

ALEC ISMAEL ROIG

Biomechanical Engineer

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EDUCATION

University of Southern California, Los Angeles, CA
Masters of Science in Biokinesiology
Cumulative GPA: 3.8/4.0

June 2020 – Present

Boston University, College of Engineering, Boston, MA
Bachelor of Science in Biomedical Engineering
Minor in Computer Science
Cumulative GPA: 3.20/4.00

September 2016 – Present
January – December 2019

RESEARCH & WORK EXPERIENCE

Stealth Mode Start-up

R&D Mechatronics Engineer

May – August 2021
Santa Ana, CA

- Continued developing a smartphone application focused on gamifying upper-limb rehabilitation
- Merged various disciplines in biomechanics, rehabilitation, computer science, and robotics to transition the application from the use of artificial intelligence object recognition to wearable sensors

Computational Neuro-rehabilitation Laboratory

Biomechanical Engineer

September 2020 – Present
Los Angeles, CA

- Created various MATLAB codes to control a 2-D, upper-limb test fixture to gather and analyze kinematic data in stroke and healthy participants including but not limited to: stretch reflexes, proprioception, EMG response, and interaction torques
- Researching the effects of accuracy vs speed-based training in arm-reaching tasks using a custom guided user interface MATLAB code to record track-tracing data from the 3D Guidance trakSTAR system

ADM Biopolis S.L.

R&D Intern

July 2019
Valencia, Spain

- Created a MATLAB guided user interface for the statistical analysis and visual processing of bioinformatic data collected on *C. Elegans* worms' responses to various testing conditions

Engineering IT

Consultant

May – October 2019
Boston, MA

- Assisted IT specialists with daily operations and tasks regarding hardware and software within the BU engineering department

Carematix Inc.

R&D Intern

June – August 2018
Chicago, IL

- Researched the feasibility of implementing heart rate variability into a blood pressure monitor
- Wrote a report to manufacturers about the new blood pressure monitor, researched fulfillment centers, created a product UDI, assisted in designing the screen layout, sorted papers for FDA, and coded Bluetooth dongles using Raspberry Pi

Zhang Lab

Lab Assistant

February – April 2018
Boston, MA

- Studied the mechanical behaviors of the extracellular matrix of the aortic and coronary arteries of mice

ThermoFisher Scientific

R&D Intern

May – June 2017
Shanghai, China

- Shadowed the Lead Chemical Engineer, assisting in optimizing their Chemical Oxygen Demand machine for water quality
- Presented a MATLAB Design of Experiment module tutorial for their employees to teach basic mathematical modeling

PROJECTS

Point-of-care System to Estimate Individual Limb Propulsion Force During Walking

September 2019 – May 2020

- Devised a diagnostic system capable of measuring stroke patient's individual limb propulsion forces using inertial measurement units to calculate trailing limb angle and a force gauge to calculate a patient's central drive

Psychological Effects of Continuous Glucose Monitoring Devices

March – April 2019

- Conducted research on the psychological effects associated with CGM devices on diabetics
- Research can be found at: <https://bu.digication.com/technology-and-the-future/home-1>

DuneRaider

February – April 2019

- Created a business concept for a fully autonomous beach cleaning rover that included a business model, market research, balance sheet, financial plan, and product design
- Finished second of nine teams after presenting our idea to three Angel Investors

Portable Kangaroo Care Baby Incubator

September – December 2017

- Built and designed a portable baby incubator for third world countries which included: EKG/HR monitor, body temperature probes, heating elements, rechargeable battery & LCD touch screen display.

CERTIFICATIONS

Modern Robotics, Course 1: Foundations of Robot Motions

April 2021

Northwestern University

- Learned about configuration spaces, reference frames, and rigid-body motion (rotation matrices) and their application to the study of robotic motion

Modern Robotics, Course 2: Robot Kinematics (IN PROGRESS)

Northwestern University

- Studying forward and inverse kinematics, velocity kinematics and statics, and kinematics of closed chains

Complete C# Masterclass

May 2021

Tutorials.eu by Denis Panjuta

- Learning all you need to know about C# and its application within Unity software

HIPAA

April 2021

University of Southern California

SKILLS

Motion Capture: inertial measurement units, goniometers, Visual 3D, Qualisys

Biometrics and Physiological Assessment: HR, HRV, electromyography, electrical stimulation, muscle physiology

Circuitry (for movement analysis): strain gauges, potentiometers, vibratory motors, DC motors

Programming: MATLAB, C#, Arduino, R, Python

Languages: English (fluent), Spanish (fluent), French (intermediate)

LEADERSHIP & AFFILIATIONS

USC BKN Master's Representative

December 2020 – Present

- Master's student representative in the Biokinesiology Student Association which is involved in all student activity throughout the school year
- In charge of pairing incoming students to current students within the division to ensure a smooth transition into the program

Boston University Running Club

September 2016 – June 2020

Distance Captain

- Tasked with leading group runs, creating track workouts, and assisting runners with any questions

Boston Athletic Association

April 2017 – May 2019

Course Operations Assistant

- Assisted in course operations for the Boston Athletic Association's annual 5km Run and 1 Mile Invite during every Marathon Monday weekend
- Tasks included setting up/cleaning up fences and distance markers, ensuring safety for runners by keeping spectators off the course, and monitoring all crosswalk sections

Sports Medicine Club

December 2014 – June 2016

Founding Member

- Created a club focused on supporting education, training and first aid services to the sports teams at school
- Worked alongside our school's Athletic Trainer during sporting events throughout the Shanghai International School community

High School Cross Country & Track and Field

August 2014 – April 2016

Captain

- Held school records in the 800m, 1500m, 3000m, and 5km distances
- Lead the cross-country team to a second-place finish at the Asia Pacific Athletic Conference my senior year
- Only athlete to medal in all distance events (800m, 1500m, & 3000m) at the Asia Pacific Athletic Conference my sophomore year