



CENTER FOR UNDERGRADUATE RESEARCH NEWSLETTER

CUR

C E N T E R F O R
UNDERGRADUATE RESEARCH

ORONO, MAINE • AY 2017 - 18 • FALL 2017



RESEARCH & CREATIVE ACTIVITIES

About CUGR

2017-2018 CUGR Advisory Committee

- **Ali Abedi** - Professor of Electrical and Computer Engineering, CUGR Director
- **Alexandria Jesiolowski** - CUGR Administrative Specialist
- **Francois Amar** - Dean, Honors College (Ex-officio member)
- **Laura Artesani** - Associate Professor of Music (2016-19)
- **Jim Artesani** - Associate Dean of Education (2017-20)
- **Timothy Cole** - Associate Dean of CLAS (Ex-officio member)
- **Heather Hamlin** - Assistant Professor of Aquaculture (2016-19)
- **Sarah Harlan-Haughey** - Assistant Professor of English/ Honors Preceptor (2016-19)
- **Charlene Ingwell-Spolan** - Assistant Professor of Nursing (2017-20)
- **Karl Kreutz** - Professor of Earth and Climate Sciences (2015-18)
- **Roberto Lopez-Anido** - Professor of Civil and Environmental Engineering (2015-18)
- **Mary Mahoney-ONEil** - Associate Dean of Education (2016-19)
- **Patricia Poirier** - Associate Professor of Nursing (2015-18)
- **Judith Rosenbaum-Andre** - Assistant Professor of Communication and Journalism (2017-20)
- **Vacant** - Student Representative (2017-)

Contact CUGR

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Check out our facebook,
twitter, and youtube feeds
for continuous updates,
announcements, and other
research & creative activity
opportunities!

CUGR INTERNSHIP OPPORTUNITIES

Available Positions

Communication Coordinator

Administrative & Event Planning Assistant

Technical Support

**Interns are compensated through one or more of
the following:**

Work-study pay;

Acknowledged volunteer hours;

Academic credit;

Regular hourly pay;

For more information including job descriptions,
skills required, and how to apply go to:

[CUGR Internship Opportunities](#)



[Twitter@UMaine_CUGR](https://twitter.com/UMaine_CUGR)



Facebook.com/centerforundergraduateresearch



YouTube: [Center4UG_Research@Umaine](https://www.youtube.com/channel/UC...)

WHAT IS CUGR?

The mission of the Center for Undergraduate Research is to increase, improve and enhance undergraduate students' participation and experiences in research, scholarship, and creative activity. The Center achieves its mission by providing leadership, coordination and support for these activities across the campus. We build upon UMaine's strengths and strategic goals as the state's leading research university, taking advantage of the hundreds of faculty and graduate students involved in research and creative projects who can teach and mentor undergraduate researchers/scholars.

CUGR PROGRAMS

Fellowship

The Academic Year and Summer Fellowships were established to help provide financial support for undergraduate students in hopes of creating an environment where students can become involved in meaningful faculty-supervised research. Students must submit a proposal that is reviewed and scored by members of the CUGR Advisory Committee. Awarded projects are selected based on the scores from the reviews and panel discussion. Each proposal must include: Abstract, Project Description, Budget and Budget Justification, and a Faculty Commitment Letter.

- **Academic Year Fellowships:** Each fellowship provides a \$1000 award for the student to help cover costs of the project. As outlined in each student contract the award performance period is Nov 1st through May 1st (of the following year) and the final report is due on May 15.
- **Summer Fellowships:** Each fellowship provides a \$3000 award for the student to help cover costs of the project. As outlined in each student contract the award performance period is May 1st through September 1st (same year) and final reports are due on September 15th.

For more information and instructions on how to apply go to page 5

UMaine Student Symposium: *Research & Creative Activities*

The student symposium jointly organized by CUGR and Graduate Student Government (GSG) is a student-centered forum to present research results for undergraduate students in form of poster, exhibits, performances, and oral presentations. This event is hosted annually each Spring and is open to all students enrolled at the University.

For more information and photos of the 2017 Student Symposium (UMSS17) go to page 8

Travel Grant

The UG Travel Grant is designed to help undergraduate students travel to academic seminars, professional meetings, and technical conferences to present their research projects and findings.

To read about a few student recipient experiences go to page 7

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Check out a **sample** of a previously awarded *fellowship proposal* and *budget worksheet* on the CUGR website - -

<https://cugr.umaine.edu/proposal-sample/>



C E N T E R F O R
UNDERGRADUATE RESEARCH

AY17-18 PROGRAM DATES AND DEADLINES

PROGRAM	DATE
2017-18 Academic Year Fellowship Proposal Submission Deadline	Oct. 13, 2017
2017-18 Academic Year Fellowship Decision Notifications	Oct. 27, 2017
2017-18 Academic Year Fellowship Performance Period	Nov. 1, 2017 - May 1, 2018
2018 UMaine Student Symposium (UMSS18) Abstract Submission Deadline	Mar. 9, 2018
2018 UMaine Student Symposium Acceptance Notifications	Mar. 19, 2018
2018 Summer Fellowship Proposal Submission Deadline	Mar. 23, 2018
2018 UMaine Student Symposium Poster Printing Deadlines	Apr. 9, 2018 (Free) Apr. 12, 2018 (50%)
2018 UMaine Student Research Symposium Event Date	Apr. 17, 2018

FOR MORE INFORMATION: CUGR.UMMAINE.EDU



Students, faculty and alumni are encouraged to submit information by contacting Alexandria Jesiolowski, 207-581-3583, CUGR@maine.edu
Visit us online at cugr.umaine.edu

The University of Maine does not discriminate on the grounds of race, color, religion, sex, sexual orientation, including transgender status and gender expression, national origin, citizenship status, age, disability, genetic information or veteran status in employment, education, and all other programs and activities. The following person has been designated to handle inquiries regarding nondiscrimination policies: Director, Office of Equal Opportunity, 101 North Stevens Hall, 207.581.1226.

Call For Proposals

The Center for Undergraduate Research is pleased to announce the Undergraduate Research and Creative Activities Academic Year Fellowship 'Call for Proposals'. This program supports undergraduate student engagement in faculty-mentored research. Several fellowships will be awarded for the 2017-18 academic year on a competitive basis; the competition is open to all UMaine undergraduate students from all majors. Each fellowship provides up to \$1000.00 support for one student to conduct faculty-mentored research. The CUGR Advisory Committee will review research and creative activities proposals for clarity of objectives, importance to the field, proposed approach, appropriateness of the budget, and indication of the project feasibility.

Eligibility Criteria:

1. Any undergraduate student currently enrolled in a degree program at the University of Maine may submit a proposal in consultation with a faculty mentor. Preference will be given to students graduating in or after May 2018.
2. Applicants need to describe the research, placing it in the context of scholarly activities, while presenting in such a way that it is understandable to the reviewers from outside of the applicant's research field.
3. Award Recipients must submit a report including technical and financial data by May 1, 2017 and are expected to present the product of their research at the 3rd Annual UMaine Student Symposium: *Research and Creative Activity (UMSS18)* on April 17, 2018.

Link to Apply: www.tinyurl.com/AY1718

SUBMIT A PROPOSAL!!!

Responsible and Ethical Conduct of Research (RCR)

Overview:

The National Institutes of Health (NIH) defines 'Responsible and Ethical Conduct of Research' (RCR) as, "the practice of scientific investigation with integrity. . [involving] the awareness and application of established professional norms and ethical principles in the performance of all activities related to scientific research."

Responsible & Ethical Research Shared Values

- Honesty – conveying information truthfully and honoring commitments,
- Accuracy – reporting findings precisely and taking care to avoid errors,
- Efficiency – using resources wisely and avoiding waste,
- Objectivity – letting the facts speak for themselves; avoiding improper bias.

For more information: [Office of Research and Sponsored Programs \(ORSP\)](#)

Important: Undergraduate students participating in CUGR Fellowship sponsored research are required to be trained in the Responsible Conduct of Research. It is not required to be trained prior to submitting an abstract for the award. RCR certification needs to be completed and submitted to CUGR prior to the end of the performance period of the research. This requirement is not meant to be onerous, and could be satisfied by comparable certifications. Please contact the CUGR office to confirm fulfillment of this requirement through previous certification completion.

Fall 2017 RCR Training Dates

Date: WED, November 15, 2017
Time: 5:00-8:30 p.m.
Place: Stodder Hall, Room 57

IMPORTANT! Pre-registration is **required** and students must be accompanied by a mentor (one per 5 students). Registration information will be available shortly in the [ORSP Newslink](#). **Please note, registrants will need valid @maine.edu credentials to access the form.**

If you need assistance with registration please contact [Leisa Preble](#)

If you have questions regarding this or other research-related trainings please contact [Amanda Ashe](#).

In addition, undergraduate students participating in NSF, NIH and USDA- NIFA sponsored research are required to be trained.

2017 Summer Creative and Academic Achievement Fellowship

The Center for Undergraduate Research is pleased to announce the recipients of the 2017 Summer Creative and Academic Achievement Fellowships. The fellowships were developed to enhance and increase undergraduate student involvement in faculty-supervised research. Each fellowship provides a \$3000 award for the student to help cover costs of the project. In addition to eight CUGR funded awards, eight undergraduates were funded through the Maine Space Grant Consortium (MSGC).

2017 Summer Fellowship Award Recipients

2017 (MSGC) Summer Fellowship Award Recipients

(Student Name, Academic Focus, Project Title, Faculty Mentor)

1. James Barry, Microbiology, "Identification of Virulence Genes in Group B Streptococcus (GBS)," advised by Meoldy Neely;
2. Meaghan Delcourt, Psychology, "Examination of Electrodermal Reactivity in Self-Injurious Behaviors," advised by Emily Haigh;
3. Taylor Delp, Psychology, "Sleep Disturbance as a Biomarker for Cognitive Decline in Aging," advised by Marie Hayes;
4. Jennifer Field, Marine sciences, "Glacier Bay National Park Corals: Comparative Reproduction Between Deep and Shallow Red Tree Corals," advised by Rhian Waller;
5. Chloe Lilly, Biological Engineering, "Engineering Polymer Infused Paper for a Self-contained Bacterial Diagnostic System," advised by Caitlin Howell;
6. Ashley Soucy, Biochemistry, "Intracellular Ca²⁺ Flux is Required for a Post-Attachment Step in JCPyV Infection," advised by Melissa Maginnis;
7. Caroline Spangenberg, Zoology, "Impact of the Acanthocephalan Parasite *Profilicollis botulus* on Estradiol Levels in the Invasive Green Crab, *Carcinus maenas*: A Potential Biological Control Organism," advised by Ian Bricknell;
8. Trevor Morin, Biochemistry, "Exploring Altered Energy Balance in EtOH-Treated Animals and its Application to Space Exploration," advised by Kristy Townsend;

1. Cassandra Dechaine, Bioengineering, "Pharmacokinetics of Bone Regeneration," advised by Michael Mason;
2. Nathan Gazey, Computer Science, "HandWaver," advised by Justin Dimmel;
3. Lila Lyons, Physics, "Neuronal Innervation Analysis of Metabolic Disease in Relation to Space Travel," advised by Kristy Townsend;
4. Andrew Nolan, Earth Sciences, "Updated Glacier Velocities for the St. Elias Mountains," advised by Ellyn Enderlin;
5. Hussein Sayed, Biology, "Controlling 2-pore Potassium Channels with Light: Synthesis and Evaluation of New Photoswitchable Channel Blockers," advised by Michael Kienzler;
6. Daniel Schlbig, electrical and computer engineering, "Optimized Scheduling for Wireless Energy Transfer with applications in Remote Structural Sensing," advised by Ali Abedi;
7. Austin Steward, bioengineering, "Effects of Liquid Gated Membranes in the PTEE Filtration of Biological Agents," advised by Caitlin Howell;
8. Dakota Sudbeck, bioengineering, "Approximation of Core Body Temperature with Infrared Based Imaging," advised by Karissa Tilbury;

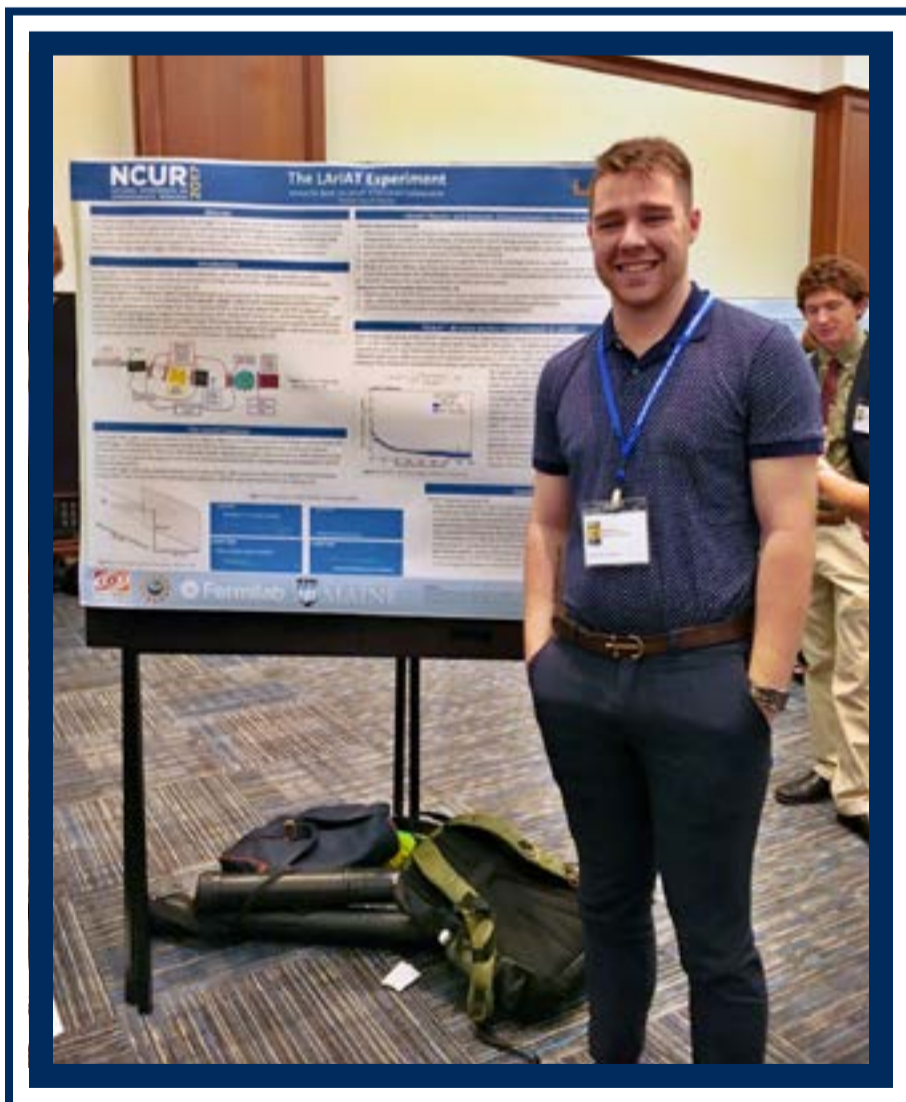
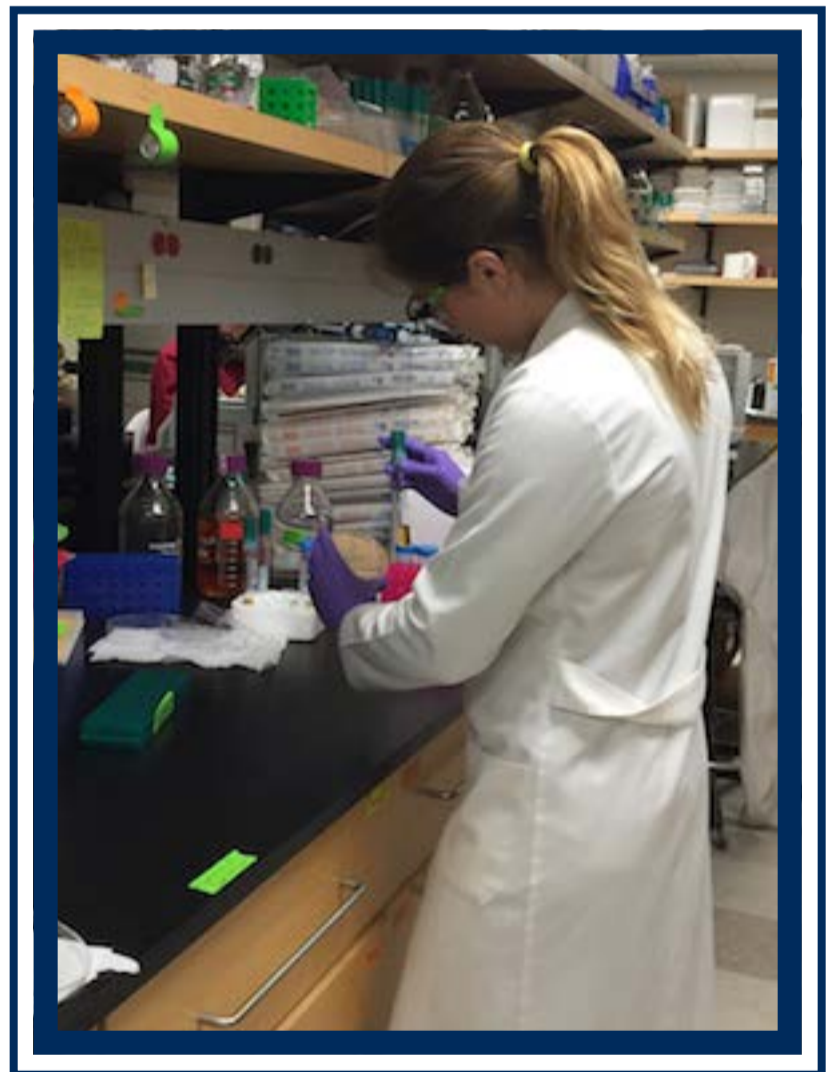
FOR FURTHER INFORMATION, PHOTOS, AND UPDATES ON THE 2017 SUMMER FELLOWSHIP RECIPIENT RESEARCH GO TO PAGE 12

2017 Travel Grant Recipients

For more information on the program and to view other UG Travel Grant Recipients go to: [CUGR TRAVEL](#)



Jessica Moore, molecular and biomedical sciences, met with Senator Susan Collins in Washington, D.C. to speak about the opportunities she has gained from participating in undergraduate research during the annual 2017 Posters on the Hill event. Alongside students from across the nation, she presented her biomedical research to lawmakers and representatives from organizations like NIH and DOE. (Left). Jessica also researched under faculty mentor, Robert Wheeler, on a project titled, Investigating a Link Between Inflammation and Invasive Candidiasis. They examined the relationship between morphology, dissemination, and the inflammatory response through a multifaceted approach using zebrafish models and drug-repressible strains of *Candida albicans* that overexpress genes for either hyphal growth (Ptet-UME6) or yeast growth (PtetNRG1). (Below)



Samuel Borer, physics and mathematics, presents his research, "Characterizing liquid argon time projection chambers for neutrino physics," at the 2017 National Conference on Undergraduate Research in Memphis, TN. Each year #NCUR2017 brings over 4,000 students and faculty together to celebrate excellence in undergraduate research, learning about innovative methods and exciting opportunities. We are proud to have a CUGR Research Scholar be a part of such an engaging and informative experience! (Left)

2017 UMaine Student Symposium: Research & Creative Activity (UMSS17)



More than 1,200 undergraduate and graduate students presented their work during the second annual University of Maine Student Symposium held at the Cross Insurance Center in Bangor on April 24, 2017. The event was organized by UMaine Graduate Student Government and the Center for Undergraduate Research (CUGR) and was open to the public. Student research presentations were featured across academic disciplines ranging from the sciences and engineering to arts and humanities. Presentations were in the form of poster sessions, oral presentations, exhibits and roundtable discussions that were held throughout the day.

Awards and cash prizes were given, in the following categories: Arts, Biomedical Science, Business, Engineering and Information Science, Social Sciences, Physical Sciences, Allied Health, to the graduate and undergraduate top scoring presentation. The top overall score across all categories was also rewarded. In addition, sponsored special awards were also awarded to the highest scoring student presentations based on predetermined criteria within a specific group (e.g. Innovation Award: was sponsored by the Foster Student Innovation Center, ECE Award sponsored by IEEE Maine Section for EE and CE students, Biomedical Award sponsored by the Graduate School of Biomedical Science and Engineering)GSBSE).

2017 Student Symposium Undergraduate Awards

(Category, Student Name(s), Project Title, Faculty Mentor)

- 1. Allied Health:** **Katarina Querfurth, Paige LeBlond, Jenna Nichols, Belinda Kirkpatrick**, “For Hospitalized In-patients, What Evidence-based Interventions will Reduce the Feelings of Stress, Anxiety and/or Fear Brought on by the Hospital Environment?” advised by Patricia Poirier
- 2. Arts:** **Meaghan Byrnes, Eric Morrison, Austin Haughton, Jacob Hall, Liam Reading**, “iSWOOP,” advised by Michael Scott
- 3. Biomedical Sciences:** **Sarai Smith**, “RNA-seq Analysis of Cluster E Phage Ukulele,” advised by Sally Molloy
- 4. Education:** **Toni Kaplan**, “Development of a Dynamic Multisensory Interface to Provide Accessible Biological Diagrams for Blind and Low Vision Students,” advised by Nick Giudice
- 5. Engineering and Information Science:** **William Breeding**, “Homogenous Integration of Iron Oxide Nanoparticles into Cellulose Nanofibers,” advised by Michael Mason
- 6. Natural Sciences:** **Christian Zwirner**, “Defensive Mechanisms of Epidermal Growth Factor Receptor in Host Response to Candida albicans Infection,” advised by Robert Wheeler
- 7. Physical Sciences:** **Samuel Borer**, “Characterizing Liquid Argon Time Projection Chambers for Neutrino Physics,” advised by Saima Farooq
- 8. Social Sciences:** **Angelina Iannazzi**, “Longitudinal Imagined Interactions Between Christians and Atheists,” advised by Jordan LaBouff
- 9. Top overall winner:** **Sarai Smith**, “RNA-seq Analysis of Cluster E Phage Ukulele,” advised by Sally Molloy
- 10. Innovation Award:** **William Breeding, Banton Heithoff, Madeline Mazjanis and Amber Boutiette**, “Pediatric Respiratory Simulation,” advised by Caitlin Howell
- 11. IEEE Award:** **Armando Ayes**, “Temperature Compensated Langasite Surface Acoustic Wave Devices for High Temperature Operation,” advised by Mauricio da Cunha

UMAINE ENGAGED BLACK BEAR (EBB) UNDERGRADUATE RESEARCH SCHOLAR DIGITAL BADGE

EBB is an innovative digital badging initiative, created to aid the University of Maine in meeting its vision to become the “most distinctively student-centered and community engaged of all the American Research Universities.”

Digital badges are awarded to students to recognize their participation and achievements, connect them with resources, guide them in the development of skills and knowledge acquisition, and engage them with the campus community and beyond. It is believed that employers, graduate admissions officers and other stakeholders will see the extensive work and deep learning that has occurred in order to acquire badges and will view them as an additional way to evaluate a student’s career readiness and fit. In fact, badges have the potential to provide an expanded framework for evaluating student achievement, skill, knowledge, and preparedness beyond the traditional resume.

Students interested in becoming an **UG Research Scholar** have (3) badge level opportunities. Once all 3 levels of badges are complete there is the possibility to receive a *meta-badge*. Below is a brief description of each badge pathway.

For more information about earning UG Research Scholar e-badges or other digital badges go to the [UM EBB website](#).

LEVEL 1

This badge is issued in recognition of the earner’s participation in undergraduate research and creative activities. Earners participate in Center for Undergraduate Research (CUGR) opportunities or other research and/or creative activities related events and begin to build relationships with faculty mentors.



LEVEL 2

This badge is issued in recognition of the earner’s engagement in undergraduate research or creative activity programs and learning experiences. Earners demonstrate active engagement by participating in faculty-mentored research projects or creative activities or other approved, faculty-mentored/supervised projects and by publically presenting their work at the Student Symposium or other approved venue.



LEVEL 3

This badge is issued in recognition of the earner’s leadership, initiative, and ongoing, active engagement in undergraduate research or creative activities. Earners take on leadership responsibilities, helping other students to achieve their learning goals and demonstrated initiative, commitment, and continued active engagement in the undergraduate research and creativity activity programs.



META-BADGE

Earners of this badge will achieve an important, University of Maine verified student engagement milestone by completing the Engaged Black Bear Undergraduate Research Scholar Learning Pathway (Levels 1, 2, and 3). The Undergraduate Research Scholar pathway encouraged students to become actively engaged in faculty-mentored undergraduate research and creativity activity efforts on campus and in the community.

Easel & Poster Board Rentals!

Are you hosting a symposium?
Do you need an easel & poster board?
Are you presenting at a conference?



Poster Board Dimensions	Qty.
36" x 48"	120
24" x 36"	35
20" x 30"	18
Tri-fold	6

Combo Qty.	Price Per Combo
First 25 (1-25)	\$4.00
Next 25 (26-50)	\$3.00
Next 50 (51-100)	\$2.50
Combo = easel + foam poster board	
PRICE/COMBO EXAMPLES:	
Rental fee for qty. 20 combos equals \$80.00, Rental fee for qty. 30 combos equals \$115.00 Rental fee for qty. 100 combos equals \$300.00	
These prices are for a maximum of 5 days, e.g. M-F or Th-M	
\$50.00 deposit is required at pick-up for loss & potential damages. Deposit will be refunded upon receipt in good condition or credited towards the final cost	
Easel Dimensions: Adjustable telescoping legs allow variable heights from 36" to 66"	

Co-Sponsored by CUGR and Honors College, every UMaine department or student group can now rent a poster board and easel at a very low cost. For availability, pricing, and other information please contact the CUGR office.

Submit a request: <http://tinyurl.com/CUGR-Rental>

Please fill out the rental form at least 2 weeks in advance to guarantee availability

RESEARCH

Grants 101 Workshops

The Office of the Vice President for Research (OVPR) and the Fogler Library are sponsoring "Grants 101: Seeking, Analyzing, and Writing Basics" throughout the 2017-2018 academic Year.

This workshop is open to all UMaine faculty, staff, and students. Space is limited and attendees must register to attend.

At this workshop, you will:

- Search for grants in PIVOT
- Analyze an agency's Request for Proposals
- Learn Grant Writing Basics

Workshop Dates:

Space is limited. To attend please RSVP To Jen Bonnet by clicking the provided link correlating with the workshop date.

1. [October 10, 2017, 10am-12pm](#)
2. [November 21, 2017, 10am-12pm](#)
3. [January 18, 2018, 10am-12pm](#)
4. [March 13, 2018, 10am-12pm](#)

All of the workshops will be held in the Fogler Library Classroom.

This workshop is an approved event towards earning a Research Scholar Digital Badge (see page 9 for more information). To fulfill a badge level 1 approved event you only need to attend the first hour of the workshop. To fulfill a badge level 2 or higher you must stay for the entire two hour workshop. If you attend the workshop towards earning any level of the Research Scholar Digital Badge, when submitting your RSVP you must enter your **Affiliation** as such:

'Other': [CUGR Research Scholar](#)

Follow a Researcher Program

Sponsored by Cooperative Extension & Climate Change Institute

Do you want to share your research with kids? Follow a Researcher is an innovative University of Maine 4-H program that uses technology and social media to facilitate conversations between youth and student researchers allowing K-12 age students to learn about the research process, and the opportunities college students have to conduct research.

- Since 2015, 4,200 youth ages 7 to 18 and over 120 educators have engaged with three different researchers during expeditions to Peru, the Falkland Islands, and Antarctica.
- Real-time twitter conversations allow students to converse with youth and teachers.
- 4-H Staff at UMaine Cooperative Extension work with student researchers throughout the process, helping to increase their ability to communicate their research.
- Youth are able to learn about the research project including expedition planning and data collection, while increasing their understanding of the scientific process, and developing an interest in the researcher's life story.

If you are interested in sharing your experiences with youth, please contact [Greg Kranich](#) or [Laura Wilson](#) to discuss the possibilities.

More information, including Archives of past expeditions, are available at [Follow a Researcher Program](#)

STUDENT EXPERIENCES

Meet some of the undergraduate researchers here at UMaine. Each student was asked a series of questions. Read what advice they have for UG students interested in pursuing their own research experience!

1. Name, academic focus, expected graduation year, brief description of research project
2. How you got started/interested in UGR?
3. What advice do you have for those pursuing UGR?
4. Where are you going from here (in terms of research, academics, occupations, etc.)?
5. How has CUGR effected your UG experience here at UMaine?
6. What benefit did working with a faculty-mentor on your research have on your overall experience?

1. **Austin Steward**, Bioengineering in the Honors College with a Medical Focus, class of 2019, I am attempting to improve Arsenic Remediation from Maine Drinking Water.

2. I first got involved with UGR as a sophomore. When Caitlin Howell was first starting up her on campus lab I volunteered services to get experience, and as the semester continued I developed my own projects alongside graduate students that eventually led to my current topic.

3. "As the Nike slogan would tell you, "Just Do It". Not to oversimplify to prompt but if there is a professor that is doing research you have interest in then let them know!" Tell them why you are interested and how that lines up with your future goals; even offer to volunteer your time at first. Don't hold yourself back for fear of difficulty, or undervalue yourself as an important scientific commodity. Embrace what you love about science and pursue it!

4. I am going to continue the research that I started this summer as my Thesis for the Honors College. This summer I was accepted early assurance into the Tufts University School of Medicine for the Maine Track Program, Class of 2023. My plans are to pursue a career in Pediatrics here in Maine.

5. The CUGR grant allowed me to spend a summer diving into research that I am passionate about, without having to worry about the standard

course load that accompanies research during the academic year. I will enter this academic year more prepared for my lab classes, having knowledge and skills that I gained this summer to guide me.

6. Having a faculty-mentor that is invested in my research has changed the way that I approach UGR. My mentor is present and timely with questions and experimental approaches, but also expects me to ask and answer hard-hitting questions about my own methods or results. This has caused tremendous personal growth and accountability, truly preparing me to defend a thesis.

"As the Nike slogan would tell you, **"Just Do It"** Not to oversimplify to prompt but if there is a professor that is doing research you have interest in then let them know!"





1. **Jim Barry**, Class of 2018, Microbiology (major), Food Science (minor). My research involves using Group B Streptococcus, an opportunistic bacterial pathogen that is a leading cause of neonatal infections. This versatile microbe may cause infections of the blood, skin and soft tissue, bone and joint, as well as, pneumonia, urinary tract infections, meningitis, and endocarditis in susceptible persons. The end goal of my research project is to identify novel virulence genes required for a successful infection. This information may be used to identify new antimicrobial targets for successful therapeutic strategies.

2. Getting started as an undergraduate researcher was easier than I thought it would be. I met with my advisor to sign up for Spring courses, and I told her that I wanted to get research experience in preparation for graduate school. We talked about my interests, and in return, she suggested I contact a few specific faculty members. I wrote an introductory email to Dr. Melody Neely, my current faculty mentor, and a few weeks later joined her lab group. Voila!

3. My advice for those pursuing UGR is that if you don't have an idea for a project, it's not as big a deal

as you might think. Don't let the lack of an idea stop you from going after research opportunities - I didn't. Once you get started on a project, learn to warmly embrace failure, because it is the salt that gives research its flavor. A final piece of advice is to use writing (preferably in your lab notebook) to analyze complex problems as you encounter them. Dumping thoughts onto paper helped tremendously with trouble shooting the constant stream of unexpected results.

4. My plan is to advance the project to the final phase outlined in the proposal (and hopefully beyond) between now and graduation in May 2018. Effectively the CUGR summer fellowship research project will become my senior capstone project. After UMaine, my goal is to matriculate into a Microbiology & Immunology Ph.D. program.

5. As an undergraduate, I have completed 19 lab science courses so far which adds up to over 600+ hours at the bench. The major value I derived from this fellowship was not spending more hours in the lab but was being able to SLOW DOWN and savor the process. If a protocol didn't work on Monday, I could return on Tuesday and do it again. In a lab course, you rarely repeat an experiment, and often you race the clock to finish on time. All-in-all this supplemental research experience has profoundly enhanced my undergraduate training at the University of Maine.

6. An unexpected bonus was getting to peek behind the curtain and see what life is like as a graduate student. My summer experience was analogous to that of the graduate students undergoing summer rotations in the lab. Working under Melody's supervision has given me a definite sense of what I can expect after graduation. As a result, I am more confident about my decision to attend graduate school and my ability to do well in that setting.

Benefits of Undergraduate Research

1. Enhances student learning through mentoring relationships with faculty.
2. Increases retention.
3. **Increases enrollment in graduate education and provides effective career preparation.**
4. Develops critical thinking, creativity, problem solving and intellectual independence.

-Council on Undergraduate Research (CUR)

1. **Vincent Caccese**, Graduate student, Mechanical Engineering & MBA, Graduation: May 2018. Project: Research and Development of a wireless load sensing and data accusation system. This system utilizes “nodes” which collect data from load cells. The nodes then transmit the data through BluetoothLE to a master node. The master node then transmits the collection of data to a mobile data accusation software such as an iPhone or Android application for processing and analysis.

2. I was introduced to UGR/MSGC through older friends who have done similar work and recommended the program to me.

3. Advice for those pursuing UGR would be, talk to a professor in your department/interest field and see if they have any topic suggestion. A lot of times, there will be a project already going on that could line up directly with a research interest of your own.

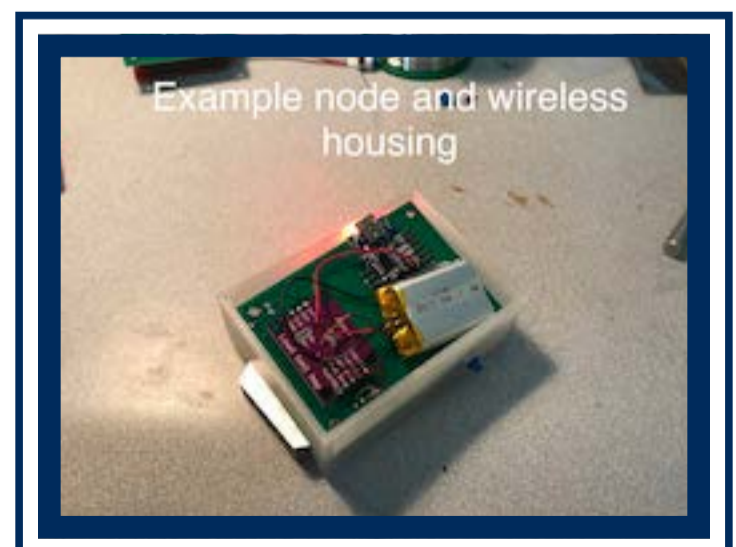
4. As I have recently finished my Mechanical Engineering undergrad, I will be working towards an MBA this academic year while continuing work in a Mechanical Engineering Lab on campus.

“...Best decision I’ve made, I daresay research experience trumps class time 9 out of 10 times.”



5. MSGC/CUGR has positively impacted my experience at UMaine by giving me a chance to learn and experience a research style job. This has opened my eyes and interests toward a different style career path which is slightly different than your standard Mechanical Engineering job.

6. Working with a faculty-mentor proved to be a great benefit when attempting a project of this style. The biggest benefit comes at the beginning when you are coming up with a project outline and deciding on a final target. This is where their experience and guidance will help determine when the project needs to go and what you will be able to accomplish in the short time allotted. It is also incredibly helpful to have your mentor to go to if you do end up getting caught problem that is eating up a large chunk of time.





1. **Cassandra Dechaine**, Class of 2018, Bioengineering, I am researching the biomedical efficacy of devices made from cellulose nanofibers as synthetic bone materials.

2. I got started in undergraduate research at the beginning of my sophomore year. I heard about the projects in Dr. Mason's Lab and wanted to be a part of them!

3. When you are first trying to get into a research lab, don't be afraid to be outgoing. Professors are extremely busy, and have students ask to work in their labs all the time. Being persistent shows your interest and could be what gets you the job!

4. I am going into my last year at UMaine and planning to apply to Law School to pursue a career in public health.

5. CUGR has allowed me to stay on campus and work on my own research project for the summer, which allowed me to do more hands-on engineering than I have in the past.

6. Working with a faculty mentor is invaluable for undergraduate researchers. Working with faculty is wonderful because they can point you in the right direction when research doesn't go exactly as planned (it never does)!

1. **Chloe Lilly**, Class of 2019, Biological Engineering, The research I am currently working on is the combination of slippery surfaces and paper diagnostics to create a point of care device for the detection of bacteria in a cost effective, easy to use device.

2. When Dr. Howell came to the university in 2016 I reached out to her because I was determined to find out if research was the path I wanted to take. It turned out that her interest and past work in bio-mimicry made me excited to get into the lab to continue her research and be exposed to a new environment.

3. Get involved as soon as opportunities are presented to you. If even if the work turns out to be something you are not interested in, you will gain invaluable experience and insight into your future interests.

4. My work is continuing into the fall with increased work in the detection portion of our paper based diagnostic, with an IDEXX Co-Op in the summer of 2018.

5. The CUGR fellowship has allowed me to have an undeterred amount of time to focus solely on research which enabled me to learn how to design my own experiments, create my own methods, and really delve into the lab environment.

6. Dr. Howell is an extremely well rounded professor and principle investigator who allowed me to have creative leeway while also teaching me invaluable skills on how to approach and solve problems along with how to navigate the world of scientific writing.





1. **Andrew Nolan**, Class of 2019, Earth and Climate Sciences Major. I spent this past summer studying glacier surge dynamics in the St. Elias Mountains, Alaska. Using remote sensing techniques relative surge areas and surface speeds were calculated for Bering and Turner Glaciers, from as far back as 1984 to present.

2. This was my first experience in undergraduate research but, I hope to continue to work in this field.

3. Building connections and meaningful relationships with professors and other students in your department is an essential first step.

4. I will be continuing my career as undergraduate here at the University of Maine. I am currently in the process of finding continued funding for this current

project. I hope to be able to continue this project through my career here at the University of Maine and use the dataset produced for my Honors Thesis.

5. CUGR in conjunction with MSGC has been my first experience in undergraduate research. It has been an incredible opportunity that I am very thankful for.

6. The opportunity to work with Prof. Ellyn Enderlin and with M.S. student William Kochitzky has been an unbelievable opportunity. Both are extremely knowledgeable within their field and have provided great assistance and guidance along the way.

Two CUGR Scholars were among three UMaine undergraduates that received early acceptance to Tufts University School of Medicine. They gained acceptance through the Maine Track Early Assurance program, which is a partnership between Tufts Medical School and Maine Medical Center created in response to a doctor shortage in rural areas. The hope is that a significant number of graduates will go on to practice medicine in Maine.

Trevor Morin, (right) a microbiology and biochemistry majors from Scarborough. Morin has performed two years of research in neurobiology professor Kristy Townsend's lab and has participated in the Maine Medical Center Research Institute Summer Student Research Program and Medical Outreach Maine trip. He was also a 2017 CUGR Summer Fellowship recipients as well as the recipient of the 2017 George J. Mitchell Peace Scholarship. This award allows Morin to attend the University College Cork in Cork, Ireland during the 2018 spring semester. Morin plans to gain different cultural perspectives and learn how to work collaboratively within the field of

science on a cross-cultural scale. (bottom, left)



Austin Steward, a bioengineering major and Honors College student from Colebrook, New Hampshire. Steward is a Maine Space Grant Consortium award recipient for his research related to arsenic remediation from Maine drinking water, which he conducted in the lab of bioengineering professor Caitlin Howell. He also is a member of several groups on campus, including Alpha Tau Omega, America's Leadership Development Fraternity; Sophomore Owls Society; and Biomedical Engineering Society.





GENERAL INFORMATION

Students, faculty and alumni are encouraged to submit information such as experiences, awards, & research interests by email, phone, or stopping by the CUGR office!

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