Getting Involved in Undergraduate Research: Sciences, Technology, Engineering & Math

Rebecca Anderson, Ph.D.
Undergraduate Research Coordinator
Website: ugr.ucsc.edu
E-mail: rlanders@ucsc.edu

Sponsored by the Divisions of:
Undergraduate Education, Physical & Biological Sciences, Research, and Baskin School of Engineering
Workshop Goals

- Define Undergraduate Research (UR)
- Explore the importance of UR to UCSC and to you
- Explore your research interests and goals
- Discuss resources for finding an opportunity
- Introduce Undergraduate Research (UR) Opportunities website
- Discuss how you can get involved
- Explore funding sources
- Discuss timelines
Undergraduate Research (UR) is an inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline. (www.cur.org)
UR in Every Division

- Examples?
  - Arts
  - Humanities
  - Social Sciences
  - Engineering
  - Physical & Biological Sciences
Some Benefits for the Professor & University

- Training the next generation of researchers
- Student characteristics:
  - Work hard
  - Energetic
  - Curious
  - Fresh perspective
  - Willing to do boring but necessary work
- Can help secure grant funding
Some Benefits to Students

- Participate in the university community
- Engage in the practice of your discipline
- Create knowledge, not just consume
- Complement coursework
- Help get into graduate school or job
- Career exploration
- Develop important traits: creativity, curiosity, ability to focus, verbal and written fluency, and respect for others’ contributions
Finding a Research Opportunity

- Networking
  - Friends, TAs, professors, etc.
  - Student groups
  - Informational interviews (CAN)
  - Ask at ACE, MEP, Academic Advisers

- Web resources
  - UCSC UR webpage
  - Career Center
  - Databases (more later)
Interests, Goals, & Practical Issues

• What classes/topics inspire you?

• What career involves your interests?
  • Does it require research training?

• What practical issues are there?
  • Do you have the time?
  • Do you need a paid position or credits?
  • Does the position require transportation?
• Goals:
  • Assist UCSC undergraduates to get involved in research
  • Increase awareness of the important contributions of UCSC UR
  • Educate faculty, staff, prospective students, and the community about UR at UCSC
**APPLICATION DATES**

**October**
- Frank and Sara McKnight Awards in Molecular Sciences due 10/1
- DOE SULI Internship application due for spring 2014, 10/1
- NIH Visit and Interviews for Seniors due 10/5
- Arts Division Irwin Project Grant due 10/17

**EVENTS**
- Joel Oppenheim, Ph.D.: Fall 2013 Undergraduate Professional Development Lunchtime Workshop Series
  - Monday, October 7, 2013 12:30 PM to 1:45 PM
- April Goral: Graduate School Admission Process
  - Tuesday, October 8, 2013 2:00 PM to 3:00 PM

**STUDENT PROFILES**

**NEW PROFILE!**
Eric Curiel (EEB) was recently quoted in the *Science Careers* article, “Think Globally, Act Locally” on the importance of student groups and attending conferences, like the Society of Chicanos/Latinos Americans in Higher Education (CASAHE) National Conference.
Research Ethics
Preparing for Undergraduate Research
Arts Division
Humanities Division
Physical and Biological Sciences Division
School of Engineering
Social Sciences Division
Join a Lab or Research Group
Application Tips & Deadlines
Research Opportunities Database
Other Research Opportunities

May
- Application for PhD in Engineering 16th Undergraduate Research Symposium due 5/18
- Sociology of Race Senior Thesis Award due 5/18
- Patricia and Rowland Rebele Grants in the History of Art and Visual Culture due 5/15
- UCSC Wind Ensemble: More Favorites for Wind & Percussion Saturday, May 18, 2013 7:30 PM to 9:00 PM

Studying Research: A Brief Guide to the Process and Presenting a Poster for the Undergraduate Research Symposium, May 17, 2013 12:30 PM to 3:30 PM

Ariel Anders (Computer Engineering) received multiple awards at national conferences for her undergraduate research presentations. "I was interested in research because it was an avenue I could actually apply the skills I was learning in my coursework," she recalls. Read more for her insights on undergraduate research.
Physical and Biological Sciences Division

Undergraduate Research in Physical and Biological Sciences

Select one of the topics below:
 Preparing for Undergraduate Research
 Finding a Research Opportunity
 Join a Lab or Research Group
 Funding Your Research
 Presentation Opportunities—where and when
 Communicating Your Results—posters and papers
 Student Organizations

Finding a Research Opportunity
Finding a research opportunity is a process that will take a considerable amount of time and commitment. The suggestions below may help.

Consider your interests

http://ugr.ucsc.edu/PbSci
Undergraduate Research Opportunities Database for UCSC and the Region

This database is continually updated. If you know of a program that should be added, contact rlanders@ucsc.edu. See Other Research Opportunities at http://ugr.ucsc.edu/other for additional programs, including Federal Programs.

Filter by Program Name

Filter by Description, Keyword, or Contact

Major(s)

Anthropology
Applied Physics
Art
Biochemistry and Molecular Biology
Bioengineering
Bioinformatics
Biology
Business Management Economics

Hold shift (PC) or command (Mac) to select multiple majors. If no majors are selected, then all programs are displayed.
Other Research Opportunities

Here is a sampling of research opportunities and databases. Please note that we cannot guarantee the accuracy of the sites.

Databases & Comprehensive Listings
Cross-discipline
  ▪ From Pathways to Science
  ▪ UC Irvine's Opportunities Database
  ▪ CSUMB Summer Research Opportunities

Federal Agency Programs
  ▪ Internship and Fellowship Opportunities in Science with the US government
  ▪ Department of Energy's (DOE) SULI Programs – Science Undergraduate Laboratory Internships at national laboratories across the country. These internships are run for 10 weeks during the summer. There are also opportunities during the fall and spring semesters. Internships are offered in areas such as physics, biology, chemistry, environmental and atmospheric sciences, engineering, computers applied mathematics and nuclear science.

Chicory Leland Energy Fellowship is a 10-week summer internship program that...
Programs & Positions

- Programs often involve:
  - Multiple students
  - A formal application/evaluation process
  - Extra activities and/or benefits
  - May involve placement in a lab
  - Stipend, research expenses, and travel and housing (in summer)
Programs & Positions (cont.)

- Positions
  - Are often negotiated directly with a professor/mentor/supervisor
  - May be volunteer, for credit, or paid
  - May be flexible
How Do I Get Involved? Programs & Positions

- Be focused and assertive
- You are here, you can do it!
- Get an overview of the work
- Read web information thoroughly
- Apply to everything!
- Don’t take the process personally
How Do I Get Involved in a Program?

- Make sure you meet the eligibility requirements
- Meet/E-mail the contact person/coordinator well before the deadline, ask questions and for suggestions
- Notify your mentor about your application and when you’ll be asking for letters
- See handout for link to Application Tips
UCSC Programs of Interest-STEM

- STEM Diversity Programs- Feb. deadline
  - Most are 2 years
  - CAMP (California Alliance for Minority Participation) is one year
  - Programs involve research, preparation for graduate school, tutoring, journal club, social activities and more

- Research Mentoring Institute (RMI) for working on any aspect of the human genome
UCSC Programs of Interest-STEM

• Some classes include research

• Be sure to check your department for additional options
  • UCSC Forest Ecology Research Plot (academic year)
  • Impact Designs: Engineering and Sustainability through Student Service (IDEASS)
  • 3-quarter upper division service-learning course
UCSC Programs of Interest-STEM

- UCSC NSF Research Experience for Undergraduates (spring deadlines)

- Undergraduate Research in the Biological Effects of Climate Change

- Summer Undergraduate Research Fellowship in Information Technology (SURF-IT)

- The Lamat Summer Research Program on High Performance Computing in Astrophysics

(c) 2004 Jo Chou
Some Other Fun UCSC Programs - STEM

- The Student Project Incubator (SPIN) Studio
  - Team computer game design (check website for next summer)

- Pinniped Cognition and Sensory Systems Laboratory

From http://pinnipedlab.ucsc.edu/multimedia/
UCSC Programs of Interest
All Disciplines

- Merrill, Porter and Crown College Research Fellowships
- UCDC- UC Washington Center
- UCCS- UC Center at Sacramento
Preparing Your Application

- Fill out application completely
  - Curriculum Vitae (CV) or resume
  - A personal statement
  - Reference letters from professors, not TAs
- Review by others for grammar, style, relevance, etc.
  - Give reviewers plenty of lead time
- Submit it on time
- If there are issues, contact the coordinator
- RELAX!!
Application Tips & Deadlines

Application Tips

- Help for every step of the process from Pathways to Science
- How to effectively obtain a letter of recommendation (from UCSC STEM Diversity)
- Writing a Curriculum Vitae (CV) (from UCSC STEM Diversity)
- Writing the Curriculum Vitae (from Purdue Owl Online Writing Lab)
- Writing the Personal Statement (from Purdue Owl Online Writing Lab)
- Summer Research–Applying and Getting in (from UCSC STEM Diversity)

Application Deadlines

April, 2013

- Psychology UR Funding due 4/5
- Deans' and Chancellor's Awards due 4/8
- Arts Division Internship Application due 4/12
- UCIRA Undergraduate Action Research Grant due 4/15

http://ugr.ucsc.edu/application_
Getting Involved in a Position in a Lab/Research Group

- Identify a group you are interested in
  - Seminars, talks, etc.
  - List of Professor’s research interests
  - Don’t overlook industry, non-profits, government
- Contact the professor/group leader
  - E-mails should:
    - Be formal (Dear Dr. or Professor)
    - Be specific to group (refer to paper, webpage, etc.)
    - Explain why research is critical for your goals
    - Have correct spelling and grammar
    - See examples on UR webpage
Dear Dr. Professor,

I am a (year, major) at (university) and I am writing to ask about opportunities for undergraduate research in your lab beginning (time period). I am especially interested in your work on (describe a paper or talk). I would appreciate the chance to meet with you to discuss (the topic) and possible opportunities for me to become involved in the project. I am eager to develop my research skills while an undergraduate to help me (career goal).

I have attached my CV and unofficial transcript. Please let me know if I can provide any additional information.

Sincerely,

Ambitious Student

Email address
Hi Joe,

My name is (Name) and I am a major in (name major). Is there space in your lab for an undergraduate? If so, what is the pay rate?

Thanks,

Name
Getting Involved in a Lab/Research Group (cont.)

• Go to office hours
  • Go right after a test
  • Be considerate
  • Show genuine interest
  • Ask about research and for advice

• Ask to go to lab/group meetings
  • Credit may be possible
Join a Lab or Research Group

There are many research opportunities for undergraduates at UCSC, but unfortunately not enough for every student who is interested. You will need to be dedicated and focused to find and keep a position. The advice below can help you, but does not guarantee that you will get into a lab or research group.

If you have any questions or would like to have more information, please contact:

Rebecca Anderson
Undergraduate Research Coordinator
rlanders@ucsc.edu
831-459-1284

To find out additional information for your field of study, go to the related webpage for the division/school:

Engineering
Humanities
Physical & Biological Sciences
Social Sciences

The pdf of the general work can be downloaded [here](http://ugr.ucsc.edu/join_a_lab).
Funding Sources

- See “Funding Your Research” for each division
- Summer internships pay for housing, travel, research expenses and a stipend
- Contact Financial Aid to see what you are eligible for
- Ask the professor, your academic adviser, and other students for suggestions
- Check your department and division webpages
College Funding

- Check the college web page
- Ask your college adviser, not all are listed online
- College funding examples: (this list is not comprehensive)
  - College 9/10 Student Funds (contact Bob Taylor)
  - Cowell Student Project Funds (contact Maria Zimmer, Crown Student Projects Funds (contact Cathy Murphy-Miles)
  - Kresge Student Project Funding (contact Shannon Mahoney)
  - Merrill College Special Students Projects Funds (see the College Assistant)
  - Porter- Student Project Funds and Creative & Innovative Grants (contact the Porter Student Activities Office)
  - Stevenson Research Project Funding (contact Debby Joyce)
Funding Sources - Pivot

- Database of external funding sources
- Free for UCSC students but you need to register

http://pivot.cos.com/
What Can I Do Now?

**Frosh**

- Get good grades!
- Plan to use Academic Support Programs
  - Learning Support Services Tutoring and MSI
  - Departmental tutoring
  - RAD (join all year) and/or MESA/MEP (join in fall)
- Go to TA and/or professor office hours for help with material
  - Email for an appointment if you can’t go to scheduled hours
- Study in groups
- Use on-line resources, like Youtube, for alternate explanations or more examples
Academic Support Programs

Check with your academic advisor for department specific programs.

**General Academic Support**

**Career Center**—The Career Center is dedicated to providing comprehensive, quality career development and employment/internship programs and resources that prepare a diverse student/alumni community to successfully meet today's and tomorrow's challenges.

**Disability Resource Center**—The DRC's goal is to assist the UCSC campus with equal educational access for students with disabilities.

**Educational Opportunity Program**—EOP provides a variety of academic and personal support programs designed to improve the retention and academic success of first-generation, low-income, or educationally disadvantaged college students. EOP serves to enhance undergraduate experiences by helping students acquire the skills to prepare for graduate programs, professional school, and future leadership roles. The **Pre-Graduate Program** hosts workshops every quarter.

**Learning Support Services**—Peer guided group sessions called Modified Supplemental Instruction (MSI) are available for selected lower and upper division undergraduate courses. Content related tutoring is available for all classes that are not supported by MSI.

**Services for Transfer and Re-entry Students**—STARS provides the extra academic and personal support transfer, re-entry and readmitted students may need to benefit fully from their education at UCSC whether they are full-or part-time. STARS is here to assist students with their pre-admissions questions, transfer graduation planning.
What Can I Do Now?

Frosh

- Go to office hours often
  - You’ll need LOR
- Join a student group
- Use the Career Center
  - Advice for choosing a major
  - Videos on webpage
- Talk to your major and college advisers
- See the UR webpage for your division
What Can I Do Now?  
**Sophomores & Juniors**

- Keep your grades high and keep going to office hours
- Be persistent and assertive
- Network with friends, professors, TAs
- Ask to attend lab/group meetings if a lab is full
- Go to department seminars
- Research summer programs in early fall
  - Plan to apply to multiple summer programs
What Can I Do Now?

Seniors & Super-Seniors

• You can still try—some professors will take seniors

• Some students stay to take a light academic load and volunteer to do research

• Look into senior capstone/thesis programs

• Consider semester abroad and/or summer schools

• Look into post-baccalaureate programs

• Look into jobs, like being a tech, to get experience
What's Next?

Participating in undergraduate research is excellent preparation for graduate school or employment. Remember that your interests may evolve during and after college, and that preparation for one career will provide skills that you can use even if you end up pursuing other options later in your life.

Select one of the topics below:
- Graduate School
- Post-baccalaureate positions
- Non-profit or Industry Positions

If you are considering graduate school:
- Talk to your research mentor about options early
- Talk to your mentor and graduate students in the department about how the process works in your discipline. You might ask:
  - What schools are strongest in your field? The best researchers in your field may be at a school you haven't heard of.
  - Where does your mentor think it would be best for you to apply?
  - What schools have students interested in your research area?
  - What schools offer the best support for your research interests?
For More Information:

- Visit the UCSC Undergraduate Research Opportunities website, ugr.ucsc.edu
- E-mail: rlanders@ucsc.edu for a meeting
- Join the list-serve on the website
- Drop-in Office Hours, Baskin 153B
  - Monday, 3-5 PM
  - Wednesday 12-2 PM
  - Friday 10 AM-12 PM
Please fill out the evaluation and leave it up front.

Thanks!