David Sinden

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home: djps.github.io github: djps linkedin: sindendavid twitter: @david_sinden

Innovative applied mathematician with a strong track record in scientific computation, with over 15 years' experience working in applied research with a focus on medical interventions. Looking for new challenges in modelling to support medical device development. Open to location.

- Formulates realistic yet tractable mathematical models, and associated deployable, tested and documented simulations. Excellent coding and software development skills developed through deployment into clinical and commercial environments, satisfying ISO 13485 standard.
- Communication skills refined through working in multi-disciplinary, international teams at the interface of academic research and industry; lecturing and teaching at universities; delivering invited presentations at international conferences.
- 17 peer-reviewed journal papers (over 250 citations), a book chapter, acquisition of grants (over 500,000€), 12 invited presentations, industrial supervisor to three PhD students, an MSc student, and maintainer of widely used open source code, k-wave-python

Experience

2019– **Fraunhofer Institute for Digital Medicine MEVIS** Bremen, Germany
Senior Research Scientist - Modelling and Simulation Group
- Developed large-scale simulations for microwave and ultrasound ablative therapies by architecting and parallelizing high-performance numerical methods, enabling clinically relevant treatment planning at scale.
- Engineered fast ultrasound beamforming algorithms and a transcranial acoustic/elastic propagation simulator by leveraging GPU-accelerated reconstruction techniques, delivering novel application.

2014–2019 **National Physical Laboratory** Teddington, United Kingdom
Senior Research Scientist - Medical Ultrasound Group
- Established measurement-based simulation for nonlinear propagation through complex media by integrating empirical measurements into computational models, incorporated into IEC technical specification 63587.

2011–2014 **Institute of Cancer Research/The Royal Marsden Hospital** Sutton, United Kingdom
Post-Doctoral Research Associate - Therapeutic Ultrasound Group/Joint Department of Physics
- Developed an ultrasound-guided high-intensity focused ultrasound treatment planning system with a multi-element phased-array by integrating beamforming control, for focal steering and enhanced safety.

2008–2011 **University College London** London, United Kingdom
Post-Doctoral Research Associate - Ultrasonics Group/Department of Mechanical Engineering
- Investigated the influence of cavitation on therapeutic ultrasound by employing numerical and analytical approaches, enabling accurate prediction of cavitation in order to optimize treatment efficacy and safety.

Education

2004–2008 **PhD - Dynamical Systems** University College London
Thesis: "Integrability, Localisation and Bifurcation of an Elastic Conducting Rod in a Uniform Magnetic Field",
Advisor: Prof. Gert van der Heijden

2003–2004 **MSc - Modern Applications of Mathematics** University of Bath

2000–2003 **BSc - Mathematics with Applied Mathematics/Mathematical Physics** Imperial College London

Awards & Esteem Indicators

2020 **IEEE IUS Challenge on Ultrasound Beamforming with Deep Learning (CUBDL)**
Joint first place in IEEE IUS CUBDL Challenge for "Improving image quality of single plane wave ultrasound via deep learning based channel compounding" (2020)

2015- **International Expert**
Member IEC/BSI Technical Committee 87 (Ultrasonics), in an individual capacity, associate IMA, full member IOP

Various **EPSRC Enhanced Scholarships**
Enhanced funding for MSc (2004), PhD (2008) and post-doctoral work (2014)

Skills

programming: python, C++, Matlab, OpenCL
DevOps: git, svn, github, gitlab, google test, pytest, make, cmake, visual studio
languages: English (native), German (B2.1) with permanent residency

libraries: ITK, VTK, boost, eigen
computation FEniCS, Comsol