Dr Yidan Xue

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May 2025

EDUCATION

DPhil Engineering Science, *University of Oxford*   Jan 2023
Thesis: Modelling oxygen transport and tissue damage in the human brain.
Supervisor: Professor Stephen Payne. Submission: Aug 2022/Viva: Oct 2022.

BEng (Hons) Mechanical Engineering, *The University of Edinburgh*   Jul 2019
Dissertation: Computational simulation and validation of flows in branching blood vessels.
Supervisors: Drs Dong-hyuk Shin and Rudolf Hellmuth. First Class Honours.
I completed the first two years of my undergraduate study (2015–2017) at Xiamen University, China.

EMPLOYMENT

Research Associate, *School of Health Sciences, The University of Manchester*   Aug 2024 – Present
Research Associate, *School of Mathematics, Cardiff University*   Jan 2024 – Jul 2024
EPSRC PDRA, *Mathematical Institute, University of Oxford*   Oct 2022 – Dec 2023
Retained Lecturer in Mathematics, *Jesus College, University of Oxford*   Jan 2023 – Sep 2023
Research Intern, *Institute of Mechanics, Chinese Academy of Sciences*   Jul 2018 – Sep 2018
Research Intern, *School of Engineering, The University of Edinburgh*   May 2018 – Jul 2018

PUBLICATIONS

Journal Articles:

1. Payne, S. J., **Xue, Y.**, Kuo, J.-F. and El-Bouri, W. K. 2025. Transit time mean and variance are markers of vascular network structure, wall shear stress distribution and oxygen extraction fraction. *Biomechanics and Modeling in Mechanobiology*, to appear.

2. **Xue, Y.** 2025. Computing Stokes flows in periodic channels via rational approximation. *Proceedings of the Royal Society A*, **481**, 20240676.

3. **Xue, Y.**, Payne, S. J. and Waters, S. L. 2025. Stokes flows in a two-dimensional bifurcation. *Royal Society Open Science*, **12**, 241392.

4. **Xue, Y.**, Jabi, W., Woolley, T. E. and Kaouri, K. 2024. Modelling indoor airborne transmission combining architectural design and people movement using the VIRIS simulator and web app. *Scientific Reports*, **14**, 28220.

5. **Xue, Y.**, Waters, S. L. and Trefethen, L. N. 2024. Computation of two-dimensional Stokes flows via lightning and AAA rational approximation. *SIAM Journal on Scientific Computing*. **46**(2), pp.A1214–A1234. **[ESI Highly Cited Paper, SIAM Reproducibility Badge]**

6. **Xue, Y.**‡, Georgakopoulou, T.‡, van der Wijk, A.-E., Józsa, T. I., van Bavel, E.‡ and Payne, S. J.‡ 2022. Quantification of hypoxic regions distant from occlusions in cerebral penetrating arteriole trees. *PLOS Computational Biology*. **18**(8), e1010166. ‡: co-first/co-senior authors.

7. Miller, C., Padmos, R. M., van der Kolk, M., Józsa T. I., Samuels, N., **Xue, Y.**, Payne, S. J. and Hoekstra, A. G. 2021. In silico trials for treatment of acute ischemic stroke: design and implementation. *Computers in Biology and Medicine*. **137**, 104802.

8. **Xue, Y.**, El-Bouri, W. K., Józsa, T. I. and Payne, S. J. 2021. Modelling the effects of cerebral microthrombi on tissue oxygenation and cell death. *Journal of Biomechanics.* **127**, 110705. **[Special Issue on Thrombus Mechanics]**

9. **Xue, Y.**, Hellmuth, R. and Shin, D. 2020. Formation of vortices in idealised branching vessels: a CFD benchmark study. *Cardiovascular Engineering and Technology.* **11**(5), pp.544–559. **[Cover Image]**

Submitted Articles/Preprints:

10. Padmos, R. M., Józsa, T. I., **Xue, Y.**, Payne, S. J. and Hoekstra, A. G. 2024. A Multi-Scale Model for Perfusion-Based Infarct Estimation in Acute Ischaemic Stroke Patients. submitted.

11. Jabi, W., **Xue, Y.**, Woolley, T. E. and Kaouri, K. 2024. 3D Topological Modeling and Multi-Agent Movement Simulation for Viral Infection Risk Analysis, submitted. Also available on arXiv: https://doi.org/10.48550/arXiv.2408.16417

12. Lin, F., Zakeri, A., **Xue, Y.**, MacRaild, M., Dou, H., Zhou, Z., Zou, Z., Sarrami-Foroushani, A., Duan, J. and Frangi, A. F. 2025. From Pixels to Polygons: A Survey of Deep Learning Approaches for Medical Image-to-Mesh Reconstruction. submitted.

DPhil Thesis:

13. **Xue, Y.** 2022. *Modelling oxygen transport and tissue damage in the human brain.* DPhil thesis. University of Oxford.

INVITED TALKS

Physical and Applied Mathematics Seminar, The University of Manchester, UK	Nov 2024
CIMIM Seminar (inaugural talk), The University of Manchester, UK	Oct 2024
SIAM Conference on the Life Sciences, Portland, Oregon, US	Jun 2024
Computational and Applied Math Seminar, Peking University, China	May 2024
Applied and Computational Mathematics Seminar, Cardiff University, UK	Feb 2024
Numerical Analysis Group Internal Seminar, University of Oxford, UK	May 2023
British Applied Mathematics Colloquium, Bristol, UK	Apr 2023

TEACHING

University of Oxford, Mathematical Institute/Department of Engineering Science
One contact hour requires at least two hours of preparation and marking at Oxford.

Tutor, A1 Differential Equations 1, Oriel College, class size: 1–2, contact hours: 8	Fall 2023
Tutor, A7 Numerical Analysis, Jesus College, class size: 1–2, contact hours: 15	Spring 2023
Tutor, C5.6 Applied Complex Variables, MI, class size: 10–12, contact hours: 16	Spring 2023
Lead Tutor, B17 Biomechanics, EngSci, class size: 3–4, contact hours: 13	Spring 2022

MENTORING

Benjamin Nicholls-Mindlin, MSc MMSC project, **University of Oxford**	2023

Rational Stokes Methods for Tissue Engineering Applications, co-supervised with Professors Sarah Waters and Helen Byrne. The thesis received the second highest distinction.

AWARDS AND FUNDING

(2025) **GW4 Open Research Prize**, *Widening Reach*, shortlisted runner up. With Wassim Jabi, Thomas Woolley, and Katerina Kaouri.

(2024) **UK RS&IN Implementation Phase: Human Health (CERSIs)**, *UK CEiRSI - The UK's Centre of Excellence on In-silico Regulatory Science and Innovation - Pilot Phase*, Member of the Manchester team. PI: Professor Alejandro Frangi.

(2022) **EPSRC Postdoctoral Research Associate**, Mathematical Institute, University of Oxford. *One-year postdoctoral position awarded to up to 5 Oxford DPhil graduates.*

(2019) **IMechE Best Student Prize**, The University of Edinburgh.

(2018) **3rd Year Class Medal for Mechanical Engineering**, The University of Edinburgh.

(2018) **Edinburgh Award**, The University of Edinburgh.

(2018) **Summer Research Scholarship**, The University of Edinburgh.

(2017/2018) **2+2 Student Scholarships**, The University of Edinburgh.

(2016) **1st Prize Scholarship for Academic Excellence**, Xiamen University.

External Funding Applications (ongoing and unsuccessful):

(2025) **NIHR: Transformative and disruptive innovations to reduce waiting lists and waiting times**, Co-Applicant. PI: Professor Emily Henderson; WP Lead: Professor Alejandro Frangi.

(2025) **MRC: Novel Human In Vitro Models of Complex Disease**, Researcher Co-Lead. PI: Professor Tao Wang; WP Lead: Professor Alejandro Frangi.

(2023) **EPSRC Responsive Mode Grant**, Researcher Co-Lead, scoring 4, 5 and 6 out of 6. PI: Professor Sarah Waters.

(2023) **Schmidt AI in Science Postdoctoral Fellowship**, University of Oxford, shortlisted.

(2022) **EPSRC NFFDy Postdoctoral Fellowship (National Fellowships in Fluid Dynamics)**, invited for full proposal, scoring a 6/6 with high confidence and a 5/6.

MEDIA

SIAM News (June 13, 2024) Epidemic Simulator and Web App Models Viral Transmission in Indoor Spaces.

MEMBERSHIPS

Society for Industrial and Applied Mathematics (SIAM), *Member*	2024 – Present
VPH Institute, *Member*	2020 – 2021, 2024 – Present
European Society of Biomechanics, *Member*	2023 – 2024

IMPACT, OUTREACH, AND SERVICE

Pint of Science (Manchester), *Organiser*   2024 – Present
'Tech Me Out' sessions, including '*From Virtual Patients to Real Solutions: Medical Innovation on Tap*'.

The Welsh Government, *Policy Modelling Group, Member*   2024 – Present

Numerical Analysis in the 21st Century Conference, in honour of Nick Trefethen's retirement from Oxford, *Numerical Methods for Differential Equations, Session Chair*   2023

Reviewer for internationally leading journals:

Cardiovascular Engineering and Technology (Springer), *Computational Mechanics* (Springer), *Building Simulation* (Springer), *Biotechnology and Bioengineering* (Wiley), *PLOS Computational Biology* (PLOS), *Journal of Fluid Mechanics* (Cambridge).

The University of Manchester:
Recruitment Interview Panel, *Member*   2024

Cardiff University:

Vendor Selection Panel, *Member* 2024

University of Oxford:

Undergraduate Admissions Panel, *Member* 2023

Disability Advisory Service, *Non-Medical Support Worker* 2019 – 2020

REFEREES

Professor Alejandro Frangi, School of Health Sciences/Department of Computer Science, The University of Manchester, a.frangi@manchester.ac.uk

Professor Stephen Payne, Institute of Applied Mechanics, National Taiwan University, stephen-payne@ntu.edu.tw

Professor Nick Trefethen, School of Engineering and Applied Sciences, Harvard University, trefethen@seas.harvard.edu

Professor Sarah Waters, Mathematical Institute, University of Oxford, waters@maths.ox.ac.uk