

# Srikanthan Ramesh

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## EDUCATIONAL BACKGROUND

Ph.D. Industrial and Mechanical Engineering Rochester Institute of Technology, Rochester, NY	2022
M.S. Industrial and Manufacturing Systems Engineering Iowa State University, Ames, IA	2017
B.Tech Mechanical Engineering Amrita University, India	2015

## PROFESSIONAL APPOINTMENTS

<b>Assistant Professor</b> Industrial Engineering and Management, Oklahoma State University, OK	Aug '22 - Present
<b>Graduate Research Assistant</b> AMPrint Center, Rochester Institute of Technology, NY	May '21 – May '22
<b>Course Instructor</b> Biomedical Engineering, Rochester Institute of Technology, NY	Jan '21 – May '21
<b>Graduate Teaching Assistant</b> Industrial and Systems Engineering, Rochester Institute of Technology, NY	Aug '20 – Dec '20
<b>Undergraduate Research Mentor</b> Industrial and Systems Engineering, Rochester Institute of Technology, NY	Aug '19 – May '20
<b>Visiting Graduate Researcher</b> Department of Biology, University of Rochester, NY	Jan '19 – Present
<b>Graduate Research Assistant</b> Industrial and Systems Engineering, Rochester Institute of Technology, NY	Jan '19 – May '21
<b>Bioink and Tissue Engineering Intern</b> Cellink LLC, Blacksburg, VA	June '18 – Dec '18
<b>Graduate Teaching Assistant</b> Industrial and Manufacturing Systems Engineering, Iowa State University, IA	Aug '16 – May '18

## AWARDS, HONORS, AND FELLOWSHIPS

Doctoral Dissertation Pitch Competition (Runner-up), Institute of Industrial and Systems Engineers	2021
Manufacturing and Design Student Sponsorship, Institute of Industrial and Systems Engineers	2021
Best Oral Presentation, Graduate Showcase, Rochester Institute of Technology	2019
Research and Creativity Grant, Office of Graduate Education, Rochester Institute of Technology	2019
Gilbreth Memorial Fellowship, Institute of Industrial and Systems Engineers	2018
Best Overall Graduate Research Poster Award, Annual Symposium, Iowa State University	2018
Wakonse College Teaching Fellowship, Graduate Professional & Student Senate, Iowa State University	2018
Graduate Research Excellence Award, Graduate College, Iowa State University	2018
Best Overall Oral Presentation, Nano@IAstate, Iowa State University	2017
NSF Student Award, Solid Freeform Fabrication Symposium	2017
Best Overall Graduate Research Poster Award, Annual Symposium, Iowa State University	2017
Professional Advancement Grant, Graduate Professional & Student Senate, Iowa State University	2017
Students-Undergraduate Research Graduate Excellence Internship, IIT-Kanpur, India	2014

## RESEARCH INTERESTS

Additive manufacturing, Bio-additive manufacturing (bio-AM), Biofabrication, Tissue Engineering, Biomaterials, Surface engineering of biomaterials, Drug delivery systems, Numerical modeling of bio-AM processes, Process monitoring and control in bio-AM

## SCHOLARLY PUBLICATIONS

Published in peer-reviewed journals

**Ramesh S**, Xu Z, Rivero IV, Cormier DR. Computational fluid dynamics and experimental validation of aerosol jet printing with multi-stage flow focusing lenses. *Journal of Manufacturing Processes*. **2023** Jun 9; 95:312-29.

Gerdes S, Gaikwad A, **Ramesh S**, Rivero IV, Tamayol A, Rao P. Monitoring and control of biological additive manufacturing using machine learning. *Journal of Intelligent Manufacturing*. **2023** Mar 6:1-23.

**Ramesh S**, Mahajan C, Gerdes S, Gaikwad A, Rao P, Cormier DR, Rivero IV. Numerical and experimental investigation of aerosol jet printing. *Additive Manufacturing*. **2022** Aug 18:103090.

Gerdes S, **Ramesh S**, Mostafavi A, Tamayol A, Rivero IV, Rao P. Extrusion-based 3D (bio) printed tissue engineering scaffolds: process–structure–quality relationships. *ACS Biomaterials Science & Engineering*. **2021** Sep 9;7(10):4694-717.

**Ramesh S**, Zhang Y, Cormier DR, Rivero IV, Harrysson OL, Rao PK, Tamayol A. Extrusion bioprinting: Recent progress, challenges, and future opportunities. *Bioprinting*. **2020** Nov 23:e00116.

**Ramesh S**, Kovelakuntla V, Meyer AS, Rivero IV. Three-dimensional printing of stimuli-responsive hydrogel with antibacterial activity. *Bioprinting*. **2020** Oct 9:e00106.

Hamilton JD, **Ramesh S**, Harrysson OL, Rock CD, Rivero IV. Cryogenic mechanical alloying of aluminum matrix composites for powder bed fusion additive manufacturing. *Journal of Composite Materials*. **2020** Sep 9:0021998320957698.

Gerdes S, Mostafavi A, **Ramesh S**, Memic A, Rivero IV, Rao P, Tamayol A. Process–Structure–Quality relationships of three-dimensional printed poly (caprolactone)-hydroxyapatite scaffolds. *Tissue Engineering Part A*. **2020** Mar 1;26(5-6):279-91.

Stromberg LR, Hondred JA, Sanborn D, Mendivelso-Perez D, **Ramesh S**, Rivero IV, Kogot J, Smith E, Gomes C, Claussen JC. Stamped multilayer graphene laminates for disposable in-field electrodes: application to electrochemical sensing of hydrogen peroxide and glucose. *Microchimica Acta*. **2019** Aug 1;186(8):533.

**Ramesh S**, Lungaro L, Tsikritsis D, Weflen E, Rivero IV, Elfick AP. Fabrication and evaluation of poly (lactic acid), chitosan, and tricalcium phosphate biocomposites for guided bone regeneration. *Journal of Applied Polymer Science*. **2018** Oct 15;135(39):46692.

Tran PL, Li J, Lungaro L, **Ramesh S**, Ivanov IN, Moon JW, Graham DE, Hamood A, Wang J, Elfick AP, Rivero IV. Cryomilled zinc sulfide: A prophylactic for *staphylococcus aureus*-infected wounds. *Journal of Biomaterials Applications*. **2018** Jul;33(1):82-93.

Spearman SS, Irin F, **Ramesh S**, Rivero IV, Green MJ, Harrysson OL. Effect of Pseudomonas lipase enzyme on the degradation of polycaprolactone/polycaprolactone-polyglycolide fiber blended nanocomposites. *International Journal of Polymeric Materials and Polymeric Biomaterials*. **2019** May 3;68(7):360-7.

#### Published in peer-reviewed conferences

**Ramesh S**, Gerdes S, Lau S, Mostafavi A, Tamayol A, Rao P, Rivero IV, Rheological, *In-situ* printability and cell viability analysis of hydrogels for muscle tissue regeneration, 28th Annual Solid Freeform Symposium, Austin, TX, USA, **2018**.

**Ramesh S**, Yan J, Downey A, Rivero IV, Laflamme S, Zellner E, Solventless fabrication of biodegradable sensors for measuring soft tissue deformation, IISE Annual Conference and Expo, Orlando, FL, USA, **2018**.

Lau S, **Ramesh S**, Rivero IV, Korley L, A Solid-state processing approach to enhance the mechanical performance of polyolefins, IISE Annual Conference and Expo, IISE Annual Conference and Expo, Orlando, FL, USA, **2018**.

**Ramesh S**, Eldakrouy M, Rivero IV, Frank MC, Additive fabrication of polymer-ceramic composite for bone tissue engineering, 27th Annual Solid Freeform Symposium, Austin, TX, USA, **2017**.

### **SELECTED CONFERENCE PRESENTATIONS**

**Ramesh S**, Occor K, Nafar S, Du K, Rivero IV, Characterizing hydrodynamic shear stress and cell viability of algal cells during extrusion bioprinting, 33<sup>rd</sup> Annual Solid Freeform Symposium, Austin, TX, USA, **2022**.

**Ramesh S**, Mahajan CG, Cormier DR, Rivero IV, Biomimetic patterning of metallic nanoparticles for antimicrobial applications, Materials Science and Technology, Virtual, **2020**.

**Ramesh S**, Mahajan CG, Cormier DR, Rivero IV, A hybrid printing approach for topographical patterning of bone tissue engineering scaffolds, IISE Annual Conference and Expo, Virtual, **2020**.

**Ramesh S**, Krishna V, Meyer AS, Rivero IV, Extrusion bioprinting of stimuli-responsive chitosan-based gel with antibacterial property, IISE Annual Conference and Expo, Orlando, FL, USA, **2019**.

**Ramesh S**, Weflen E, Rivero IV, Solid-State Fabrication and Characterization of Polycaprolactone/Chitosan Biocomposites for Additive Manufacturing, IISE Annual Conference and Expo, Orlando, FL, USA, **2018**.

**Ramesh S**, Yan J, Downey A, Rivero IV, Laflamme S, Zellner E, Solventless Fabrication of Biodegradable Sensors for Measuring Soft Tissue Deformation, IISE Annual Conference and Expo, Orlando, FL, USA, **2018**.

**Ramesh S**, Eldakrouy M, Rivero IV, Frank MC, Additive Fabrication of Polymer-Ceramic Composite for Bone Tissue Engineering, 27th Annual Solid Freeform Symposium, Austin, TX, USA, **2017**.

**Ramesh S**, Lungaro L, Tsikritsis D, Rivero IV, Elfick A, Solventless Preparation of Polylactic/Chitosan/Tricalcium Phosphate Biocomposite Powders for Guided Bone Regeneration, IISE Annual Conference and Expo, Pittsburgh, PA, USA, **2017**.

## RESEARCH EXPERIENCE

### Graduate Research Assistant

May '21 – Aug '22

AMPrint Center, Rochester Institute of Technology, NY

- Performed experimental and computational fluid dynamics modeling studies on aerosol jet printing.
- Investigated the influence of printhead geometry in dictating the morphology of aerosol printed lines.
- Developed silver nanoparticle inks for high-resolution aerosol jet printing.
- Established relationships to link ink rheology to droplet size distribution of aerosolized ink.

### Bioink and Tissue Engineering Intern

June '18 – Dec '18

- Established operating procedures for assessing printability of bioinks for extrusion bioprinting.
- Collaborated with academic partners to develop thermoplastic scaffolds for macular degeneration.
- Established protocols for 3D print bioglass-containing biomaterials for bone tissue engineering.
- Designed and printed biodegradable gelatin methacrylate scaffolds for tissue engineering.
- Worked with industry partners to develop printing protocols for thermoplastic biomaterials.

### Graduate Research Assistant

Aug '15 – Aug '22

iMED Laboratory, Rochester Institute of Technology, NY (Previously in ISU, IA)

- Investigated multi-material and non-planar capabilities for surface patterning tissue engineered scaffolds via aerosol jet printing.
- Implemented a two-step process for biomimetic patterning and sintering of low-melting point biocompatible substrates.
- Performed numerical analyses to explain principal aerodynamic interactions in aerosol jet printing.
- Fabricated interdigitated sensors on flexible substrates for nitric and nitrous oxide detection.
- Formulated and bioprinted novel pH-sensitive bioinks for inhibiting the formation of bacterial biofilms.

### Summer Undergraduate Research Fellow

June '14 – Aug '14

Advanced Nanoengineering Laboratory, Indian Institute of Technology, India

- Obtained and analyzed rheological data of polystyrene, low-density polyethylene, and polypropylene.
- Developed analytical models for predicting the die swell using a strain energy density function.
- Identified a linear relationship between die swell and maximum recoverable deformation.
- Established relationships between intrinsic material properties and the predicted die swell values.

## RESEARCH MENTORING

### Research Mentor

Aug '22 - Present

School of Industrial Engineering and Management, Oklahoma State University, OK

#### Undergraduate Students Mentored

Ms. Olivia Fulkerson

Project: Multi-objective Bayesian optimization assisted additive manufacturing

*\*Awarded CEAT Undergraduate Research Scholarship*

Mr. Erik Inman

Project: Effect of surface defects on the mechanical performance of 3D-printed polymer composites

### Research Mentor

Aug '19 – May '21

Industrial and Systems Engineering, Rochester Institute of Technology, NY

#### Undergraduate Students Mentored

Ms. Julia Geigel, Ms. Abbey Pfentner

Project: Fabrication of biodegradable strain-sensors for measuring soft-tissue deformation

Ms. Emily Lazarus, Mr. Melvin Cruz

Project: Influence of pore geometry in 3D-printed bone scaffolds

(Outcome: 1 journal article currently under preparation, 1 poster presentation)

#### Graduate Students Mentored

Ms. Maria Ceballos Santa

Project: Formulation of aloe vera bioinks for skin tissue engineering

Mr. Elliott Gengo

Project: Analytical modeling for predicting printability in extrusion bioprinting

(Outcome: 1 conference presentation)

### Research Mentor

Aug '17 – May '18

Industrial and Manufacturing Systems Engineering, Iowa State University, IA

#### Undergraduate Students Mentored

Ms. Moira Henderson

Project: 3D-printing of thermoplastic bone tissue scaffolds

(Outcome: 1 poster presentation)

Ms. Jaclyn Stiller

Project: Mechanical and physico-chemical characterization of 3D-printed bone scaffolds

(Outcome: 1 poster presentation)

#### Graduate Students Mentored

Ms. Sharon Lau

Project 1: Solid-state grinding of polyolefins for improving mechanical performance

Project 2: Formulation and rheological analysis of hydrogels for musculoskeletal tissue engineering

(Outcome: 2 peer-reviewed conference proceedings)

**TEACHING****Instructor of Record, Oklahoma State University**

Aug '22 - Present

Courses TaughtSemester

IEM 3103 Probability and Statistics for Engineers

Spring '23

IEM 3303 / MET 3543 Manufacturing Processes (Eval. 4.45/5.00; N=40)

Fall '22

**BIME 391 Course Instructor**

Jan '21 – May '21

- Prepared and delivered independent lectures covering topics in biomechanics and biomaterials.
- Held office hours and graded project presentations/reports.

**Graduate Teaching Assistant**

Aug '16 – May '18, Aug '20 – Dec '20

- Assisted faculty members with classroom instructions and record keeping.
- Prepared and delivered numerous classroom and laboratory lectures.
- Mentored student teams for term projects.
- Prepared grading rubrics and graded exams, lab reports, and homework assignments.

Courses and Laboratories TaughtSemester

†BIME 391 Biomechanics and Biomaterials Lab (Eval. Not Available)

Spring '21

ISE 420 Production Planning and Scheduling (Eval. 4.19/5.00; N=48)

Fall '20

IE 448 Manufacturing Systems Engineering (Eval. 4.41/5.00; N=141)

Spring '18

¥IE 248 Engineering System Design, Mfg. Processes and Specs. (Eval. 4.73/5.00; N=80)

Fall '17

\*IE 348 Solidification Processes (Eval. 4.81/5.00; N=36)

Spring '17

\*IE 248 Engineering System Design, Mfg. Processes and Specs. (Eval. 4.34/5.00; N=54)

Fall '16

\*Laboratory instructor, ¥Head teaching assistant, †Course instructor

**SERVICE AND OUTREACH****Manufacturing Engineering Planning Committee, OSU, Stillwater**

Jan '23 - Present

**Graduate Advisory Committee, IEM, OSU**

Aug '22 - Present

**Toyota Production Systems Laboratory Instructor**

May '19 – June '19

College and Careers, Industrial and Systems Engineering, RIT

- Conducted hands-on workshops and demonstrations for high-school students making career decisions.

**Student Committee Member**

Aug '17 – May '19

Manufacturing and Design Division, IISE, USA

- Organized a student-oriented webinar (Graduate School: Common Questions and Opportunities in Manufacturing and Design) and engaged in a conversation with faculty members from ISU and NCSU
- Contributed to a student-targeted newsletter for a year (2017-2018).