David Sinden PhD

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28357 Bremen, British Citizen with permanent residency in Germany

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. Experienced in leading a managing complex interdisciplinary projects, as well as working in a team.
- 18 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

Professional Experience

Nov 2019– **Fraunhofer-Institut für Digitale Medizin MEVIS** Bremen, Germany
Senior Research Scientist — Modelling & Simulation Group
Skills: python, ITK/VTK, ultrasound modelling, treatment planning, software development, elastography, uncertainty analysis
- Develops large-scale simulations for microwave and ultrasound ablative therapies by implementation of high-performance numerical methods, enabling clinically relevant treatment planning at scale.
- Engineers fast ultrasound beamforming algorithms and a transcranial acoustic/elastic propagation simulator by leveraging GPU-accelerated signal-processing techniques, delivering real-time imaging performance and improved diagnostic accuracy.

Jun 2014–Nov 2019 **National Physical Laboratory** Teddington, United Kingdom
Senior Research Scientist — Ultrasound & Underwater Acoustics Group
Skills: python, matlab, Finite Element Analysis (COMSOL, FeniCS), ultrasound modelling, signal processing , uncertainty analysis
- Established measurement-based simulation for nonlinear propagation through complex media by integrating empirical measurements into high-fidelity nonlinear computational models, enabling accurate predictions and incorporation into the IEC standard 63587.

Jun 2011– Jun 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 real-time ultrasonic imaging and adaptive beamforming control, enabling precise focus steering, dynamic treatment adjustments, and enhanced therapy safety.
- Implemented motion-management strategies for therapeutic ultrasound.

Jun 2008– Jun 2011 **University College London** London, United Kingdom
Post Doctoral Research Associate — Ultrasound Group/Department of Mechanical Engineering
Skills: mathematical modelling, Fortran, differential equations
- Investigated the influence of cavitation on therapeutic ultrasound by employing numerical simulations and analytical modeling, enabling accurate prediction of cavitation thresholds and optimization of treatment efficacy and safety.

Education

2004–2008 **PhD - Dynamical Systems** University College London, United Kingdom
2003–2004 **MSc - Modern Applications of Mathematics** University of Bath, United Kingdom
2000–2003 **BSc - Mathematics with Applied Math./Math. Physics** Imperial College London, United Kingdom

Professional Recognition

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 (Institute of Mathematics and its Applications),
- full member IOP (Insitute of Physics)

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 (B2.2) with permanent residency
Libraries: ITK, VTK, boost, eigen
Computation: FEniCS, Comsol