Gabriella M. Shull

1202 7th street SE, Unit 7, Minneapolis, MN 55414
ogshull@umn.edu • +1 (718) 710-5421 • linkedin • github • https://ogshull.github.io/

EDUCATION

M.S. in Biomedical Engineering,

- University of Minnesota, Twin Cities, Minneapolis, Minnesota, USA — Aug 2016 – Present
  - Minor: Neuroengineering
  - Cumulative GPA: 3.89 / 4.00

B.S. in Biomedical Engineering,

- State University of New York, Binghamton, Binghamton, New York, USA — Aug 2013 – May 2016
  - Minor in computational biosystems, and medical devices
  - Graduated with College Honors, Magna Cum Laude.
  - Cumulative GPA: 3.54 / 4.00

RESEARCH EXPERIENCE

Biosensing and Biorobotics Research Group, Dept. of Mechanical Engineering, UMN

- Graduate Research Student — Jan 2017 – Present
- Thesis project: Computer vision guided robotic cell microinjector
  - Developed robotic microinjector to inject single cells in the developing neocortex with sub micron resolution using computer vision through microscope images.
- Actuatable woven neural probes
  - I developed electrode arrays for chronic intracortical recording, functionalized electrodes with shape memory alloys, and demonstrated their use *in vivo*. I gained experience in PCB design, electroplating, fabrication, and characterization.
- Adviser: Prof. Suhasa Kodandaramiah

Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany

- Visiting Graduate Research Student — Jun 2017 – Aug 2017, May 2018 – Jun 2018
  - Tested the automated microinjector in collaborators lab and gained experience working with a cross disciplinary team in an unfamiliar environment.
  - The system I built increased yield of microinjection by 46x relative to manual microinjection which allows new scientific questions to be explored through the use of this tool.
  - Advisers: Prof. Wieland Huttner and Dr. Elena Taverna

Cellular Preservation Services Incorporated Biotechnology, Owego, NY

- Team Leader, Engineer — Aug 2015 – May 2016
  - Led a team of engineers to develop a thermoregulatory balloon device for surgical cryoablation procedures, and tissue engineered model to test device. We won an award for this work and presented at a regional conference.
  - I made the overall design of the hardware, and connected electronic components into closed loop control system using microcontroller programming.
  - Optimized my leadership skills through discretizing project objectives into concrete goals, identifying team members strengths, and managing the project under frequent corporate deadlines.
  - Supervisor: Dr. Kristi Snyder

Organs-on-Chip Lab, Dept. of Biomedical Engineering, SUNY Binghamton

- Undergraduate Research Student — Mar 2014 – May 2016
  - Developed and characterized novel *in vitro* model of gastrointestinal epithelium and investigated the influence of nanoparticle ingestion on gut barrier function.
  - Discovered that a common food additive alters gene expression and cell viability, and that the presence of beneficial bacteria mitigates these effects.
  - Adviser: Prof. Gretchen Mahler

Institute for Nanotechnology, Dept. of Chemistry, Northwestern University

- REU Student — Jun 2015 – Aug 2015
  - Synthesized di-copper complex to minimize t2 relaxation time for use as a MRI contrast agent in the brain.
  - Adapted to unfamiliar field/lab, and developed a desire to use nanotechnology to interface with the brain.
  - Advisers: Prof. David Harris, Kang Du.

LEADERSHIP EXPERIENCE

Hive Mine LLC, Minneapolis, MN

- Co-founder, Owner — Dec 2017 – Present
  - Created small business to create cryptocurrency mining farm.
  - Gained experience in acquiring $50k in investment, creating business documents, working with accountants, lawyers, insurance agents, and land lords.

Interdisciplinary Studio for Learning and Design (ISLAND), SUNY Binghamton

- President of External Affairs, Co-Founder, Web Master — Aug 2015 – May 2016
  - Created a student organization to host design challenges using projects that benefit the community locally, and and globally including participation in design competitions.
  - Ran workshops teaching MATLAB, Arduino, and R and oversaw development of the website.

Biomedical Engineering Society (BMES) Student Chapter, SUNY Binghamton

- Vice President — Aug 2014 – May 2016
  - Pioneered the growth of the chapter from 8 to 58 students.
  - Created a mentorship program to connect upper level students/grads to underclassmen in order to ensure sustained student success across their careers, and created lab tour event to connect students with research.
  - Created outreach event to engage young students underrepresented in STEM in experiments.

COMMUNITY OUTREACH

The Science for All Outreach Program, UMN

- Webmaster, Volunteer — Aug 2017 – Present
  - Provide middle school students with tangible understanding of STEM concepts via experiments (e.x. I made an EMG controlled race car and had the students race one another via EMG)

Medical Devices Center, UMN

- Graduate Team Leader, Volunteer — Aug 2016 – May 2017
  - Mentored a group of undergraduate students to develop a surgical catheter device for Dr. Marcos Molina, MD.
  - Presented our work at a prominent surgical conference.

SKILLS

Languages - Spanish (intermediate), English (native)

Programming - Python, MATLAB, C++, Eagle PCB Designer, Solidworks, ANSYS, Arduino, R, Java Script, Adobe Photoshop/Illustrator, MS Word/Excel/PowerPoint.

Characterization - 2-photon/confocal/fluorescent/wide field microscopy, EIS, IHC, qPCR, SEM

Fabrication - chemical synthesis, electroplating, fine-soldering, paralyene-C deposition, platinum sputtering

In Vitro - 3D bioprinting, mammalian/bacteria cell culture, single cell microinjection

In Vivo - automated patch clamp, extracellular recording, mouse crainiotomy/surgery, virus injection

Machining - 3D printing, CNC milling, laser cutting

FELLOWSHIPS

- **National Science Foundation Graduate Research Fellowship** — awarded in Apr 2018
  Awarded to students ”with demonstrated potential to enhance the vitality of the US science and engineering enterprise”.
- **NSF IGERT Fellowship in Neuroengineering** — Aug 2016 - Aug 2017
  University of Minnesota, Twin Cities
  Awarded to graduate students engaged in interdisciplinary approaches to neuroengineering.
- **Small Scale Systems Integration Center Undergraduate Fellowship** — Jan 2016 - May 2016
  SUNY Binghamton
  Won this to fund my independent research project.
- **NSF Research Experience for Undergraduate Fellowship** — Jun 2015 - Aug 2015
  Chemistry Department, Northwestern University
  Competitive research fellowship awarded to students with high potential for impact in future career.
- **Howard Hughes Medical Institute Undergraduate Research Fellowship** — Jun 2014 - Aug 2014
  SUNY Binghamton
  Awarded to students engaged in interdiciplinary research projects.

AWARDS

- **Second Place (out of 30 teams)**, — Nov 2017
  Blockchain for Social Impact Hackathon, Brooklyn, NY.
  For developing ethereum blockchain based platform to incentivise ex felons to engage in therapy.
- **Second Place (out of 7 teams)**, — Oct 2017
  Code Switch Hackathon, St. Paul, MN
  For developing ethereum blockchain based platform for community building.
- **NSF IGERT Travel Award**, — Jun 2017
  University of Minnesota, Twin Cities
  Awarded for international travel for collaboration.
- **Best Biomedical Engineering Senior Capstone Project**, — May 2016
  Biomedical Engineering Department, SUNY Binghamton
  Won best capstone project out of 9 teams in department.

- **Undergraduate Travel Award (won award twice)**, Sep 2014, Aug 2015
  Biomedical Engineering Department, SUNY Binghamton
  Travel costs to present research were covered by this award.

PUBLICATIONS

[1] J. Richter, G. Shull, J. Fountain, Z. Guo, L. Musselman, A. Fiumera, and G. Mahler, "Titanium dioxide nanoparticle exposure alters metabolic homeostasis in a cell culture model of the intestinal epithelium and Drosophila melanogaster," *Nanotoxicology*, pp. 1-17, Mar 2018.

PATENTS

[1] G. Shull, W. Huttner, E. Taverna, S. Kodandaramaiah, "Robotic Platform for HighThroughput Single Cell Gene Manipulation in Intact Tissue," Provisional Patent 20180069. Filed September 6,2017 with U.S. Patent and Trademark Office.

INVITED TALKS

[1] G. Shull, "The Autoinjector" Design of Medical Devices Conference. Minneapolis, MN April 2018

PEER REVIEWED CONFERENCE PRESENTATIONS AND PAPERS

[1] G. Shull, J. J. Hu, J. Buschnyj, H. Koon, J. Abel, S.B. Kodandaramaiah, "Shape Memory Alloy Actuatable Woven Neural Probes," *Conference on Smart Materials, Adaptive Structures and Intelligent Systems*, San Antonio, Texas, USA, Sep 2018.

[2] R.G. Smith, R. A. Johnson, G. Shull, D. Sorby, C. J. Modl, A. Panoskaltsis-Mortari, T. M. Kowalewski, "Towards Robotic Bioprinting Directly ont Moving, Stretching Anatomy," *Hamlyn Symposium on Medical Robotics*, South Kensington, London, UK, Jun 2018.

[3] G. Shull, C. Haffner, W. Huttner, S. Kodandaramiah, E. Taverna, "The Autoinjector: An Image Guided Robot for Single Cells Microinjection," *Neuromodulation Symposium*, Minneapolis, Minnesota, USA, Apr 2018.

[4] G. Shull, C. Haffner, W. Huttner, S. Kodandaramiah, E. Taverna, "Image Guided Robot for Microinjectioninton Single Cells in Organotypic Slices of Mouse Telencephalon," *Institute for Engineering in Medicine Annual Symposium*, Minneapolis, Minnesota, USA, Nov 2017.

[5] G. Shull, C. Haffner, W. Huttner, S. Kodandaramiah, E. Taverna, "A robot for high throughput analysis of neural stem cells in intact tissue," *EMBO Conference: Gene regulatory mechanisms in neural fate decisions*, Alicante, Spain, Sep 2017.

[6] M. Molina,G. Shull, G. Jacobs, T. Woodcock, C. Phillips, D. Srishyla, "Keeping the staple line safe: re-engineering the nasogastric tube and the use of direct visual guidance for its safe deployment," *Society of American Gastrointestinal and Endoscopic Surgeons Annual Meeting*, Houston, Texas, USA. Mar 2017.

[7] G. Shull, J. Richter, G Mahler, "TiO2 Nanoparticle Exposure Alters Glucose Transport and Expression inan In Vitro model of the Intestinal Epithelium," *42nd Annual Northeast Biomedical EngineeringConference (NEBEC)*, Binghamton, New York, USA. Apr 2016.

[8] G. Shull, D. Liacona, N. Martucci, I. Wang, K. Snyder, "Thermoregulatory Balloon Device and Tissue Engineered Model for Thermal Ablation Applications," *42nd Annual Northeast Biomedical EngineeringConference (NEBEC)*, Binghamton, New York, USA. Apr 2016.

[9] G. Shull, J. Richter, G Mahler, "Nanoparticle Ingestion Affects Glucose Transport in in Vitro Model of the Intestinal Epithelium," *Biomedical Engineering Society Annual Meeting (BMES)*, Tampa, Florida, USA. Oct 2015.

[10] J. Richter, G. Shull, G Mahler, "TiO2 Nanoparticle Ingestion Alters Glucose Absorption in an in Vitro Model of the Intestinal Epithelium," *41st Annual Northeast Biomedical Engineering Conference (NEBEC)*, Troy, New York, USA. Apr 2015.

[11] G. Shull, J. Richter, G Mahler, "The Effects of Nanoparticle Ingestion on Glucose Transport and Uptake in the Gut Microbiome," *Biomedical Engineering Society Annual Meeting (BMES)*, San Antonio, Texas, USA. Oct 2014.

CONTACT REFERENCES

Prof. Suhasa B. Kodandaramaiah
Assistant Professor, Department of Mechanical Engineering, University of Minnesota, Twin Cities
- Relationship - Masters thesis PI (2016 - 2018)
- Email - suhasabk@umn.edu
- Phone - 612-626-1307

Dr. Elena Taverna

Researcher, Department of Evolutionary Genetics, Max Planck Institute for Evolutionary Anthropology

- Relationship - Collaborator for masters thesis (2017 - 2018)
- Email - elena_taverna@eva.mpg.de
- Phone - +49-(0) 341 3550 555

Prof. Gretchen Mahler

Associate Professor, Department of Biomedical Engineering, SUNY Binghamton

- Relationship - Undergraduate PI (2014 - 2016)
- Email - gmahler@binghamton.edu
- Phone - 607-777-5238