andrew **crozier**
computational modeller

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languages
english (native)
german (B1)

interests

My interests are primarily related to computational modelling, in particular where it has the potential to deliver substantial improvements to society. My postgraduate and postdoctoral research has worked towards improving healthcare with complex, biophysically grounded models, however I am increasingly interested in data science and statistical modelling as an effective method to extract value from the massive data sets becoming available.

education

2010 – 2014 **PhD Biomedical Engineering** King's College London
Personalised Electromechanical Modelling of Cardiac Resynchronisation Therapy
Simulated the effects of a specialised pacemaker on a subset of heart failure patients using a detailed biophysical model of cardiac electromechanics. The model was personalised to clinical data for each patient and used to analyse the mechanisms for reponse to therapy.

2006 – 2010 **MSci Applied Mathematics and Physics** Queen's University Belfast
1st Class Honours. Subjects included Financial Mathematics, Computational Physics, Advanced Calculus, Statistical Mechanics, Quantum Mechanics and Astrophysics. Final year (masters) project on stochastic simulation of biological tissues using Monte Carlo methods, for which I was awarded the William Blair Morton prize.

experience

since 2014 **Medical University of Graz, Austria** Postdoctoral Researcher
Developed a pipeline for the generation of high resolution, patient-specific models of the heart as part of a collaborative EU project which aims to determine the applicability and effectiveness of such models for cardiology (cardioproof.eu).

2010 – 2014 **IAESTE (London Local Committee)** Founder / President / IT Coordinator
Founded the London Local Committee of the International Association for the Exchange of Students for Technical Experience (IAESTE), elected twice as President (2010-2012) and once as IT Coordinator (2012-2013).

06 – 07 2009 **University of Innsbruck, Austria** Internship
Worked in an experimental physics group studying ultralow temperature matter. Developed an experimental setup and a GUI application in MATLAB to analyse the performance of high quality optical lenses.

skills

programming / it

Highly proficient in Python and a range of numerical and scientific libraries including NumPy, SciPy, matplotlib, ITK and VTK.

Also experienced in C, C++, MATLAB, SQL, LaTeX, parallel programming and high performance computing (MPI, OpenMP), web development (PHP, Flask), Linux system usage and administration, Vim and Sublime Text editors, virtualisation software (VirtualBox) and graphics software (Inkscape).

science

Excellent general knowledge of physics, applied mathematics and statistics, including model fitting and regression. My postgraduate and postdoctoral research has primarily focussed on fitting complex deterministic models to diverse patient data.

presentation

Skilled in scientific writing and creation of high quality figures and graphics, and experienced in presenting results both internally and at international scientific conferences.

business

Experienced in maintaining professional relationships with clients through leadership of the IAESTE London Local Committee and interaction with project partners and clinicians during my postgraduate and postdoctoral work.

publications

Image-based personalization of cardiac anatomy for coupled electromechanical modeling
A. Crozier, C. Augustin, A. Neic, A. Prassl, M. Holler, T. Fastl, A. Hennemuth, K. Bredies, T. Kuehne, M. Bishop, S. Niederer, and G. Plank
Annals of Biomedical Engineering *2016*

The relative role of patient physiology and device optimisation in cardiac resynchronisation therapy: A computational modelling study
A. Crozier, B. Blazevic, P. Lamata, G. Plank, M. Ginks, S. Duckett, M. Sohal, A. Shetty, C. A. Rinaldi, R. Razavi, N. P. Smith, and S. A. Niederer
Journal of Molecular and Cellular Cardiology *2015*

Verification of cardiac mechanics software: benchmark problems and solutions for testing active and passive material behaviour
S. Land, V. Gurev, S. Arens, C. M. Augustin, L. Baron, R. Blake, C. Bradley, S. Castro, A. Crozier, M. Favino, T. E. Fastl, T. Fritz, H. Gao, A. Gizzi, B. E. Griffith, D. E. Hurtado, R. Krause, X. Luo, M. P. Nash, S. Pezzuto, G. Plank, S. Rossi, D. Ruprecht, G. Seemann, N. P. Smith, J. Sundnes, J. J. Rice, N. Trayanova, D. Wang, Z. Jenny Wang, and S. A. Niederer
Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences *2015*

The impact of beat-to-beat variability in optimising the acute hemodynamic response in cardiac resynchronisation therapy
S. Niederer, C. Walker, A. Crozier, E. R. Hyde, B. Blazevic, J. M. Behar, S. Claridge, M. Sohal, A. Shetty, T. Jackson, and C. Rinaldi
Clinical Trials and Regulatory Science in Cardiology *2015*

Quality metrics for high order meshes: analysis of the mechanical simulation of the heart beat
P. Lamata, I. Roy, B. Blazevic, A. Crozier, S. Land, S. Niederer, D. Hose, and N. Smith
IEEE Transactions on Medical Imaging *2013*

An automatic service for the personalization of ventricular cardiac meshes
P. Lamata, M. Sinclair, E. Kerfoot, A. Lee, A. Crozier, B. Blazevic, S. Land, A. J. Lewandowski, D. Barber, S. Niederer, and N. Smith
Journal of The Royal Society Interface *2013*