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# William Matthews

DPhil MEng

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## EDUCATION

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### University of Oxford, University College

October 2019 - December 2023

*DPhil*

*Oxford, UK*

- Silicon Photomultipliers as Optical Wireless Receivers in Ambient Light. Supervisor Prof. Steve Collins.
- Published a total of thirteen papers, with more in draft. Presented at three conferences.
- Achieved world-record data-rates using a SiPM as a receiver with On-Off Keying and OFDM.
- Created a high-performance Monte-Carlo simulator of SiPMs in C++.
- Invented and optimised novel optics for solid-state solid angle filtering.

### University of Oxford, University College

Matriculated 2015 - Graduated 2019

*First Class MEng Engineering Science*

*Oxford, UK*

- Mathematics and Statistics-dense course. Specialisms in Information (ML, Signal Processing, Communications), Robotics (Control, Planning, Machine Vision), Math, Plasmonics and Semiconductors.
- Earned a Scholarship for First Class performance.
- 3<sup>rd</sup> Year Projects: 'Control of an Ammonia-Based ESS' & 'Optimal FIR Filter Generation'.
- 4<sup>th</sup> Year Project: 'Graph Modulation: Ultra-efficient Communication and Storage for 6G Systems'. Supervised by Prof. Justin Coon.

## EXPERIENCE

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### Avos Ltd.

July 2023 - Present

*Software Engineer*

*Cambridge, UK*

- Startup in stealth mode.
- Full stack software Engineer with focus on backend and data engineering.
- Wrote a significant amount of Golang, Python (for R&D), SQL, and React.
- Core responsibilities in data cleaning, knowledge creation, curation, and recall.
- Developed entire pipelines for data ingestion, prompt construction, LLM output processing and more.
- Notable experience with various LLM APIs, prompt engineering, and data pipelines.
- Experience with embedding models, vector databases, search engines, and RAG.
- Became the go-to person for all matters NLP and ML, and led the 'AI team' in the company.
- Read multiple papers a week and implemented research into the company's products where appropriate.
- Formed a close working relationship with the CEO and CTO, and gave guidance on the company's direction with respect to NLP.
- Wrote recommendation systems to surface relevant information custom to each user.

### Oxford University Racing

May 2019 - September 2020

*Chief Software & Electrical Engineer*

*Oxford, UK*

- Managed a team of ten people. Led the development for key electric vehicle systems.
- Responsible for all low voltage electrical systems and software on the vehicle.
- Developed a continuous integration system for vehicle control unit software, among other circuits.

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**ProXisense Ltd.**

July 2018 - September 2018, July 2019 - April 2020

*Intern, Consulting Software & Electrical Engineer*

*Harwell, UK*

- Solely responsible for creating critical software to process sensor data, as well as processing raw signals for customer demonstrations, sensor calibration and internal R&D use.
- Created a custom thermal simulation package to guide future thermal product sensor development.
- Using Kalman filters, improved sensor accuracy and precision for blade tip timing and clearance measurement by a factor of 200 through my own initiative.
- Processed and presented results to clients, leading towards two new contracts.

## TECHNICAL STRENGTHS AND CAPABILITIES

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**Languages** Go, C/C++, Python 3, MATLAB, SQL, bash, PHP, Type/JavaScript

**Markup** HTML, CSS,  $\text{\LaTeX}$

**Workflow** zshell, tmux, vim, git, ssh, VSCode

**Software** React, Simulink, KiCAD, FreeCAD, Solidworks, Wireshark, GIMP

**Methods** Discrete and Continuous Signal Processing, Machine Learning, Optimisation, Statistics, Data Visualisation

Comfortable with Torch, Keras and Tensorflow. Wrote an autograd from the ground up.

Daily-drives GNU/Linux. Experienced at designing, building and testing RF circuit boards, 3D printing.

## HOBBIES AND INTERESTS

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Running, Fishing, Squash, OpenStreetMap Contributor.

I enjoy fiddling with my blog (when I can find the time), and working on various software projects. I have recently started to contribute to the open source community, and have a few small projects on GitHub.

Attempting research into ML in my own time, with a personal goal to publish a paper in the field within two years.

## REFERENCES AND ADDITIONAL INFORMATION

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References available on request. Additional information available on <https://willmatthews.xyz>.