Summer Research Program for Undergraduates

Program Handbook 2018
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Program Committee and Administrative Team

SREU Administrative Team

Ms. Tracy Beauregard, Program Coordinator and Student Services Specialist
Office: DCH 382
Phone: 704-687-8320
Email: tlbeaure@uncc.edu

Dr. Tony Schmitz, Associate Chair for Graduate Programs and Professor
Office: DCH 164
Phone: 704-687-5086
Email: Tony.Schmitz@uncc.edu
**Program Introduction**
Welcome to the 2018 Summer Research Experience for Undergraduates program hosted by the Department of Mechanical Engineering and Engineering Science at the University of North Carolina at Charlotte! During our eight-week program, you will be introduced to in-depth research in the field of mechanical engineering. Your faculty mentor will work with you to complete a research project and prepare for its presentation in both an oral and poster format. Graduate students will also work with you to help you understand laboratory procedures and what graduate research is like. Each week, you will attend a brief seminar focused aspects of professional development and research.

**Program Objectives**
The Summer Research Experience for Undergraduates program will provide students with:

- an appreciation for the challenges of research
- experience working as an engineer
- an understanding of what graduate school entails
- exposure to research areas within the Mechanical Engineering discipline and the Department of Mechanical Engineering & Engineering Science at UNC Charlotte

**Program Expectations**
Participants are responsible for attending all program events and completing all program requirements including the oral presentation and poster exhibition. All presentations and posters must be reviewed and approved by the faculty mentor. Additional reports may be required by the faculty mentor.

- **Time Allocation – 35-40 hours/week for 8 weeks**
  Participants are expected to treat the SREU program as they would a full-time job. Working hours are typically 8/9am to 5pm – flexibility is afforded for attending program seminars, interacting with graduate students, equipment schedules, and the needs of the individual project.

- **Summer Research Symposium – Wednesday, July 25, 9 AM, Student Union 340**
  All SREU participants are expected to participate in the Fourth Annual Summer Research Symposium. This is an opportunity for all undergraduate researchers on campus to present their results. The contents of the research poster and presentation should include project background, synopsis of any literature review, research goals or hypothesis, research plan or methodology, results and conclusions, and suggestions for future work/research. *Business dress is expected.*
<table>
<thead>
<tr>
<th>Participant Name and College</th>
<th>Project Title</th>
<th>Faculty Mentor</th>
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<tbody>
<tr>
<td>Jason Solomon <em>UNC Charlotte</em></td>
<td>Experimental Investigation into Molecular Hydrodynamics</td>
<td>Dr. Peter Tkacik, Mr. Jerry Dahlberg</td>
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<td>Daniel Saraphis <em>UNC Charlotte</em></td>
<td>Response of concrete under uniaxial and triaxial compressive loads</td>
<td>Dr. Harish Cherukuri, Dr. Miguel Pando</td>
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<tr>
<td>Alex Caviness <em>UNC Charlotte</em></td>
<td>Grazing incidence x-ray reflectivity for NIF target surface studies</td>
<td>Dr. Stuart Smith</td>
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<td>Marc Duemmler <em>UNC Charlotte</em></td>
<td>Precision Engineering POEMS: Programmed, Optical, Electrical and Mechanical Systems</td>
<td>Dr. Bin (Kyle) Zhang</td>
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<td>Thomas Lawe <em>UNC Charlotte</em></td>
<td>Formulation Design of Dissolving Microneedles</td>
<td>Dr. Gloria Elliott</td>
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<td>Ezron Manco <em>UNC Charlotte</em></td>
<td>Post Polishing of Ultra-Precision Machined Optical Surfaces</td>
<td>Dr. Chris Evans, Dr. Joseph Owen</td>
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<td>Joachim Sagayaraj <em>UNC Charlotte</em></td>
<td>Autonomy in an Electrical Vehicle</td>
<td>Dr. Amir Ghasemi</td>
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<td>Hunter Soper <em>UNC Charlotte</em></td>
<td>Optimized Robotic Locomotion via Reinforcement Learning</td>
<td>Dr. Scott Kelly</td>
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<td>Robert Jenkins <em>UNC Charlotte</em></td>
<td>A comprehensive analysis and design of 3D printed upper limb prosthetic devices</td>
<td>Dr. Nigel Zheng</td>
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<td>Mohran Al Jurdi <em>UNC Charlotte</em></td>
<td>Fatigue Strength of Wrought Iron Wire</td>
<td>Dr. Ronald Smelser</td>
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<td>Douglas Lawrence <em>UNC Charlotte</em></td>
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<td>Dr. Terry Xu</td>
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<td>Jackson Hardwood <em>Lake Norman Charter School</em></td>
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# Program Schedule June

## June 2018

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<td>Fellowships and Honors Programs 3-5PM @ Fretwell 100</td>
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- **First Day of Program ORIENTATION**
  - 9AM @ DUKE Fishbowl Study
  - Attendance Required
- **Thinking about Graduate School**
  - 3-5PM @ Fretwell 100
- **Professional Writing**
  - 3-5PM @ Fretwell 113 and 100
- **NSF Graduate Fellowships**
  - 3-5PM @ Fretwell 100
- **Cookout**
  - 11:00AM @ Alumni Pavilion
- **June Timesheets Due in WTE by 5pm**
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Program Logistics

Faculty-Student Contact Hours

Project Overview and Goals
It is important in the early stages of the project to make sure you understand what is required of you ... if you are not sure, please ask. Discuss a meeting schedule with your faculty mentor.

Training on Equipment/Software
Your faculty mentor, graduate students, and lab managers may all play a role in training you on the appropriate equipment and software needed to complete your project. Access to certain laboratories/equipment may require additional procedural and/or safety training.

Research Planning
Eight weeks will go by quicker than you think. It is important to develop a schedule as a way to manage your time effectively.

Progress Checks/Meetings with Faculty Mentor/Research Group
You can expect your faculty mentor to do progress checks with you on a periodic basis. If you are working with a research group as part of a larger project, you may be asked to attend those group meetings.

Independent Work

Getting Up to Speed on the Research Topic
- Terminology
- Project Background and Literature Review
- Important: Can you clearly articulate why you are doing the work and what the project goals are?

Familiarize Yourself with the Lab and Lab Equipment
- Read equipment manuals
- Request training on equipment
- Review and refer to safety guidelines and procedures

Assessing your Knowledge
- Formulate questions as you work in order to effectively use faculty mentor contact time
- Attend professional development seminars

Project Presentation and Poster
- Make sure you are making sufficient progress on your project presentation and poster
- Take note of approval and submission deadlines in the SREU schedule
Document your Work

- Utilize a lab or engineering notebook to document your work.
- Keep track of your sources for citations; plagiarism is a serious violation of academic integrity and is not tolerated

Useful Resources and Links

UNC Charlotte J. Murrey Atkins Library - [http://library.uncc.edu/](http://library.uncc.edu/)

Engineering Research Guide (Atkins Library, Engineering Librarian is Jeff McAdams) - [http://guides.library.uncc.edu/engineering](http://guides.library.uncc.edu/engineering)

UNC Charlotte Writing Resources Center – Writing Handouts and Quick References – [http://wrc.uncc.edu/Resources-for-Students](http://wrc.uncc.edu/Resources-for-Students)

American Society of Mechanical Engineers – Student Engineers - [http://www.asme.org/groups/educational-resources/student-engineers](http://www.asme.org/groups/educational-resources/student-engineers)
**Poster Guidelines and Submission of Project Abstract**

Final project abstracts must be submitted by Monday, July 16 to ensure that programs are printed in time for the Research Symposium on July 25. Please email your abstract to Patrick Gentile at pgentil1@uncc.edu and copy Tracy Beauregard, tlbeaure@uncc.edu.

Posters may be landscape or portrait orientation, 36” x 48”, and include the following components:

- Poster title, your name, faculty mentor’s name, your institution, along with REU program
- Introduction/Abstract
- Methodology
- Results and Conclusions
- Acknowledgements
- References

A standard template is available on the MEES website: [https://mees.uncc.edu/research/sreu](https://mees.uncc.edu/research/sreu)

Prepare a 3-5 minute verbal explanation for the poster session.

**Project Abstracts**

Students will prepare a project abstract with the guidance of their faculty mentor, which will be featured in the Summer Research Symposium program and on the Mechanical Engineering website. An abstract template and examples are available on the MEES website: [https://mees.uncc.edu/research/sreu](https://mees.uncc.edu/research/sreu)
Safety
The SREU program in Mechanical Engineering & Engineering Science at UNC Charlotte is committed to providing a safe working research environment to all program participants.

Please review and refer to the following links for Lee College of Engineering safety guidelines and procedures:

https://engr.uncc.edu/about-us/safety
https://engr.uncc.edu/about-us/safety/safety-guidelines
https://engr.uncc.edu/about-us/safety/safety-policy-labs

Participants are not permitted to work in labs or the machine shop unsupervised at any time.

In case of an emergency:

The UNC Charlotte Police can be summoned from any of approximately 200 campus phones by simply pressing the emergency button, by dialing 911 from any campus telephone line, or by calling 704-687-2200 from an off-campus phone or cellular phone. The Police Telecommunicators are authorized to dispatch police, fire, or emergency medical services immediately upon receiving a call for help. All emergency phone use will be followed up by police response or call back.

These emergency phones can also be used for non-emergency usage such as: requests for safety escorts, to report suspicious persons or activities, or to report any other problems or concerns while on campus. http://www.police.uncc.edu
Compensation
All time-keeping is tracked and managed through the Web-Time Entry (WTE) system which is a part of Banner Self-Service. During the orientation session, participants will be provided with specific instructions for entering and submitting their time worked in WTE.

All timesheets must be submitted by 5:00pm on the following dates:

Friday, June 29 (June Timesheet)
Friday, July 27 (July Timesheet)

Pay dates for participants will be:

Friday, July 13
Wednesday, August 15

Direct Deposit
UNC Charlotte requires all employees to use Direct Deposit for payroll disbursements. Instructions on how to sign up for direct deposit in Banner Self-Service will be given during the orientation session.

Email and Mosaic System Access
UNC Charlotte student participants will already have email and access to Mosaic systems.

External participants will be provided with a sponsored UNC Charlotte email account and access to Mosaic systems.

UNC Charlotte ID
UNC Charlotte student participants will already have a UNC Charlotte ID Card.

External participants will visit the UNC Charlotte ID card office following the orientation session to have their UNC Charlotte ID card made. Please bring photo ID and your UNC Charlotte ID# (will be provided during the orientation session).

Participants may wish to add dollar value to the UNC Charlotte ID card for meals. Details can be found in the ID Office and Student Union, as well as at the following link:
Parking Services and Transportation
Parking permits are the participant’s responsibility. Parking areas for Residents and Commuters are identified on the Campus Map.

Dining Services
Please visit http://www.dineoncampus.com/unccharlotte/ for dining locations and summer hours. You can add dollar value for dining to your UNC Charlotte ID card if desired.

Student Health Center
If you should need medical care while on campus, you can be seen at the Student Health Center, located on the corner of Mary Alexander and Cameron Blvd (building 65 on campus map). The fee for conference visitors is $45. There could also be additional costs for lab, x-ray, or pharmacy charges. When the patient checks out they will be given a walkout statement that lists their diagnosis and charges, with their corresponding codes. To make an appointment, please visit http://studenthealth.uncc.edu/medical-services/appointments
The Student Health Center’s summer hours are Monday – Friday, 8:00am to 5:00pm. The Pharmacy is open 8:30am – 5:00pm.

For after-hours or additional health care options, please see the list of Charlotte-area hospitals and urgent care facilities on page 13.

Campus Recreation Center
If you are interested in purchasing a membership at the campus recreation center, you may purchase a monthly pass at the Faculty/Staff rate. Information about campus recreation facilities is available at http://recservices.uncc.edu.

The office is open during regular business hours or a representative will be available in June with special evening hours. You will need to bring a picture ID when signing up.
Campus Map

Directions to UNC Charlotte’s Main Campus

For directions to campus and additional campus maps, please visit:
http://www.uncc.edu/directions.
Key Contacts – Lab and Administrative Staff

○ Center for Precision Metrology (CPM) - First Floor, Duke Centennial Hall
  - Jimmie Miller - Metrology (tel: 7-8312, room: DCH 170)
  - Greg Caskey - Metrology (tel: 7-8499, room: DCH 165)

○ Bio (Woodward Hall)
  - David Gray - Bio equipment (tel: 7-8317, room: WH 380A)
  - Tracy Breslin - Key requests, etc. (tel: 7-8692, room: WH 257)

○ SEM Training
  - Haitao Zhang - Key requests, etc. (tel: 7-8128, room: DCH 279)

○ Machine Shop
  - Joe Dalton (tel: 7-8238, room: DCH 125)

○ Electrical
  - Garry Hodgins (tel: 7-8254, room: DCH 221)
  - Franklin Green (tel: 7-8185, room: DCH 237)

○ Motorsports
  - Luke Woroniecki (tel: 7-7306, room: Kulwicki Lab 191B)

○ Administrative
  - Tracy Beauregard – Program administration, payroll, key requests, etc. (tel: 7-8320, tlbeaure@uncc.edu, room: DCH 382)
  - Erica Tadlock – Hiring and payroll, key requests. (tel: 7-7183, erica.tadlock@uncc.edu, room: DCH 384)
  - Laini Pound - Purchasing, accounts payable/receivable. (tel: 7-8337, lainipound@uncc.edu, room: DCH 380)
After Hours and Additional Health Care Options

Charlotte Area Hospitals & Urgent Care

The Charlotte area has many hospitals and urgent care clinics. Listed below are some that are relatively close to the UNC Charlotte campus. They are listed here for informational reasons only and are not endorsed by UNC Charlotte. Miles are the approximate distance from the campus. List maintained by the UNCC Student Heath Center, (704) 987-6400. Updated 9/22/2009

HOSPITALS

Carolina Medical Center – University
1.25 miles
8800 North Tryon Street
Charlotte, NC 28262
704-863-6000
www.cmc-university.org

Presbyterian Hospital
9.8 miles
200 Hawthorne Lane
Charlotte, NC 28204
Phone: 704-394-4000
www.presbyterian.org

Carolina Medical Center - Mercy
9.94 miles
2001 Vail Ave,
Charlotte NC 28207
(704) 304-5000
www.cmc-mercy.org

Carolina Medical Center
9.96 miles
1000 Bylthe Boulevard
Charlotte, NC 28203
704-355-2000
www.carolinamedicalcenter.org

NorthEast Medical Center
13.85 miles
920 Church Street North
Concord, NC 28025
704-403-3000
www.cmc-northeast.org

WALK-IN CLINICS

Minute Clinic
6.2 miles
10515 Mailard Creek Road
Charlotte, NC 28262
988-369-2727
www.minuteclinic.com

NextCare Urgent Care
6.3 miles
3210 Prosperity Church Road
Charlotte, NC 28269
704-371-8800
www.nextcare.com

CMC Prosperity Crossing Urgent Care
7.8 miles
5435 Prosperity Church Road
Charlotte NC 28269
704-863-9030
www.carolinascmc.com

Carolina HealthCare Urgent Care - Eastland
9.0 miles
5717 Albemare Road,
Charlotte, NC 28212
704-563-2150
www.carolinascmc.com

BEHAVIORAL HEALTH

Behavioral Health Center CMC-
Randolph
10 miles
501 Billingsley Rd
Charlotte, NC 28211
704-444-2400 or toll free 1-800-418-2085
www.carolinascmc.com/services/behavioralCenter/Randolph.cfm

Presbyterian Hospital Behavioral Health Services
9.8 miles
200 Hawthorne Lane
Charlotte, NC 28204
(704) 384-4000
http://www.presbyterian.org/site/our_service/