Zack Dan El-baz

Project Portfolio:

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CONTACT

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EDUCATION

2024 2019 **University of Bristol** Engineering Design (Mechanical – MENG)

2018 2013 **St Paul's School London**

2013 2011 **St Paul's Junior School** (Colet Court)

QUALIFICATIONS

Masters	MEng
A* A-Level	Art
A A-Level	Maths
	Physics
A* GCSE	Maths
	Physics
	Art
	French
A GCSE	English Language
	English Literature
	Computing
	Biology
	Chemistry
	Spanish
B GCSE	Geography

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	Outcomes
2022-2024	**Synthetic Knee: Crux.** Designed high fidelity synthetic knee aimed at replacing cadaveric testing. Capable of recreating 6DoF human gait to within 0.1mm using AI bone location estimation. Includes Modular bone surfaces, 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 internal electronic layout and injection moulded casing for a durable, wearable RTK device that has a 12-hour battery life and operational temperature range of -10°C to 30°C, with IP67 waterproof rating. Capable of 100mm accuracy tracking, haptics, OLED, and audio feedback for user friendly performance.	**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.** Research for gathering altitude variance data using live pressure and humidity readings. Development of prototypes for the first commercially viable GPS tracker that accurately identifies location in all three dimensions.	**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 injection moulded modular charging docks and respective injection moulded components to cater for large fleets of trackers. These form removeable portable charging trays that fit inside standardised waterproof Nanuk 918 and 950 cases.	**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, capable of climbing and descending staircases and opening doors. Its payload also contained a suite of 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, that can be attached to standard bikes, and is capable of safely and comfortably expediting the transport of a person in need of medical attention. It contained a vaccine cooler, and enough storage to support the provision of an ad hoc clinic at remote locations.	**Empathetic and adaptable approach to user centred design** **Visually presenting complex mechanisms** in an easily understandable manner

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SKILLS

FLUENT	BASIC
English	Spanish
French	German
	Japanese

- SolidWorks
- Autodesk Inventor
- Python
- MATLAB
- Simio
- Excel
- Word
- Overleaf (LaTex)
- PowerPoint

INTERESTS

Creative

3D modelling with clay and Blender

Generative art: Weighted Voronoi stippling, single line drawing

Sports

Bouldering: Indoor Comp style. Current level: V7, Highest: V10

Gymnastics: Rings & Parallel bars

Judo: Blue Belt, multiple competition wins (2012-2017)

Boxing: White collar Undefeated (1 Fight)

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, 3rd place floor routing, 3rd 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

2022-2024

University of Bristol: Dissertation



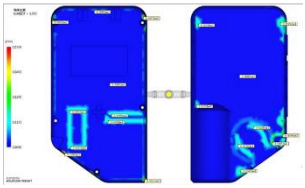
My dissertation was conducted collaboratively with CRUX product design. It explores non-invasive methods for capturing human knee motion and designing a biologically representative test rig fixture for testing knee implants. I evaluated non-invasive methods for determining femur and tibia locations during 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 Landlease Australia.