

- CONTACT INFORMATION** Mayor lab
Research Department of Cell and Developmental Biology
UCL
Anatomy Building
Gower Street, London, United Kingdom, WC1E 6BT
E-mail: A.Szabo@ucl.ac.uk
WWW: <http://www.homepages.ucl.ac.uk/~ucbtasz/>
- RESEARCH INTERESTS** Collective cell migration, morphogenesis, embryo development, mechanistic modelling of biological phenomena
- EMPLOYMENT**
- 2013 – current Postdoctoral researcher, **UCL**, London
Study of collective cell motion in neural crest population, using both computational and biological models.
- 2011 – 2013 Postdoctoral researcher, **CWI-NCSB**, Amsterdam
Research of evolutionary tumour growth via computational biology in the group of Dr. Roeland Merks at the Center for Mathematics and Computer Science and the Netherlands Consortium for Systems Biology.
- 2011 – 2011 Part-time research associate, **ELTE**, Budapest
Computational simulation of in vitro tumour invasion in the group of Dr. András Czirók at the Eötvös University.
- 2008 – 2011 Part-time research associate, **KUMC**, Kansas City
Study of early embryonic development in vivo: collaboration with Dr. Charles D. Little's lab at the University of Kansas Medical Center.
- EDUCATION** **Eötvös University**, Budapest, Hungary
- PhD in Biophysics (2011)
- Thesis: An empirical and computational study of vasculogenesis
 - Advisor: András Czirók, PhD
- MSc in Biophysics (2006)
- Thesis: Modeling of spatial network formation of tissue cells
 - Advisor: András Czirók, PhD
- AWARDS**
- BSDB / Company of Biologists travel award, 2015
 - Marie Curie Intra-European Fellowship, 2013 – 2015
 - ESMTB Reinhart Heinrich Doctoral Thesis Award runner-up, 2011
 - APS Award for Outstanding Doctoral Thesis Research in Biological Physics runner-up, 2011
 - Eötvös University: University PhD Scholarship, 2007 – 2011

PUBLICATIONS

- **A. Szabó** and R. M. H. Merks. Blood vessel tortuosity selects against evolution of aggressive tumor cells in confined tissue environments: A modeling approach. *PLoS Comput Biol* 13(7): e1005635. (2017)
- **A. Szabó**, M. Melchionda, G. Nastasi, M.L. Woods, S. Campo, R. Perris and R. Mayor. In vivo confinement promotes collective migration of neural crest cells. *JCB* 213(5):542-555. (2016)
- **A. Szabó**, I. Cobo, S. Omara, S. McLachlan, R. Keller, R. Mayor. The Molecular Basis of Radial Intercalation during Tissue Spreading in Early Development. *Dev Cell* 37(3):213-225. (2016)
- **A. Szabó** and R. Mayor. Modelling collective cell migration of neural crest. *Curr Op Cell Biol* 42:22-28. (2016)
- E. Scarpa, **A. Szabó**, A. Bibonne, E. Theveneau, M. Parsons and R. Mayor. Cadherin Switch during EMT in Neural Crest Cells Leads to Contact Inhibition of Locomotion via Repolarization of Forces. *Dev Cell* 34(4):421. (2015)
- **A. Szabó** and R. Mayor. Cell traction in collective cell migration and morphogenesis: The chase and run mechanism. *Cell Adhesion & Migration* 9:380 (2015)
- D. Palachanis, **A. Szabó** and R. M. H. Merks. Particle-based simulation of ellipse-shaped particle aggregation as a model for vascular network formation. *Comp. Part. Mech.* 2(4):371 (2015)
- A. Czirók, K. Varga, E. Méhes and **A. Szabó**. Collective cell streams in epithelial monolayers depend on cell adhesion. *New J. of Phys.* 15 075006 (2013)
- **A. Szabó**, R. M. H. Merks. Cellular Potts modeling of tumor growth, tumor invasion and tumor evolution. *Frontiers in Oncology* 3:87 (2013)
- A. K. Lagendijk, **A. Szabó**, R. M. H. Merks, J. Bakkers. Hyaluronan: A critical regulator of endothelial-to-mesenchymal transition during cardiac valve formation. *Trends in Cardiovascular Medicine* 23 (5), 135–142 (2013)
- A. Czirók, K. Varga, E. Méhes, **A. Szabó**. Collective cell streams in epithelial monolayers depend on cell adhesion. *New Journal of Physics* 15 (7), 075006 (2013)
- A. Aleksandrova, A. Czirók, **A. Szabó**, M. B. Filla, M. J. Hossain, P. F. Whelan, R. Lansford, B. J. Rongish. Convective tissue movements play a major role in avian endocardial morphogenesis. *Developmental Biology* 363 (2012) 348–361
- **A. Szabó**, K. Varga, T. Garay, B. Hegedűs, A. Czirók. Invasion from a cell aggregate – the roles of active cell motion and mechanical equilibrium. *Phys. Biol.* 9 (2012) 016010
- **A. Szabó**, P. A. Rupp, B. J. Rongish, C. D. Little, A. Czirók. Extracellular matrix fluctuations during early embryogenesis. *Phys. Biol.* 8 (2011) 045006.

- **A. Szabó**, R. Ünnep, E. Méhes, W. Twal, S. Argraves and A. Czirók. Collective cell motion in endothelial monolayers. *Phys. Biol.* 7 046007, **2010**
- **A. Szabó**, A. Czirók. The role of cell–cell adhesion in the formation of multicellular sprouts. *Math Model Nat Phenom* 5(1):106, **2010**
- **A. Szabó**, E. Méhes, E. Kósa, A. Czirók. Multicellular sprouting in vitro. *Biophys J.* 95(6):2702–2710, **2008**.
- A. Czirók, E. A. Zamir, **A. Szabó**, and C. D. Little. Multicellular sprouting during vasculogenesis. *Curr Top Dev Biol*, 81:269–289, **2008**.
- **A. Szabó**, E. D. Perryn, and A. Czirók. Network formation of tissue cells via preferential attraction to elongated structures. *Phys Rev Lett*, 98(3):038102, **2007**.

CONFERENCE
PARTICIPATION

- A. Szabó. The molecular basis of radial intercalation during epiboly. *Experimental Biology 2017*, Chicago, USA, **2017**; invited talk
- A. Szabó, I. Cobo, S. Omara, S. McLachlan, R. Keller, and R. Mayor. A novel mechanism of epiboly: chemotaxis towards complement factor C3 during gastrulation. *Developmental Biology Gordon Research Conference*, Holyoke, USA, **2015**; poster presentation
- A. Szabó, I. Cobo, S. McLachlan, S. Omar, R. Keller, and R. Mayor. Complement C3 chemotaxis drives *Xenopus* epiboly. *UK Xenopus Meeting*, Portsmouth, UK, **2015**
- A. Szabó and R. M. H. Merks. Cell-based modelling of phenotypic plasticity in healthy and cancerous tissues. *V. International Conference on Computational Bioengineering*, **2013**, KU, Leuven, Belgium
- *Cooperation and the Evolution of Multicellularity*, **2013**, The Kavli Institute for Theoretical Physics, UCSB, Santa Barbara, CA, USA
- *Multiscale Systems Biology of Cancer*, **2012**, Lorentz Center, Leiden, The Netherlands
- A. Szabó and R. H. M. Merks. Cell-based modeling of tumor development. *Modeling of Multicellular Development and Cancer: European CompuCell3D/SBW Hands-on Workshop*, **2012**, Lorentz Center, Leiden, The Netherlands
- A. Szabó, R. Ünnep, E. Méhes, W.O. Twal, W.S. Argraves, Y. Cao and A. Czirók. Collective cell motility in endothelial monolayers. *Active Dynamics on Microscales: Molecular Motors and Self-Propelling Particles*, **2012**, Lorentz Center, Leiden, The Netherlands; poster and talk
- A. Szabó and R. H. M. Merks. Cell based modelling of tumour evolution. *The Annual Meeting of the Dutch Society for Theoretical Biology* **2012**, Schorl, The Netherlands
- A. Szabó and R. H. M. Merks. Cell based modelling of phenotypic tumour evolution. *Netherlands Institute for Systems Biology Symposium* **2012**, IJmuiden, The Netherlands

- Young Investigators in Systems Biology Workshop **2012**, Arnhem, The Netherlands
- Bioinformatics and Systems Biology - Bridging the Divide Workshop, **2012**, Lorentz Center, Leiden, The Netherlands; poster and talk
- A. Szabó, K. Varga, T. Garay, B. Hegedűs, A. Czirók. Invasion from a cell aggregate: the roles of active cell motion and mechanical equilibrium. Netherlands Consortium for Systems Biology Symposium **2011**, Soesterberg, The Netherlands; poster presentation
- Modelling angiogenesis: joining cells, maths and computers Workshop **2010**, Lorentz Center, Leiden, The Netherlands
- A. Szabó. Modelling the streaming motion of tissue cells. Statistical Physics Workshop **2010**, Budapest, Hungary
- A. Szabó, R. Ünneper, A. Czirók. Statistical analysis and mathematical modeling of collective cell motion in endothelial and epithelial cultures. Experimental Biology **2009**, New Orleans, LA, USA; poster presentation
- A. Szabó, E. Kósa, E. Méhes, A. Czirók. Mathematical models of collective cell motility and pattern formation. Experimental Biology **2008**, San Diego, CA, USA; poster presentation

SEMINARS

- Mathematics Institute Seminar, Leiden University (Leiden, NL **2017**)
- Cell and Developmental Biology Seminar, UCL (London, UK, **2017**)
- Biosciences Postdoctoral Seminar Series, UCL (London, UK, **2017**)
- Developmental Biology Seminar, UCL (London, UK, **2017**)
- Biosciences Postdoctoral Seminar Series, UCL (London, UK, **2016**)
- Cell and Developmental Biology Seminar, UCL (London, UK, **2016**)
- Institute for the Physics of Living Systems Seminar, UCL (London, UK, **2016**)
- Developmental Biology Seminar, UCL (London, UK, **2016**)
- Cell and Developmental Biology Seminar, UCL (London, UK, **2015**)
- Developmental Biology Seminar, UCL (London, UK, **2014**)
- Computational Biology Seminar, UCL (London, UK, **2013**)
- CWI Scientific Meeting, CWI (Amsterdam, The Netherlands, **2013**)
- Cell and Developmental Biology Seminar, IRB (Barcelona, Spain, **2012**)
- ESMTB Minisymposium, CWI (Amsterdam, The Netherlands, **2012**)
- Mathematics and ICMS seminar on particle systems, Eindhoven TU (Eindhoven, The Netherlands, **2012**)
- Modelling, Analysis and Computing cluster, CWI (Amsterdam, The Netherlands, **2011**)
- Randall Institute, KCL (London, UK, **2011**)
- MRC Laboratory for Molecular Cell Biology and MRC Cell Biology Unit, MRC-UCL (London, UK, **2011**)

OTHER ACTIVITIES

Memberships

- BioSciences IT Advisory Board, UCL (2016–)

- British Society for Developmental Biology (2015–)
- European Society for Mathematical and Theoretical Biology (2011–)
- American Association of Anatomists (2008–2014)

Manuscript revision

- Physical Review Letters
- Journal of Theoretical Biology
- Ecological Complexity
- Royal Society Open Science
- Journal of Computational Particle Mechanics
- Theoretical Biology and Medical Modelling
- IEEE International Conference on Bioinformatics and Biomedicine
- Springer
- Journal of Women's Health, Issues & Care

Teaching

- 2017 : CoMPLEX Summer project co-supervisor of Koki Shimada: Modelling Collective Migration of the Neural Crest With Reinforcement Learning
- 2017 : CoMPLEX mini-project co-supervisor of Ben Ingledow: Can the Physical Model of Viscous Fingering be used to Predict Features of Neural Crest migration during Development of Xenopus Embryos?
- 2011-2012 : MSc thesis co-supervisor of Iraes Rabbers: Modeling of Branching Morphogenesis in Kidney Development