Juraj Szavits-Nossan

Curriculum Vitae

PERSONAL DETAILS

address: School of Biological Sciences, University of Edinburgh,
Mayfield Road, Edinburgh EH9 3JD, United Kingdom
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orcid: 0000-0002-1540-5209
scholar: scholar.google.co.uk/citations?user=hepr85QAAAAJ

HIGHLIGHTS

Published 18 peer-reviewed publications (17 as the first or corresponding author)
Awarded a prestigious early-career fellowship in the UK (success rate $\approx$ 14%)
Lectured two undergraduate and graduate physics courses (University of Edinburgh)
Successfully supervised 2 MPhys and 5 BSc students (University of Edinburgh)

EDUCATION

Nov 2011 Ph.D. in Nonequilibrium Statistical Physics, University of Zagreb, Croatia
Mar 2005 B.Sc. in Theoretical Physics, University of Zagreb, Croatia

ACADEMIC EMPLOYMENT

Current Postdoctoral Research Associate
Apr 2021 School of Biological Sciences, University of Edinburgh, UK
Research area: stochastic kinetic modelling of transcription
PI: Ramon Grima

Mar 2021 Research Fellow
Sep 2019 School of Physics and Astronomy, University of Edinburgh, UK
Research area: stochastic kinetic modelling of mRNA translation

Sep 2019 Leverhulme Trust Early Career Research Fellow
Sep 2016 School of Physics and Astronomy, University of Edinburgh, UK
Research area: stochastic kinetic modelling of mRNA translation

Aug 2016 Postdoctoral Research Associate
Apr 2012 School of Physics and Astronomy, University of Edinburgh, UK
Research areas: stochastic kinetic modelling of protein aggregation into amyloid fibrils; condensation phenomena in stochastic processes
PIs: Martin Evans, Rosalind Allen, Cait MacPhee and Mike Cates

Mar 2012 Senior Research Assistant
Nov 2011 Institute of Physics, Zagreb, Croatia

Oct 2011 Research Assistant
Apr 2005 Institute of Physics, Zagreb, Croatia
PhD Title: Phase transitions in driven diffusive systems far from equilibrium
PhD Supervisor: Katarina Uzelac

GRANTS AND FELLOWSHIPS

2016–2019 Leverhulme Trust Early Career Fellowship, University of Edinburgh
Project title: “Deciphering rules for optimal protein biosynthesis”
Amount awarded: £162,000 (185,000€)

LIST OF PUBLICATIONS

Under peer review:

20. X. Meng, A. Reed, J. Szavits-Nossan and J. McCarthy, *Stochastic scanning events on the GCN4 mRNA 5' untranslated region generate cell-to-cell heterogeneity in the yeast nutritional stress response*, submitted to Nucleic Acids Research

19. J. Szavits-Nossan and R. Grima, *Steady-state distributions of nascent RNA for general initiation mechanisms*, submitted to Phys. Rev. Research

Peer-reviewed:

18. J. Szavits-Nossan and R. Grima, *Mean-field theory accurately captures the variation of copy number distributions across the mRNA's life cycle*, Phys. Rev. E 105, 014410 (2022), 15pp
Editors' Suggestion

17. J. Szavits-Nossan and B. Waclaw, *Current-density relation in the exclusion process with dynamic obstacles*, Phys. Rev. E 102, 042117 (2020), 11pp

16. J. Szavits-Nossan and L. Ciandrini, *Inferring efficiency of translation initiation and elongation from ribosome profiling*, Nucleic Acids Research 48(17), 9478–9490 (2020), 13pp

15. J. Szavits-Nossan and M. R. Evans, *Dynamics of ribosomes in mRNA translation under steady and non-steady state conditions*, Phys. Rev. E 101, 062404 (2020), 12pp

14. S. Scott and J. Szavits-Nossan, *Power series method for solving TASEP-based models of mRNA translation*, Phys. Biol. 17, 015004 (2020), 16pp

13. J. Szavits-Nossan, M. Carmen Romano and L. Ciandrini, *Power series solution of the inhomogeneous exclusion process*, Phys. Rev. E 97, 052139 (2018), 13pp

12. J. Szavits-Nossan, L. Ciandrini and M. Carmen Romano, *Deciphering mRNA sequence determinants of protein production rate*, Phys. Rev. Lett. 120, 128101 (2018), 6pp

11. J. Szavits-Nossan, M. R. Evans and S. N. Majumdar, *Conditioned random walks and interaction-driven condensation*, J. Phys. A: Math. Theor. 50 024005 (2017), 28 pp
Selected for the "Emerging Talents" collection

10. J. Szavits-Nossan and M. R. Evans, *Inequivalence of nonequilibrium path-ensembles: the example of stochastic bridges*, J. Stat. Mech. P12008 (2015), 22 pp

9. J. M. D. Kalapothakis, R. J. Morris, J. Szavits-Nossan, K. Eden, S. Covill, S. Tabor, J. Gillam, P. E. Barran, R. J. Allen and C. E. MacPhee, *A kinetic study of ovalbumin fibril formation: the importance of fragmentation and end-joining*, Biophys. J. 108(9), 2300–2311 (2015), 12pp

8. J. Szavits-Nossan, M. R. Evans and S. N. Majumdar, *Condensation transition in joint large deviations of linear statistics*, J. Phys. A: Math. Theor. 47, 455004 (2014), 31pp
Selected for the "Highlights of 2014" collection

7. J. Szavits-Nossan, K. Eden, R. J. Morris, C. E. MacPhee, M. R. Evans and R. J. Allen, *Inherent variability in the kinetics of autocatalytic protein self-assembly*, Phys. Rev. Lett. 113, 098101 (2014), 5pp

6. J. Szavits-Nossan, M. R. Evans and S. N. Majumdar, *Constraint-driven condensation in large fluctuations of linear statistics*, Phys. Rev. Lett. 112, 020602 (2014), 5pp

5. J. Szavits-Nossan, *Disordered exclusion process revisited: some exact results in the low-current regime*, J. Phys. A: Math. Theor. 46, 315001 (2013), 24pp

4. J. Szavits-Nossan and K. Uzelac, *Absence of phase coexistence in disordered exclusion processes with bypassing*, J. Stat. Mech. P05030 (2011), 18pp

3. J. Szavits-Nossan and K. Uzelac, *Impurity-induced shocks in the asymmetric exclusion process with long-range hopping*, J. Stat. Mech. P12019 (2009), 13pp

2. J. Szavits-Nossan and K. Uzelac, *Scaling properties of the asymmetric exclusion process with long-range hopping*, Phys. Rev. E 77, 051116 (2008), 8pp

1. J. Szavits-Nossan and K. Uzelac, *Totally asymmetric exclusion process with long-range hopping*, Phys. Rev. E 74, 051104 (2006), 8pp

TEACHING EXPERIENCE

University of Edinburgh:

Advanced Statistical Physics, lecturer, undergraduate course (2020/21, 2019/2020)
Nonequilibrium Statistical Physics, lecturer, graduate course (2018/19)

University of Zagreb:

Hydrodynamics, tutor, undergraduate course (2011/12)
Advanced Statistical Physics, tutor, undergraduate course (2008/09, 2009/10)
Statistical Physics, tutor, undergraduate course (2007/08)

STUDENT SUPERVISION

2 Master's and 5 Senior Honours Projects, University of Edinburgh

INVITED TALKS

2021 Dynamics of mRNA translation inferred from experimental data
Cologne Evolution Colloquium, 27 Jan

2020 Inferring efficiency of translation initiation and elongation from ribosome profiling
Riboviz UK-USA collaboration, 30 Sep

2019 Mathematical models for gene expression data
Growth and division in mathematics and medicine, London, 4–6 Nov

2019 Inferring translation dynamics from ribosome profiling data
Research Seminar, School of Biosciences, University of Kent, 1 Oct

2018 Mathematical modelling of mRNA translation: old questions and new insights
Reverse mathematical methods for reconstructing molecular dynamics in single cell, Pisa, 15–19 Oct

2018 mRNA sequence determinants of protein production rate
8th Regional Biophysics Conference, Zreče, 16–20 May

2016 Conditioned random walks and spatially-extended condensation
Condensation phenomena in stochastic systems, Bath, 5 Jul

PROFESSIONAL ACTIVITIES

Editor — Journal of Visualized Experiments (JoVE) Methods Collection (Guest Editor)
"Research methods for understanding the dynamics of gene expression"

Referee — Physical Review E, Physical Review Letters, Physical Biology, Entropy, Integrative Biology, Journal of Statistical Mechanics: Theory and Experiment, Biophysical Journal (full record available at Web of Science)

CONFERENCES (last five years)

2020 Online One-Day Meeting for Early Career Biological Physicists, 16 Dec
2020 Physics in Life and Medicine, online meeting, 14 Oct
2019 Growth and division in mathematics and medicine, London, 4–6 Nov (invited talk)
2019 20th IUPAB Congress and 12th EBSA Congress, Madrid, 20-24 Jul (talk)
2019 Translation UK, Glasgow, 3–5 Jul (talk)
2018 Reverse mathematical methods for reconstructing molecular dynamics in single cell, Pisa, 15–19 Oct (invited talk)
2018 8th Regional Biophysics Conference, Zreče, 16–20 May (invited talk)
2018 43rd MECO, Krakow, 1–4 May (poster)
2018 Open Statistical Physics, Milton Keynes, 21 Mar (talk)
2017 Quantitative Methods in Gene Regulation IV, Cambridge, 18–19 Dec (talk)
2017 19th IUPAB Congress and 11th EBSA Congress, Edinburgh, 16–20 Jul (poster)

ADMINISTRATION

2012–2015 Statistical Physics Group Meetings organiser, University of Edinburgh
2008–2012 Linux High-Performance Computing Cluster administrator, Institute of Physics

CAREER DEVELOPMENT

2017 Introduction to Python for Biologists, Edinburgh
2013 Summer School Fundamental Problems in Statistical Physics XIII, Leuven, Belgium
2008 Les Houches Summer School: Long-range interacting systems, France
2007 Les Houches Predoctoral School in Statistical Physics, France

LANGUAGES

English full professional proficiency
German elementary proficiency
Croatian native proficiency

REFERENCES

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