Mihaly Koltai

kolmisi@gmail.com | mihaly-koltai | mbkoltai | +44-(0)7830618418

SKILLS

- infectious disease modelling:
  - dynamic transmission models (ordinary differential/difference/integro-differential equations)
  - parameter inference: MCMC and optimisation methods
  - global sensitivity analysis of large-scale models
- health economics:
  - cost effectiveness analysis for preventive biologics, using clinical trial (efficacy) data
- Programming languages (in order of proficiency): R, MATLAB, Python, C++, Julia
- Certificates in ML: Machine Learning | Machine Learning with Python | Neural Networks and Deep Learning | Improving Deep Neural Networks
- Languages: English (C2), French (C1), German (C1), Hungarian (native)

WORK EXPERIENCE

Imperial College London, MRC Centre for Global Infectious Disease Analysis **06/2023-**
Research fellow *London, UK*
Senior postdoc position in mathematical modelling of tuberculosis
- Dynamic modelling of TB burden in England in foreign-born ethnic groups (R)
- Demographic model of immigration + transmission model of latent TB in ethnic minorities

LSHTM (Uni London), Centre for Math. Modelling of Infectious Diseases **08/2020-06/2023**
Postdoctoral research fellow *London, UK*
Postdoc in infectious disease (ID) modelling using dynamic transmission models
- 100+ variable ODE-model of RSV resurgence (UK), time series fitting (R)
- integro-differential model of immunity waning for RSV seasonality (C++, R)
- cost-effectiveness analysis (CEA) of RSV vaccine and monoclonal antibodies in LMICs
- leading collaboration & authoring lead article of joint paper on CEA of RSV immunisation
- three 1^{st} + two shared-1^{st} author publications in 2 years
- projects available as reproducible code at GitHub account (1, 2, 3)

Institut Curie, Computational Systems Biology of Cancer group (U900) **09/2016-07/2020**
Postdoctoral research fellow *Paris, France*
Postdoc on mathematical modelling of cell fate decisions at French national cancer institute.
- Using matrix methods, derived exact solution as alternative to previously used stochastic simulator of cell-fate decisions, ≈10x speed-up for models of intermediate size
- 1^{st} author paper in BMC Bioinformatics
- Exact solution implemented and publicly available as MATLAB toolbox

Universität Heidelberg & Max Planck Institute Marburg **04/2012-05/2016**
PhD candidate *Heidelberg/Marburg, Germany*
PhD on mathematical modelling of microbial cell signalling at one of the leading unis of Germany
- ODE and algebraic model (MATLAB) of cell signalling, shared 1^{st} author paper (Nature Comms.)
- Monte Carlo simulations and analytical approximation (MATLAB) of 2D motility of bacterial cells, shared 1^{st} author paper (PNAS)

Eotvos Lorand University, Dept. of Biological Physics **09/2010-02/2012**
Research assistant & MSc student *Budapest, Hungary*
MSc on agent-based stochastic model of cell signalling, 2 months of research at UCSF (US).
- Within top 5% of class during MSc work by grades
- Built a stochastic agent-based model of cell signalling to test experimental hypotheses
- Co-built online cell signalling dashboard SignaLink, shared 1^{st} author publication

EDUCATION

Ruprecht-Karls-Universität Heidelberg **Heidelberg, Germany**
PhD in Mathematical Biology, Grade for thesis 1.0 (highest distinction), *2016*
Eotvos Lorand University **Budapest, Hungary**
Diploma (BSc+MSc) in Biology/Biochemistry, thesis work at Dept. of Biological Physics *2012*

SELECTED PUBLICATIONS

Group publications omitted. See Google Scholar profile for all.

M Koltai, J Moyes et al, *Estimating the cost-effectiveness of maternal vaccination and monoclonal antibodies for respiratory syncytial virus in Kenya and South Africa*, BMC Medicine, https://doi.org/10.1186/s12916-023-02806-w, 2023

F Krauer, T E Fjelde, M Koltai et al, *Estimating RSV seasonality from pandemic disruptions: a modelling study*, medrxiv, https://doi.org/10.1101/2022.06.18.22276591, 2022

D Hodgson, M Koltai et al, *Optimal Respiratory Syncytial Virus intervention programmes using Nirsevimab in England and Wales*, Vaccines, https://doi.org/10.1016/j.vaccine.2022.10.041, 2022

M Koltai, F Krauer et al, *Determinants of RSV epidemiology following suppression through pandemic contact restrictions*, Epidemics, https://doi.org/10.1016/j.epidem.2022.100614, 2022

M Koltai, A Warsame et al, *Date of introduction and epidemiologic patterns of SARS-CoV-2 in Mogadishu, Somalia: estimates from transmission modelling of satellite-based excess mortality data in 2020*, Wellcome Open Research, 6, 255, 2021

M Koltai, V Noel, A Zinovyev, L Calzone, E Barillot, *Exact solving and sensitivity analysis of stochastic continuous time Boolean models*, BMC Bioinformatics 21, 241 (2020)

A. Banderas*, M. Koltai*, A. Anders, V. Sourjik, *Sensory input attenuation allows predictive sexual response in yeast*, Nat Commun. 2016 Aug 25;7:12590

S. Bubendorfer*, M. Koltai*, F. Rossmann, V. Sourjik, K. M. Thormann, *Secondary bacterial flagellar system improves bacterial spreading by increasing the directional persistence of swimming*, Proc Natl Acad Sci USA. 2014 Aug 5;111(31):11485-90

D. Fazekas*, M. Koltai*, D. Türei* et al, *SignaLink 2 - a signaling pathway resource with multi-layered regulatory networks*, BMC Syst Biol. 2013 Jan 18;7:7

(*equal contribution)

References

Prof. Stefan Flasche (line manager at LSHTM (2nd postdoc))
London School of Hygiene & Tropical Medicine
London, United Kingdom
stefan.flasche@lshtm.ac.uk (or stefan.flasche.work@gmail.com)

Prof. Mark Jit (head of department & co-PI at LSHTM (2nd postdoc))
London School of Hygiene & Tropical Medicine
Keppel Street
London, United Kingdom
mark.jit@lshtm.ac.uk

Prof. Emmanuel Barillot (head of research group at Institut Curie (1st postdoc))
Unit Director of U900 (Bioinformatics, Biostatistics, Epidemiology of Cancer)
Group Leader of Computational Systems Biology of Cancer group
Institut Curie
Paris, France
emmanuel.barillot@curie.fr

Dr. Andrei Zinovyev (line manager at Institut Curie (1st postdoc))
Senior scientist, scientific coordinator of Computational Systems Biology of Cancer group, Institut Curie
Principal Scientist at Evotec
Paris, France
Andrei.Zinovyev@curie.fr (or zinovyev@gmail.com)

Prof. Victor Sourjik (PhD advisor at Uni Heidelberg)
Managing Director of Max Planck Institute for Microbiology
Group leader of Microbial Networks group
Max Planck Institute for Microbiology
Marburg, Germany
victor.sourjik@synmikro.mpi-marburg.mpg.de