

Kinjal Shah

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Education

- Johns Hopkins University**, M.S.E. in Robotics Baltimore, MD
Laboratory for Computational Sensing and Robotics, Whiting School of Engineering | GPA: 3.76 2019-Present
- Masters Thesis: Cognitive Load Aware User Interfaces for Mixed Reality Environments
 - Relevant coursework: Augmented Reality, Haptic Interface Design for Human-Robot Interaction, Machine Learning, Deep Learning, Human Computer Interaction, Computer Integrated Surgery, Algorithms for Sensor Based Robotics
- University of Pennsylvania**, B.S.E. in Bioengineering Philadelphia, PA
School of Engineering and Applied Science | *Magna Cum Laude* | GPA: 3.67 2012-2016
- Relevant coursework: Brain Computer Interfaces, Bioengineering Modeling and Design, Biomicrofluidics
- The Wharton School**, B.S. in Economics Philadelphia, PA
Concentration in Operations, Information, and Decisions | *Magna Cum Laude* | GPA: 3.67 2012-2016
- Relevant coursework: Product Design, Venture Capital, Healthcare Policy, Decision Processes

Research Experience

- Cognitive Load Aware User Interfaces for Mixed Reality Environments** Baltimore, MD
Research Advisor: Professor Mathias Unberath Jan 2020-Present
- Developing causal models enabling detection of cognitive state changes via pupil tracking in-the-wild
 - Designing workload aware intelligent agents for mixed reality applications using human-centered design process
 - Conducting user studies to observe eye motion during tasks of varying difficulties
- Intraoperative Guidance of Orthopaedic Instruments** Baltimore, MD
Research Advisor: Dr. Ali Uneri Jan 2020-June 2020
Submitted to SPIE Medical Imaging 2021
- Developed intraoperative image guidance method to automatically detect, triangulate, and localize orthopedic instruments
 - Implemented and evaluated performance of U-Net and Mask R-CNN architectures for guidewire detection task
 - Designed dataset generation pipeline to create training dataset from real pelvic radiographs with simulated guidewires
 - Successfully achieved generalization to real clinical images with 87% recall and 90% precision
- Haptic Feedback for Upper Limb Motion Guidance** Baltimore, MD
Research Advisor: Professor Jeremy D. Brown Sep 2019-Jan 2020
Accepted to 2020 Haptics Symposium Work-in-Progress Track
- Developed wearable device prototype to enable motion guidance for rehabilitation through cutaneous haptic feedback
 - Designed velocity tracking and haptic feedback algorithm to control two vibration motors via a Raspberry Pi based on inertial measurement unit (IMU) data in Python
- Automated Point-of-Care Pancreatic Cancer Diagnostic** Philadelphia, PA
Research Advisor: Professor David Issadore Aug 2015-May 2016
Bioengineering Senior Design Award, First Honorable Mention – SEAS Senior Design Competition
- Detected pancreatic cancer cell derived exosomes from human serum at concentrations modeling precancerous stages by developing an automated, microfluidics based point-of-care diagnostic device
 - Created automated, cost-effective, on-chip serum processing and diagnosis protocol involving 3D printed encasing designed using SolidWorks, Arduino based microcontroller, and image processing using MATLAB

Open Source Initiatives

- COVID-19 United States County-level Dataset**
https://github.com/JieYingWu/COVID-19_US_County-level_Summaries
Winner of Kaggle COVID-19 Dataset Award

Work Experience

Johns Hopkins University

Baltimore, MD

Teaching Assistant: Haptic Interface Design for Human-Robot Interaction

Fall 2020

- Conducted office hours, graded assignments, and supported first online delivery of course
- Mentored 33 students in completion of final projects

Accenture

Philadelphia, PA

Life Sciences Consultant (2018-19), **Senior Analyst** (2017-18), **Analyst** (2016-17)

2016-2019

- Designed R&D technology strategy road-map for transformation initiative at a global biotechnology company
- Developed data analytics approach to enable data-driven insights from historical, existing, and future data
- Managed clinical cloud implementation from strategy definition through launch involving future state design, requirements gathering, user acceptance testing, and change management
- Assessed merger and acquisition options for client facing loss of patent protection on key revenue generator

Publications

Intraoperative Guidance of Orthopaedic Instruments Using 3D Correspondence of 2D Object Instance Segmentations

Irina Bataeva, **Kinjal Shah**, Rohan Vijayan, Runze Han, Nirali Sheth, Gerhard Kleinszig, Sebastian Vogt, Greg Osgood, Jeffrey H. Siewerdsen, Ali Uneri

SPIE Medical Imaging 2021 (Under Submission)

Feasibility of Image-based Augmented Reality Guidance of Total Shoulder Arthroplasty Using Microsoft HoloLens 1

Wenhao Gu, **Kinjal Shah**, Jonathan Knopf, Nassir Navab, Mathias Unberath

MICCAI 2020 Joint Workshop on Augmented Environments for Computer Assisted Interventions

Journal of Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization

A County-level Dataset for Informing the United States' Response to COVID-19

Benjamin D. Killeen, Jie Ying Wu, **Kinjal Shah**, Anna Zapaishchykova, Philipp Nikutta, Aniruddha Tamhane, Shreya Chakraborty, Jinchu Wei, Tiger Gao, Mareike Thies, Mathias Unberath

https://github.com/JieYingWu/COVID-19_US_County-level_Summaries

<https://arxiv.org/pdf/2004.00756.pdf>

Proposing a framework for evaluating haptic feedback as a modality for velocity guidance

Kinjal Shah*, Shweta Ravichandar*, Jeremy D. Brown

Haptics Symposium 2020: Work-in-Progress Track

Honors and Awards

LCSR Faculty Scholarship

2019-2021

MICCAI 2020 Student Participation Award

2020

Computer-Integrated Surgical Systems and Technology Project Award

2020

Ruhr Fellowship

2014

Advancing Women in Engineering Research Scholar

2013

Skills

- Programming: Python, C/C++/C#, MATLAB, Arduino
- Mixed Reality: Unity, Microsoft HoloLens, Pupil Core
- Machine Learning Libraries: TensorFlow, PyTorch
- CAD: SolidWorks, 3D Printing