Heather L. Borgard
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University of Hawai‘i John A Burns School of Medicine

Education

2017-2020 MSc in Biomedical Engineering, University of British Columbia, Vancouver, Canada
- Thesis: *Predicting Occlusal Force and Area through a Simulation of Mastication and Controlled Study*

2011-2015 BS in Biomedical Engineering, Arizona State University, Tempe, AZ
- Capstone: *Universal Bioreactor for Tissue Engineering of Hollow Organs*

Professional Experience

2020-Present Bioinformatics Core Program Manager
Research Corporation of University of Hawaii | Honolulu, HI
- Contributed to two academic publications and helped the Core receive several NIH grants

2017-2020 Graduate Research Assistant
University of British Columbia | Vancouver, Canada
- Facilitated the award of a competitive Canadian Institutes of Health Research (CIHR) grant

2018-2019 Animal Care Technician
University of British Columbia | Vancouver, Canada
- Assisted researchers to deliver superior animal care in a large research facility

2015-2017 Research Assistant
Midwestern University | Glendale, AZ
- Provided the data collection, analysis, and writing of two publications

2015-2017 Physical Therapy Rehab Technician
Banner Health | Sun City, AZ
- Supported physical therapists with patient transport and treatment plans

2014-2015 Biomedical Product Development
Arizona State University | Tempe, AZ
- Conducted capstone project with the Mayo Clinic of Arizona to develop a hollow organ bioreactor with vibration treatment to stimulate vocal cell proliferation

4/2014-10/2014 Emergency Department Medical Scribe
Scribe America | Phoenix, AZ
- Supported health care providers in a high intensity environment by documenting all aspects of patient care

Awards and Scholarships

2018	Volunteer of the Month *Let's Talk Science Award*
2018	Faculty of Applied Science Graduate Award *UBC Scholarship*
2011-2015	Regents High Honors Endorsement *ASU Scholarship*
2014-2015	Dean's List *ASU*

Technical Skills

3D image rendering and model creation (Amira, Avizo, Blender), Animation (Blender, Autodesk Maya), Bioinformatics, Biomechanical computer modeling (ArtiSynth), CAD (Solid Works), Circuit design, Data analysis, DNA sequencing, Game development (Unity, Unreal Engine 3/4), Image processing, Image segmentation, Lab management, Material ordering, Mathematical modeling (MATLAB), Medical Image Analysis (CT, MRI), Microcontroller programming, Microscope usage, Programing languages (C, C#, C++, Java, Python), Statistical analysis (SPSS, R)

Publications

Gong T, **Borgard H**, Zhang Z, Gao Z, Deng Y. Whole Genome Bisulfite Sequencing Data Analysis: Available Tools and a Practical Guide. (2021 expected)

Guo, R., Chen, Y., **Borgard, H**., Jijiwa, M., Nasu, M., He, M., & Deng, Y. (2020). The Function and Mechanism of Lipid Molecules and Their Roles in The Diagnosis and Prognosis of Breast Cancer. Molecules (Basel, Switzerland), 25(20), 4864. https://doi.org/10.3390/molecules25204864; PMCID: PMC7588012; PMID: 33096860

Borgard H., Abdi A.H., Prisman E., Fels S. (2020) Creation of Categorical Mandible Atlas to Benefit Non-Rigid Registration. In: Ateshian G., Myers K., Tavares J. (eds) Computer Methods, Imaging and Visualization in Biomechanics and Biomedical Engineering. CMBBE 2019. Lecture Notes in Computational Vision and Biomechanics, vol 36. Springer, Cham. https://doi.org/10.1007/978-3-030-43195-2_50

Wu X, Sánchez CA, Lloyd J, **Borgard H**, Fels S, Paydarfar JA, Halter RJ. (2020). Estimating tongue deformation during laryngoscopy using hybrid FEM-multibody model and intraoperative tracking: a cadaver pilot study. Proc. SPIE 11315, Medical Imaging 2020: Image-Guided Procedures, Robotic Interventions, and Modeling, 113151E. https://doi.org/10.1117/12.2550471

Borgard, H.L., Baab, K., Pasch, B. et al. (2020). The Shape of Sound: a Geometric Morphometrics Approach to Laryngeal Functional Morphology. J Mammal Evol 27, 577–590 https://doi.org/10.1007/s10914-019-09466-9

Wu X, Fels S, Paydarfar JA, Halter RJ, Sanchez CA, Kahng PW, Rees CA, Ponukumati AS, Eisen EA, Pastel DA, **Borgard H**, Lloyd JE. (2019). Multi-modal Framework for Image-guided Trans-oral Surgery with Intraoperative Imaging and Deformation Modeling. Annu Int Conf IEEE Eng Med Biol Soc. 2019 Jul; 2019:6975-6978. doi: 10.1109/EMBC.2019.8857322

Abdi, A.H., **Borgard, H**., Abolmaesumi, P. & Fels, S.. (2019). AnatomyGen: Deep Anatomy Generation From Dense Representation With Applications in Mandible Synthesis. Proceedings of The 2nd International Conference on Medical Imaging with Deep Learning, in PMLR 102:4-14

Riede, T., **Borgard, H. L**., & Pasch, B. (2017). Laryngeal airway reconstruction indicates that rodent ultrasonic vocalizations are produced by an edge-tone mechanism. Royal Society Open Science. https://doi.org/10.1098/rsos.170976

Presentations

2019 *Creation of Categorical Mandible Atlas to Benefit Non-Rigid Registration*. Computer Methods, Imaging and Visualization in Biomechanics and Biomedical Engineering Symposium. New York City, NY, August 2019

2019 *A Validated Study on the Prediction of Masticatory Function Post HNC Reconstructive Surgery Using a Subject-Specific Biomechanical Computer Model.* Biomedical Engineering Graduate Association Symposium, University of British Columbia, Vancouver, Canada, March 2019

2017 *Airway Reconstruction in Vocal Organs.* Kenneth A. Suarez Research Day, Midwestern University, Glendale, AZ, April 2017

2016 *Of Tinamou, Vulture, and Hummingbird Vocal Function and Morphology.* Southwest Brain Cognition and Vocal Behavior Meeting, University of Arizona, Tucson, AZ, August 2016

2015 *Universal Bioreactor for Tissue Engineering of Large Hollow Organs for Regenerative and Reparative Medicine.* Biomedical Engineering Symposium, Arizona State University, Tempe, AZ, April 2015.

Teaching Experience

Graduate Teaching Assistant, University of British Columbia
Graded and advised students in courses with 20-30 students
Spring 2019, EECE 518 – *Human Interface Technologies*
Fall 2018, BMEG 557 - *Statistical Methods for Evaluating Medical Technologies*

Teaching Assistant, Arizona State University
Graded and advised students in courses with over 30 students
Fall 2014, BME 382, *Biomedical Product Design and Development*
Spring 2014, BME 300– *Bioengineering Product Design*
Fall 2013, FSE 294 – *Special Topics in Engineering*

Graduate Course Projects

1/2018-4/2018 Labyrinth Nature Walk in VR for Stress Reduction Therapy

Human Interface Technologies (EECE518) | Vancouver, Canada
- Developed a virtual reality environment that was targeted to reduce stress and enhance pedestrians' walking experience through a natural, labyrinth meditation

1/2018-4/2018 Deep Reinforcement Learning for Simple Motor Arm
Sensiomotor Computation (CPSC 530P) | Vancouver, Canada
- Created an optimal learning control paradigm for an inverse model of biomechanical systems

9/2017-12/2017 DTI Fiber Tracking of the Human Tongue
Medical Imaging (EECE 544) | Vancouver, Canada
- Analyzed DTI muscle fiber data of the human tongue and compared with other studies that measured muscle fiber lengths and trajectories

Relevant Coursework

Anatomy and Physiology with Applications to Biomedical Devices, Clinical and Industrial Biomedical Engineering, Statistical Methods for Evaluating Medical Technologies, Statistics for Biosciences, Engineering Mechanics, Transport Phenomena, Signals and Systems, Microcomputer Applications

Volunteer Work

2021-Present Grant Writer
Overt Foundation
- Perform extensive research and craft detailed proposals to obtain funding for patients of the program, outreach opportunities, and various administrative costs for the non-profit organization

2017-2019 Teacher Partnership Volunteer
Let's Talk Science, University of British Columbia
- Designed science curriculum for elementary and middle schools by leading hands-on science activities

2013-2014 EMT Volunteer
Student Emergency Medical Services (SEMS), Arizona State University
- Provided direct patient care on the ASU campus as a first responder

2012-2013 Research Volunteer
Haynes Lab, Arizona State University
- Facilitated DNA/RNA isolation utilizing Real Time PCR methods

Languages

English (Native)

Mandarin Chinese (Intermediate)

Spanish, Japanese (Elementary)