# EPIC CUGR Newsletter

## Fall 2020

# THE UNIVERSITY OF MAINE

Knowledge • Discovery • Innovation



#### Fall 2020 Issue 16

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Stay connected with CUGR!

Cover: "Ship Harbor" by Janet Elvidge

Note: Photographs were taken prior to the coronavirus pandemic. The University of Maine and University of Maine at Machias follow federal and state Centers for Disease Control and Prevention health and safety guidance, which includes social distancing and use of face coverings for the start of the 2020–21 academic year.

#### **Contact Us**

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## **CUGR Welcomes New Associate Director**

Dr. Melissa Maginnis, Ph.D.

## Associate Director, Center for Undergraduate Research



Melissa Maginnis

Dr. Melissa Maginnis has been appointed as Associate Director of the Center for Undergraduate Research (CUGR) effective July 1st, 2020.

"Dr. Maginnis is one of our most active and engaged faculty mentors, with demonstrated high quality research as evidenced by the number of highly competitive awards won by her students", said Assistant Vice President Abedi who directs CUGR. "We are excited to welcome Dr. Maginnis to CUGR and look forward to further growth of CUGR under her leadership."

Dr. Melissa Maginnis, a recently-tenured faculty member in the Department of Molecular and Biomedical Sciences, joined the UMaine faculty in 2014. She is a virologist, and her laboratory is focused on understanding the cellular and molecular basis of viral disease. Defining how viruses recognize and invade cells within the host can ultimately elucidate targets for novel antiviral therapies to prevent or treat viral illnesses.

"My research program is focused on viral disease, a significant human health issue, which also provides excellent student training opportunities." "We now all understand the impact that viruses can have on human health and our lives in general due to the COVID-19 pandemic. It is critical that we continue to research viral disease so that we can advance our knowledge in this area to be prepared for future viral outbreaks."

Dr. Maginnis has served as the Lead of the UMS COVID-19 Scientific Advisory Board since April to guide a team of UM and USM researchers to provide science-based evidence for the safe planning of the potential future of the UMS.



October 2, 2020

## **Virtual Event**

Showcasing research and creative works by UMaine undergraduate and graduate students through online programming.

Watch for updates on the website and social media! umaine.edu/umss #umss20



#### Academic Year 2020-21 Call for Proposals Research & Creative Activities Undergraduate Fellowships

Important Dates: Online application deadline: October 16th Award announcement: October 30th Award performance period: November 1, 2020 – May 1, 2021

**The Center for Undergraduate Research** is pleased to announce the Undergraduate Research and Creative Activities Fellowships 'Call for Proposals'. This program supports undergraduate students in faculty-mentored research. Several fellowships will be awarded for Academic Year 2020-21 on a competitive basis. The competition is open to all UMaine and University of Maine at Machias undergraduate students from all majors.

Each undergraduate fellowship provides up to \$1200 award to support students 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:**

Any undergraduate student currently enrolled in a degree program at the University of Maine or the University of Maine at Machias may submit a proposal in consultation with a faculty mentor. Preference will be given to students graduating in May 2021 or after.

#### **Application Guidelines:**

- 1. Applicants need to describe the research, placing it in the context of scholarly activities, while presenting it in such a way that it is understandable to the reviewers from outside the applicant's research field.
- 2. All proposals must be accompanied by a faculty mentor commitment letter submitted through the provided electronic link found in the application form and emailed to awardees.
- Award Recipients must submit a report including technical and financial data by Friday, May 14, 2021. All recipients are required to submit an abstract and present the product of their research at the 6<sup>th</sup> Annual UMaine Student Symposium: Research and Creative Activity (UMSS21) in April 2021.

### Academic Year 2020-21 Call for Proposals Maine Space Grant Consortium (MSGC) Undergraduate Research Experience

**Important Dates:** 

Online application deadline: October 16th

Award announcement: October 30th

Award performance period: November 1, 2020 – May 1, 2021

**The Center for Undergraduate Research** is pleased to announce the Undergraduate Research Experience call for proposals funded by Maine Space Grant Consortium (MSGC). This program supports engagement in faculty-mentored research in collaboration with a NASA field center collaborator. Several students will be awarded for Academic Year 2020-21 on a competitive basis. The competition is open to all UMaine undergraduate students from all majors with research related to space science and technology.

Each student receives a \$1200 award to conduct faculty-mentored research. The CUGR Advisory Committee will review undergraduate research experience proposals for clarity of objectives, importance to the field, proposed approach, appropriateness of the budget, and indication of the project feasibility.

#### **Eligibility Criteria:**

Any undergraduate student currently enrolled in a degree program at the University of Maine with a research project related to space science and technology may submit a proposal in consultation with a faculty mentor. Students must be U.S. Citizens. Preference will be given to students graduating in May 2021 or after.

#### **Application Guidelines:**

- 1. 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.
- 2. All proposals must be accompanied by a faculty mentor commitment letter submitted through the provided electronic link found in the application form.
- Award Recipients must submit a report including technical and financial data by Friday, May 14, 2021. All recipients are required to submit an abstract and present the product of their research at the 6<sup>th</sup> Annual UMaine Student Symposium: Research and Creative Activity (UMSS21) in April 2021.

Apply now: https://tinyurl.com/FallFellowship2020

## Experiential Programs Innovation Central (EPIC)

umaine.edu/research/epic



#### Vision

To provide the best high-impact student-centered undergraduate education in the nation and beyond.

#### Mission

To enable comprehensive development and systematic integration of innovative highimpact experiential learning in undergraduate programs. Where learning goes beyond the classroom, as students methodically gain invaluable experiential education during their years at UMaine, preparing them as successful professionals and lifelong learners.

#### **INT 125: Experiential Program Innovation Central**

#### Enroll now! Class begins on October 23<sup>rd</sup>!

Class meeting time: Friday 2:00 - 4:50 pm

Credit hours: 3

This course is designed to provide an overview of experiential learning pathways for students at a 21<sup>st</sup> century land grant research institution. INT 125 is taught by various interdisciplinary faculty instructors, led by Ali Abed (Coordinator), Assistant Vice President for Research and Center for Undergraduate Research Director

#### For more information contact Ali Abedi: ali.abedi@maine.edu



#### New Funding Opportunities in Artificial Intelligence (AI), Health and Life Sciences, and Advanced Research Computing

The Office of the Vice President for Research and Dean of the Graduate School is offering \$1200 fellowships in the areas of artificial intelligence and health and life sciences to 20 qualified students (10 in each area). Funding for faculty to utilize Advanced Research Computing resources for these projects is available through this new program.

#### **Artificial Intelligence Initiative - Student Fellowship Opportunity**

The emerging field of Artificial Intelligence (AI) is a strategic growth area for UMaine. The mission of the AI initiative is to develop, through innovative and coordinated research, education, and strategic partnerships, transformative AI-based solutions that enhance the social and economic well-being of the citizens of Maine and beyond. Ten fellowships will be offered to students who apply through the CUGR AY



2021 Fellowship form. Students from any discipline who are focused on artificial intelligence will be considered for this fellowship when working with a faculty mentor. Pandemic related research proposals will be given special consideration. A few funding slots have been allocated to this category.

#### Institute of Medicine – Student Fellowship Opportunity

UMaine Institute of Medicine Fellowships support faculty and students in health and life sciences to develop transformative medical-based solutions through collaborations with a coordinated network of researchers and educators in partnership with health care professionals and other stakeholders. Ten proposals, dedicated to the advancement of human health and wellbeing in the state of



Maine and beyond, will be funded through this program. Applicants are expected to demonstrate how discovery and learning in health and life sciences, from basic to translational research, can enhance clinical practices, biomedical research, and/or healthcare workforce development.

#### Advanced Research Computing (ARC) – Faculty and Student Resources



UMaine Advanced Research Computing offers local and cloudbased computing and storage services to all faculty and students. This infrastructure can be utilized to support Al/machine learning research for a variety of applications including health/life sciences, and to counter access constraints to high memory, GPU-based hardware. Funding to support ARC usage is made available through the office of the Vice President

for Research and Dean of the Graduate School. Student applicants in consultation with their faculty mentor should select this option under CORE section of the CUGR application system to be considered.

## **Easel & Poster Board Rentals**

Having an art event? Interested in displaying your students' work? Having a virtual or hybrid conference?

Co-sponsored by CUGR and the Honors College, every University of Maine department or student group can rent poster boards and easels at a low cost.

These prices are for a maximum of five days, e.g. Monday to Friday or Thursday to Monday.

Easel Dimensions: Adjustable telescoping legs allow variable heights from 36" to 66".

For availability, pricing and other information, contact the CUGR office at cugr@maine.edu.



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

Combo Qty.	Price Per Combo	
1–25	\$4	
26–50	\$3	
51–100	\$2.50	
Combo = easel + foam poster board		
PRICE/COMBO EXAMPLES:		
Rental fee for qty. 20 combos equals \$80		
Rental fee for qty. 30 combos equals \$90		
Rental fee for qty. 100 combos equals \$250		

#### **CUGR Fellowships**

#### **Summer 2020**

#### **Award Recipients**

Summer Fellowships are 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' proposals are reviewed and scored by the CUGR Advisory Committee. Awarded projects are selected based on the scores from the reviews and panel discussions. Each proposal must include: abstract, project description, timeline, budget table, budget justification, and a faculty commitment letter.

#### Award Recipients, Project Titles:

Dawsin Blanchard, Deep Network Compression Using Information Theoretic Scores

Jacob Cote, The Role of Prophage Mediated Defense in Pathogenic Mycobacteria

Janet Elvidge, Creating a Website: Even a Frugal, Non-Techie Artist Can Do It

**Lauren Genenbacher**, How Capitalism Corrupted America's Public Drinking Water Systems and How the Local and Federal Political Environment Helped Entrench This Issue

**Emma Gibbons**, Investigating the Effects of Cytokinin Hormone in Drought Resistance of Lowbush and Highbush Blueberries

Sarah Hunt, A Qualitative Analysis of Lesbian and Gay Coparenting

Kiera Luu, Dulse Sea Vegetable Nursery

**Christian Potts,** Mechanisms of Cetylpyridinium Chloride Inhibition of Immune Mast Cell Function: Focus on Ca2+ Mobilization

Marlys Rietdyk, Effects of Warming on Wild Blueberry Growth Pattern and Production

Nicole Ritchey, Fungal Communities in Ancient and Contemporary Marine Sponges

**Chelsea Sainsbury,** Synthesis of Photoswitchable Triptan Derivatives and Evaluation of their Activity on Serotonin Receptors

Karim Seifeldin, Understanding the Pattern of Underdevelopment in the United States

**Miranda Snyder**, How Alumni of Middle and High School Activist Organizations Perceive Their Involvement Related to Their Academic Self-Concept

## Maine Space Grant Consortium

#### **Summer 2020**

#### **Award Recipients**

The Maine Space Grant Consortium is an affiliate of NASA's National Space Grant College and Fellowship Program. The mission of the Maine Space Grant Consortium is to support NASA's mission and four strategic enterprises by strengthening Maine's aerospace related research and education assets, which are critical to the Agency.

#### Graduate\* Awardees, Project Titles:

Daniel P. Regan, Pathogen Collection and Handling System for Spacecraft Biosurveillance

Joel Tewksbury, Surface Acoustic Wave Devices as Biosensors for Long Term Space Travel

**Ingalise Kindstedt**, Improving Land Surface Temperature Estimates from the NSAS MODIS Sensor in the St. Elias Mountains, Yukon, Canada

**Tess Walther,** Recent Variations in Alpine Glacier Terminus Positions in Southern McMurdo Sound, Antarctica, Using Field Observations and NASA Satellite Imagery

**Alex Koch**, Application of Machine Learning Techniques to Classify and Identify Galaxy Merger Events in the CANDELS Fields

#### Undergraduate Awardees, Project Titles:

Basel White, Wavelet-Based Automatic Pectoral Muscle Segmentation from Mammograms

Joseph Patton, MESAT-1 Electrical Power Subsystem

Joshua Hamilton, Tuning CNF Fibril Orientation for Tissue Integration

• Note: This year, we continue the undergraduate program only based on new awards term.

## Miranda Snyder

Major: Secondary Education & English Faculty Mentor: Dr. Susan K. Gardner Class of 2021



Miranda Snyder

## How did you get started in undergraduate research?

My interest in research blossomed when I realized how research can combine various interdisciplinary interests and methods. This realization has since been incorporated into the mode of my current research, which infuses education-based concepts such as academic selfconcept with sociological concerns, specifically in the realm of women's, gender, and sexuality studies, such as activism in identity-based causes, including feminist organizations.

#### Brief description of your research project:

Interviewing alumni of the Maine-based nonprofit, Hardy Girls Healthy Women, to understand how they perceive their involvement in activism during Middle-High school as related to their academic self-concept.

#### What benefit did working with a faculty mentor on your research have on your overall experience?

Dr. Susan K. Gardner, my faculty mentor, has provided the ideal support and guidance in my execution of this research. Her experience in research with various focuses and methodologies has provided ample framework to base the process of my own work around. Beyond her experience in the research and academic realm, she has been a wonderful support and sounding board for any concerns raised during the research process. Dr. Gardner is responsive, resourceful, and an inspiring mentor.

#### Any other interesting information or advice?

In order to execute research or any project to its fullest degree, one must be passionate about the material at hand. Fusing personal interest with one's unique skillset is essential to channeling the motivation and rigor needed to complete meaningful research. Additionally, seeking out and forming collaborative connections with mentors who share your interests is incredibly helpful. I am extremely grateful for my entire thesis committee, who has provided helpful critical insight into every step of the process thus far.

### **Nicole Ritchey**

Major: Marine Science Faculty Mentor: Dr. Laurie Connell Class of December 2020



Nicole Ritchey

#### How did you get interested in Undergraduate Research?

Once I arrived at college I knew I wanted to participate in undergraduate research. I like learning by hands-on experience and I was interested in gaining practical knowledge in my field of study.

#### Brief description of your research project:

I am researching Antarctic fungal species found in Antarctic marine sponges. I have already received Next-Gen sequencing results and am currently processing the sequences with Gen-Bank to identify fungal species from the Antarctic sponge samples.

## What benefit did working with a faculty mentor on your research have on your overall experience?

My faculty mentor, Dr. Laurie Connell, is very knowledgeable in the Antarctic fungi field. Her knowledge has been incredibly helpful in designing my research study. Her guidance has made my research experience very positive.

#### Any advice to other undergraduates?

If you have a good mentor, they will help make it the best experience you can get, no matter the size of the project.

#### Janet Elvidge

Major: Studio Art Faculty Mentor: Giles Timms Class of 2024



Janet Elvidge

## How did you get started in undergraduate research?

In my former life I was a librarian where I understood the value of research for students. Now in my 50s I am going back to school in the Studio Art program and wanted to use research to explore how newbie, frugal and potentially non-techie artists can create a web presence.

#### Brief description of your research project:

I am exploring best practices for artists to set up a digital presence and then creating one for myself.

## What benefit did working with a faculty mentor on your research have on your overall experience?

I greatly benefited from my mentor's guidance on creating the proposal. My mentor has a lot of knowledge in my area of research and helped me critically think about what kinds of questions I need to ask for my research.

#### Any advice to other undergraduates?

Pick a topic you are interested in! A great place to start your research is at Fogler Library. The librarians and resources are top notch!

#### **Emma Gibbons**

Major: Botany Faculty Mentor: Dr. Yongjiang Zhang Class of 2022



Emma Gibbons

## How did you get started in undergraduate research?

I have been working for Dr. Zhang for about a year now and working with him and the other students in my lab has significantly improved my knowledge on plant sciences and crop stress physiology. Dr. Zhang's research focus is blueberry plants, which are rarely the subject of plant science research. I would like to change that, and contribute to seldom known climaterelated and plant-related research.

#### Brief description of your research project

My project will quantify the exact effects of the plant hormone cytokinin on blueberry plants. Consistent monitoring and measuring of the plants' structural and mechanistic state will take place to achieve this. After the application, the plants will be subject to a drought simulation. The overall results will provide the degree of drought tolerance that the plants possess and how the hormone aids or limits the plant growth during a drought.

## What benefit did working with a faculty mentor on your research have on your overall experience?

My faculty mentor has been in China since January, but he does all that he can to help me from a distance and always is quick to answer my questions and talk with me and my lab group about our work. The other students in my lab group have helped me immensely with further understanding the work that I'm doing and helping me improve on data collection and data analysis.

#### Any advice to other undergraduates?

Keep in strong communication with your mentor(s) and anyone associated with your work. Don't be afraid to ask for help and help others when you can. You will learn a lot as long as you do the best that you know you're capable of!

### **Basel White**

Major: Biomedical Engineering Faculty Mentor: Dr. Andre Khalil Class of 2022



Basel White

## How did you get started in undergraduate research?

My mother was diagnosed with breast cancer my freshman year of high school. It was then I knew I wanted to major in Biomedical Engineering, and become involved in breast cancer research. As soon as I arrived at The University of Maine, I discovered the work the CompuMAINE Laboratory on campus was accomplishing in regards to breast cancer research, and I immediately became involved.

#### Brief description of your research project:

My research project is focused on generating specialized chains corresponding to the contour of both the pectoral muscle and outside of the female breast. This will aid in automatically creating a black and white image spatially corresponding to where the breast tissue lies. This task is currently done manually.

## What benefit did working with a faculty mentor on your research have on your overall experience?

Dr. Khalil continues to share his experience and knowledge in the subjects Biomedical Engineering and Mathematics, and on how to succeed as both an undergraduate student and researcher. Due to his mentorship, the experience I am acquiring in computational breast cancer research is consistently increasing.

#### Any advice to other undergraduates?

My advice to others about research is that if you are interested in working in a lab and getting involved in research, do it as soon as possible. There is truly no prerequisite for getting involved in research at the collegiate level. I joined the CompuMAINE Lab in November of my freshman year, and it was the best decision I have made. The experience you acquire through performing research is different and equally as valuable as that of learning in a classroom setting.

## Alex Koch

Major: Astrophysics Faculty Mentor: Dr. David Batuski Class of 2021



Alex Koch

## How did you get started in undergraduate research?

A collaborating researcher, Dr. Dale Kocevski, who teaches at Colby College, has been working with a group of researchers studying the Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey (CANDELS). They have been looking into using machine learning techniques, such as Random Forest Classifiers and Computer Vision algorithms, to help identify galaxy mergers.

#### Brief description of your research project

I am researching the application of machine learning techniques to identify galaxy merger events. With today's large surveys such as CANDELS and SDSS, which return millions of astronomical images, it is becoming less practical for astronomers to classify galaxies manually. Therefore, we turn to machine learning and artificial intelligence to help us identify interesting astronomical phenomena, such as galaxy merger events.

#### What benefit did working with a faculty mentor on your research have on your overall experience?

Dr. Batuski and Dr. Kocevski have helped immensely in my fundamental understanding of these events. While none of us began this project as an expert in machine learning, we have all benefited by working together to understand how these complex algorithms work and how they can best be applied for solving the problem at hand.

## Any other interesting information or advice?

Sometimes it takes time to find a project that you are truly passionate about. Don't be afraid to try new things, even when they begin to cross over into other areas of science. You should never let not knowing something stop you from learning it.

### **Kiera Luu**

Major: Marine Science Faculty Mentor: Dr. Tim Bowden Class of 2022



Kiera Luu

## How did you get started in undergraduate research?

After being accepted for an internship with Dr. Anne Langston Noll, I became more immersed in the world of commercial aquaculture, including shellfish, finfish, and sea vegetables. Through my volunteer and intern work at Pemetic Sea Farms, I began to experience and subsequently, understand some of the issues in extensive aquaculture, such as ocean acidification, product diversification, and market adaptability. That's when I got interested in Integrative Multi-Trophic Aquaculture, where more than one crop is grown in an almost symbiotic nature, to supplement the growth of crops, while diversifying income for farmers. I am interested in the co-culture of CO<sub>2</sub> bioremediators such as dulse and shellfish like oysters. I am researching dulse so as to find affordable, manageable culture methods to then share with shellfish farmers all over Maine, in hopes that IMTA improves the yield and strength of their shellfish.

#### Brief description of your research project

Dulse (Palmaria palmata) nursery for the aquaculture of a popular snack seaweed

#### What benefit did working with a faculty mentor on your research have on your overall experience?

Tim Bowden and Anne Langston Noll have been a wealth of knowledge when it comes to sea farming. They have introduced me to other shellfish and sea vegetable farmers, encouraged me to delve into literature on seaweed culture, and taught me about farming oysters as well.

#### Any other interesting information or advice?

Don't hesitate to reach out to your professors for advice. They're more than likely experienced in research and development. Many of my professors have been very helpful with this project.

## cugr.umaine.edu



#### **CUGR Advisory Committee**

Ali Abedi, Assistant VP Research and CUGR Director, Professor of ECE, COE Melissa Maginnis, Associate Professor of Microbiology and CUGR Assistant Director Stephanie Welcomer, Interim Dean of the Honors College Amelia Couture Bue, Assistant Professor of Communication and Journalism, CLAS Zachary Ludington, Assistant Professor of Spanish, Modern Languages and Classics, CLAS Laura Artesani, Chair and Associate Professor, Music Education Coordinator, CLAS George Criner, Associate Dean for Academics, NSFA Sally Dixon-Molloy, Honors Preceptor, Assistant Professor of Genomics, NSFA Jean MacRae, Associate Professor of Civil and Environmental Engineering, COE Patricia Poirier, Graduate Program Coordinator, Professor of Nursing, NSFA Olivia Lovejoy, Undergraduate Student Representative Stefano Tijerina, Lecturer, Management, MBS Deborah Eremita, Undergraduate Program Coordinator, Assistant Professor of Nursing, NSFA Timothy Cole, Associate Dean for Academics, CLAS

#### **CUGR Program Dates and Deadlines**

#### Academic Year 2020-2021

Online Application Deadline 10/16/20 Award Announcement 10/30/20 Performance Period 11/1/20 – 5/1/21 Apply at the link below: https://tinyurl.com/FallFellowship2020

#### **UMaine Virtual Student Symposium**

Friday, October 2 Register for the event: https://umaine.edu/umss/

## Stay connected with CUGR



Facebook.com/centerforundergraduateresearch



#### Center4UG\_Research





Instagram.com/umaine.cugr/



https://www.linkedin.com/groups/8956092/



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