

Blake E. Zimmerman

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I am a recent graduate of the University of Utah's Biomedical Engineering Ph.D. program with 4 years of experience in machine learning, computational optimization, and image processing. I am passionate about using applied mathematics and innovative computational approaches to engage with complex analytical challenges. I am looking for full-time employment that will allow me to apply and further develop my skills in machine learning and scientific computing to determine impactful, user-driven solutions.

Skills

Languages & Libraries: Python, \LaTeX , MATLAB, PyTorch, Tensorflow, Git, Bash, Slurm, CMake, C/C++

Operating Systems: Linux (Ubuntu, openSUSE, CentOS), Windows, macOS

Professional: Effective engagement through verbal and written communication; Interdisciplinary team collaboration and management experience; Adaptable audience-specific presentation abilities; Timeline and goal awareness; Attentive listening and incorporation of feedback.

Open Source Projects

- **CAMP** <https://github.com/blakezim/CAMP>
Computational Anatomy and Medical imaging using PyTorch
 - Read the Docs: <https://sci-camp.readthedocs.io/en/latest/>
 - Documented functions and examples, including coordinate system conventions for medical images.
 - Wrote core techniques, including data i/o, as building blocks other research projects.
 - Contributed GPU-accelerated implementations of medical image registration algorithms.
 - Developed 3D deformable surface registration for triangular mesh objects.
 - Implemented volume-preserving deformable registration to reflect physiological tissue deformations.

Relevant Experience

- **Utah Center for Advanced Imaging Research (UCAIR)** University of Utah, Salt Lake City, UT
Postdoctoral Researcher *December 2020 – Present*
 - Applying machine learning techniques to clinically targeted biomedical applications.
 - Designing and implementing novel histology workflow for quantitative imaging applications.
 - Developing standard operating procedures for transferring histology registration procedures.
 - Communicating Ph.D. project results and collaborating on grant proposals.
- **Scientific Computing and Imaging (SCI) Institute** University of Utah, Salt Lake City, UT
Graduate Research Assistant to Sarang C. Joshi and Allison H. Payne *January 2016 – December 2020*
 - Extensive collaboration with multi-disciplinary focused ultrasound group at UCAIR
 - Animated and produced [video summary](#) for effective communication of image registration projects.
 - Accelerated computational projects with GPU clusters and distributed Linux computing.
 - Designed and implemented diffeomorphic image registration algorithms for multi-modality images.
 - Initiated and coordinated deep learning meetings for students and faculty.
 - Teaching Assistant for biomedical engineering courses: Computational Methods and Biosystems Analysis.
- **Bard Access Systems** Salt Lake City, UT
Imaging Research and Development Intern *January 2015 – January 2016*
Field Assurance Engineer Intern *May 2014 – December 2014*
 - Traveled to implement product design changes at remote manufacturing facilities.
 - Designed and led component qualification operations for product development.
 - Communicated and implemented standard operating procedures and reports according to FDA standards.
 - Coordinated with component suppliers and manufacturing teams to ensure product success.
 - Wrote professional reports to communicate identified failure mode analysis on implanted medical devices.
- **Orthopedic Research Lab** Salt Lake City, UT
Undergraduate Research Assistant *May 2013 – May 2014*

- Segmented and built 3D models of human hips from CT images and perform real-life motion experiments.
- Generated mesh structures of hip joint cartilage for finite element analysis during motion animations.
- Communicated scientific results with poster and oral presentations in professional conference settings.

Education

Ph.D. Biomedical Engineering, GPA: 3.906

University of Utah

December 2020

Salt Lake City, UT

M.S. Bioengineering

University of Utah

December 2018

Salt Lake City, UT

B.S. Biomedical Engineering, GPA: 3.808

University of Utah

May 2016

Salt Lake City, UT

Selected Courses:

- Mathematics of Imaging
- Image Processing
- Introduction to Bioimaging
- Ultrasound
- Programming for Engineers
- Computational Methods
- Introduction to Optimization
- Classical Control Systems
- Introduction to Topology
- Medical Imaging Systems
- Advanced Magnetic Resonance Imaging
- Proposal Writing & Presentation

Selected Contributions:

[Google Scholar](#), [arXiv](#)

1. **Zimmerman, B. E.**, Johnson, S. L., Odéen, H. A., Shea, J. E., Winkler, N. S., Factor, R. E., Joshi, S. C., & Payne, A. H. (2021). Towards Acute, Non-contrast Assessment of Magnetic Resonance Guided Focused Ultrasound Thermal Therapies. *In Preparation*.
2. **Zimmerman, B. E.**, Johnson, S. L., Odéen, H. A., Shea, J. E., Factor, R. E., Joshi, S. C., & Payne, A. H. (2021). Histology to 3D In Vivo MR Registration for Volumetric Evaluation of MRgFUS Treatment Assessment Biomarkers. *Manuscript submitted for publication*.
3. **Zimmerman, B. E.**, Johnson, S., Odéen, H., Shea, J., Foote, M. D., Winkler, N., Sarang Joshi, & Payne, A. (2020). Learning Multiparametric Biomarkers for Assessing MR-Guided Focused Ultrasound Treatments. *IEEE Transactions on Biomedical Engineering*.
4. Johnson, S. L., **Zimmerman, B. E.**, Shea, J. E., Odéen, H. A., Winkler, N. S., ., Factor, R. E., Merrill, R., Hadley, R., Joshi, S. C., & Payne, A. H. (2020). Assessment of Acute Thermal Lesions after MRgFUS Ablation with Longitudinal Volumetric MRI Registration [Submitted: *Journal of Hyperthermia*]
5. Foote, M. D., **Zimmerman, B. E.**, Sawant, A., & Joshi, S. C. (2019, June). Real-time 2d-3d deformable registration with deep learning and application to lung radiotherapy targeting. In *International Conference on Information Processing in Medical Imaging* (pp. 265-276). Springer, Cham.

Selected Volunteer Experience

• Lowell Bennion Community Service Center's Project Youth

Campus Host

- Welcomed hundreds of local 6th graders to the University of Utah campus for a day.
- Led a small group of students during and between interactive lectures to encourage college attendance.

Interests

Sports: Skiing, mountain biking, rock climbing, ice climbing, mountaineering, trail running, river rafting, and more.

References

Sarang C. Joshi

Professor, Biomedical Engineering

- Warnock Engineering Building, 72 S Central Campus Drive, University of Utah, Salt Lake City, UT 84112

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