

# Zack Dan El-baz

Project Portfolio:



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## CONTACT



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## EDUCATION

2024  
2019  
  
2018  
2013  
2013  
2011

**University of Bristol**  
Engineering Design  
(Mechanical – MENG)

**St Paul's School London**

**St Paul's Junior School**  
(Colet Court)

## QUALIFICATIONS

2:1 Masters

MEng

A\* A-Level

Art

A A-Level

Maths  
Physics

A\* GCSE

Maths  
Physics  
Art

A GCSE

French  
English Language  
English Literature  
Computing  
Biology  
Chemistry  
Spanish  
Geography

B GCSE

## Work Experience

2021-2022

### Lightbug: Year in Industry placement, Engineering and Product Assistant.

Working on world's smallest 4G GPS trackers and other IOT devices. Roles included Product Design, Design for manufacture (injection moulding and package design), Research and Development and Technical Support, Communication with high end clients to create high quality, durable and reliable products.

2020

**Work placement as consultant engineer (9 weeks).** Selected (three placements offered, 30 applicants) for nine-weeks at Hoare Lea (cancelled due to Corona virus)

2018-2019

**Sauveteurs Sans Frontières.** Volunteered abroad, working directly with the President of the charity. Assisted with first aid training courses and helped organise a fundraising gala of approx. 200 people, where I successfully networked with potential donors.

2017

**International Space Settlement Design Competition.** Represented the UK in the world finals at the Kennedy Space Centre, Florida. My team was the global runner-up.

2017

**UK Space Design Competition.** Part of the winning team (50 in my team, 250 competitors in the finals) of a 48-hour competition which involved designing a functional moving moon base on Mercury and a sub-nautical moon base, on Europa.

## Project Experience

## Key Skills

2022-2024

### Synthetic Knee: Crux.

- Designed synthetic knee to replace cadaveric testing in biomechanics.
- Recreated 6DoF human gait with 0.1mm accuracy using AI-based bone location estimation.
- Included modular bone surfaces, adjustable ligament placement, and ligament elasticity.

**Project management** of 2-year client project including leading and coordinating the project delivery, ensuring the deliverables were aligned with clients' requirements and project scope

2021-2022

### RTK Device: Onwave.

- Designed electronic layout and injection-moulded casing for a wearable RTK device.
- Features 12-hour battery life and operates between -10°C and 30°C, with IP67 waterproofing.
- Provides 100mm tracking accuracy, with haptics, OLED display, and audio feedback for enhanced usability.

**Sole responsibility of company project for external client**

**Presenting progress back to client** weekly to ensure deliverables met client requirements

2021-2022

### Altitude Variance Data Gathering: Lightbug.

- Conducted research on altitude variance using real-time pressure and humidity data.
- Developed prototypes for a GPS tracker capable of 3D location identification with high accuracy.
- First commercially viable solution for tracking altitude variance.

**Detecting and presenting key insights** to the internal team to launch a new product

**Leading primary research and data analysis**

2021-2022

### Charging Docks: Racetracker.

- Designed modular injection-molded charging docks for large fleets of tracking devices
- Created removable, portable charging trays that fit inside Nanuk 918 and 950 waterproof cases.
- Engineered for ease of transport and efficiency in field operations.

**Understanding entire production line** to achieve seamless delivery

**Working with an international team in different time-zones** Kuwait and Norway

2020-2021

### Fire Risk Assessment Robot: University of Bristol.

- Designed a portable robot, deployable from a rucksack, for fire risk assessment.
- Capable of climbing and descending stairs, opening doors, and navigating obstacles.
- Integrated IR/visible cameras, sensors, and wireless transceivers for real-time communication.

**Collaboration with multiple team members** organising regular meetings

**Compliance with national regulation standards** ensuring reliable performance

2020-2021

### Bicycle Ambulance: University of Bristol.

- Designed a trailer attachable to standard bicycles for rapid and safe patient transport.
- Capable of expediting medical assistance, equipped with a vaccine cooler and storage for supplies.
- Intended for use in remote locations, allowing setup of ad-hoc clinics.

**Empathetic and adaptable approach to user centred design**

**Visually presenting complex mechanisms** in an easily understandable manner

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## SKILLS

### LANGUAGES

**FLUENT** | **BASIC**  
English | Spanish  
French | German  
Japanese

### CAD

SolidWorks  
Autodesk Inventor  
Fusion 360

### CODING LANGUAGES

Python  
MATLAB  
JavaScript

### SIMULATION PROGRAMS

Abaqus  
Simio

### PRESENTATION

Word  
Excel  
PowerPoint  
Overleaf (LaTeX)

## INTERESTS

### Creative

3D modelling with clay and  
Blender

Generative art: Weighted  
Voronoi stippling, single line  
drawing

### Sports

Bouldering: Indoor Comp style.  
Current level: V8,  
Highest: V10  
Gymnastics: Rings & Parallel bars  
Judo: Blue Belt, multiple  
competition wins  
(2012-2017)  
Boxing: White collar  
Football: 5-a-side with friends  
Skiing: Off-piste, casual

## Achievements

2024

**The Fighter Bristol** White collar boxing winner. 8 weeks of training 4 times a week. Fight held in Bristol O2 Arena.

2023

**UGC London Gymnastics** approx. 15 competitors, 3<sup>rd</sup> place floor routing, 3<sup>rd</sup> place overall performance.

2019

**Climbing Hangar London Summer Bouldering League** First prize, approx. 30 competitors in all three rounds in the Professional Male Category.

2018

**Representative of School Club Committee.** Created sports and academic teams for club competitions, introduced all the new pupils (ages 13-14) to the school to make them feel comfortable and confident.

2016

**London Youth Games** bronze medal for judo (under 55 Kg). **2014** - London youth games gold medal for judo (under 38 Kg).

## Recent Portfolio Projects

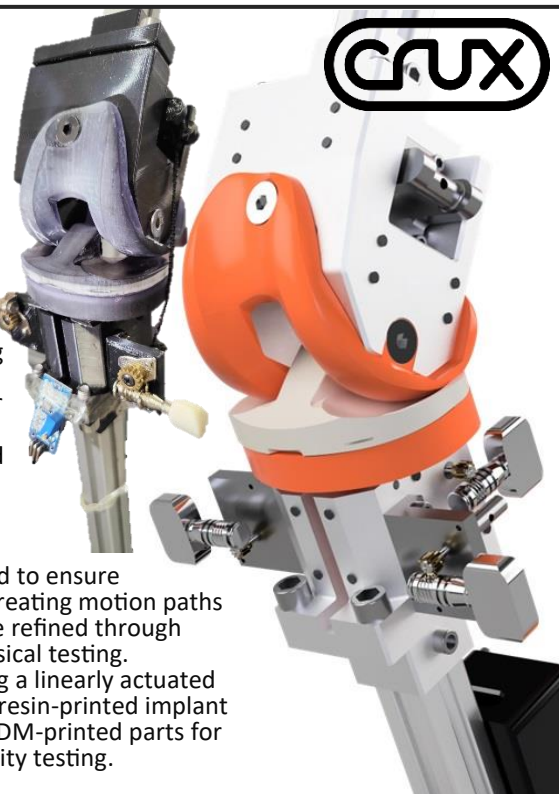
### University of Bristol: Dissertation



My dissertation was conducted collaboratively with CRUX product design. It explores non-invasive methods for capturing human knee motion and designing a biologically representative test rig fixture for testing knee implants. I evaluated non-invasive methods for determining femur and tibia locations during motion. Empirical calculation from motion tags, AI prediction and Motion Capture suits were assessed.



The test rig fixture is designed to ensure biological accuracy when recreating motion paths robotically. CAD models were refined through iterative 3D printing and physical testing. Validation was achieved using a linearly actuated rig. The final design features resin-printed implant geometries for realism and FDM-printed parts for assembly and motion capability testing.



2021-2022

### Lightbug: RTK Device Onwave



In my year in industry, I developed a durable, wearable Real Time Kinematic (RTK) device with Onwave, aimed at preventing injuries in the infrastructure industry and improving fleet management.

This involved designing the electronic layout and injection moulded casing, ensuring a 12-hour battery life, -10°C to 30°C operational range, IP67 waterproof rating, and 100mm accuracy tracking.

I managed the engineering process from conceptualization to assembly, learning design for mass manufacture and injection moulding nuances through collaboration with Shenzhen Kaierwo. By consistently delivering high-quality work, I established Onwave as Lightbug's highest profit client in 2022, with the RTK device gaining interest from international infrastructure companies including Network Rail and Lendlease Australia.

