Ibrahim Bin Yasir

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TECHNICAL SKILLS

• 3D Motion Capture • MATLAB • COMSOL • LabView • SolidWorks • C++ • PDMS Manufacturing • Deep Learning • Haptics • Design Thinking • Modeling and Optimization • Rapid Prototyping • Sensor Planning • Lithography • Python.

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST), South Korea *Masters in Robotics* **Feb 2021**

Coursework related to **Haptics**, **Rehabilitation Engineering**, **Cognition and Emotion** and Intelligent Robots
Technical Skills: Lithography, COMSOL, Transcutaneous Stimulation, LabView, Python (Pytorch), 3D Motion capture and Analysis

National University of Sciences and Technology (NUST), Pakistan *B.S. Mechanical and Manufacturing Engineering* **Aug 2018**

Coursework related to CAD, Engineering Materials, Machine Design, Measurements and Instrumentation, Manufacturing Processes
Technical Skills: ABAQUS, SOLIDWORKS, Data Acquisition, Sensor Fusion, Polymer Fabrication

PROFESSIONAL EXPERIENCE

Korea Advanced Institute of Science and Technology, *Researcher* *Daejeon, South Korea* **| *Mar 2021 – Present***

- Developing an EMI immune transparent optical waveguide sensor that can measure triaxial fingertip forces. The sensor can be used in wearable displays as well as robotic graspers.

Human-Robot-Interaction Lab KAIST, *Graduate Researcher* *Daejeon, South Korea* **| *Feb 2019 – Feb 2021***

- Contributed in developing a soft sensorized wearable glove using Shape Memory Alloy (SMA) coiled spring actuator for a wearable assist robot for the wrist and upper extremity. The product was successfully able to deliver the required torque and range of motion desired during activities of daily motion. (Joint project KAIST and CNU Hospital funded by NRF and Ministry of Health and Welfare)

- Investigated various techniques and combinations of **sensory haptic feedback** to the **upper extremity** including electro-tactile, skin-stretch and vibration for intuitional sensory substitution of patients suffering from tactile and proprioceptive loss

- Worked on a self-sensing soft tactile actuator based on Dielectric elastomer actuator (DEA) for wearable haptic interface. The wearable prototype demonstrated close loop system with an output force of 0.9 N, bandwidth 0-30 Hz, flexibility, and weights 3.2 g.

RISE Lab, School of Mechanical Engineering, NUST, *Undergraduate Researcher* *Islamabad, Pakistan* **| *Oct 2017 - Dec 2018***

- Developed a bio-inspired hybrid actuator inspired by crustacean exoskeleton by incorporating rigid shells and a soft core. When actuated, the biomimetic actuator was able to produce forces up to 11.5 N at 135 KPa, satisfying the required criteria of 8N for palm grasping. The proposed soft bio-inspired hybrid bending actuator was used as a supernumerary sixth finger for rehabilitation and robot grippers.
- Utilized SOLIDWORKS for 3D modelling of the rigid shells and locking mechanism and ABAQUS for design simulation.

Qadri Group, Sugar and Cement Plant Manufacturers, *Lead for Manufacturing* *Lahore, Pakistan* **| *July - Aug 2017***

- Achieved annual cost reduction of 5.27 million (PKR) by identifying and optimizing nozzle drilling.
- Designed a workbench using 3D modeling, and established new working standards that enabled a time reduction of 2,334 manual working hours annually.
- For employee safety, formulated an optimized layout of the entire factory floor by analytically calculation and Simulated using DIALUX-EVO

Atlas Honda Limited, *Intern* *Sheikhupura, Pakistan* **| *June - July 2016***

- Monitored techniques to optimize the assembly line time Honda CD 70 and 125 motorbikes. Achieved reduction of downtime by increasing the Overall Equipment Effectiveness (OEE)

Pakistan Aeronautical Complex, *Intern* *Kamra, Pakistan* **| *August 2016***

- Examined operation of K-8, F-7, and FT-5 aircraft in the Aircraft Rebuild Factory (ARF). Studied various operations involved in the manufacturing and assembly of the aforementioned aircrafts.

PUBLICATIONS

- **Ibrahim Bin Yasir**, Jung-Hwan Youn, Sajjad Hussain Ki-Uk Kyung *"Design of a Transparent, Simple, and Flexible Optical Force Sensor for Measurement of Triaxial Forces"* ICAE 2021 (To be presented)
- Jung-Hwan Youn, **Ibrahim Bin Yasir**, Ki-Uk Kyung *"Self-sensing Soft Tactile Actuator for Fingertip Interface"* IROS 2020
- Jaeyeon Jeong, **Ibrahim Bin Yasir**, Jungwoo Han, Cheol Hoon Park, Soo-Kyung Bok, Ki-Uk Kyung, "*Design of Shape Memory Alloy-Based Soft Wearable Robot for Assisting Wrist Motion* ", Applied Sciences, 2019

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- Jaeyeon Jeong, **Ibrahim Bin Yasir**, Jungwoo Han, Ki-Uk Kyung**,** "*Design of SMA-based Actuator and its Application to a Wearable Robot for Wrist* **"**, AMSM 2019
- Geonwoo Hwang, **Ibrahim Bin Yasir**, Kyujin Hyeon, Ki-Uk Kyung, *"Carbon Fiber Reinforced Electro-adhesion Pad for a Soft Gripper"*, AMSM, 2018
- **Ibrahim Bin Yasir**, Umer Niazi, Fahd Imtiaz, Yasar Ayaz, "*A novel bio-inspired hybrid bending actuator with automatic locking*", IPO, Pakistan (Filing process underway)

OTHER PROJECTS

Reinforcement Learning for position control (Pytorch (*Python*), NI-DAQ) *Daejeon, South Korea | Sep* ***2019***

- Used Pytorch to demonstrate Reinforcement-Learning for Shape memory alloy (Nitinol) position control during convection cooling. The algorithm was able to replicate traditional controllers such as PID without any prior analytical modeling of the actuator.

Emotion Recognition for Computer-Human Interaction (TensorFlow, OpenCV) *Daejeon, South Korea | March* ***2019***

- Implemented a real-time emotion detection algorithm by training a deep network using TensorFlow on equal distribution of CK+ and JAFFE dataset.
- Preprocessed via OpenCV, facial alignment and recognition using DNN and histogram correction

Human-Robots-Interaction Lab KAIST, *Undergraduate Researcher* **(Electroadhesion)** *Daejeon, South Korea | July* ***2018***

- Achieved structural enhancement of soft electroadhesion pads by using carbon fibers reinforcement inside electrodes increasing operational force.

ASME National Human Powered Vehicle Competition, Engineer *& Pilot* *GIKI, Pakistan | April* ***2016***

- Fabricated and designed a Human driven vehicle for American Society of Mechanical Engineers event IMEC 16.
- Improved the design to recumbent-driven and used derailleurs for a twist-chain assembly for steering. Additionally, structural tests and rollover protection that enabled us to win the competition.

Electronics Lab School of Mechanical Engineering, NUST, *Undergraduate Researcher* *Islamabad, Pakistan | December* ***2016***

- Analyzed the momentum and position of a cricket ball via ultrasonic sensor, FSR and placing IMU on the blower's hand to predict if it was into or above the stumps.
- Mechatronic evaluation of FSR, ultrasonic, IMU sensors with MATLAB and Arduino

HONORS & AWARDS

- Daedeok High School (Lecture and Mentoring) 2021
- Pioneers 2071 (*Master of Ceremonies*)
- KAIST Graduate Scholarship 2019-2021
- KAIST Student Mentor 2020
- ASME's Human Powered Vehicle Challenge-National Champion 2016
- Shahbaz Sharif Scholarship (Matric) for Academic Excellence
- Fauji Foundation Stipend 2017, 2018.
- Model United Nations Abbottabad- Outstanding Diplomacy Award

SERVICE

International Student Mentor, *Mentor* ***2019-2021***

Introduce biomimetic and soft robotics and guiding club activities (High School)
Guide freshman through initial months of life at KAIST (College)

Hunehar, Non-Profit Organization, *Director of Finance* ***24 Months***

One of the Pioneers in establishing an NGO working for child education for underprivileged children. Worked as Director of Finance. Left after opening a school tailored for education for poor children

Shifa Eye Hospital, *Intern* ***1 Month***

Worked with patients, the finance department, learned how to check eye-sight via hand-held equipment and held an eye camp in rural areas of Rawalpindi

Justajoo, Ramadan Drive, *Volunteer* ***1 Month***

Distributed food among the needy in remote areas of Lahore during the fasting period for Muslims

Interests: Community Service, Soccer, Research, Running, Mentoring