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
Skills: python, VTK, ultrasound modelling, treatment planning, software development
- 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
Skills: python, VTK, ultrasound modelling, treatment planning, software development
- 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
Skills: python, VTK, ultrasound modelling, treatment planning, software development
- 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
Skills: python, VTK, ultrasound modelling, treatment planning, software development
- 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

9.2004–6.2008 **PhD - Dynamical Systems** University College London, UK
2003–2004 **MSc - Modern Applications of Mathematics** University of Bath, UK
2000–2003 **BSc - Mathematics with Applied Mathematics/Mathematical Physics** Imperial College London, UK

Awards & Esteem Indicators

2020 **IEEE IUS Challenge on Ultrasound Beamforming with Deep Learning (CUBDL)**
Joint first place in international machine learning challenge applied to ultrasound image reconstruction (2020)

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

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

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