

# KATHLEEN PIERI

## PERSONAL

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**Summary:** Ph.D. Candidate exploring the fundamentals of three-dimensional printing shape memory polymers for uses in biomedical research and clinical applications.

## EDUCATION

**Syracuse University** (2016- present)

*Ph.D. Student* Bioengineering

**Syracuse University** (2012- 2016)

*B.S.* Bioengineering

## EXPERIENCE

**Graduate Research Assistant** (2016-present)

*Henderson Lab, Syracuse Biomaterials Institute, Syracuse, NY*

- Primary research topic includes fundamental studies of 3D printing shape memory polymers that can be used in biomedical applications
- Performed multiple syntheses of a custom bio- and cyto-compatible shape-memory thermoplastic polyurethane
- Developed filament fabrication technique for using shape memory polymers in commercial 3D printers
- Leading a study on the printing parameter effect on the shape-memory properties of printed shape-memory polymers
- Working on development of a transformative process using a 3D printer that allows the manual programming step in the shape memory effect to be eliminated

**Graduate Teaching Assistant** (2016-present)

*Syracuse University, Dept. of Biomedical and Chemical Engineering, Syracuse, NY*

- BEN 465/665: Biomechanics. Worked closely with the instructor to help guide students through problem-based learning projects. Also responsible for maintaining the gradebook, providing detailed feedback on assignments and projects, and giving occasional lectures.
- BEN 485/685: Biomaterials and Medical Devices. Responsible for grading assignments and exams, answering student questions and giving guest lectures on special topics.
- BEN 341: Heat and Mass Transfer. Assist the instructor by grading assignments and quizzes. Leads discussions sections on occasion
- BEN 231: Mass and Energy Balances. Responsible for grading assignments and proctoring exams. Lectured on occasion and provided extra help and review sessions for students

### **Undergraduate Research Assistant (2013-2016)**

*Gilbert Lab, Syracuse Biomaterials Institute, Syracuse, NY*

- Assisted in modular hip implant retrieval and failure analysis
- Assessed extent of, and classified corrosion and level of degradation on implants
- Utilized imaging instruments including optical and scanning electron microscope
- Extensive experience with cell culture techniques and corrosion testing methods and analysis

## **PROJECTS**

### **Fundamentals of 3-Dimensional Printing Shape-Memory Polymers (2016-present)**

*Current Research*

- Exploring the extent to which popular and easily adjusted printing parameters effect the fixing and recovery ratios of 3d printed dogbones

### **Programing via Printing (2018-present)**

*Current Research*

- Using a custom synthesized thermoplastic polyurethane and modified printing parameters to trap strains into printed architectures
- Cyto-compatible element of the material is predicted to yield products that can be readily used in biomedical research and wound healing applications

### **3-Dimensional Printing Medical Models (2017)**

*Independent Study, SUNY Upstate, Syracuse, NY*

- Printed life-size models of patient medical conditions using MRI, CT, and microscope data. Models were prepared in Slicer and printed with PLA using a Makerbot Replicator Z18. Patient conditions included kidney aneurism, infant heart, adolescent skull

### **Inflammatory Joint Fluid Corrosion Assessment (2013-2016)**

*Undergraduate Honors Capstone Project*

- Created an electrochemical cell to assess level of corrosion in a human joint
- Established a systematic and quantitative measurement of inflammatory index
- Identified constraints for functionality and performance and created prototype
- Evaluated prototype for electrochemical behavior through a series of corrosion tests in various solutions

### **Cloud-based Thermometer (2015-2016)**

*Undergraduate Senior Design Project*

- Designed a device that would allow its operator to receive real time updates on the system condition
- Team based project in collaboration with Welch Allyn

## **LABORATORY SKILLS**

Scanning Electron Microscopy, Optical Microscopy

Cell Culture: CH10T1/2 cells

Electrochemical Testing

Polymer synthesis: Thermoplastic Polyurethane

Polymer Extrusion

*3D Printers:* MakerBot, Ultimaker

*CAD:* Autodesk Inventor, Solidworks

*Computer Programs:* Matlab, Microsoft Visual Studio, Simplify3D, Slicer, R Studio

## **PUBLICATIONS**

### **Paper**

Sivan S, Pieri KG, Gilbert JL. “Adverse” Local Tissue Reactions Cause Corrosion of Titanium Alloy Hip Implant Components In Vivo: A retrieval analysis of three cases, *Journal of Biomedical Materials Research* (in review)

### **Poster Presentation**

Sivan S, Pieri KG, Gilbert JL, Cell-Induced Corrosion on Titanium Alloys, Orthopedic Research Society 2015, Annual Meeting, Las Vegas, Nevada, March 2015