# David Sinden

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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, internationally recognised expert on ultrasound simulation for therapy and diagnosis. Looking for new challenges in modelling to support medical device development, open to relocation.

- Formulates realistic yet tractable mathematical models, and deployable, tested and documented simulations. Excellent coding and software development skills developed through clinical/commercial deployment, satisfying ISO 13485/IEC 62304 standards.
- 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"

**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