Earl E. Bakken Medical Devices Center

Internship Program Description – 2020

Thank you for your interest in applying to the 2020 Earl E. Bakken Medical Devices Center (MDC) Summer Internship program. The program begins on May 27th, 2020 and ends on August 19th, 2020. The MDC is located in the heart of the University of Minnesota’s (UMN) Medical School in the Mayo Building on UMN’s east bank campus. With over 8,000 square feet of meeting spaces and prototyping equipment spread across five different labs, the MDC is the innovator’s playground. The MDC provides students, researchers, inventors, medical professionals, and UMN faculty with access to a variety of resources to design, build, and prototype medical devices and customized equipment. With machining, electronics, 3D printing, tissue dissection, CAD software, and virtual prototyping resources available, there are tools for innovators of all backgrounds to utilize. The MDC also works closely with medical professionals and device companies across the globe to develop new life enhancing tools and devices to make a positive impact in health care. Check out this video to see how the MDC played a role in separating conjoined twins using virtual reality.

The Bakken MDC Internship program is designed to train students to become medical device innovators by teaching essential prototyping skills, critical components of the engineering design process, and providing real world experience in product development. The volunteer-based program targets exceptional individuals who are interested in medical technology, eager to gain more device development experience, and seeking both leadership and team-based experiences. It is our hope that students who engage in the program become MDC contributors not only for the duration of the summer, but also in the years to come.

Throughout the summer, the program introduces a variety of medical devices as well as teaches specific aspects of the engineering design process. MDC Interns complete guided tutorials to learn prototyping techniques in machining, laser cutting, electronics, 3D printing, and computer aided design (CAD) - as well as develop other important hands on skills. After a base knowledge is developed, the program provides the interns with the opportunity to practice what they have learned by working on a real medical device development project with experienced technical mentors and medical professionals. Along with the prototyping instruction and design experiences, the internship is also a leadership platform. We ask that all interns provide a management presence in the Center by helping to maintain the labs, supervising other activity while working, and even teaching others skills that they learned in the program. While we ask for a 11-week commitment over the summer, we hope to build a growing intern network that continues to return to innovate and provide leadership in the MDC for semesters to come. We are very excited about the MDC program we have planned for this summer. It is built on the experiences of previous years and continues to grow as more aspiring innovators join our team. More details about the internship can be found below.
If you are interested in applying for this program, please fill out the application form by following the link below. The deadline for applications is Sunday, April 19th, 2020 at 11:55 PM. Application results will be sent out no later than Monday, April 27th, 2020.

APPLICATION HERE: [https://z.umn.edu/2020MDCApplication](https://z.umn.edu/2020MDCApplication)

More info about the MDC can be found at [www.mdc.umn.edu](http://www.mdc.umn.edu). If you have any questions, please contact Cara Piazza at piaz020@umn.edu.

**Job Description/Requirements:**

An MDC Intern is required to attend weekly meetings on Wednesday nights from 5:00 PM – 6:30 PM. While missing one or two of these meetings is understandable, it is expected that the weekly meetings are attended on a regular basis. Interns are required to be physically present in the Center a minimum of 15 hours per week on average, but these hours can be scheduled by the Intern as long as they are conducive to meeting with their design team and attending the weekly meetings. Applicants that are willing to commit more time to being physically present in the Center during the program will be given preference.

**Learning Objectives and Outcomes:**

- Learning how to use basic and advanced prototyping equipment through hands-on experiences
  - Design Software
  - Machining
  - Microprocessor Programming
  - 3D Printing
  - 3D Scanning
  - Virtual Reality
  - and many more!

- Working on a team to develop a medical device
  - Learn the engineering design process
  - Learn about product development
  - Apply fabrication skills to make medical device prototypes
  - Work in a team environment
  - Work with medical professionals and technical experts
  - Potential for patents or publications ([10 invention disclosures in the past three years!]())

- Developing leadership skills
  - Supervising and maintaining laboratories
  - Presenting project updates to other intern teams during weekly meetings
  - Teaching other students how to safely operate prototyping equipment
  - Working with various design teams to provide prototyping advice
  - Leading MDC tours and helping at outreach events
2019 Bakken MDC Internship Program Statistics and Information

### Academic Background of 2019 Bakken MDC Interns

- Mechanical Engineering: 38%
- Biomedical Engineering: 32%
- Pharmacy: 3%
- Health Services Management: 3%
- Finance: 6%
- Undeclared: 3%
- Computer Engineering: 3%
- Computer Science: 3%
- Electrical Engineering: 3%
- Health Informatics: 3%
- Chemical Engineering: 3%

*Figure 1: Majors of Accepted Students*

### Education Level of 2019 Bakken MDC Interns

- Freshman: 14%
- Sophomore: 17%
- Junior: 21%
- Senior: 31%
- Grad: 17%

*Figure 2: Education Level of Accepted Students*
### Table 1: 2019 Bakken MDC Internship Program Projects Overview

<table>
<thead>
<tr>
<th>Device Projects</th>
<th>Brief Description</th>
</tr>
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<tbody>
<tr>
<td>Self-Cannulation</td>
<td>At home hemodialysis device</td>
</tr>
<tr>
<td>Wearable Athletic Sensing</td>
<td>Wearable device for physiological monitoring of athletes</td>
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<tr>
<td>Prosthetic Hip</td>
<td>Prosthetic hip implant device for improved comfort</td>
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<tr>
<td>Levadopa Monitoring</td>
<td>Parkinson's treatment and monitoring technology</td>
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<tr>
<td>Vascular Doppler</td>
<td>Mobile vascular doppler device for hospitals</td>
</tr>
<tr>
<td>Urethral Erosion</td>
<td>Wearable device to prevent penile erosion from in-dwelling catheters</td>
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### Table 2: 2019 Bakken MDC Internship Program Technical Mentors

<table>
<thead>
<tr>
<th>Name</th>
<th>Background</th>
<th>Project Mentored</th>
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| Ibrahim Yekinni, MBBS   | • MDC Innovation Fellow Alumni  
                          • Entrepreneur                                                                                                                                 |
| Adam Black, PhD         | • MDC Innovation Fellow Alumni  
                          • Entrepreneur                                                                                                                                 |
| Eric Little, PhD, JD    | • Assistant Professor of Mechanical & Manufacturing Engineering at St. Cloud State University  
                          • Patent Attorney  
                          • Past MDC Innovation Fellow  
                          • Entrepreneur                                                                                                                                 |
| Paul Rothweiler, MBA    | • Over 30 years of leadership experience in medical device development                                                                    |
| Dan Glumac, PhD         | • MDC Innovation Fellow Alumni  
                          • University of Minnesota Researcher  
                          • Adjunct Professor of Electrical Engineering at University of Minnesota                                                              |
| Amy Hoelscher, DNP      | • MDC Innovation Fellow Alumni  
                          • Entrepreneur                                                                                                                                 |