

# Timothy Josephson

## Personal Info

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 504 Beacon St., Apt. 22,  
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## Education

**Ph.D.**, Biomedical Engineering  
Boston University, 2020-Present

**M.S.**, Mechanical Engineering  
Drexel University, 2020

**B.S.**, Mechanical Engineering  
(Minor in Materials Science)  
Drexel University, 2020

## Skills

### Languages

MATLAB Python Julia

Java Arduino

### Software

ABAQUS ANSYS Creo

AutoCAD Vicon Nexus

Fusion 360

## Work and Research

**Drexel University**, Philadelphia, PA

*Sept 2015-June 2020*

*Researcher - Multiscale Computational Mechanics and Biomechanics Lab*

- Used finite element damage models to study the fracture behavior of cortical bone
- Developed a histological procedure for microstructural imaging of human cortical bone
- Implemented machine learning, image processing, and statistical analysis techniques to relate simulated mechanical behavior to microstructural morphology

**DePuy Synthes - Johnson & Johnson**, West Chester, PA

*Apr 2019-Sept 2019*

*R&D Engineering Co-op - Trauma, Upper Extremities  
Apr 2019-Sept 2019*

- Developed designs and performed computational mechanical analysis on a new set of surgical implants
- Wrote engineering rationales and design verification documentation to prepare for product launches
- Patent application submitted for a screw-in-screw internal fixation device for distal radius fractures

**Thomas Jefferson University**, Philadelphia, PA

*Apr 2018-Apr 2019*

*Researcher- Daniel Baugh Institute for Functional Genomics/Computational Biology*

- Developed and analyzed computational multiscale systems biology models of epidermal wound healing
- Employed linear algebra and differential equations techniques to develop, solve and analyze complex systems of differential equations in MATLAB and Python
- Manuscript under preparation for submission

**Applied Physics Lab - Johns Hopkins University**, Laurel, MD

*Apr 2017-Sept 2017*

*Biomechanics Co-op - Biomechanics and Injury Mitigation Systems*

- Studied biomechanical injury dynamics using 3D motion capture technology
- Performed high-rate mechanical testing for material characterization using digital image correlation
- Developed a data management system and object-oriented MATLAB code to enable rapid analysis of data from hundreds of injury surrogate/crash test dummy experiments

## Inventions & Projects

Screw-in-Screw Internal Fixation Device – Patent Application Filed with DePuy Synthes

## Publications

- [1] **Josephson TO**. 2020. *A microstructural analysis of the mechanical behavior of cortical bone through histology and image processing*. ProQuest Dissertations and Theses Global. (Accession No.28022452).
- [2] **Josephson TO**, Moore JP., Maghami E., Freeman T, Najafi AR. In Progress. *Computational Study of the Mechanical Influence of Lacunae and Perilacunar Zones in Cortical Microcracking*
- [3] Moore JP., **Josephson TO**, Maghami E., Najafi AR. In Progress. *Impact of Microcracks on Fracture Propagation of Cortical Bone Using Phase Field Method*

## Honors & Awards

Graduated *Summa Cum Laude*, Drexel University, 2020

Graduated, Honors College, Drexel University, 2020

*Pi Tau Sigma* - International Honor Society for Mechanical Engineers, 2015-2020