MCEH Summer Internship 2019

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<tr>
<th>Internship title</th>
<th>Optimization and Mathematical Modeling in Healthcare Intern</th>
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| Reports to       | Prof. Kimia Ghobadi  
|                  | Center for Systems Science and Engineering  
|                  | Department of Civil Engineering |

**Internship purpose**

The student will work on healthcare data to develop models for complex problems and discover insights through the use of optimization, data analytics, machine learning, and computational techniques. In addition to analytical skills, the intern should be proficient in programming, integrating large datasets, and communicating results. The intern will work closely with faculty, students, data stewards, and clinicians at Johns Hopkins University.

The Intern will acquire theoretical and practical knowledge in mathematical modeling, optimization, analytics, and artificial intelligence. The student will obtain hands-on experience with healthcare environments and healthcare data. The aim of the project is to leverage mathematical modeling and machine learning techniques to transform raw healthcare data into information providing evidence for medical decision-making, operational decisions, organizational strategies, and policy-making.

All Malone Center interns are expected to create a poster and present the results of their internship at the Johns Hopkins Research Symposium on Engineering in Healthcare, Nov 2019

**Short Project Description**

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<th>Research Project</th>
<th>Optimization and Mathematical Modeling in Healthcare</th>
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<td><strong>Description</strong></td>
<td>Scheduling clinical staff in the hospitals is critical and depends on both the number of patients and their needs. Given that the staff need to have their schedules in advance and the patient composition and quantity is uncertain, we combine data analytics and optimization models to find a schedule that minimizes the over- and under-staffing in surgery and medicine units.</td>
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| **Tasks**        | - Week 1-3: Scoping the Problem—literature review of methods and application areas  
|                  | - Week 4-8: Performing data analytics for insights from the data and developing optimization models  
|                  | - Week 8-12: Integrating the optimization models with predictive data |
| **Required Skills** | Strong background in mathematical programming, optimization, linear algebra, and data analytics. Proficient in programming (both object-oriented and R). |

**Qualifications**

- Bachelor’s degree in mathematics, computer science, statistics, or relevant fields. Graduate students preferred. Strong undergraduate students will be considered.
- Strong background in optimization, machine learning, and analytics
- Strong programming skills (R, Python, Julia/JuMP, etc.)
- Must demonstrate strong critical thinking and analytical reasoning skills
• Ability to execute assigned project tasks within established schedule
• Possesses sound documentation skills; writes and communicates clearly and concisely
• No previous research/industry experience required.

Working conditions and physical requirements

Indoor- shared office environment
Possible exposure to clinical setting (observing workflow)
Ability to physically operate computer required
May need to lift up to 20 lbs

Compensation

$13/hr up to $6,500 depending on schedule and duration

Anticipated Start Date

June, 2019

Duration

Summer Semester, 2019
Possibility for extended internship depending on performance, project need and interest on both sides

Location

The Johns Hopkins Homewood Campus, 3400 North Charles Street, Baltimore, MD 21218

Application Process

Email your resume and one paragraph describing what you are looking to gain from this internship to Vess Vassileva-Clarke: vclarke@jhu.edu.

Please include the name, email address and/or telephone # of your academic adviser (the faculty member who advises you).

Use Subject line “MCEH Optimization and Mathematical Modeling Internship-Summer 2019” for your email.

Applications received on or before May 5, 2019 will be given first consideration.