

George Crowley, FHEA

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🌐 <https://george-crowley.github.io/>

🌐 LinkedIn

Education

2022–2027

📖 **PhD Candidate in Electrical & Electronic Engineering**, University of Sheffield.

- **Thesis Title:** *Machine Learning Methods for Monitoring of Complex Water and Sewer Network Infrastructure*.
- **Advisors:** Dr. Iñaki Esnaola, Prof. Simon Tait, Prof. George Panoutsos, Prof. Vanessa Speight.
- **Funding:** Sponsored by *Thames Water & EPSRC CDT in Water Infrastructure and Resilience (WIRe)*.

2019–2022

📖 **BSc (Hons) in Mathematics** (First Class Honours), University of Sussex.

- **Thesis Title:** *Methods for the Observational Model*.
- **Advisors:** Dr. James Van Yperen, Dr. Eduard Campillo-Funollet, Prof. Anotida Madzvamuse.

Research Publications

Journal Articles

- 1 **G. Crowley**, S. Tait, G. Panoutsos, V. Speight, and I. Esnaola, “Information-theoretic sensor placement for large sewer networks,” *Water Research*, vol. 268, p. 122 718, Jan. 2025. 🔗 DOI: 10.1016/j.watres.2024.122718.

Pre Prints

- 1 **G. Crowley** and I. Esnaola, *Symmetry of concentration and scaling for self-bounding functions*, *arXiv preprint*, arXiv:2509.22375, 2025. 🔗 URL: <https://arxiv.org/abs/2509.22375>.
- 2 **G. Crowley** and I. Esnaola, *Submodularity of mutual information for multivariate Gaussian sources with additive noise*, *arXiv preprint*, arXiv:2409.03541, 2024. 🔗 URL: <https://arxiv.org/abs/2409.03541>.

Conferences & Presentations

Oral Presentations

- 2026 📖 **WIRe Annual Conference**, Sheffield, UK.
“Monitoring our sewer networks: the good, the bad, and what’s left to improve.”

Poster Presentations

- 2025 📖 **26th IWA Young Water Professionals (YWP) Conference**, Brighton, UK.
“Effects of sensor placement in large sewer networks.”
- 📖 **8th London Symposium on Information Theory (LSIT)**, Cambridge, UK.
“Applying concentration inequalities to information-theoretic sensor placement problems.”

Academic & Professional Experience

Research Appointments & Consultancy

- 2026 📖 **Visiting Student Research Collaborator**, Princeton University, USA.
Department of Electrical and Computer Engineering. Hosted by Prof. H. Vincent Poor.
- 2026 – Present 📖 **Data & Research Consultant**, Southern Water & University of Sheffield, UK.
Developed uncertainty quantification frameworks for combined sewer overflow (CSO) intervention analysis using operational data to enable Environment Agency compliance.

Academic & Professional Experience (continued)

Teaching & Pedagogy

- 2025
- 2023 – 2025
- Fellow of the Higher Education Academy (FHEA)**, *Advance HE*.
- Graduate Teaching Assistant**, *Dept. of Automatic Control & Systems Engineering*, University of Sheffield.
Delivered labs and tutorial support for AER124, ACS232, and ACS6106. Marked exams for AER203 and ACS131.

Employment History

- 2026 – Present
- 2019 – 2022
- 2017 – 2018 & 2014-2016
- Consultant (Southern Water)** – *The University of Sheffield*.
Developing uncertainty quantification methods for measuring the impact of combined sewer overflow interventions for **Southern Water**.
- Fitness Advisor** - *Southdowns Leisure*, Worthing, West Sussex.
- Sales Advisor** – *Vodafone UK*, Worthing, West Sussex.

Academic Service

Peer Reviewer

- 2025
- IEEE International Symposium on Information Theory (ISIT 2025)**.
- IEEE International Conference on Communications (IEEE ICC 2025)**.

Skills & Technical Expertise

Computational & Technical

- Languages
- HPC & Tools
- Methods & Modelling
- Python, MATLAB, HTML, Linux (HPC), $\LaTeX$.
- High-Performance Computing (HPC) environments (*Stanage* Linux cluster), Git, GitHub.
- Data-Driven & Probabilistic Modelling, Uncertainty Quantification (UQ), Information Theory, Machine Learning (Anomaly Detection), Optimal Sensor Placement, Numerical Methods (ODEs/PDEs).

Domain Expertise

- Water Infrastructure
- Urban Drainage Modelling, Combined Sewer Overflow intervention analysis, Environmental regulatory compliance evidence (Environment Agency).

References

1.

Dr. Iñaki Esnaola (PhD Primary Supervisor) - Senior Lecturer (Associate Professor).
School of Electrical and Electronic Engineering, University of Sheffield.
Email: esnaola@sheffield.ac.uk

2.

Prof. Simon Tait (PhD Secondary Supervisor) - Professor of Water Engineering.
School of Mechanical, Aerospace and Civil Engineering, University of Sheffield.
Email: s.tait@sheffield.ac.uk