

# Sehui Jeong

Ph.D. Candidate | Stanford University | sehui@stanford.edu | Website

## Research Interests

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Textile-Based Systems and Soft Robotics, Multiscale Simulation of Entangled Structure, Mechanics-Informed Design Optimization

## Education

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### Stanford University

Sep. 2022 – Present

- Ph.D. Candidate in Mechanical Engineering (Advisor: **Allison M. Okamura**)
- Stanford Graduate Fellowship in Science & Engineering (**The Chambers Fellowship**)
- Co-President of Korean Graduate Student Association at Stanford (Jun. 2024 – Jun. 2025)

### Seoul National University

Mar. 2018 – Feb. 2022

- Bachelor of Science in Mechanical Engineering, Minor in Statistics (**Valedictorian**, GPA: 4.21/4.30)
- Korea Government Presidential Science Scholarship
- WINNS(Women in eNginneering Network at SNU) Fellowship

## Publication & Conference

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### Journal Publications

1. du Pasquier, C., **Jeong, S.**, & Okamura, A. M. "Finite Element Modeling of Pneumatic Bending Actuators for Inflated-Beam Robots". IEEE Robotics and Automation Letters (2023). DOI: 10.1109/LRA.2023.3320010
2. **Jeong, S.**, Choi, H., Youn, B.D., Son, H. "Statistical prior modeling with radius-uniform distribution for a correlation hyperparameter in bayesian calibration". Structural Multidisciplinary Optimization 66, 69 (2023). DOI: 10.1007/s00158-023-03520-0

### Under Review (\*: Equally Contributed)

1. du Pasquier, C.\*, **Jeong, S.\***, Liu, P., Williams, S., Okamura, A.M., Tibbits, S., Chen, T. "Knit Happens: Designing the Mechanics of Machine Knitting". arXiv:2501.07567v2.
2. Wang, Y., An, J., Kim, H., **Jeong, S.**, Kim, H., Park, J., Ko, S., Son, J., Lee, H. Printing Mosaics of Magnetically Programmed Liquid Crystal Directors for Reversibly Morphing Soft Matter. arXiv:2401.06590.

### In Preparation

1. **Jeong, S.**, Naylor, A.X., Aviles, M.C., Gonzalez, F., Saiyed, S.S., Sung, C., Okamura, A.M. "Knitted Origami for Reconfigurable Soft Robotics"
2. Cline, B., Bai, C., **Jeong, S.**, Xu, L., Wang, Y., Surjadi, J.U., Portela, C.M., Chen, T. "Entanglement-driven mechanics through 3D printed knit architectures across scales"
3. Darwin, E.C.\*, **Jeong, S.\***, Sim, J.\*, Kuhl, E. "Discovering the Mechanics of Skin: Transversely Isotropic Biological Models for Tissue"
4. An, J., **Jeong, S.**, Kim, H., Kim, K., Ko, S., Kim, M., Lee, H. "Patterning Functionally Anisotropic Domains Using Digital Light and Controlled Magnetic Field"
5. An, J., **Jeong, S.**, Lee, H. "Real-time Analysis of Magnetically Programmed Liquid Crystal molecules"

### Conference Presentations/Abstract (\*: Presenter)

1. **Jeong, S.\***, du Pasquier, C.\*, Liu, P., Williams, S., Okamura, A.M., Tibbits, S., Chen, T. "A Multiscale Modeling Framework for the Design of Machine Knitted Fabrics", SES 2025

2. du Pasquier, C.\*, **Jeong, S.**, Okamura, A.M. "Finite Element Modeling of Pneumatic Bending Actuators for Inflated-Beam Robots". Robosoft 2024
3. Lee, H.\*, Wang, Y., An, J., **Jeong, S.** "Programming Molecular Order of a Liquid Crystal Elastomer with Magnetic-Field-Assisted DLP Printing". 2023 MRS Spring Meeting
4. An, J., **Jeong, S.**, Lee, H.\* "Programming Molecular Order of a Liquid Crystal Elastomer with Magnetic DLP Printing", KSME 2022

## Patent

1. Apparatus and method for 3D spatial alignment and 3D printing of liquid crystal polymers using permanent magnets, Howon Lee and **Sehui Jeong**, Korean Patent, Application number: 1020230067608

## Research Experience

### **Collaborative Haptics and Robotics in Medicine Lab, Stanford University** Jan. 2023 – Present

PI: Allison M. Okamura; Ph.D. Student, Graduate Research Assistant

- Developed a structural mechanical model for steering an inflatable soft robot using fabric pneumatic artificial muscles (fPAM) and compared its performance with existing artificial muscles
- Built a yarn-level finite element simulation of knitted fabric for prediction of mechanical response and designed an optimization strategy for programmable wearable knitted devices
- Proposed a novel method to create origami patterns in knitted textiles for reconfigurable structure
- Developed an efficient numerical model for knitted fabric by integrating discrete elastic rods with incremental potential contact algorithms

### **Soft Intelligent Materials Laboratory, Stanford University** Sep. 2022 – Dec. 2022

PI: Ruike Renee Zhao; Rotation Student, Graduate Research Assistant

- Developed and modeled shape-morphing structures composed of acrylate-based polymer and shape memory polymer or liquid crystal elastomer fibers

### **Advanced Manufacturing and Programmable Matter Laboratory, Seoul National University** Mar. 2021 – Jun. 2022

PI: Howon Lee; Undergraduate Research Assistant

- Designed a device for precise magnetic field control, integrating it into a 3D Digital Light Processing(DLP) printing system for magnetically responsive structures with controlled orientations and strengths up to 500 mT

### **Laboratory for System Health and Risk Management, Seoul National University** Dec. 2019 – Feb. 2021

PI: Byeng D. Yoon; Undergraduate Research Assistant

- Proposed a user-independent prior distribution for a specific hyperparameter in Bayesian calibration of model discrepancy and evaluated its performance in a case study

## Honors & Awards

- Best Paper Award – KSME(Korean Society of Mechanical Engineers) 2022 Conference Mar. 2023
- The Best Tutor of Engineering Mathematics 1 Oct. 2020, Apr. 2020
- The Best Materials and Manufacturing Processes Award (Coursework) Dec. 2019
- Asia-Pacific Simon Marais Mathematics Competition 2018 Pairs – 7th place Dec. 2018

## Teaching and Mentoring Experience

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### Course Assistant – Stanford University

Fall 2025

- ME 161 (Dynamic Systems, Vibrations and Control), Prof. Allison M. Okamura

### Mentoring Summer Undergraduate Researcher – Stanford University

- Athena Xiao-Tong Naylor, Fernando Gonzalez, Magaly Cristal Aviles, "Design and Prototype of Knitted Origami Structure for Soft Robotic Applications" Jun. 2025 – Aug. 2025
- Sheza Sajid Saiyed, "Design and Prototype of Knitted Origami Structure" Jun. 2024 – Aug. 2024

### Undergraduate Course Assistant – Seoul National University

Mar. 2021 – Jun. 2021

- Thermodynamics

### Peer Tutoring – Seoul National University

Mar. 2019 – Feb. 2021

- Solid Mechanics, Thermodynamics, Fluid Mechanics, Foundation of Physics (International students), Calculus 1, Calculus 2, Engineering Mathematics

## Skills

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- Programming: Python, C++, MATLAB, Julia, FORTRAN(UMAT), C
- Simulation: Abaqus, Houdini, ANSYS
- HW Development: SolidWorks, LabVIEW