

Alexander J. Stewart

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EDUCATION

- 2006-2010 **PhD** - Mathematical Biology. *The Construction of Transcription Factor Networks through Natural Selection.*
Department of Genetics, Evolution and Environment, University College London
Advisors: Andrew Pomiankowski and Rob Seymour (February 2010)
- 2005-2006 **MRes** - Mathematical Biology, Centre for Mathematics and Physics in the Life Sciences and Experimental Biology, University College London
Advisors: Andrew Pomiankowski and Rob Seymour (September 2006, Distinction)
- 2001-2005 **MSci** - Physics, Imperial College London (2005, 1st Class Honours)

RESEARCH POSITIONS

- 2017- **Visiting Faculty, Princeton University**
Levin Lab, Guyot Hall, EEB
- 2015- **Royal Society University Research Fellow (tenure track)**
Department of Genetics, Evolution and Environment, University College London
- 2011-2015 **Postdoctoral Fellow**
Department of Biology, University of Pennsylvania
Advisor: Joshua Plotkin
- 2010-2011 **EPSRC Fellowship**
Jointly at University of Pennsylvania and University College London
Advisors: Andrew Pomiankowski and Joshua Plotkin

GRANTS AND FUNDING

- 2016-2020 Defense Advanced Research Projects Agency (DARPA)
The statistical mechanics of crowds (\$5.25M project grant, awarded to co-PIs Alexander Stewart, Joshua Plotkin, Erol Akçay, David Rand, Johan Bollen, Simon Levin)
- 2016 LIDO summer studentship
The selective consequence of stochastic expression divergence in diploid regulatory networks (\$3.5k award to fund summer studentship)
- 2015-2020 Royal Society
The population genetics of social dilemmas (\$770k University Research Fellowship grant awarded to Alexander Stewart)
- 2012-2014 National Philanthropic Trust
An explanatory framework for the evolution of complexity (\$170k grant coauthored with PI Joshua Plotkin)

2010-2011 EPSRC
PhD Plus postdoctoral fellowship (\$50k fellowship awarded to Alexander Stewart)

AWARDS AND FELLOWSHIPS

2010-2011 EPSRC PhD Plus Fellowship.
2008 CoMPLEX International Research Fellowship (carried out at Weizmann Institute, Rehovot, Israel).
2006 Distinction for masters thesis, awarded by University College London.
2005 Tyndall Physics Prize for undergraduate thesis, awarded by Imperial College London.
2005 1st Class Honors degree awarded by Imperial College London

PUBLICATIONS

Stewart AJ, Parsons T, Plotkin JB (2016), Evolutionary consequences of behavioral diversity. *PNAS* 113: 7003-7009

Stewart AJ, Plotkin JB (2016). Small groups and long memories memories promote cooperation. *Scientific Reports* 6, 26889

Stewart AJ, Plotkin JB (2015). The evolvability of cooperation under local and non-local mutations *Games* 6(3), 231-250

Stewart AJ, Plotkin JB (2014). The collapse of cooperation in evolving games. *PNAS* 111: 17558-17563

Stewart AJ, Plotkin JB (2013). From extortion to generosity, evolution in the Iterated Prisoner's Dilemma. *PNAS* 110: 15348-15353

Stewart AJ, Plotkin JB (2013). The evolution of complex gene regulation by low specificity binding sites. *Proc. R. Soc. B* 280: 20131313

Stewart AJ, Seymour R, Pomiankowski A, Reuter M (2013). Under-dominance constrains the evolution of negative autoregulation in diploids *PLoS Comp. Bio.* 9: e1002992

Stewart AJ, Seymour R, Pomiankowski A, Plotkin J (2012). The population genetics of cooperative gene regulation. *BMC Evol. Bio.* 12:173

Stewart AJ, Hannehalli S, Plotkin JB (2012). Why transcription factor binding sites are ten nucleotides long. *Genetics* 192:973-985

Stewart AJ, Plotkin JB (2012). Extortion and cooperation in the Prisoner's Dilemma. *PNAS* 109:10134-10135

Stewart AJ, Parsons T, Plotkin JB (2011). Environmental robustness and the adaptability of populations. *Evolution* 66:1598-1612

Stewart AJ, Seymour R, Pomiankowski A (2009). Degree dependence in rates of transcription factor

evolution explains the unusual structure of transcription networks. *Proc. R. Soc. B.* 276:2493-2501

ARTICLES SUBMITTED OR IN PREPARATION

Lavery D, Baker A, van der Wel M, Morsink F, Hale, M, Hooijer G, McDonald S, Offerhaus G, Quirke P, Novelli M, Rodriguez-Justo M, Treanor D, Graham T, **Stewart AJ**, Meijer S, Wright N and Jensen M. Functional clonal heterogeneity during esophageal cancer progression. (in review at *Nature Medicine*)

Stewart AJ, Parsons T and Plotkin JB. Social interactions speed multi-step adaptations

Stewart AJ and Plotkin JB. Coevolutionary dynamics of intuition and memory

Stewart AJ and Plotkin JB. Super-memory and partial inheritance in social evolution

Diakonova M and **Stewart AJ**. Decision making dynamics in low density populations with zealots

Stewart AJ and Raihani N. Group thinking and generosity in the evolution of cooperation

Rohani R, Pomiankowski A, **Stewart AJ**. Random monoallelic expression as an evolutionary strategy

Hill M, Reuter M and **Stewart AJ**. Sexual antagonism leads to entanglement in gene networks

Stewart AJ, Jansen M. A public goods model of Barrett's dysplasia

SELECTED CONFERENCE PRESENTATIONS

- 2017 Invited speaker, Gruter Institute for Law and Behavioral Research. Insights into Innovation and Growth conference
- 2017 CaCCoN talk, Princeton University. "The role of drift in social behavior"
- 2017 Invited seminar, UCSD, Department of Cognitive Science
- 2017 Invited seminar, UC Berkeley, Department of Psychology
- 2017 Invited seminar, Cardiff University, Department of Mathematics Seminar
- 2017 Invited seminar, University of Vermont Complex Systems program
- 2016 Invited speaker, RA Fisher Centre Meeting.
- 2016 Invited seminar, Imperial College London, Complex Systems program
- 2014 Evolution conference talk, Raleigh NC. "The collapse of cooperation in evolving games"
- 2013 Invited seminar, Princeton University, EEB Department, "Social interactions speed multi-step adaptation"
- 2013 Invited speaker, Genomics and Computational Biology Graduate Group Annual Retreat
- 2010 CoMPLEX Annual Conference, London. "Environmental robustness and the adaptability of populations."
- 2010 SMBE poster, Lyon. "The evolution of gene regulation by cooperative transcription factors."

- 2009 ESEB poster, Turin. “A barrier to the evolution of negative autoregulation in diploids”
 2009 SMBE talk, Iowa City. “Degree dependence in the rates of transcription factor evolution”
 2008 Evolutionary Dynamics conference talk, Warwick. “Degree dependence and the evolution of transcription networks”

TEACHING AND STUDENT MENTORING

- 2016 Student mentoring - Reza Rohani, LIDo funded summer student *The selective consequence of stochastic expression divergence in diploid regulatory networks* (UCL)
 2016- BIOL3012 Sex, Genes and Evolution (UCL lectures)
 2016- BIOL2012 Fundamentals of ecology (UCL lectures)
 2015- BIOLM019 Current topics in research (UCL research tutorials for MSci students)
 2015- BIOL1004 First year core skills (UCL discussion group on research career paths)
 2015-16 Student mentoring – Jorge Menendez Canelas, student project on expression asymmetry in gene networks (UCL)
 2015 Student mentoring – Michael Warner, student project on evolutionary game theory (UPenn)
 2014 Student mentoring - Alexandra Brown, student project on evolutionary game theory (UPenn)
 2012-13 Student mentoring - Krishna Kalinin, student project on biological clocks (UPenn)
 2009 Student mentoring - Joe Bailey, student project (UCL with Andrew Pomiankowski)
 2008 Student mentoring - Ben Hall, student project (UCL with Andrew Pomiankowski and Rob Seymour)