SIMON WARD

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Simon Ward Vanderbilt

EDUCATION

Vanderbilt University (Nashville TN, US) **2019 – 2024 (Feb)**
PhD in Electrical and Computer Engineering

Durham University (Durham, United Kingdom)
Master and Bachelor of Physics (MPhys) with honours **2011 – 2015**

ENGINEERING EXPERIENCE

Vanderbilt University (Nashville, TN)
Research Associate **2019 – present**
Investigating the application of machine learning, AI and statistics to enhance performance and accessibility of medical diagnostic tests.

- Devised approach to reduce sensor response time by a factor > 5, using ensembles of LSTM deep neural networks (Python) for time series forecasting, uncertainty estimation, adversarial training, and transfer learning with a large-scale simulated dataset, enabling rapid testing of harmful molecules.
- Designed a capture agent-free biosensor by applying machine learning, applying data visualization and classification (Python) to data from biosensor arrays, a step towards unprecedented robust, scalable, and low-cost biosensors.
- Invented algorithm using Morlet wavelet filtering and Fourier analysis (Matlab) which improved detection limits of thin film sensors by 10x, and released easy-to-use open-source app.
- Built software (Python) and hardware to automate biosensor data collection, improving accuracy by 48% and increasing experimental throughput by 100x.

Crowcon Detection Instruments Ltd. (Abingdon, UK) – $47mil revenue company designing and manufacturing gas detection solutions for a wide range of industries.
Electronic Engineer **2015 – 2019**

- Developed safety-critical, production-ready gas detector firmware (C) and electronics, driving the companies push towards IoT capability and expansion into a previously untapped market.
- Solved design flaws in products after troubleshooting customer problems under pressure and finding the root cause (ESD susceptibility, temperature drift), rescuing orders ($70,000+).
- Designed new test procedures, using software (Python) and hardware to raise production yields by 5%.

Durham University (Durham, UK) – Elite public university in the north of England, founded in 1832.
Research Associate **2012 – 2015**

- Engineered eddy current pipeline defect testing solution and data analytics (Python), potentially reducing operating costs by >20%, and communicated findings to partners and stakeholders at GE.

LEADERSHIP

Vanderbilt University (Nashville, TN)
Research Mentor **2019 – 2024**

- Led interdisciplinary team of undergraduate and graduate students working on projects I curated. The 5 undergraduate mentees over 4 years went on to be co-authors on publications, presenters at national conferences, and graduate students embarking on PhD degrees of their own.
- Represented Vanderbilt School of Engineering to external stakeholders in public online information sessions and several in-person events, sharing research and experiences at Vanderbilt.

Teaching Associate **2019 – 2020**

- Instructed undergraduate course focused on Python and digital systems, creating 30% of lab content.

AWARDS AND HONORS

- C.F. Chen 2022 Graduate Student Paper Award for “Best Paper in Electrical Engineering” ($5000)
- SPIE Optics and Photonics Education Scholarship 2022 ($3000)
- Vanderbilt Graduate Leadership Institute Fall 2022 Dissertation Enhancement Grant ($2000)

SKILLS AND TOOLS

Python (NumPy, Pandas, Scikit-learn, Keras, TensorFlow, Matplotlib), MySQL, Git, C, Linux, Dimensionality reduction (LDA, PCA), Classification (Linear/Logistic Regression, Random Forest, SVM, KNN, ANN), Time series forecasting (RNN, GRU, LSTM), Digital Signal Processing (Fourier Analysis, Wavelet processing)