

ESZTER LAKATOS

Dept. of Mathematical Sciences
Chalmers tvärgata 3
413 58 Gothenburg, Sweden

eszter.lakatos@chalmers.se
+46-31-772-1816

I am a **computational biologist** passionate about developing quantitative techniques to understand the biological principles governing disease in order to improve clinical decision making.

RESEARCH

In my research I combine mechanistic mathematical models, bioinformatic analysis and machine learning tools to identify the key evolutionary dynamics that shape cancer genomes. In particular, I create methods to quantifying the cancer-immune interaction and to harnessing liquid biopsies to capture development over time.

EDUCATION

Imperial College London (2013–2017) London, United Kingdom

Ph.D. in Theoretical Systems Biology

Supervisor: Prof Michael P.H. Stumpf

Thesis title: Stochastic analysis and control methods for molecular cell biology

Pázmány Péter Catholic University (2012–2013)

Budapest, Hungary

M.Sc. of Infobionics Engineer

Grade: *honours*, Average: 5.0/5.0

Pázmány Péter Catholic University (2008–2012)

Budapest, Hungary

B.Sc. in Molecular Bionics

Grade: *honours*, Average: 5.0/5.0

WORK EXPERIENCE

Assistant Professor at Chalmers University of Technology (2023–) Gothenburg, Sweden

Computing Disease Evolution in cancer (CODE) group

Postdoctoral Researcher at BCI/ICR (2017–2022)

London, United Kingdom

Supervisor: Prof Trevor Graham

MSc Diploma Student at Institute of Biophysics, SU (2012–2013)

Budapest, Hungary

Supervisor: Dr Miklós Kellermayer

Intern at EMBL (June–September 2011)

Heidelberg, Germany

Supervisor: Dr Francois Nédélec

TEACHING EXPERIENCE

Lecturer (2020–)

UK & Sweden

Courses taught: Quantifying immune selection from cancer genomics; Stochastic modelling for biology; Statistical analysis and experiment design

Graduate Teaching Assistant (2014–2018)

ICL, United Kingdom

Courses taught: Introduction to Python programming; Coding for Medics (python); Introduction to scientific modelling and Matlab language; Introduction to Bioinformatics module; Genome and protein databases

Teaching Assistant (2009–2013)

PPCU, Hungary

Courses taught: Digital Signal Processing; Data Mining; Calculus I-II; Linear Algebra and Discrete Mathematics I-II; Cell Biology and Genetics I-II; Physics of Information Technology; Operation of AFM and STM

SUPERVISION

PhD, main supervisor:

Lotta Eriksson (2024–, Chalmers)

PhD, mentor:

Vinaya Gunasri (2020–2023, BCI); Qingli Guo (2019–2023, University of Helsinki & ICR)

9-month MSc dissertation, main supervisor:

Ni Zuoyu (2024, Chalmers); Hampus Johansson (2024, Chalmers); Gerard Llibre (2021, BCI)

6-month MSc dissertation, main supervisor:

Linnea Hallin & Lotta Eriksson (2024, Chalmers); Charlotte Preunkert & Simone Piccioni (2024, Chalmers); Syeda Fatima (2021, BCI); Bryony Coppack (2020, BCI)

3-month MSc dissertation, main supervisor:

Dr Badia Ahmed (2021, BCI); Jay Stanley (2019, BCI)

Jay received the prize for Best MSc Dissertation and presented his project at the British Society of Gastroenterology Annual Meeting (2020).

3-month MSc project, co-supervisor:

Marta Aparicio (2023, ICL); Sisi Fan, Quentin Geissmann, Saulius Lukauskas (2015, ICL)

The project by Sisi, Quentin & Saul was published in *Bioinformatics*.

BSc summer internship, main supervisor:

Ziba Niazi (2020)

POSITIONS OF TRUST

Associate Editor for *npj Precision Oncology* (2024–)

Guest Associate Editor for *Frontiers in Genetics* (2021–2022)

Journal Research Topic: Computational approaches applied to cancer genetics, immunogenomics, and immuno-oncology

Expert reviewer (2016–) for the following journals:

Nature Communications Biology, *npj Precision Oncology*, *Oncot Immunology*, *Genome Medicine*, *International Journal of Quantum Chemistry*, *Frontiers in Genetics*, *Journal of Pathology* **Mini-symposium organiser (2024)**

At the European Conference on Theoretical and Mathematical Biology

SELECTED PUBLICATIONS

A. Cornish*, A. J. Gruber*, . . . , **E. Lakatos*** *et al.*: “The genomic landscape of 2,023 colorectal cancers,” *Nature*, **2024**

E. Lakatos*, V. Gunasri*, L. Zapata *et al.*: “Epigenome and early selection determine the tumour-immune evolutionary trajectory of colorectal cancer,” *bioRxiv*, **2024**

H. Kayhanian*, W. C. H. Cross*, S. E. M. Horst*, P. Barmpoutis*, **E. Lakatos*** *et al.*: “Homopolymer switches mediate adaptive mutability in mismatch repair-deficient colorectal cancer,” *Nature Genetics*, **2024**

H. Hockings, **E. Lakatos**, W. Huang, *et al.*: “Adaptive therapy achieves long-term control of chemotherapy resistance in high grade ovarian cancer,” *bioRxiv, under review at Cancer Research*, **2023**

L. Zapata, G. Caravagna, M. J. Williams, **E. Lakatos**, *et al.*: “Immune selection determines tumor antigenicity and influences response to checkpoint inhibitors,” *Nature Genetics*, **2023**

Q. Guo, **E. Lakatos**, I. Al Bakir, K. Curtius, T. A. Graham and V. Mustonen: “The mutational signatures of formalin fixation on the human genome,” *Nature Communications*, **2022**

J. Househam, T. Heide, G. Cresswell, *et al.*: “Phenotypic plasticity limits genetic control in colorectal cancer evolution,” *Nature*, **2022**

E. Lakatos, H. Hockings, M. Mossner, W. Huang, M. Lockley and T. A. Graham: “LiquidCNA: tracking subclonal evolution from longitudinal liquid biopsies using somatic copy number alterations,”

iScience, **2021**

E. Lakatos, M. J. Williams, R. O. Schenck, *et al.*: “The evolutionary dynamics of neoantigens in growing tumors,” *Nature Genetics*, **2020**

R. O. Schenck, **E. Lakatos**, C. Gatenbee, T. A. Graham and A. R. A. Anderson: “NeoPredPipe: High-Throughput Neoantigen Prediction and Recognition Potential Pipeline,” *BMC Bioinformatics*, **2019**

E. Lakatos*, A. Salehi-Reyhani*, M. Barclay*, M. P. H. Stumpf and D. R. Klug: “Protein degradation rate is the dominant mechanism accounting for the differences in protein abundance of basal p53 in a human breast and colorectal cancer cell line,” *PLOS One*, **2017**

E. Lakatos, P. Kirk, A. Ale and M. P. H. Stumpf: “Multivariate moment closure techniques for stochastic kinetic models,” *The Journal of Chemical Physics*, **2015**

SKILLS & INTERESTS

Computational skills: R, Python, High Performance Computing clusters, Julia, bash, \LaTeX , C++, MATLAB, Microsoft Office

Languages: Hungarian (native speaker), English (fluent), Russian (basic level)

Interests: cycling, indoors climbing, choir, hiking, watercolour

SELECTED AWARDS & ACHIEVEMENTS

Area of Advance Health Engineering start-up grant (**2022**)

Emerging Leaders in Computational Oncology Award for scientific achievement (**2020**)

LIDo Research Experience Placement Award (**2020**)

Life Sciences Initiative, Centre for Computational Biology Showcase Award (**2018 & 2019**)

Prize for Best Lay Summary at Department of Life Sciences Postgraduate Open Day (**2016**)

First prize for best talk at the annual Applied Mathematics and Mathematical Physics day (**2015**)

Schrödinger Scholarship (**2013–2016**)

Grant of the Hungarian Republic (academic years **2011/12 & 2012/13**)

Fifth place at Hungarian National High School Competition in Mathematics (**2008**)