Tay Fu Wen

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EDUCATION

University of Oxford | MEng in Engineering Science (Info Engineering)   **Expected Graduation: June 2026**

NUS High School of Math and Science | Chemistry Major with Physics and Math Honours   **Nov 2019**
Scholarships: SG:Digital Scholarship (2022), A*STAR Science Award (2018), DSO YDSP Scholarship (2016)

SKILLS

Programming Languages: Python, HTML, CSS, SQL | **Others**: Mathematica, Arduino, Sklearn, Django, Unit Testing

WORK EXPERIENCE

Zimplistic (Rotimatic) – Firmware Engineer Intern   **November 2021 – January 2022**
- Developed **Unit Test** scripts for the heater and wedge press sub-assemblies to ensure safety.
- Built Outgoing Quality Control (OQC) machines that run a series of Unit Tests on the different sub-assemblies of the **Rotimatic*** to flag the failure, and conducted analysis after to diagnose the type of failure.
- **Hacked** printers and scanners to integrate them into our OQC machine to streamline the QC process.

* Rotimatic is the world's first robotic kitchen appliance. It makes flatbread through dispensing, mixing, flattening and heating raw ingredients.

A*STAR, Bioinformatics Institute – Electronics Engineering Intern   **Apr 2018 – Dec 2019**
- Designed and engineered a Smart mattress to alleviate pressure ulcer formation in bed-ridden patients.
- Smart mattress comprised a cartesian network of our proprietary polymer, force-sensitive resistors, transistors and electromagnets – all controlled by an **Arduino** which maintained a negative feedback loop.
- Used **Fritzing** to design our prototype before soldering and wiring the components to form our product.
- Smart mattress patented in 2019 and has been undergoing clinical trials at Ang Mo Kio-Thye Hua Kwan Hospital since 2020.   **[SSEF Gold, Korean Science Academy Science Fair Most Creative Research]**

PERSONAL PROJECTS

Handwritten Digits Recogniser   **Jul 2021**
- Built a Convolutional Neural Network (CNN) in **Python** to identify different handwritten digits.
- CNN was trained with features from the **MNIST** dataset using the **Sklearn** library.
- The confusion matrix returned an accuracy of 97.7% given the testing features.

Modelling the Paradoxical Downward Oscillatory Motion of a Bubble in an Oscillating Pressure Field
          Jun 2018 – Feb 2019
- Developed a dynamic numerical model in **Mathematica** to explain the motion of the bubble and derived an analytical solution to further characterise the behaviour of it (sinking criteria, decomposed motion).
- Force analysis done showed that the isothermal expansions of the bubble coupled with its time-varying upthrust manifested a Bjerknes Force that time-averages to a non-zero value, explaining the sinking motion.
- Verified through Phase and Trajectory plots that the model holds true as frequency and amplitude of pressure field, and the viscosity of the fluid were varied (experimental data collected via computational pixel tracking).

Modelling the Liquid Capillary Bridge between Objects   **Jun 2016 – Feb 2017**
- Developed a quasistatic quantitative model in **Mathematica** of the capillary bridge and characterised its force.
- Energy considerations with the Euler-Lagrange equation and pressure considerations using the Young-Laplace equation showed convergence in the same second order ODE which described the capillary bridge. Using boundary conditions based off the Young equation, the ODE was solved numerically simulating the bridge.
- Verified through Force-Displacement plots that the model holds true as viscosity and volume was varied.

Modelling the Newton's Cradle with Hertzian and Viscoelastic Considerations   **Jun 2018 – Feb 2019**
- Developed a dynamic quantitative model in **Mathematica** of a dissipative Newton's Cradle.
- Torque considerations with Hertzian and Viscoelastic losses were used to describe the motion of each bob. Considering the collision condition vectorially, the piecewise function of its torque is split based on collision and is then solved numerically giving the trajectory of each bob, and as a whole the motion of the Cradle.
- Verified through Trajectory plots that the model holds true as length of string, angle of release, and number of bobs were varied.

AWARDS / ACTIVITIES

Singapore Science and Engineering Fair (SSEF) – Gold; Bronze	**2019; 2018**
Singapore Physics Olympiad – Bronze, invitation to National Training Team	**2018**
Singapore Young Physicist Tournament – Bronze; Silver	**2019; 2017**