Stuart Walker PhD MEng MIMechE

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PhD qualified Chartered Mechanical Engineer with post-doctoral and commercial experience.

Key Skills:

- **Experimentation:** Instrumentation and measurement of structural and fluid dynamics using direct imaging, laser, optical, ultrasonic and acoustic methods.
- **Computation:** Machine learning and programming in MatLab and Python. Finite Element and Computational Fluid Dynamics. Sensor / device development with Raspberry Pi. Comfortable in Windows and Linux.
- **Communication:** Numerous peer-reviewed journal papers, international conferences, commercial reports, presentations to large audiences, public engagement & media.

Experience:

Post-Doctoral Research Associate, "Plastics: Redefining Single Use", University of Sheffield - Aug. 2019 to present

PDRA at the Grantham Institute for Sustainable Futures, working on an EPSRC-funded project to understand the future role of plastic. Part of a team carrying out life cycle assessment to understand the full lifetime impact of plastic and alternatives across proof of concept studies in medicine, agriculture and food packaging.

- Part of a genuinely multi-disciplinary team across four faculties and 15 departments
- Developing and publishing (work in press) new techniques in Life Cycle Assessment (e.g. dynamic assessments)
- Working closely with industry, from a small local dairy to Coca Cola and Marks & Spencer
- Supervising two MEng student projects and two PhD supervisions

I represent the centre and University at national and international events and sit on a panel of manufacturers (sole academic partner), allowing insight and influence, but requiring me to communicate very effectively. I continue Tidal Turbine research with partners in the UK and Italy and recently presented at EWTEC 2019 (work in press).

Researcher in Low Carbon Product Design and Development, University of Derby - Sept. 2018 to Aug. 2019

Multi-skilled consultant at the University of Derby Institute for Innovation in Sustainable Engineering (IISE). Funded by ERDF to reduce carbon emissions across Derbyshire. Recovered project performance against targets.

- Development of machine learning system for UAV image classification (£40k project delivered entirely myself)
- Mathematical and computational modelling of novel in-stream hydroelectric generator
- Development, life cycle assessment and environmental certification of new low U-value window range
- Design and testing of prototype steam generator powered by forced cavitation
- Monitoring and sensor development of drinks manufacturing site to reuse waste process energy.

I also represented the institution at national events, continued computational and experimental tidal stream energy work (in collaboration with University of Florence via MaRINet2), presented at conferences, and played a key role in writing a multi-million pound bid for continuation of the ERDF project. This was successful and is now underway.

Post-Doctoral Researcher in Structural Dynamics, University of Sheffield - Jan. 2017 to Aug. 2018

Part of the renowned University of Sheffield Dynamics Research Group, I was the lead experimental researcher on the *S^3 – Disease Surveillance for Systems and Structures* project, under Prof. Keith Worden.

Carried out experimental and computational work, including full experimental and day-to-day responsibility for a scanning laser vibrometer, experimental testing using optical, accelerometer and force measurements, and Finite Element model development and updating. This work was presented at the ISMA2018 conference.

Chalet Manager (Winter) & Resort Manager (Summer) - Dec. 2015 to Oct. 2016

Planned career break. With my wife I managed a remote 25-bed chalet in winter and three self-catered chalets in summer. Developed customer service, advanced driving, improved French and German language skills.

EPSRC Doctoral Prize Researcher, University of Sheffield - Dec. 2014 to Dec. 2015

12 month EPSRC fellowship on turbine wake interaction. Undertaken at Universities of Florence and Sheffield.

Major achievements included the design and construction of low cost scale turbine models with speed and power instrumentation; characterisation of large water channel to understand boundary layer and turbulence; flow data

measurement using ultrasonic and laser systems and statistical analysis in MatLab. I also built a Computational Fluid Dynamics (CFD) model using ANSYS CFX and studied turbulence results using Q criterion and vorticity. Work was presented at two European conferences in 2015 and published in 2017.

PhD Researcher, University of Sheffield - Sept. 2010 to Dec. 2014
Title: *'Hydrodynamic interactions of a Tidal Stream Turbine and Support Structure'*

Undertaken within the University of Sheffield E-Futures Doctoral Training Program, including taught first year on energy and resource use and demand, fossil, nuclear and renewable energy. Postgraduate research skills diploma. PhD major achievements included developing a collaboration with commercial developer, designing and constructing instrumented turbines, using a range of flow measurement methods (Dye injection, Laser, Ultrasonic and Acoustic Doppler systems, Particle Image Velocimetry), developing skills in system construction, use, repair and safety. Data analysis using MatLab. Computational modelling of tidal flows using ANSYS CFX and Fluent. I was also successful in applying for EU FP7 funding and published three peer-reviewed journal articles.

Life Cycle Assessment project with TATA Steel - Sept. 2010 to Dec. 2015
Continued collaboration after initial work during first year of PhD. Study of embodied energy of Tidal energy devices using commercial software and self-developed spreadsheet / VBA tool. Two peer-reviewed journal publications.

Graduate Consultant, AECOM Advanced Design Group - Sept. 2007 to Sept. 2010
Member of a specialist team within the AECOM Buildings Division. Main responsibilities:

- Energy demand modelling and energy planning at building scale
- Part of masterplan design teams on energy, water and transport layout (e.g. Qatar 2022 World Cup bid)
- Computational modelling for building regulation compliance, using dynamic thermal modelling
- CFD analysis for external wind assessment and internal airflow analysis (full project management)
- Presentations and reports for clients, design teams, planning authorities
- Managed two members of staff when project workload required

Ski Instructor (Snowsport England qualified Club Instructor), Sheffield Ski Village - Sept. 2004 to Oct. 2005
Part-time role during undergraduate degree. Planned and delivered lessons to clients of all ages.

Manufacturing Engineer, Labman Automation - May to Sept. 2004
Assisted in the design and construction of robotic systems for commercial and academic applications.

Design Engineer, BioGene Research - May to Sept. 2002 & 2003
Part of a small team developing DNA test equipment. Produced construction guide to develop batch manufacturing.

Publications

- **Journal articles:** 6 (+ in press) publications in peer-reviewed journals including Jnl of Cleaner Production, IMechE Part M, Sustainability, Environment and Behavior (sp). Regular journal reviewer. Full list available.
- **Presentations**: International, European and UK conference presentations, poster presentations (recent award winner), and regular speaker at Public Engagement and STEM events.

Funding Awards

- **MaRINet 2 (April 2018 & August 2019):** Laboratory access at University of Florence LABIMA lab
- **Urban Flows Observatory Sensor Design Competition (Feb. 2018):** Awarded £1000 to develop prototype sensors
- **Engineering Researcher Society DO fund (Feb. 2018):** Small grant for part manufacture
- **MaRINet (June 2015):** Funding awarded to access large facility at the University of Florence

Previous Education

- **MEng Mechanical Engineering (2:1) - July 2007**
  University of Sheffield
- **Stokesley School & 6th Form College - July 2003**
  A Levels: Design Technology (A) Maths (B); Physics (B). AS Levels: General Studies (A); German (C)
  GCSEs: 10 at A*-B inc. Maths (A), English (A*/ A) and Science (A*)

Further Details

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