - Safety Training, Technical Writing & Presentation
  - Group Problem Solving
  - Online Literature Search, Project Documentation, Statistical & Uncertainty Analysis
  - Poster Making, and Public Speaking & Communications

- Four Field Trips
  - Related to Four Projects
REU PROGRAM ACTIVITIES: Project Meetings

REU Team Represented by Group Leader (Rotated Weekly)

Faculty Mentor (FM) Graduate Research Assistant (GRA)

Maintains a Daily “LOG BOOK” Signed by GRA Weekly

2 Meetings/Week
REU Group Leader presents:
- Progress from last meeting
- Work planned till next meeting
- Questions asked
- Discussion and agreements

ALL Submit Weekly Progress Report Form
REU PROGRAM ACTIVITIES: Reports and Presentations

- Project Planning Report
  - Each group presents a report on the third day (June 11) during the 8:00 – 9:30 p.m., including
    - Project Goal and Objectives
    - Project Research Tasks
    - Project Time Schedule
    - Typed Report and PowerPoint Presentation
    - Give a hard copy of report and PPT and E-mail to AC, GRA, Dr. Kukreti, Dr. Aure and Mr. Vuppala
REU PROGRAM ACTIVITIES: Reports and Presentations (Continued)

- **Interim Progress Reports**
  - "Bi-weekly Progress Reports" due on alternative Fridays (**June 20, July 3 & July 18**)
  - PowerPoint presentation (1:00-4:00 p.m.): Starts at **1:00 p.m. sharp**
  - Give a hard copy of Report and PPT and E-mail to AC, GRA, Dr. Kukreti, Dr. Aure and Mr. Vuppala
  - Each group member to participate in the presentation
  - Social hour (4:00-5:00 p.m.) with refreshments follows
REU PROGRAM ACTIVITIES:
Reports and Presentations (Continued)

- **Final Technical Research Report/Paper Presentation and Poster**
  - Draft due on Friday, **July 25 by 3:30 p.m.** to AC, returned Monday, July 27 at 8:00 a.m.
  - Format instructions supplied **must** be used
  - Four hard copies due on Tuesday, **July 28 by 10:00 a.m.** for distribution to the Judges and Email to AC, GRA, Dr. Kukreti, Dr. Aure and Mr. Vuppala
  - Poster and oral presentation to external judges on Friday, **August 1**: starts at **8:30 a.m. sharp**
    - Poster presentation
    - 20 minutes PP presentation
    - 5-10 minutes of questions and answers
  - Lunch/Dinner and refreshments served
Weekly Progress Reports:

- Completed by each REU Participant independently – time set aside each Friday
- Completed by AC
- Completed by GRA
- Will be made available on Survey Monkey at: http://www.surveymonkey.com/
- MUST be submitted each Friday by 5:00 p.m.
REU PROGRAM ACTIVITIES:
Awards

- Certificate for each participant
- “Best Project” selected by Judges
REU PROGRAM ACTIVITIES: Skills Workshops

Eight Research Skills Workshops - a designated group will prepare a write-up on each experience

- **Workshop # 1:** “Safety Training” by Ms. Ellen Elsbernd
  - Date: June 10th
  - Seminar: 8:30-9:30 a.m.  Venue: 749 Baldwin Hall (BH)
  - Online Training: 9:30-10:30 p.m.  Venue: 805 Old Chem
  - Writers: Project 1 Team

- **Workshop # 2:** “Online Literature Search” by Mr. Ted Baldwin and Mr. Jim Clasper
  - Time: 4:30-6:00 p.m.  Date: June 13th
  - Writers: Project 2 Team  Venue: 550 Baldwin Hall

- **Workshop # 3:** “Project Documentation: Photography & Video Recording by Mr. Thomas Haines & Ms. Debi Haines
  - Time: 8:30 a.m.-12:00 noon  Date: June 16th
  - Writers: Project 5 Team  Venue: 749 BH

- **Workshop # 4:** “Statistical & Uncertainty Analysis” by Dr. Lilit Yeghiazarian
  - Time: 3:00-5:00 p.m.  Date: June 16th
  - Writers: Project 1 Team  Venue: 749 BH
REU PROGRAM ACTIVITIES: Skills Workshops

Eight Skills Workshops (continued)

- **Workshop # 5:** “Technical Writing and Presentation” by Dr. Margaret Kupferle
  - Time: 1.00-3.00 p.m.
  - Date: June 18th
  - Writers: Project 2 Team
  - Venue: 749 BH

- **Workshop # 6:** “Group Problem Solving” by Dr. Margaret Kupferle
  - Time: 3.00-5.00 p.m.
  - Date: June 18th
  - Writers: Project 3 Team
  - Venue: 749 BH

- **Workshop # 7:** “Public Speaking & Communications” by Ms. Amber Erickson
  - Time: 8:30 a.m. -12:00 noon
  - Date: June 24th
  - Writers: Project 4 Team
  - Venue: 749 BH

- **Workshop # 8:** “Poster Making – Session 1 and 2” by Dr. Daria Narmoneva
  - Session 1 Time: 8:30-10:30 a.m.
  - Date: June 30th
  - Session 2 Time: 10:00 a.m.-12:00 noon
  - Date: July 15th
  - Writers: Project 4 Team
  - Venue: 749 BH / 825 Old Chem
REU PROGRAM ACTIVITIES: Enrichment Seminars

- Three Research Enrichment Seminars - a designated group will prepare a write-up on each experience

  - **Enrichment Seminar # 1:** “Ethics in Engineering Research” by Dr. Anant Kukreti
    - Time: 8:30-9:30 a.m.          Date: June 12th
    - Writers: Project 3 Team      Venue: 749 BH

  - **Enrichment Seminar # 2:** “Taking Research from Lab to Real-World” by Dr. Dorothy Air & Mr. Geoffrey Pinski
    - Time: 3:30-5:00 p.m.          Date: July 1st
    - Writers: Project 4 Team      Venue: 749 BH

  - **Enrichment Seminar # 3:** “Graduate Education Opportunities & Application Process” by Dr. Steve Buchberger
    - Time: 8:30-10:30 p.m.         Date: July 7th
    - Writers: Project 5 Team      Venue: 749 BH
REU PROGRAM ACTIVITIES: Field Trips

Four field trips - a designated group will prepare a write-up on each experience

- **Field Trip #1**: Visit to Cincinnati Water Works
  - Time: 1:00-5:00
  - Date: July 2nd
  - Writers: Project 1 Team

- **Field Trip #2**: Visit to Cincinnati Children’s Hospital
  - Time: 1:00-3:30
  - Date: July 9th
  - Writers: Project 3 Team

- **Field Trip #3**: Visit to ODOT Traffic Management Center, Columbus
  - Time: 11:15-5:30
  - Date: July 16th
  - Writers: Project 5 Team

- **Field Trip #4**: Visit to U.S. Air Force Museum, Dayton
  - Time: 12:00 noon-5:00
  - Date: July 23rd
  - Writers: Project 4 Team
A designated project group will prepare a write-up on the experience – similar to an engineering magazine article (sample given).

Describe the speaker, topics covered and lessons learned (must have sufficient details).

The report must be submitted two days after the delivery of the workshop or seminar or after the field trip.

E-mail the report to:
- Dr. Anant Kukreti at anant.kukreti@uc.edu
- Dr. Temesgen Aure at auretw@ucmail.uc.edu
REU PROGRAM ACTIVITIES: Evaluations From Each Participant

- **Pre-Evaluation**: to evaluate prior perceptions regarding research – due before students arrive.

- **REU Site Satisfaction Questionnaire**: to evaluate quality of facilities, activities, and guidance provided - to be completed Friday, August 1 from 1:30-5:00 p.m.

- **Post-Evaluation**: to evaluate research skills acquired, mentorship provided, and future plans – to be completed on Friday, August 1 from 1:30-5:00 p.m.
REU PROGRAM ACTIVITIES:
Final Project Meeting

- Final meeting on Friday, August 1 from 1:30 p.m.
- All participants submit “REU Participant Personal Information Form”
- On Friday, August 1 from 1:30-5:00 p.m.
  - Materials requested submitted and checked for compliance
  - REU Site Satisfaction Questionnaire completed
  - Post-REU Evaluation completed
  - Cleaning and Wrap-Up
- Project ends on Friday, August 1 at 5:00 p.m.
REU PROGRAM ACTIVITIES: Activities Beyond Summer

- A **Presentation** at your school, e.g., at an ASCE Student Chapter Meeting
- **Letter** from faculty advisor documenting this activity sent to Dr. Kukreti
- UC students must present a **Poster** in the Spring (in April) **Undergraduate Research Poster Day**
- Submit a **Paper** to a student paper presentation competition and/or conference – this is a requirement
- Complete Online **Tracking Form** Annually in March
- Last payment is tied to completing **ALL** requirements
General Laboratory and Office Usage and Safety

- **Attire**
  - Closed toe shoes
  - Full length pants
  - Safety glasses when needed
  - Hard hats when needed

- **Equipment training and usage**
  - Provided by laboratory technician and/or Graduate Research Assistant prior to usage
  - No equipment should be used without receiving training
  - All tools borrowed should be returned before the end of the day
Laboratory and Office Usage and Safety Issues (Continued)

- **Never work alone in Lab**

- **Use of Project Office (400 RH)**
  - Project Office should be kept clean on a daily basis - no exceptions
  - Lock the room after leaving – no exceptions

- **Copy Machine Usage**
  - Limited printing (few pages only) must be done using REU Office printer
  - For larger jobs we will use CEEMS Xerox Machine in Old Chem 609: Email all printing jobs to Dr. Temesgen Aure
  - He or Samantha Burgess will coordinate the printing
Project Website

http://www.eng.uc.edu/reu/
QUESTIONS?
OVERVIEW OF 2014 SUMMER REU RESEARCH PROJECTS FOLLOW