John T. Golden

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EDUCATION

B.S. in Mechanical Engineering, **University of California, Irvine** Sep. 2019 – Jun. 2023
Minor in Biomedical Engineering
GPA: 3.5

M.S. in Mechanical Science and Engineering, **University of Illinois Urbana-Champaign** Aug. 2023

RESEARCH HIGHLIGHTS

Undergraduate Research Proposal 2021 (Lateral flow immunoassay) Nov. 2021 – 2022
Co-Author
- Achieved control in stopping fluid propagation in a nitrocellulose membrane on a CD microfluidic in order to improve the incubation time of an analyte
- Received funding from the Undergraduate Research Opportunities Program
    - Responsible for CNC manufacturing, post-production of testing base and experimentation
- Facilitated the development of the proposal into a published paper

Joint University Research Project (Novel PDMS label) Jan. 2022 – Present
Author
- Innovated a new PDMS-adhesive manufacturing process that led to the disclosure of a new patent
- Collaborated with a postdoctoral researcher at MIT and PI in testing the Young's Modulus of a PDMS film over a CD microfluidic device
    - Provides novel method for estimating Young's Modulus
- Responsible for novel manufacturing of PDMS membrane, CD fabrication, experimentation and validation of Young's Modulus
    - Finalizing submission for *Lab-on-Chip*

Summer Undergraduate Research Proposal 2022 (Electrokinetic separation) Jun. 2022 – Present
Co-Author
- Partnered with a graduate student to successfully separate microbeads using electrokinetics on a CD microfluidic device
- Demonstrated the manufacturing innovation showcased above in utilization of the elastic properties to push separated pockets of liquid into new areas
- Showcased the separation of microbeads into distinct pockets for an immunoassay response
    - Next steps is separating biological cells (either RBCs and WBCs or lung cells)
- Received funding from Undergraduate Research Opportunities Program
- Finishing experiments for publication

Shoulder Exoskeleton Research Jun. 2022 – March. 2023
Co-Author
- Improved upon a compact linkage designed as a shoulder orthosis by incorporating sensors to detect range of motion of the shoulder, and ultimately the shoulder position as the arm moves
- Collaborated with my project sponsor and his graduate student in the translation of joint angles into useful shoulder angles
- Designed, manufactured and assembled the complete device
- As of Nov. 2022 begun working alongside clinicians at Hoag Orthopedics for design considerations and applications
- Accepted to CCToMM 2023
- Currently designing the next iteration of the device to improve angular error from 6° to < 2°

Grasping Index and Thumb Project Oct. 2022 – Feb. 2023

Co-Author

- Validation of an eight-bar index finger and four-bar thumb with motion-capture data
- Designed and fabricated the four-bar thumb and actuation mechanism
- Conference paper accepted to IDETC 2023

Senior Design Project (Haptic Actuator) Oct. 2022 – Present

Co-Author

- Joint research with *META* to produce microactuators for haptic technology
- Led a team of UCI senior-standing mechanical engineers
- Designed the underlying actuating mechanism/actuator and elastic bellows to work in conjunction with one another
- Successfully turned device ON/OFF with ~1 J per cycle and a displacement of 2mm; however, requires a frequency of 10^6

JOURNALS

S. Peshin, J. Golden, C. Mast, B. Gan, and L. Kulinsky "Controlling the advancement of the liquid front of the nitrocellulose membrane assay under the influence of the centrifugal force on the Lab-on-a-Disc platform". *Sensors and Actuators: B. Chemical **386** (2023) 133735*

J. Golden, M. Michael, M. Mohammad, and L. Kulinsky, Novel manufacturing technique for PDMS adhesive labels and application. *In prep.*

CONFERENCE PROCEEDINGS

J. Li, J. Golden, B. Johnson, E. Quilligan, V. Gardner, C. Prietto, and J. McCarthy, "Spherical exoskeleton for the measurement of shoulder movement", *Accepted to CCToMM (2023)*

V. Audrey, S. Herandez, J. Golden, V. Ton, and N. Robson, "Natural motion grasping design using control-orientated kinematic models", *Accepted to IDETC-CIE (2023)*

PROFESSIONAL EXPERIENCE

Nexus Dx May. 2021 - Nov. 2022

Research Assistant

- Designed, fabricated, and experimented on prototype microfluidic CDs
  - Diagnosed the error between disks by improving blood plasma bonding to the analyte by manipulating the disk's geometry to increase incubation time through centrifugal action
  - Incorporated additional air ventilation to main design to remove reverse pressure gradients, allow testing fluid to distribute adequately to each chamber
  - Assisted in the process of making a soft mold based off the results for the company's new product

AWARDS

Graduate College Master's Fellowship

TECHNICAL SKILLS

Design: Solidworks, SolidCAM, COMSOL
Manufacturing: CNC, 3D-Printing
Reporting: MATLAB, LaTeX, Microsoft Office, Python