

# Zita Borbála Fülöp

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## Curriculum Vitae

### Personal Statement

Dedicated doctoral researcher specialising in Mathematical Biology, Continuum Mechanics, and Asymptotic Homogenisation. Through homogenisation techniques, I develop novel mathematical models to describe the behaviour of brain tumours in the context of electrochemotherapy. By integrating patient-specific data and numerical simulations, I aim to develop personalised treatment strategies that improve the efficacy and safety of cancer therapies. Passionate about treatment optimisation and predictive oncology, I strive to bridge the gap between theoretical research and real-world clinical applications. I am committed to making research accessible to a broad audience, sharing insights with individuals from diverse backgrounds to foster greater understanding of the role mathematics plays in advancing medical science.

### Education

- 2022 – ■ **PhD in Applied Mathematics**, University of Glasgow.  
Topic: Improved design of anti-cancer therapies via multiscale modelling and simulations.  
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.
- 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.

## Presentations

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- Invited
- **No Boundaries: A Festival of Cross-Disciplinary Collaboration**, Glasgow, United Kingdom, 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.
  - **Radboudumc Seminar**, Nijmegen, Netherlands, 26 August, 2025.  
*Patient-Specific Multiscale Modelling of High-Grade Gliomas: Targeted Modulation of Interstitial Fluid Flow Using Electric Field*  
Type: Oral presentation.
  - **The British Applied Mathematics Colloquium (BAMC)**, Exeter, United Kingdom, 23-26 June 2025.  
Type: Oral presentation.
  - **Centre for Mathematics Applied in the Life Sciences (CMALS) Show and Tell event**, University of Glasgow, 21 January 2025.  
Type: 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.  
Type: Oral presentation.
  - **International Workshop: Exploring Brain Dynamics**, Glasgow, United Kingdom, 20-21 May 2024.  
Type: Oral presentation.
  - **2023 edition of the congress of the Italian Society of Applied and Industrial Mathematics (SIMAI)**, Matera, Italy, 28 August-1 September 2023.  
Type: Oral presentation.

## Presentations (continued)

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| Contributed       | ■ <b>Soft Tissue Mechanics group seminar</b> , University of Glasgow, 1 March 2023.<br><u>Type</u> : Oral presentation.  |
|                   | ■ <b>Retreat for Women in Applied Mathematics</b> , ICMS, Bayes Centre, Edinburgh, United Kingdom, 12-16 January 2026.<br><u>Type</u> : Oral presentation.   |
|                   | ■ <b>Computational Biology Conference</b> , Glasgow, United Kingdom, 15-16 September 2025.<br><u>Type</u> : Oral presentation.   |
|                   | ■ <b>SoftMech Seventh Soft Tissue Modelling Workshop</b> , Milan, Italy, 11-13 June 2025.<br><u>Type</u> : Oral presentation.  |
|                   | ■ <b>Computational Biology Conference</b> , Glasgow, United Kingdom, 5-6 September 2024.<br><u>Type</u> : Poster presentation.   |
| Public engagement | ■ <b>The British Applied Mathematics Colloquium (BAMC)</b> , Newcastle, United Kingdom, 9-11 April 2024.<br><u>Type</u> : Oral presentation.   |
|                   | ■ <b>SoftMech Sixth Soft Tissue Modelling Workshop</b> , Glasgow, United Kingdom, 7-9 June 2023.<br><u>Type</u> : Poster presentation.   |
|                   | ■ <b>STEM for BRITAIN 2026 Poster competition</b> , House of Commons Parliament, London, United Kingdom, 17 March, 2026.<br><i>STEM for Britain is a public engagement poster competition for early career researchers to showcase their research to policymakers and MPs.</i><br><u>Type</u> : Poster presentation. |
|                   | ■ <b>Science Slam Competition</b> , Glasgow, United Kingdom, 3 July, 2025.<br><i>The Science Slam is a public engagement event where researchers present their scientific work to a non-expert audience.</i><br><u>Type</u> : Oral presentation.   |
|                   | ■ <b>AI and Mathematics Research Patient and Public Day</b> , Glasgow, United Kingdom, 26 November 2024.<br><u>Type</u> : Oral presentation.   |
|                   | ■ <b>3 Minute Thesis Competition</b> , Glasgow, United Kingdom, 12 March, 2024.<br><i>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.</i><br><u>Type</u> : Oral presentation.                      |

## Miscellaneous Experience

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| Achievements | ■ <b>STEM for BRITAIN 2026 Silver Award in Mathematics</b> , House of Commons UK Parliament, London, United Kingdom, 2026.              |
|              | ■ <b>Best Presentation Award</b> , Computational Biology Conference, Glasgow, United Kingdom, 2025.                                     |
|              | ■ <b>1st prize Science Slam competition</b> , Glasgow, United Kingdom, 2025.  |
|              | ■ <b>2nd prize for the Best Early Career Researcher Oral Presentation</b> , Seventh Soft Tissue Modelling Workshop, Milan, Italy, 2025. |

## Miscellaneous Experience (continued)

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- **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.
- **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

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- 2024 ■ **MATHS 1: Introduction to Advanced Mathematics**, University of Glasgow.
- **MATHS 2A: Multivariable Calculus**, University of Glasgow.
- **MATHS 2B: Linear Algebra**, University of Glasgow.