EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH

Curriculum Vitae

Personal information

Jakub Tomek

Work experience

06/2022-present

Department of Physiology, Anatomy, and Genetics, University of Oxford, Department of Pharmacology, UC Davis

Sir Henry Wellcome Fellowship on interdisciplinary research of arrhythmogenic mechanisms in diabetes

(*Computational modelling of human diabetic remodelling in the heart, Langendorff heart imaging, single-cell Ca imaging, FRET imaging.*)

02/2021-06/2022

Department of Pharmacology, UC Davis (Bers lab)

Postdoctoral research in calcium handling and signalling

(*Investigating molecular interactions using FRET (ratio & FLIM) imaging in single myocytes, computational cardiomyocyte model development, creating software for image analysis.*)

04/2019-12/2020

Department of Physiology, anatomy, and genetics, University of Oxford (Herring lab)

Postdoctoral researcher in cardiovascular physiology

(*I had primary responsibility for designing, planning, executing, and analysing experiments using dual-dye Langendorff imaging, and for setting up new imaging methods in the lab and training colleagues.*)

02/2018-03/2019

Department of Computer science, University of Oxford (Rodriguez lab)

Postdoctoral researcher in computational cardiovascular science

(*Design and development of a new state-of-the-art computational human ventricular myocyte model.)*

Education and training

09/2013 - 07/2018

DPhil in Department of Physiology, Anatomy and Genomics and Department of Computer Science, University of Oxford

(*Image processing, computational cardiac modelling, Langendorff heart preparation and dual-dye mapping, including stellate ganglion isolation and stimulation, clinical statistics*)

09/2008-06/2013

Undergraduate + Master in Computer Science, Faculty of Mathematics and Physics, Charles University in Prague (*Algorithmic design, AI, machine learning, image processing*)

Additional information

Publications

SELECTED JOURNAL PUBLICATIONS (22 OF 39, FULL LIST ON GOOGLE SCHOLAR)

Abbreviations for my contributions: conception and design (**C**), experimental data collection (**D**), methods development, including simulations (**M**), data analysis and interpretation (**A**), manuscript writing (**W**). † denotes a leading/co-leading role.

2024

- M Tomkova, MJ McClellan, G Crevel, AM Shahid, N Mozumdar, **J Tomek**, E Shepherd, S Cotterill, B Schuster-Boeckler, S Kriaucionis.; *Human DNA polymerase ε is a source of C> T mutations at CpG dinucleotides*; in Nature Genetics. (**M**)
- X Zhou, ZJ Wang, J Camps, **J Tomek**, A Santiago, M Vazquez, M Vaseghi, B Rodriguez; *Clinical phenotypes in acute and chronic infarction explained through human ventricular electromechanical modelling and simulations*; in Elife. (**M**)

2023

- **J Tomek***, M Nieves-Cintron, MF Navedo, CY Ko*, DM Bers*; *SparkMaster 2: A New Software for Automatic Analysis of Calcium Spark Data*; in Circulation Research 133 (6), ***co-corresponding** (**C**†,**M**†,**A**†,**W**†). Featured article by the editors, also featured at the departmental websites in Oxford and Davis.
- **J Tomek**, M Zaccolo; *Compartmentalized cAMP signalling and control of cardiac rhythm*; in Philos. Trans. R. Soc. Lond., B 378. (**W**†)
- **J Tomek**, N Herring, DJ Paterson; Sympathetic control of the heart; book chapter (Primer on the Autonomic Nervous system 4th ed., Elsevier, ISBN 978-0-323-85492-4). (**W**†)
- M Tomkova, **J Tomek**, J Chow, JD McPherson, DJ Segal, F Hormozdiari; *Dr. Nod: computational framework for discovery of regulatory non-coding drivers in tissue-matched distal regulatory elements*; In Nucleic Acids Research 51 (4) (**M**)

2022

- J Rubáčková-Popelová*, **J Tomek***, M Tomková, R Zivná; *Normalization of four different types of pulmonary hypertension after atrial septal defect closure*; in Frontiers in Cardiovascular Medicine 1519, ***co-first** (**A**†,**W**†)

2021

- **J Tomek***, ZJ Wang, AB Burton, N Herring, G Bub; *COSMAS: a lightweight toolbox for cardiac optical mapping analysis*; in Scientific Reports 11(1), ***corresponding** (**C**†,**D**,**M**†,**A**†,**W**†)
- J Szlovák***, J Tomek***†, …, David A Eisner, Blanca Rodriguez, Norbert Nagy; *Blockade of sodium-calcium exchanger via ORM-10962 attenuates cardiac alternans*; in Journal of molecular and cellular cardiology 153. ***†co-first, corresponding** (**C**†, **M**†,**A**†,**W**†)
- A Varró, **J Tomek**, N Nagy, L Virag, E Passini, B Rodriguez, I Baczkó; *Cardiac transmembrane ion channels and action potentials: cellular physiology and arrhythmogenic behavior*; In Physiological Reviews 101 (3) (**W;** main author of parts on simulations)

2020

- **J Tomek***, A Bueno-Orovio, E Passini, X Zhou, A Minchole, O Britton, C Bartolucci, S Severi, A Shrier, L Virag, A Varro, B Rodriguez*; *Development, calibration, and validation of a novel human ventricular myocyte model in health, disease, and drug block*; in Elife 8, e48890. ***co-corresponding** (**C**†,**M**†,**A**†,**W**†). Featured at the departmental website.
- M Popel*, M Tomkova*, J **Tomek***, Ł Kaiser, J Uszkoreit, O Bojar, Z Žabokrtský; *Transforming machine translation: a deep learning system reaches news translation quality comparable to human professionals*; in Nature Communications 11(1):1-15. ***co-first** (**C**†,**D**,**A**†,**W**†) Featured in the Editor's Highlights.
- M Kalla, G Hao, N Tapoulal, **J Tomek**, K Liu, L Woodward, 'Oxford Acute Myocardial Infarction (OxAMI) Study', E Dall'Armellina, AP Banning, RP Choudhury, S Neubauer, RK Kharbanda, KM Channon, OA Ajijola, K Shivkumar, DJ Paterson, N Herring; *The cardiac sympathetic co-transmitter neuropeptide Y is pro-arrhythmic following ST-elevation myocardial infarction despite beta-blockade*; in European Heart Journal 41(23):2168-2179. (**D**,**A**†,**W**)

2019

- **J Tomek***, G Hao, M Tomkova, A Lewis, C Carr, DJ Paterson, B Rodriguez, G Bub, N Herring*; *β-adrenergic receptor stimulation and alternans in the border zone of a healed infarct: an ex vivo study and computational investigation of arrhythmogenesis*; in Frontiers in Physiology 10, 350. ***co-corresponding** (**C**†,**D**†,**M**†,**A**†,**W**†)

2018

- M Tomkova, **J Tomek**, S Kriaucionis, B Schuster-Böckler; *Mutational signature distribution varies with DNA replication timing and strand assymetry*; in Genome Biology 19(1):1-12. (**A**,**W**)
- **J Tomek***, M Tomkova, X Zhou, G Bub, B Rodriguez; *Modulation of cardiac alternans by altered sarcoplasmic reticulum calcium release: a simulation study*; in Frontiers in Physiology 9, 1306. ***corresponding** (**C**†,**M**†,**A**†,**W**†)

2017

- **J Tomek**, B Rodriguez, G Bub, J Heijman; *β-adrenergic receptor stimulation inhibits proarrhythmic alternans in post-infarction border zone cardiomyocytes: a computational analysis*; in American Journal of Physiology-Heart and Circulatory Physiology 313(2):338-353; Featured article. ***corresponding** (**C**†,**M**†,**A**†,**W**†)
- **J Tomek**, G Bub; *Hypertension-induced remodelling: on the interaction of cardiac risk factors*; in Journal of Physiology, 595(12):4027-4036. ***corresponding** (**C**†,**W**†)
- F Pini, AK East, C Appia-Ayme, **J Tomek**, R Karunakaran, , M Mendoza-Suárez, A Edwards, JJ Terpolilli, J Roworth, JA Downie, PS Poole. *Lux bacterial biosensors for in vivo spatiotemporal mapping of root secretion*; in Plant Physiology 174:1289-1306. (**M**,**A**)

2016

- **J Tomek**, RAB Burton, G Bub; *Ccoffinn: Automated Wave Tracking in Cultured Cardiac Monolayers*; in Biophysical journal 111(8):1595-1599. (**C**, **M**†, **A**†, **W**†)
- M Kalla, M Chotalia, C Coughlan, G Hao, MJ Crabtree, **J Tomek**, Gil Bub, D Paterson, N

Herring; *Protection against ventricular fibrillation via cholinergic receptor stimulation and the generation of nitric oxide;* in Journal of Physiology 594(14):3981-92. (**M**,**A**,**W**)

2015

- RAB Burton, A Klimas, CM Ambrosi, **J Tomek**, A Corbett, E Entcheva, G Bub; *Optical control of excitation waves in cardiac tissue*; in **Nature Photonics**, 9(12):813. (**A**, **W**)

Projects

The most relevant project for the role is the development of the current state-of-the-art virtual cardiac muscle cell model ToR-ORd: Development, calibration, and validation of a novel human ventricular myocyte model in health, disease, and drug block | eLife , which has recently received the EPAA 3Rs science prize.

In addition, I've spent last five years building a next-generation model that is even more life-like, general, and will substantially advance the applicability of computational cardiac models in research and industry.

Memberships

N/A

Other Relevant Information