

Zita Borbála Fülöp

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in LinkedIn



Curriculum Vitae

Personal Statement

Dedicated doctoral researcher working at the intersection of mathematical modelling, medical imaging, and oncology. My mission is to improve brain cancer treatment by developing predictive diagnostic tools that support personalised treatment strategies. My work combines continuum modelling, numerical simulations, and medical data, and is carried out in close collaboration with clinicians and international research partners. I aim to bridge the gap between theoretical mathematics and real-world medical challenges, developing models that can inform treatment design and contribute to more effective cancer therapies. I am passionate about knowledge exchange and public engagement, and I enjoy making complex mathematical ideas accessible and show how mathematics can contribute to meaningful advances in healthcare and improved patient outcomes.

Education

- 2022 – **PhD in Applied Mathematics**, University of Glasgow.
Topic: Multiscale modelling of electrochemotherapy and its application to treatment for glioblastoma
Supervisors: Dr. Raimondo Penta, Dr. Ariel Ramirez-Torres.
- 2017 – 2022 **MSci in Mathematics and Statistics**, University of Glasgow.
Integrated Masters Degree, Grade: First class
Masters thesis title: Multiscale Modelling of Fluid Transport in Tumour Tissues via Electrophoresis.
Supervisor: Dr. Raimondo Penta.
Honours thesis title: Schur polynomials and applications of the Robinson-Schensted-Knuth correspondence.
Supervisor: Prof. Christian Korff.
- 2011 – 2017 **High School Degree**, Apáczai Csere János Gyakorlógimnázium és Kollégium, Budapest, Hungary.

Skills

- Languages **Hungarian:** native language.
English: C2 proficiency.
German: B2, fluent level of speaking, reading and writing.
Italian: B2, fluent level of speaking, reading and writing.
- Coding **LaTeX**, Python, Matlab, R.
- Software COMSOL Multiphysics, VMTK, Paraview, 3DSlicer, FSLeves, Meshmixer, Mandelbulb, Fiji, Meshlab, FreeSurfer.

Research Publications

Peer-reviewed Articles

- 1 Z. B. Fülöp and R. Penta, “Multiscale analysis of electrically stimulated vascularised tumours,” *Journal of Theoretical Biology*, p. 112 307, 2025, [<https://doi.org/10.1007/s00033-023-02141-3>].
- 2 Z. B. Fülöp, A. Ramírez-Torres, and R. Penta, “Multiscale modelling of fluid transport in vascular tumours subjected to electrophoresis anticancer therapies,” *Zeitschrift für angewandte Mathematik und Physik*, vol. 75, no. 1, p. 9, 2024, [<https://doi.org/10.1016/j.jtbi.2025.112307>].

Pre-prints

- 1 Z. B. Fülöp, Á. D. Tárnoki, L. D. Tárnoki, A. Girelli, and R. Penta, “Patient-specific multiscale modelling of glioblastoma: Targeted modulation of interstitial fluid flow using electric field,” available at Research Square [<https://doi.org/10.21203/rs.3.rs-8790032/v1>], 2026.

Presentations

Invited

- **Politecnico di Milano Laboratory of Modeling and Scientific Computing (MOX) Seminar**, Milan, Italy, 2026.
Type: Oral presentation.
- **60th Society for Natural Philosophy Meeting: Continuum Theory and Life Sciences, Predicting Drug Distribution and Tumour Recurrence in Glioblastoma Using Patient-Specific Multiscale Modelling** Glasgow, United Kingdom, 2026.
Type: Oral and poster presentation.
- **No Boundaries: A Festival of Cross-Disciplinary Collaboration, How to Find Your Voice and Your Collaborators**, Glasgow, United Kingdom, 2026.
Type: Oral presentation.
- **UMC Utrecht Translational Neuroimaging Meeting**, Utrecht, Netherlands, 2026.
Type: Oral presentation.
- **Applied Mathematics Seminar: A New Therapeutic Opportunity for Glioblastoma: Targeted Modulation of Interstitial Fluid Flow Using Electric Field** University of Glasgow, 5 February 2026.
Type: Oral presentation.
- **Applied Mathematics Seminar: How to Communicate and Collaborate Beyond Mathematics**, University of Glasgow, 30 October 2025.
Type: Oral presentation.
- **Strathclyde University Continuum Mechanics Seminar**, Glasgow, 15 October 2025.
Type: Oral presentation.
- **International CMALS (Centre for Mathematics Applied to the Life Sciences) Workshop on New trends in Mathematics and Life Sciences**, Glasgow, United Kingdom, 15-16 September 2025.
Type: Poster presentation.
- **2025 edition of the congress of the Italian Society of Applied and Industrial Mathematics (SIMAI)**, Trieste, Italy, 1-5 September 2025.
Type: Oral presentation.

Presentations (continued)

	 Radboudumc Seminar, Nijmegen, Netherlands, 26 August, 2025. <i>Patient-Specific Multiscale Modelling of High-Grade Gliomas: Targeted Modulation of Interstitial Fluid Flow Using Electric Field</i> <u>Type</u>: Oral presentation.
	 The British Applied Mathematics Colloquium (BAMC), Exeter, United Kingdom, 23-26 June 2025. <u>Type</u>: Oral presentation.
	 Centre for Mathematics Applied in the Life Sciences (CMALS) Show and Tell event, University of Glasgow, 21 January 2025. <u>Type</u>: Oral presentation.
	 Joint workshop of the Italian Group of Computational Mechanics (GIMC) and the Italian Society of Applied and Industrial Mathematics (SIMAI), Naples, Italy, 10-12 July, 2024. <u>Type</u>: Oral presentation.
	 International Workshop: Exploring Brain Dynamics, Glasgow, United Kingdom, 20-21 May 2024. <u>Type</u>: Oral presentation.
	 2023 edition of the congress of the Italian Society of Applied and Industrial Mathematics (SIMAI), Matera, Italy, 28 August-1 September 2023. <u>Type</u>: Oral presentation.
	 Soft Tissue Mechanics group seminar, University of Glasgow, 1 March 2023. <u>Type</u>: Oral presentation.
Contributed	 Retreat for Women in Applied Mathematics, ICMS, Bayes Centre, Edinburgh, United Kingdom, 12-16 January 2026. <u>Type</u>: Oral presentation.
	 Computational Biology Conference, Glasgow, United Kingdom, 15-16 September 2025. <u>Type</u>: Oral presentation.
	 SoftMech Seventh Soft Tissue Modelling Workshop, Milan, Italy, 11-13 June 2025. <u>Type</u>: Oral presentation.
	 Computational Biology Conference, Glasgow, United Kingdom, 5-6 September 2024. <u>Type</u>: Poster presentation.
	 The British Applied Mathematics Colloquium (BAMC), Newcastle, United Kingdom, 9-11 April 2024. <u>Type</u>: Oral presentation.
	 SoftMech Sixth Soft Tissue Modelling Workshop, Glasgow, United Kingdom, 7-9 June 2023. <u>Type</u>: Poster presentation.
Public engagement	 STEM for BRITAIN 2026 Poster competition, House of Commons Parliament, London, United Kingdom, 17 March, 2026. <i>STEM for Britain is a public engagement poster competition for early career researchers to showcase their research to policymakers and MPs.</i> <u>Type</u>: Poster presentation.

Presentations (continued)

- **Science Slam Competition**, Glasgow, United Kingdom, 3 July, 2025.
The Science Slam is a public engagement event where researchers present their scientific work to a non-expert audience.
Type: Oral presentation.
- **AI and Mathematics Research Patient and Public Day**, Glasgow, United Kingdom, 26 November 2024.
Type: Oral presentation.
- **3 Minute Thesis Competition**, Glasgow, United Kingdom, 12 March, 2024.
The 3 Minute Thesis competition challenges doctoral students to describe their research to a non-specialist audience in just three minutes, using only one slide.
Type: Oral presentation.

Miscellaneous Experience

Internship	■ University Medical Center Utrecht, March-April 2026 Two-month research internship focused on MRI workflows. Explored the incorporation of realistic capillary networks and patient-specific modelling parameters to improve physiological relevance. Initiated collaborations on cerebrovascular reactivity and diffusion in tumoroids, and developed a novel modelling concept linking vascular permeability and radiotherapy-induced damage to explain differential responses between hypofractionated and standard radiotherapy using a multi-continuum approach.
Achievements	■ STEM for BRITAIN 2026 Silver Award in Mathematics, House of Commons UK Parliament, London, United Kingdom, 2026. ■ Best Presentation Award, Computational Biology Conference, Glasgow, United Kingdom, 2025. ■ 1st prize Science Slam competition, Glasgow, United Kingdom, 2025. ■ 2nd prize for the Best Early Career Researcher Oral Presentation, Seventh Soft Tissue Modelling Workshop, Milan, Italy, 2025. ■ Mobility Scholarship, College of Science and Engineering, University of Glasgow, 2025. Awarded £1,000 research grant to undertake a research visit at Radboud University Medical Center, collaborating with clinicians to enhance MRI image interpretation skills and deepen understanding of radiotherapy mechanisms through hands-on experience and interdisciplinary learning. ■ 3 Minute Thesis Competition Finalist, University of Glasgow, 12 March 2024. ■ 1st prize for the best PhD poster presentation, Sixth Soft Tissue Modelling Workshop, Glasgow, United Kingdom, 2023.
Clinical Partnerships	■ National Institute of Oncology, Budapest, Hungary, 2023- Independently initiated and secured a collaboration with the National Institute of Oncology in Hungary. Presented my research to clinical doctors, including the Head of the Radiology Department, and successfully secured a data-sharing and Co-operation Agreement. Personally drafted and submitted the ethics committee approval document for the National Board of Public Health and Pharmaceuticals.

Miscellaneous Experience (continued)

	University Medical Center Utrecht, Utrecht, Netherlands, 2024- Independently established a collaboration with University Medical Center Utrecht, resulting in a formal data sharing agreement between my home institution, University of Glasgow, and UMC Utrecht. Ensured compliance with ethical and regulatory standards throughout the agreement process.
Biostatistics	Semmelweis University (Neonatal Unit), Budapest, Hungary, 2023-2025. Collaborated extensively with clinical professionals, leveraging advanced analytical techniques to investigate drug administration protocols and predictive factors influencing laboratory outcomes in prematurely born infants.
Conference organiser	The British Applied Mathematics Colloquium (BAMC), Exeter, United Kingdom, 2025. Organised a mini-symposium titled Mathematical and Computational Modelling of Heterogeneous and Multiscale Biological Tissues.
Other	Knowledge Exchange course, 3-5 January 2024. REF21 Impact Poster Design, University of Glasgow, 2023-2024. Illustrated and designed 6 posters for the Mathematics and Statistics building, fostering a more inviting atmosphere for visitors.

Teaching assistance

2024-2026	Tutor and Demonstrator, University of Glasgow.
2024	MATHS 1: Introduction to Advanced Mathematics, University of Glasgow. MATHS 2A: Multivariable Calculus, University of Glasgow. MATHS 2B: Linear Algebra, University of Glasgow.