

# Beth Jelfs

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## Work Experience

April 2022 – Present  
Dept. Electronic, Electrical &  
Systems Engineering  
University of Birmingham, UK

### Assistant Professor in Signal Processing & Data Analysis

Adaptive signal processing algorithms for signal characterisation and machine learning.

March 2021 – March 2022  
March 2017 – March 2021  
School of Engineering  
RMIT University, Australia

### Lecturer (Assistant Professor)

#### Vice-Chancellor's Research Fellow

Tracking responses in time-varying systems:

– Time-varying delay estimation; Path-prediction; Image processing.

June 2015 – October 2016  
August 2013 – May 2015  
Dept. Electronic Engineering  
City University of Hong Kong,  
Hong Kong

### Research Fellow

#### Postdoctoral Fellow & International Transition Team

Study of finger coordination: fusion of EEG, EMG & kinematics.

Methods for neural synchronization & information transfer.

June 2011 – June 2013  
Dept. Medical Physics &  
Bioengineering  
University College London, UK

### Postdoctoral Research Associate

Integrating monitoring & modelling for real time tracking of cerebral circulation & metabolism.

June 2010 – June 2011  
Dept. Chemistry & Dept. Physics  
University of Oxford, UK

### Postdoctoral Research Assistant

Statistical signal processing for nanopore DNA sequencing.

July 2009 – November 2009  
Dept. Neurosciences  
K.U. Leuven, Belgium

### Research Assistant

Efficient complex-valued echo state networks

October 2000 – September 2001  
Marconi Optical Components, UK

### Test Technician

Testing lasers/laser related products for both production & research.

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## Education

April 2010  
Imperial College London, UK

### PhD Electrical & Electronic Engineering

Thesis: Collaborative Adaptive Filtering for Machine Learning

July 2005  
University of Leicester, UK

### MEng Electronic & Software Engineering

1st Class Honours

## Grants & Awards

2024–2025 BAE Systems	<p><b>Akeru - Phase A</b>  <b>Goal:</b> Validate subsystems for a MISO over the horizon radar.  <b>Role:</b> Design and validation of MISO signal processing.</p>
2023–2024 Network Rail	<p><b>Feasibility Research Detection of Weapon</b>  <b>Goal:</b> Investigate radar for weapons detection at stand-off distance.  <b>Role:</b> Identify appropriate signal processing techniques to identify signatures of different weapons.</p>
2022–Ongoing University of South Australia & Trinity College Dublin	<p><b>Collaborative Research Agreement</b>  <b>Goal:</b> Automated prostate cancer diagnosis and prognosis.  <b>Role:</b> Development of image processing &amp; machine learning software for use with a tissue biomarker developed by collaborators.</p>
2020 SmartSat Cooperative Research Centre	<p><b>Ideation Challenge</b>  <b>Goal:</b> Development of a vision based attitude estimation system for high altitude platforms.  <b>Role:</b> Successfully lead a project to rapidly conceive &amp; produce a minimum viable product.</p>
2020-2021 Trusted Autonomous Systems Defence Cooperative Research Centre	<p><b>Project for the Defence Artificial Intelligence Centre</b>  <b>Goal:</b> Performance assessment for a self-organising low-cost, high altitude balloon constellation for persistent surveillance &amp; comms.  <b>Role:</b> Development of a simulation platform to allow assessment of performance based on real and simulated data.</p>
2020 RMIT University	<p><b>Maxwell Eagle Endowment Award</b>  <b>Goal:</b> Using machine-based learning to develop prognostics of CAR T cell outcomes in older patients.  <b>Role:</b> Design of image processing &amp; predictive machine learning.</p>
2019 RMIT University	<p><b>Capability Development Fund</b>  <b>Goal:</b> High throughput platform for tracking cellular response.  <b>Role:</b> Creating efficient image processing algorithms for development of high volume machine learning architecture.</p>
2017–2018 Australian Academy of Technology Sciences and Engineering	<p><b>Global Connections Fund Bridging Grant</b>  <b>Goal:</b> Development of a wireless portable device to monitor muscle fatigue in collaboration with PLUX Wireless Biosignals.  <b>Role:</b> Successfully designed new algorithms to assess muscle status in real time.</p>
2017 RMIT University	<p><b>Scheme for Teaching and Learning Research</b>  <b>Goal:</b> Development of a framework for problem based learning workshop style education.  <b>Role:</b> Design of framework.</p>
2017–2021 RMIT University	<p><b>Vice-Chancellor's Research Fellowship</b>  <b>Goal:</b> To investigate the use of time-varying algorithms in the assessment of biomedical data for machine learning applications.  <b>Role:</b> Sole investigator, project design, management &amp; dissemination of results.</p>

- 2015 **Research Exchange Project**  
BayChina Collaboration with Neuroscientific Theory Group at TU München.
- 2010 **Best Student Paper Award**  
International Symposium on Neural Networks For paper “Modelling of Brain Consciousness based on Collaborative Adaptive Filters”.
- 2008 **Academic Research Collaboration Project**  
British Council and DAAD Collaboration with TU München and the Max-Planck-Institute for Dynamics and Self-Organization.
- 2007 **International Travel Grant**  
Royal Academy of Engineering To attend IEEE International Conference on Acoustics Speech and Signal Processing.
- 2005–2009 **Doctoral Training Award**  
Engineering & Physical Sciences Research Council
- 2005 **Best Graduating Student**  
British Computer Society

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## Teaching & Supervision

- University of Birmingham  
RMIT University **Supervision**  
Currently supervising 5 PhD students (1 completion)  
Supervision of ~20 MSc and 5 Undergraduate projects to date
- 2023–present **Module Lead: Software and Systems**  
University of Birmingham  
~50 students Delivery & redesign of teaching materials for the object-oriented programming aspects of a technical elective for 4th year undergraduate and taught masters.
- 2023 **Guest Lecturer: Biomedical Signal Analysis**  
Shantou University Design and delivery of AI aspects of an undergraduate biomedical signal processing course.
- 2021 **Lecturer: Computer and Network Security**  
RMIT University  
~50 students Delivery & redesign of teaching materials for the computer security aspects of a technical elective for 4th year undergraduate and taught masters.
- 2021 **Tutor: Engineering Computing**  
RMIT University  
~200 students Delivering online C++ tutorials as part of a core 2nd year undergraduate engineering course during COVID pandemic.
- 2019–2020 **Lecturer: Signals & Systems 1**  
RMIT University Offshore course taught at School for Higher and Professional Education, Vocational Training Council, Hong Kong.
- 2018–2021 **Course Coordinator: Biomedical Signal Analysis**  
RMIT University  
~50 students Design and delivery of a core 3rd year undergraduate course in biomedical engineering and technical elective for electronic engineering.

2014–2015 **Guest Lecturer: Brain Machine Interface: Technology, Culture, & Society**  
City University of Hong Kong  
~200 students  
Lecturing on BMI Technology & Neural Computation for a university elective.

2013–2015 **International Transition Team Graduate Teaching Assistant**  
City University of Hong Kong  
Providing English language support including student tutorials, proof-reading of academic papers & preparation of teaching materials.

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## Professional Activities

2023–Present Secretary of IEEE UK and Ireland Computer Society Chapter  
IEEE Computer Society

2023 Session Chair  
IEEE Engineering in Medicine & Biology Conference (EMBC)

2022–Present Chair of the Biomedical Signal Processing and Systems Technical Committee  
Asia Pacific Signal and Information Processing Association (APSIPA)

2022–Present Member of Women in Signal Processing subcommittee on empowerment, awareness, communications and visibility.  
IEEE Signal Processing Society

2021 Associate Editor  
Encyclopedia BRAIN

2020–2022 Steering Committee Member AI4Space Research Network  
SmartSat Cooperative Research Centre

2020 Special Session Organiser: Multidimensional Biomedical Signal and Image Processing  
APSIPA Annual Summit & Conference

2018 Special Session Organiser: Emerging Technologies for Healthcare  
APSIPA Annual Summit & Conference

2017–2022 Vice-Chancellor's Fellows Advisory Group  
RMIT University

"enGENEious" conference  
2012  
Conference Organising Committee

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## Public Engagement & Invited Talks

2023 **Clinical & Health Sciences Seminar**  
University of South Australia, Australia  
Motion Estimation and Alignment for Biomedical Images

2021 **Research Seminar**  
Bionics Institute, Australia  
Surrogate Data and What to Do When We Don't Know the Ground Truth

- 2020 **Engaging for Impact: Innovation in Healthcare with Precision Medicine Session**  
RMIT University, Australia Tissue Image Processing
- 2019 **Biomedical Engineering Department Invited Lecture Series**  
Shantou University, China Biomedical Signal Processing
- 2019 **Bioinformatics Network Symposium**  
RMIT University, Australia Machine Learning for High Throughput Cell Imaging.
- 2013 **Pint of Science Event Manager**  
London, UK Science festival for the general public
- 2011–2013 **UCL Outreach**  
University College London, UK Demonstrations and talks with school children for events including:  
- Medical Physics Masterclass;  
- Women in Engineering Taster Day;  
- University Challenge Event.
- 2011 **Doctoral Training Centre Mini-Conference**  
University of Oxford, UK DNA Nanopore Sequencing
- 2008 **Faculty of Computer Science Invited Talk**  
University of Applied Sciences Schmalkalden, Germany Signal Modality Characterisation Using Collaborative Adaptive Filters