Iain D. Couzin FRS

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Centre for the Advanced Study of Collective Behaviour, University of Konstanz
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Personal Details

Name: Iain Douglas Couzin FRS

Professional preparation

University of St. Andrews, UK	Biology	B.Sc. Hons. 1st class, 1995
University of Bath, Bath, UK	Biology	Ph.D., 1999
University of Leeds, Leeds, UK	Postdoctoral researcher	2000 – 2002
Balliol College, Oxford, UK	Junior Research Fellow	M.A. (Oxon), 2003
Princeton University, Princeton, USA	Pew Biocomplexity Fellow	2002 – 2005
University of Oxford, Oxford, UK	Zoology & Math. Biol.	2002 – 2005

Appointments

June 2019 – present	Founding Director, Max Planck Institute of Animal Behavior, Department of Collective Behaviour, Konstanz, Germany
Jan 2019 – present	Speaker (Director), Centre for the Advanced Study of Collective Behaviour, German Science Foundation Cluster of Excellence, U. Konstanz, Germany
Feb 2015 – present	Chair of Biodiversity and Collective Behaviour, Department of Biology, University of Konstanz, Germany
Oct 2014 – May 2019	Director, Max Planck Institute for Ornithology, Konstanz, Germany
Feb 2013 – Jan 2015	Full Professor, Department of Ecology and Evolutionary Biology, Princeton University
Nov 2007 – Jan 2013	Assistant Professor, Department of Ecology and Evolutionary Biology, Princeton University
2005 – 2007	Royal Society University Research Fellow, Dept. of Zoology, University of Oxford
2003 – 2007	Junior Research Fellow in the Sciences, Balliol College, Oxford

Awards

2025	Fellow of the Royal Society
2025	The President's Medal, The Royal Entomological Society
2024	The Fyssen International Prize
2024	Global Highly Cited Researcher, Web of Science, Clarivate
2024	Vox's Future Perfect 50 list of innovators, thinkers, change-makers and scholars
2023	Rothschild Distinguished Fellowship, University of Cambridge
2022	The Gottfried Wilhelm Leibniz Prize
2022	Falling Walls Prize Life Sciences Winner
2019	The Lagrange Prize
2018-2022	Global Highly Cited Researcher, Web of Science, Clarivate
2013	The Zoological Society of London Scientific Medal
2013	The Benjamin Meaker Visiting Professor, Institute for Advanced Studies, Univ. Bristol
2012	National Geographic's Emerging Explorer Award
2012	Top 5 most cited articles of the decade (1999-2010), Lab Times publication analysis of Animal Behavior Research
2012	The Murray Visiting Professorship, University of Sydney, Australia
2011	PopTech Science and Public Leadership Award
2010	Popular Science Magazine's 'Brilliant 10' Award
2009	The Mohammed Dahleh Award, UC Santa Barbara
2008	Searle Scholar Award

2005 Royal Society University Research Fellowship

Select distinguished lectures

2025 The Verrall Lecture, The Royal Society of Entomology, London
2025 The Otto Creutzfeldt Lecture, German Neuroscience Society, Göttingen
2025 The Winston Chen Lecture, Harvard University, USA
2024 Plenary Lecture, Ascona Neuroscience Symposium, Switzerland
2024 Special Lecture, Federation of European Neuroscience Societies (FENS), Vienna, Austria
2023 Nobel Prize Symposium Lecture, Stockholm, Sweden
2023 Rothschild Distinguished Lecture, University of Cambridge, UK
2022 Falling Walls Science Breakthroughs of the Year, Berlin
2022 The Rhodes Lecture, Emory University, USA
2019 Tokyo Prize (Japanese Emperor Prize) Symposium, Tokyo, Japan
2019 Annual Distinguished Lecture, Cognitive, Computational and Systems Neuroscience (CCSN), Washington University in St. Loui
2019 Public Lecture, SAGE Centre for the Study of the Mind at the University of California Santa Barbara
2019 The Darwin Lecture, University of Cambridge, UK
2019 The Gatsby Lecture, COSYNE (Computational and Systems Neuroscience), Denver, USA
2018 The Immelmann Lecture, University of Bielefeld, Germany
2017 The Siemens Lecture, Carl Friedrich von Siemens Foundation, Munich, Germany
2017 The Odum Lecture, University of Georgia, USA
2017 The Bowen Lecture, Johns Hopkins Campus, Rockville, USA
2015 Director's Seminar, Howard Hughes Medical Institute (HHMI), Janelia Research Campus
2014 The Kwanghil Koh Lecture on Mathematics in Our Time, College of Sciences, NC State University
2014 Interdisciplinary Distinguished Seminar, Federal Laboratory for Analytical Sciences and the Army Research Office, NC, USA
2014 Public Lecture and Keynote, Courant Research Center Symposium "Evolution of Social Behavior", University of Göttingen, Germany
2014 The Institute of Science and Technology (IST) Distinguished Lecturer Series, Austria
2013 The Benjamin Meaker Lecture, Institute for Advanced Studies, University of Bristol
2013 Howard Hughes Medical Research Institute, "Pathbreaking careers in science"
2013 The Jacob Marschak Lecture, UCLA Anderson School of Management
2012 The Murray Lecture, University of Sydney, Australia
2012 The Bernard Rothenberg Lecture in Biology and Public Policy, PA
2012 The von Neumann Public Lecture, Institute for Discovery, University of Wisconsin Madison
2012 National Geographic Live! Discussion between Nobel Laureate Mario Molina and National Geographic Explorer Iain D. Couzin
2012 Public Lecture, Harvard Museum of Natural History
2012 Keynote Address, NVIDIA GPU Technology Conference, San Jose
2011 The Prosser Lecture, Dartmouth College
2011 The Blundon Lecture, Nova Scotia
2011 The Storer Lecture, UC Davis
2011 The Santa Fe Community Lecture, James A. Little Theatre, Santa Fe
2010 Public Lecture, Center for Science and Industry IMAX Theatre, Columbus, OH;
2009 Mohammed Dahleh Distinguished Lecture, UC Santa Barbara
2008 The Marsden Lecture, McGill University, Canada

Publications

2025

[180] Sayin, S., Couzin-Fuchs, E., Petelski, I., Günzel, Y., Salahshour, M., Lee, C-Y., Graving, J.M., Li, L., Deussen, O., Sword, G.A., & Couzin, I.D. (2025) The behavioral mechanisms governing collective motion in swarming locusts, ***Science*** 387(6737), 995-1000.

- Accompanying *Perspective* of our paper by C. Buhl & S.J. Simpson "Virtual Reality Rewrites the Rules of the Swarm" *Science* 337(6099), 1181-1182.

[179] Li, L., Nagy, M., Amichay, G., Wu, R., Wang, W., Deussen, O., Rus, D. & Couzin, I.D. (2025) Reverse engineering the control law for schooling in zebrafish using virtual reality, ***Science Robotics***, 10(101), eadq6784.

- Accompanying *Focus* article on our paper by N.J. Cowan & R.J. Full "Swimming in the "Matrix": VR fish pass the Turing test using a simple control law for collective behavior" *Science Robotics* 10(101), eadw8581.

[178] Gao, Z. & Couzin, I.D. (2025) Swarming transitions of self-propelled particles with anisotropic interactions, ***Physical Review Research*** 7(2), 023144

[177] Chan, A. H. H., Brookes, O., Waldmann, U., Naik, H., Couzin, I. D., Mirmehdi, M., ... & Kano, F. (2025). Towards Application-Specific Evaluation of Vision Models: Case Studies in Ecology and Biology. *Accepted in CVPR*.

[176] Lebovich, L., Alisch., T., Redhead, E.S., Parker, M.O., Loewentein, Y., Couzin, I.D. & de Bivort, B.L. (2025) Spatiotemporal dynamics of locomotor decisions in *Drosophila melanogaster*, *in revision at PNAS*.

[175] Salahshour, M. & Couzin, I.D. (2025) Allocentric flocking, i*n revision at Nature Communications*.

[174] Salahshour, M. & Couzin, I.D. (2025) Subjective rationality provides a solution to social dilemmas. *In review.*

[173] Bath, D.E., Graving, J.M., Walter, T., Vizcaíno, J.P. & Couzin, I.D. (2025) Collective sensing in mobile animal groups, i*n revision at Current Biology*.

2024

[172] Wu, R., Deussen, O., Couzin, I.D. & Li, L. (2024) Non-invasive eye tracking and retinal view reconstruction free swimming schooling fish. ***Communications Biology*** 7(1), 1-8.

[171] Goldstein, A., Chen, X., Amichai, E., Boonman, A., Harten, L., Nathan, R., Toledo, S., Couzin, I.D.* & Yovel, Y.* (2024) Acoustic map-based navigation in echolocating bats. ***Science*** 386(6721), 561-567. (*equal contribution)

[170] Chao, L-M., Couzin, I.D. & Li, L. (2024) On turning maneuverability in self-propelled burst-and-coast swimming, ***Physics of Fluids*** 36, 111918.

[169] Sampaio, E., Sridhar, V.H., Francisco, F., Nagy, M., Sacchi, A., Stransburg-Peshkin, A., Núhrenberg, P., Rosa, R., Couzin, I.D.* & Gingins, S.* (2024) Multidimensional leadership and composition-driven success in octopus-fish hunting groups. ***Nature Ecology and Evolutionary Biology*** 8, 2072-2084 (*equal contribution)

[168] Heins, C., Millidge, B., Da Costa, L., Mann, R., Friston, K. and Couzin, I.,D. (2024) Collective behavior from surprise minimization. ***PNAS*** (121)17, e2320239121.

[167] Amichay, G., Li, L., Nagy, M. & Couzin, I.D. (2024) Revealing the mechanism and function underlying pairwise temporal coupling in collective motion. ***Nature Communications*** 15, 4356.

[166] Waldmann, U., Chan, A.H.H., Naik. H., Nagy, M., Couzin, I.D., Deussen,

O., Goldlücke, B. & Kano,. F. (2024) 3D-MuPPet: 3D multi-pigeon pose estimation and tracking, ***International Journal of Computer Vision***, 1-18.

[165] Gorbonos, D., Oberhauser, F., Costello, L.L., Günzel, Y., Couzin-Fuchs, E., Koger, B. and Couzin, I.D. (2024) An effective hydrodynamic description of marching locusts. ***Physical Biology*** 21, 026003.

[164] Chao, L-M., Jia, L., Wang, S., Liberzon, A., Ravi, S., Couzin, I.D., & Li, L (2024) Tailbeat perturbations improve swimming efficiency by reducing the phase lag between body motion and the resulting fluid response. ***PNAS Nexus***, pgae73.

[163] Gorbonos, D., Gov, N.S. and Couzin, I.D. (2024) The geometrical structure of bifurcations during spatial decision-making. ***PRX Life*** 2, 013008.

[162] Li, L., Chao, L-M., Wang, S., Deussen, O., & Couzin, I.D. (2024) Robotwin: a platform to study hydrodynamics in schooling fish. ***IEEE Robotics and Automation Magazine*** 31(1), 10-17.

2023

[161] Davidescu, M.R., Romanczuk, P., Gregor, T. & Couzin, I.D. (2023) Growth produces coordination trade-offs in an animal lacking a central nervous system. ***PNAS*** 120 (11), e2206163120

[160] Couzin, I. D., & Couzin-Fuchs, E. (2023). The chemical ecology of locust cannibalism. ***Science*** *380*(6644), 454-455.

[159] Williams, H.J., Sridhar, V.H., Hurme, E., Gall, G.E., Borrego, N., Finerty, G.E., Couzin, I.D., Galizia, C.G., Dominy, N.J., Rowland, H.M. & Hauber, M.E., 2023. Sensory collectives in natural systems. ***eLife*** 12, p.e88028.

[158] Nagy, M., Naik, H., Kano, F., Carlson, N., Koblitz, J.C., Wikelski, M. & Couzin, I.D. (2023) SMART-BARN: Scalable Multimodal Arena for Real-time Tracking Behaviour of Animals in laRge Numbers. ***Science Advances*** *9*(35), eadf8068.

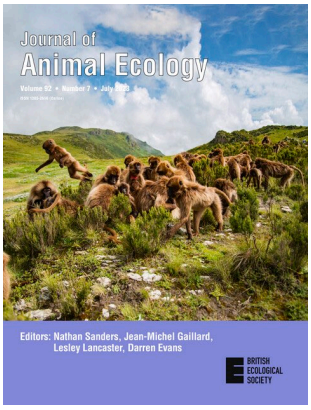
[157] Neubauer, L., Davidson, J.D., Wild, B., Dormagen, D.M., Landgraf, T., Couzin, I.D. & Smith, M.L. (2023) Honey bee drones are synchronously hyperactive inside the nest, ***Animal Behaviour*** 203, 207-223..

[156] Jhawar, J., Davidson, J.D., Weidenmüller, A., Wild, B., Dormagen, D.M., Landgraf, T., Couzin, I.D., & Smith, M.L. (2023) How honey bees respond to heat stress from the individual to colony level. ***Journal of the Royal Society Interface*** 20(207), 20230290.

[155] Oscar, L., Li, L., Gorbonos, D., Couzin, I. D., & Gov, N. S. (2023). A simple cognitive model explains movement decisions in zebrafish while following leaders. ***Physical Biology***, *20*(4), 045002.

[154] Couzin, I. D., & Li, L. (2023). The benefits of swimming together. ***eLife***, *12*, e86807.

[153] Koger, B., Deshpande, A., Kerby, J. T., Graving, J. M., Costelloe, B. R., & Couzin, I. D. (2023). Quantifying the movement, behaviour and environmental context of group-living animals using drones and computer vision. ***Journal of Animal Ecology*** 92(7), 1357-1371.



[152] Sridhar, V. H., Davidson, J. D., Twomey, C. R., Sosna, M. M., Nagy, M., & Couzin, I. D. (2023). Inferring social influence in animal groups across multiple timescales. ***Philosophical Transactions of the Royal Society B***, *378*(1874), 20220062..

[151] Naik, H., Chan, A. H. H., Yang, J., Delacoux, M., Couzin, I. D., Kano, F., & Nagy, M. (2023). 3D-POP-An automated annotation approach to facilitate markerless 2D-3D tracking of freely moving birds with marker-based motion capture. Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (***CVPR***), 21274-21284

[150] Couzin, I.D. & Heins, C. (2023) Emerging technologies for behavioral research in changing environments. ***Trends in Ecology and Evolution***, 38(4), 346-354.

2022

[149] Kano, F., Naik, H., Keskin, G., Couzin, I.D. & Nagy, M. (2022) Head-tracking of freely-behaving pigeons in a motion-capture system reveals the selective use of visual fields, ***Scientific Reports*** 12(1), 1-15.

[148] Jolles, J., Sosna, M.M.G., Mazué, G.,P.F., Twomey, C.R., Bak-Coleman, J., Rubenstein, D.I. & Couzin, I.D. (2022) Both predator and prey features predict the predation risk and survival of schooling prey. ***eLife*** 11, e76344.

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[146] Waldman. U., Nail, H., Nagy, M., Kano, F., Couzin, I.D., Deussen, O. & Goldlücke, B. (2022) I-MuP-PET: Interactive multi-pigeon pose estimation and tracking, In ***DAGM*** *German Conference on Pattern Recognition*, pp. 513-528. Cham: Springer International Publishing.

[145] Smith, M.L., Davidson, J.D., Wild, B., Dormagen, D.M., Landgraf, T. & Couzin, I.D. (2022) Behavioural variation across the days and lives of honey bees, ***iScience*** 10482.

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[142] Tuia, D. … Couzin, I,D. et al. (2022) Perspectives in machine learning for wildlife conservation` ***Nature Communications***, 13, 792.

[141] Jetz. W. … Couzin, I.D. et al., (2022) Biological Earth observation with animal sensors. ***Trends in Ecology and Evolutionary Biology***, 37(4), 293-298.

2021

[140] Sridhar, V.H., Li, L., Gorbonos, D., Nagy, M., Schell, B.R., Sorochkin, T., Gov, N.S. & Couzin, I.D. (2021) The geometry of decision-making in individuals and collectives, ***PNAS*** 118 (50), e2102157118.

[139] Bak-Coleman, J. B., Alfano, M., Barfuss, W., Bergstrom, C. T., Centeno, M. A., Couzin, I. D., ... & Weber, E. U. (2021). Stewardship of global collective behavior. ***PNAS***, 118 (27), e2025764118.

[138] Lutz, M.J., Reid, C.R., Lustri, C.J., Kao, A.B., Garnier, S. & Couzin, I.D. (2021) Individual error correction drives responsive self-assembly in army ant scaffolding structures, ***PNAS*** 118 (17), e2013741118.

[137] Davidson, J.D., Sosna, M.M.G.., Twomey, C.R., Sridhar, V.H., Leblanc, S.P. & Couzin, I.D. (2021) Collective detection based on visual information in animal groups. ***Journal of the Royal Society Interface*** 180, 20210142.

[136] Walter, T., & Couzin, I. D. (2021). TRex, a fast multi-animal tracking system with markerless identification, 2D body posture estimation and visual field reconstruction, ***eLife*** 10: e64000.

[135] Li, L., Ravi, S., Xie, G., & Couzin, I. D. (2021). Using a robotic platform to study the influence of relative tailbeat phase on the energetic costs of side-by-side swimming in fish. ***Proceedings of the Royal Society A***, 477(2249), 20200810.

[134] Marcelino, R., Sampaio, J., Amichay, G., Gonçalves, B., Couzin, I. D., & Nagy, M. (2021). Collective Behavior in Football. *Match Analysis: How to Use Data in Professional Sport*, 18.

[133] Wild, B., Dormagen, D.M., Zachariae, A., Smith, M.L., Traynor, K.S., Brockman, D., Couzin, I.D. & Landgraf, T. (2021) Social networks predict the life and death of honey bees, 12(1), 1110 ***Nature Communications***.

2020

[132] Li, L., Nagy, M., Graving, J.M., Bak-Coleman, J., Xie, G & Couzin, I.D. (2020) Vortex phase matching as a strategy of schooling in robots and in fish, ***Nature Communications*** 11(1), 1-9.

[131] Jolles, J., Mazué, G., Davidson, J., Behrmann-Godel, J. & Couzin, I.D. (2020) *Schistocephalus* parasite infection alters sticklebacks' movement ability and thereby shapes social interactions, ***Scientific Reports*** 10, 12282.

[130] Nagy, M., Horicsányi, A., Kubinyi, E., Couzin, I.D., Vásárhelyi, G., Flack, A. & Vicsek, T (2020) Synergistic benefits of group search in rats, ***Current Biology*** 30, 1-6.

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[127] Carlson, N., Kelly, E.M. & Couzin, I.D. (2020) Individual vocal recognition across taxa, ***Philosophical Transactions of the Royal Society B*** 375, 20190479.

[126] Marcelino, R., Sampaio, J., Amichay, G., Gonçalves, Couzin, I.D. & Nagy, M. (2020) High-throughput analysis of correlated trajectory segments reveals dynamical and adaptive strategies of team sport players, ***Chaos, Solitons and Fractals*** 138, 109831.

[125] Naik, H., Bastien, R., Navab, N. & Couzin, I.D. (2020) Animals in virtual environments, ***IEEE Transactions on Visualization and Computer Graphics***, 2073-2083.

2019

[124] Papageorgiou, D., Christensen, C., Gall, G.E.C., Klarevas-Irby, J., Nyaguthii, B., Couzin, I.D. & Farine, D.R. (2019) The multi-level society of a small-brained bird, ***Current Biology*** 29(21), R1120-R1121.

[123] Graving, J.M., Chae, D., Naik, H., Li, L., Koger, B., Costelloe, B.R. & Couzin, I.D. (2019) DeepPoseKit, a software toolkit for fast and robust animal pose estimation using deep learning, ***eLife*** 8:e47994.

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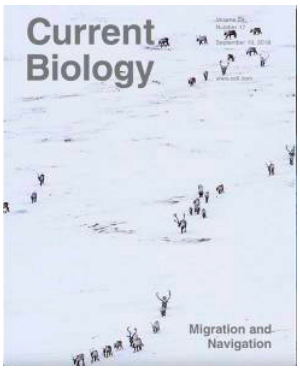

H., Lazer, D., McElreath, R., Mislove, A., Parkes, D.C., Pentland, A.S., Roberts, M.E., Shariff, A., Tenenbaum, J.B. & Wellman, M. (2018) Machine behaviour, ***Nature*** 568(7753), 477-486.

2018

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2017

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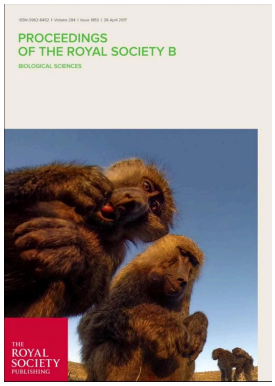

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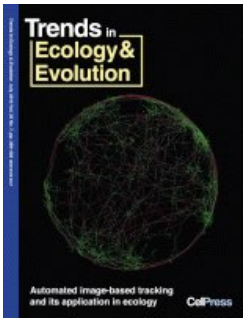

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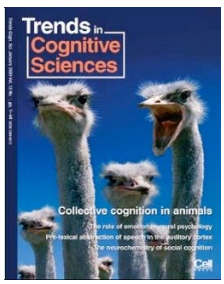

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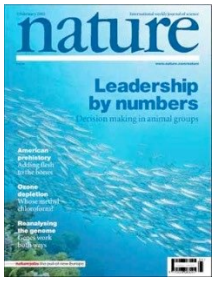

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Public communication of science

The beauty and ubiquity of collective animal behaviour provides a powerful means by which to engage the public in science. Throughout my career I have been dedicated to promoting the public understanding of science, building trust in science, combatting misinformation and promoting science as a public good. In addition to regularly giving international public lectures, as a National Geographic Explorer I have worked on "Live!" events, including "Lessons from a cannibal plague" and "Discussion between Nobel Laureate Mario Molina and Iain Couzin". I have worked with Radiolab in the US, doing both radio and a live show, and with the BBC World Service & Wellcome Collection, "Exchanges at the Frontier, with Iain Couzin" London, broadcast on BBC World Service. In visual media I worked with the BBC as science consultant on series including *Predators* (3 episodes, 2000), *Massive Nature* (2004), *Swarm: Nature's Incredible Invasions* (2 episodes, 2009), and appeared on *The Code* (2011) and *Dara O'Briens Science Club* (2013). Following my move to the US, I worked as science consultant with National Geographic on *Great Migrations* (3 episodes; 2010) and PBS on *Nature: The Gathering Swarms* (2014). Since moving to Germany I have worked with ARTE documentary on Swarm Intelligence, with ZDF on Smart Swarms and 3 shows with 3Sat. In 2023 I collaborated with UK YouTuber Tom Scott on a video It's the Matrix, but for locusts which has received nearly 3 million views.

Teaching

I teach at both undergraduate and masters student levels. I also teach internationally, including as faculty of a Training Program in Quantitative Biology and Ecology for young Brazilian and other Latin American scientists in Sao Paolo, Brazil. I have also developed, with National Geographic Learning, an international teaching unit on collective behavior and cooperation for an integrated skills course for lower-secondary/middle schools worldwide. I have also been involved with AimHigher Masterclasses, including at Newcastle United's "St. James Park" and Sunderland F.C.'s "The Stadium of Light", targeting students groups underrepresented in universities.

Mentorship

29 Ph.D. and Postdoctoral alumni have gone on to tenure track or tenured positions at: Ahmedabad University (India), Auburn University (USA), Chalmers University of Technology (Sweden); CSIC Centre for Advanced Studies Blanes (Spain), Cornell University (USA), Eötvös Loránd University (Hungary), Humboldt University of Berlin (Germany), Indian Institute of Technology Varanasi (India), Indian Institute of Science (India), Johns Hopkins University (USA), New Jersey institute of Technology (USA), Polytechnic University of Turin (Italy), The City University of New York (CUNY) (USA), The Hebrew University of Jerusalem (Israel), University of Adelaide (Australia), 2x University of Bristol (UK), UC San Diego (USA), University of Glasgow (UK), UMass Boston (USA), University of Minnesota (USA), University of Pennsylvania (USA), University of Strasbourg (France), University of Sydney (Australia), University of Toulouse (France), 2x University of Washington (USA), University of Wyoming (USA) and Wilfred Laurier University (Canada).

Training in my lab also focuses on pathways to contributions outside academia, for example:
Dr. Sepideh Bazazi (PhD student) is Team Lead at OliverWyman UK and was TechWomen100 winner in 2020; Dr. Mircea Davidescu (PhD student) is Decision Science Manager at Meta; Dr. Jolyon Faria (Postdoc.) is Data Science Director at AstraZeneca, Cambridge; Dr. Andrew Hartnett (Ph.D. student) is Senior Software Engineering Manager at Lattitude AI; Dr. Conor Heins (Ph.D. student) is Senior Machine Learning Engineers, VERSES AI; Dr. Yael Katz (Postdoc.) is Founder and CEO of Simbryo Technologies, Co-Founder and former CEO of Braincheck, and Entrepreneur in Residence at Rice University Business School.

Funding

BABOTS: the Design and Control of Small Swarming Biological Animal Robots (PI)
Agency: ERC Horizon Award: € 0.64 million (M)
Duration: 2023 - 2027

Advanced Simulation, Analysis and Interpretation of Network Structures in Biological Data "Smart-Nets"
Agency: ERC Marie Sklodowska-Curie Actions, Innovative Training Networks (ITN) Award: € 3.36M
Duration: 2020 – 2024

Individual Differences and Bio-Inspired Design of Vehicle Group Dynamics (Co-PI with Naomi Leonard and Fumin Zhang)
Agency: ONR Award: $ 3.00 million
Duration: 2019 – 2024

The Centre for the Advanced Study of Collective Behaviour (PI, with Co-PIs Oliver Deussen and Urs Fischbacher)
Agency: The German Science Foundation (DFG) Award: €32 Million
Duration: 2019 - 2025

The Center for Visual Computing of Collectives (PI, with Daniel Keim Co-PI)
Agency: The German Federal and State Government Award: €33.0 Million
Duration: From 2016

ALliance for organismal Interaction AnalysiS (ALIAS) (PI, with Oliver Deussen Co-PI)
Agency: Regionale Forschungallianzen in Baden-Württemberg Award: €0.9 Million
Duration: From 2016

Collective animal behaviour (Structure and Innovation Fund for Research) (PI)
Agency: Ministry of Science, Research and the Arts Baden-Württemberg Award €1.5 Million
Duration: From 2014

Center for Reality Mining of Animal-Human Systems (PI)
Agency: Humboldt-Princeton partner Program Award: $0.05 Million
Duration: 10/1/2014 - 9/30/15

Sensory Networks and Collective Information Processing in Animal Groups (PI)
Agency: National Science Foundation Award: $0.32 Million
Duration: 02/01/2014 - 02/01/2018

Bio-inspired scalable collaboration of autonomous vehicles that sense, learn and decide (Co-PI with Naomi Leonard, Princeton and Fumin Zhang, Georgia Institute of Technology.
Agency: Office of Naval Research Award: $2.23 Million
Duration: 07/01/2014-6/30/2018

Robustness and Adaptability in Collective Behavior (Co-PI with Simon Levin and Naomi Leonard)
Agency: Army Research Office Award: $0.36 Million
Duration: 07/01/2014-6/30/2017

Information processing and computation in fish groups (co-PI with Gasper Tkacik, Austria and Elad Schneidman, Weizmann Institute, Israel)
Agency: Human Frontiers Science Program Award: $1.05 Million
Duration: 05/01/2012 - 04/31/2015

CNH: Social-ecological complexity and adaptation in marine systems (Co-PI with Simon A. Levin),
Agency: National Science Foundation Award: $1.5 Million
Duration: From 10/01/2012 - 10/01/2016

The Perceptual Basis for Collective Behavior in a Model Vertebrate (PI; Co-PI is Esteban Fernandez-Juricic, Purdue University)
Agency: National Science Foundation
Duration: From 10/01/2012 - 10/01/2013 Award: $0.18 Million

A Platform for Data-Parallel GPU Computing at Princeton (Co-PI with David August, James Stone and Jeroen Tromp),
Agency: National Science Foundation
Duration: from 10/01/2012 Award $0.35 Million

Experimental and Theoretical Analysis of Collective Dynamics of Swarming Systems (PI)
Agency: National Science Foundation (NSF)
Duration: 09/03/2009 – 09/30/2013 Award: $0.54 Million

Coordination and collective decision-making (co-PI with Simon A. Levin and Naomi E. Leonard)
Agency: Army Research Office
Duration: 08/17/2011 - 06/16/2013 Award: $0.42 Million

Bio-Inspired Autonomous Control for Optimal Exploration and Exploitation in Marine Environments (Co-PI with Naomi Leonard, Princeton University, and Fumin Zhang, Georgia Tech)
Agency: Office of Naval Research (ONR)
Duration: 06/01/2009 – 05/31/2014 Award: $3.0 Million

Collective Behavior and Social Transmission of Information in Human Crowds (PI)
Agency: Oxford Risk Research and Analyses Ltd.
Duration: 09/15/2010 – 09/14/2012 Award: $0.17 Million

Collective Motion and Decision-Making in Animal Groups (PI)
Agency: Kinship Foundation, Searle Scholars Program
Duration: 07/01/2008 – 06/30/2011 Award: $0.3 Million

Plenary/Keynote/Distinguished/Public Lectures (from 2007)

2025 Plenary Lecture, Dynamics Days 25, Denver, USA
Keynote Speaker, Wageningen Institute of Animal Sciences, Netherlands
Keynote Speaker, UK Multi-Agent Systems Symposium, London, UK

2024 Plenary Lecture, Distributed Autonomous Robotic Systems (DARS), Cornell Tech, NYC, USA
Plenary Lecture, ANTS 2024 International Conference on Swarm Intelligence, Konstanz
Keynote Speaker, BonnBrain 2024, Bonn, Germany
David & Edith Harris Physics Colloquium, MIT, Boston, USA
Plenary Speaker, Düsseldorf Neuroscience Symposium, Düsseldorf

2023 Plenary Speaker, Dubrovnik Conference on Cognitive Science, Croatia
SciFoo, GoogleX, USA
Plenary Speaker, Workshop on Collective Behaviour, University of Cambridge, UK
Plenary Speaker, Collective Intelligence Symposium, Santa Fe Institute, USA
Keynote Speaker, the 22nd International Conference on Autonomous Agents and Multiagent Systems (AAMAS), London, UK
The Munich Neuroscience Lectures, Germany
Plenary Address, Max Planck Institute of Intelligent Systems Annual Retreat, Schluchsee, Germany
Public Lecture, "Of Fish and fascists", Science and Cocktails, Amsterdam, Netherlands

The Faculty Club Lecture, RWTH Aachen University, Aachen, Germany

2022 Plenary Speaker, Inaugural Symposium, The Price Centre for the Social Brain, Rockefeller University, NYC, USA
Plenary Speaker, SIAM Conference on the Life Sciences, Pittsburgh, USA
Keynote Address, NIH Brain Behavior and Synchronization Workshop, Bethesda, USA

2021 Keynote Speaker, Conference on Complex Systems, Lyon, France
Keynote Speaker, International Forum on Advanced Environmental Sciences and Technology (iFAST) in honor of Simon Levin's 80th birthday
Plenary Speaker, European Brain and Behavior Society Meeting, EPFL, Switzerland

2020 Keynote Address, New Perspectives for Science, Tübingen, Germany
Keynote Speaker, Society for Experimental Biology Meeting, Prague, Czech Republic
Plenary Lecture, Advanced Course on Systems Biology, Innsbruck, Austria
Plenary Lecture, German Ethological Society Meeting, Tübingen, Germany
Keynote Address, Biology20, Fribourg, Switzerland

2019 Annual Distinguished Lecture, Cognitive, Computational and Systems Neuroscience (CCSN), Washington University in St. Louis
Keynote Speaker, VIII. Complexitat, Barcelona, Spain
SciFoo, GoogleX, USA
Presentation to the Governing Board of the Wellcome Trust, Munich
Plenary Speaker, Complex Systems Summer School, Bari, Italy
Public Lecture, SAGE Centre for the Study of the Mind at the University of California Santa Barbara
Plenary Speaker, VIP Opening Event, TownHall Europe, The Davignon Center for New Leadership, Brussels
Plenary Speaker, 20th Anniversary of the Ecology and Evolutionary Biology Interdisciplinary Program at Texas A&M University
Plenary Speaker, Computational Social Science - Quo Vadis, ETH Zurich
Plenary Speaker, Complexitat Day, Barcelona
Keynote Speaker, Life 2019, Utrecht, Netherlands

2018 Public Lecture, Centre for Interdisciplinary Research (ZiF), University of Bielefeld, Germany
Plenary Speaker, 4th International Conference on Computational Social Science, Northwestern University, USA.
Plenary Speaker, PINC Conference, Netherlands.
Opening Plenary Lecture, CAJAL Advanced Course in Behavior and Neural Systems, Champalimaud Centre, Lisbon, Portugal
Plenary Lecture, Complexity Science Hub, Vienna, Austria
Keynote Speaker, International Summit on Social Cognition in Humans and Robots, Hamburg, Germany
Session Chair, Friends of Europe high-level European Union roundtable, Brussels, Belgium
Keynote Speaker, International Conference on Computational Social Science (IC2S2), Kellog School of Management at Northwestern University, USA

2017 Opening Plenary Address, Ecology Across Borders (the Joint Annual meeting of the British Ecological Society, The Ecology Society of Germany, Austria and Switzerland, The Netherlands Ecological Society and the European Ecological Federation)
The Evening Keynote Address, Boston Consulting Group Alumni Meeting, Munich, Germany
The Odum Lecture, University of Georgia, USA
The Bowen Lecture, Johns Hopkins Campus, Rockville, USA

Public Lecture, Science Meets Music, Benjamin Hall, Jupiter, FL, USA
Plenary Speaker, The 50th Anniversary Symposium of the Fisheries Society of the British Isles, University of Exeter, UK
Public Lecture, Mathematical Models in Ecology and Evolution, City University of London, London, UK
The Complex Systems Public Lecture, University of Sheffield, Sheffield, UK

2016 Plenary Speaker, The European Conference of Behavioural Biology, Vienna
Keynote address, the 6th Brain and Behavior Meeting, Haifa, Israel
German Academy of Sciences (Leopoldina) Plenary, Modeling Nature and Society, Weimar
Plenary Speaker, ETH Zurich / Max Planck Institute Workshop: Design and Coordination of Micro- to macro-scale Swarms
BIG Seminar, University of Lausanne, Switzerland

2015 Director's Seminar, Howard Hughes Medical Institute (HHMI), Janelia Research Campus
Opening Keynote Speaker and Closing Address, Frielandtage, German Primate Centre, Göttingen
Plenary Speaker, Lake Como Summer School on Complexity, Italy
Plenary Speaker, Physics of Emergent Behaviour, London Science Museum
SciFoo, Googleplex, Mountainview, California
Plenary Speaker, The Champalimuad Neuroscience Symposium, Lisbon, Portugal
Directors' Seminar, Max Planck Institute for Intelligent Systems, Tübingen, Germany
Plenary Speaker, Animal Social Networks in Behavioral Research, University of Neuchatel, Switzerland
Plenary Speaker, AniMove workshop, Max Planck Institute for Ornithology, Radolfzell, Germany
Ernst Strüngmann Forum, Complexity and Evolution
Plenary Speaker, The Scottish Informatics and Computer Science Alliance Workshop on Computational Ecology, University of Edinburgh, Scotland, UK

2014 Plenary Speaker, Max Planck International Research School in Organismal Biology, Grand Challenges Symposium, Konstanz, Germany
Plenary Speaker, The Joint Annual Meeting of the Society of Mathematical Biology and the Japanese Society for Mathematical Biology, Osaka, Japan
Keynote Address, 13th International Conference on Autonomous Agents and Multiagent Systems, Paris, France
The Institute of Science and Technology (IST) Distinguished Lecturer Series, Austria
Interdisciplinary Distinguished Seminar, Federal Laboratory for Analytical Sciences and the Army Research Office, NC, USA
Public Lecture and Keynote, Courant Research Center Symposium "Evolution of Social Behavior", University of Göttingen, Germany
Plenary Speaker, Interaction Networks and Collective Motion in Swarms, Flocks and Crowds, Helsinki, Finland
Plenary Speaker, Animal Behavior Society Meeting, Princeton, USA

2013 Benjamin Meaker Visiting Professorship, Institute for Advanced Studies, University of Bristol
BBC World Service & Wellcome Collection, "Exchanges at the Frontier, with Iain Couzin" London, broadcast on BBC World Service
Public Lecture, Institute for Advanced Studies and Worldwide Universities Network, Bristol.
Plenary Speaker, Behaviour 2013, Newcastle, UK
Plenary Speaker, Animal Movement in Confined Space, University of Bristol, UK
Center for Immunity, Infection and Evolution Visiting Professor, University of Edinburgh
Howard Hughes Medical Research Institute, "Pathbreaking careers in science"

Keynote Address, Israel Society of Ecology and Environmental Sciences
The Jacob Marschak Speaker, UCLA Anderson School of Management

2012 The Murray Visiting Professorship, University of Sydney, Australia
Bernard Rothenberg Lecturer in Biology and Public Policy, PA
von Neumann Public Lecture, Institute for Discovery, University of Wisconsin Madison
National Geographic Live! Discussion between Nobel Laureate Mario Molina and National Geographic Explorer Iain D. Couzin
Keynote Address, Max Planck Symposium on Biodiversity, Berlin
N.J. Brainpower List
Public Lecture, Harvard Museum of Natural History
Keynote Address, NVIDIA GPU Technology Conference, San Jose
Visiting Professor, Tel Aviv University
Forum Speaker, Aspen Environment Forum, Aspen, Colorado
Keynote Address, NetSci 2012, Northwestern University
Plenary Lecture, Collective Intelligence 2012, MIT, Boston

2011 The Prosser Lecture, Dartmouth College
The Blundon Lecture, Nova Scotia
The Storer Lecture, UC Davis
BigThink Delphi Fellow
Plenary Lecture, Mathematical Biosciences Institute, Ohio State University
The Santa Fe Community Lecture, James A. Little Theatre, Santa Fe

2010 Public Lecture, Center for Science and Industry IMAX Theatre, Columbus, OH;
Distinguished Lecturer, Pacific Institute for Mathematical Sciences
Plenary Address, International Union for the Study of Social Insects (IUSSI), Copenhagen
Keynote Address, Forum for the Future of Complex Systems, UNC, Charlotte
Distinguished Speaker, Pacific Institute for the Mathematical Sciences and Center for Scientific Computing, Canada

2009 Mohammed Dahleh Distinguished Lecture, UC Santa Barbara
Top 10 most cited articles in 2009 (5th), *Phil. Trans. Roy. Soc. Lond. B*
Member of the Faculty of 1000 Biology

2008 The Marsden Lecture, McGill University, Canada
World Science Festival, NYC
Keynote Lecture, 'Formation flying, missions and technologies', European Space Agency

2007 Plenary speaker, International Conference on Complex Systems, Boston
Plenary speaker, Society for Industrial and Applied Mathematics (SIAM) Dynamics, Snowbird, Utah
Plenary speaker, Dynamics Days, Boston

2003 Fellow of the Center for Interdisciplinary Research, University of Bielefeld

Further Invited lectures & Seminars

2024 Biomechanics and Behaviour Seminar, University of Oxford, Oxford, UK
Bernstein Workshop, Berlin, Germany

2023 Bernstein Conference Workshop 'Behavior Across the tree of Life', Berlin, Germany
Invited Speaker, Behaviour 2023, Bielefeld University, Germany

Worldwide VVTNS Neuroscience Seminar, Zoom
Cornell University Systems Thinking Conference, Zoom
Invited Speaker, From Individual to Group Decision Making, Weizmann Institute, Israel
Invited Speaker, Brainy Days in Jerusalem: The Future of Neuroscience, Israel
Serrapilheira/ICTP-SAIFR Training Program in Quantitative Biology and Ecology, San Paolo, Brazil

2022 The Cambridge Centre for Physical Biology Seminar, Cambridge University, UK
From Individual to Collective Behaviour in Biological and Robotic Systems, International Cen tre for Mathematical Sciences, Edinburgh, UK

2021 Intelligent-ish: how dumb agents do clever things, Sainsbury Wellcome Centre, University College London, UK

2019 Special Seminar, HSRCB, MCB, Quant Bio and OEB, Harvard University
Airbus BlueSky Participant, Flying Brains Workshop, Munich
MIT Mechanical Engineering Colloquium, MIT, Boston
Lecturer, Federation of European Neuroscience Societies (FENS) - Hertie Winter School on Neural Control of Instinctive and Innate Behavior
Colloquium for Neuroinformatics, University of Zurich and ETH Zurich
Invited Speaker, Nutritional Homeostasis Workshop, LIMES Institute, University of Bonn
Lecturer, Summer School - Complex networks: theory, methods and applications, Lake Como School of Advanced Studies
Invited Speaker, Computation in Biological Systems, Society for Experimental Biology Annual (SEB) Meeting, Seville, Spain

2018 Columbia University Integrative Animal Behavior Seminar
Columbia University Neuroscience Seminar
6th Annual Toulouse Economics and Biology Workshop, Toulouse, France
Sölden Neuroscience Symposium, Sölden, Austria
German Physical Society Meeting, Physics of Contagion Processes, Berlin, Germany
Departmental Seminar, Neurobiology, Weizmann Institute of Science, Israel
Speaker, International neuroscience Conference, Sölden, Austria
Speaker, 6th Toulouse Economics and Biology Workshop, France

2017 MIT Colloquium on Brain and Cognition, MIT, Boston, USA
Centre for Brain Science Seminar, Harvard University, USA
Integrative Research Institute for the Life Sciences (ISI) Seminar, Humboldt University, Berlin, Germany
Speaker, Max Planck - Chinese Academy of Sciences Conference on Mechanisms of Animal Behavior, Shanghai, China
Speaker, World health Summit, Berlin, Germany
Speaker, Biologing Symposium, Konstanz, Germany
Speaker, Gordon Conference on Movement Ecology of Animals, Ventura, USA
Heidelberg Institute for Theoretical Studies Colloquium, Heidelberg, Ggermany
Speaker, Journal of Experimental Biology Symposium on the Evolution of Social Behavior, The Eiger, Switzerland
The Munich Centre for Neurosciences Seminar, Germany

2016 Departmental Seminar, Zology, Cambridge University, Cambridge, UK
Centre for Integrative Biology Seminar, University of Toulouse, Toulouse, France
Integrative Research Institute for Life Sciences Seminar, Humboldt University, Berlin
Biology Symposium, University of St. Andrews, Scotland

Interfacultative Munich Center for Neurosciences – Brain and Mind of the Ludwig-Maximilians-Universität
Speaker, Transport Phenomena in Collective Dynamics, ETH Zurich, Switzerland
Physics Colloquium, University of Konstanz, Konstanz, Germany

2015 Department Seminar, University of Exeter Cornwall Campus, UK
CAnMove Seminar, University of Lund, Sweden

2014 Interdisciplinary Center for Life Sciences and Engineering Seminar, Technion - Israel Institute of Technology
Department of Biology Seminar, Bar Ilan University, Israel
6th SIDEER Symposium, Exploring Real World Networks, From Genes to Ecosystems, Sede Boqer Campus of Ben Gurion University, Israel
Shalom Applebaum Memorial Lecture, The Hebrew University, Rehovot, Israel
Departmental Seminar, Department of Evolution, Systematics and Ecology, The Hebrew University, Jerusalem, Israel

2013 Invited speaker, Deutsche Physikalische Gesellschaft Spring Meeting, Regensburg
Biophysics seminar, MIT
Graduate Student Invited Speaker, Department of Ecology and Evoilutionary Biology, Cornell.
Graduate Student Invited Speaker, Department of Neurobiology and Behavior, Cornell.
Google Science Fair
Complexity Group Seminar, Stanford University
Office of Naval Research, Science of Autonomy Meeting
Center for Immunity, Infection and Evolution Special Seminar, University of Edinburgh
Batsheva de Rothschild Seminar on Marine Life in the Flow, Eilat, Israel
Organizer, Animal Swarms Workshop, Israel
Graduate student invited speaker, Department of Ecology and Evolutionary Biology, University of Arizona
Biocomplexity seminar, Stanford University

2012 *Science* magazine Live Chat, The Science of Decision-Making
Society for Social Neuroscience Annual Meeting, New Orleans
Sensory Coding and the natural Environment, IST Austria
Center for Studies of Physics and Biology, The Rockefeller University
Champalimaud Foundation Ar Event, Lisbon
Neuroscience Seminar, Champalimaud Center for the Unknown, Lisbon, Portugal
Departmental Seminar, Biology, Texas A&M
Departmental Seminar, School of Biological Sciences, UT Austin
Princeton Institute In Computational Science and Engineering Conference
Graduate Student Invited Speaker, School of Biological Sciences, UC Irvine
Department of Neuroscience, UC Irvine
School of Biological Sciences, University of Sydney
Department of Mathematics, University of Pittsburgh

2011 Department of Organismic and Evolutionary Biology Seminar, Harvard University
Department of Psychology Seminar, Harvard University
PopTech Conference, Maine
Undergraduate Invited Speaker, Dept. of Biochemistry, University of Pennsylvania
Graduate Student Invited Speaker, Tufts University
Graduate Student Invited Speaker, University of Florida
Plenary Speaker, Insect self-organization and swarming, Math. Biosci. Institute, Ohio State University

Graduate Student Annual Invited Speaker, University of Florida
Woods Hole Marine Biology Laboratory, Woods Hole
Institute of Evolution, University of Haifa, Israel
Ecology, Evolutionary Biology and Behavior, Michigan State University
City University of New York, New York
Ernst Strungmann Forum, Frankfurt institute for Advanced Studies

2010 Microbes to Metazoans: Evolution of Social Behavior, Georgia Tech, 2010
Workshop in Honor of Danny Cohen's 80th Birthday, The Hebrew University, Jerusalem
BIOCOMPLEXITY XI, The evolution of cooperation, Bloomington, Indiana
EVOS Seminar, Bingamton University
Department of Biology, Tel Aviv University
Department of Physics, University of Maryland
Lecturer, Complex Systems Summer School, Santa Fe
Workshop on Nonlinear Dynamics of Networks, University of Maryland
Workshop on Group Behavior, University of Arizona
Disease in Motion, Princeton University
Swarm Workshop, Max Planck Institute for the Physics of Living Systems, Dresden

2009 Applied Mathematics Colloquium, Cornell University
Robotics Institute, Carnegie Mellon University
DARPA Microsystems Technology Office Seminar, San Jose
Sloan-Schwartz Annual Meeting on Computational Neuroscience, Harvard University
Invitational speech, Board of National Institute of General Medical Sciences, Bethesda
Ecology Seminar, University of Pennsylvania
Workshop on Soft Active Materials, Syracuse University
Collective Decision Making Workshop, Santa Fe Institute, Santa Fe
Department of Neurobiology, Weizmann Institute, Israel

2008 Session Leader, Collective Animal Motion, Gordon Research Conference on Theoretical Biology and Biomathematics, Italy
NSF Workshop on Complex Systems, Washington DC
Renaissance Technologies Colloquium, Long Island, NY
NIH Modeling Social Behavior, Bethesda, MD
Princeton Plasma Physics Laboratory, Princeton, NJ

2007 Divisional seminar, Division of Biology, Caltech
Department of Ecology and Evolutionary Biology and Institute for Genomics and Systems Biology, University of Chicago
Centre for Integrative Multiscale Modeling & Control and Dynamical Systems, Caltech
Department of Biosciences, Birmingham University, UK
AAAS Meeting, San Francisco
Speaker, BIOCOMP, Italy
Departmental Seminar, Mechanical Engineering, MIT

Scientific Service

Scientific Advisory Committee, ComplexChaos AI (2024 -)
Artificial Intelligence for Collective Intelligence (AI4CI) Science Council (2024 -)
Honorary member of the Italian Society for Chaos and Complexity (2020 -)
Scientific Board of Trustees, BIOTOPIA, Natural History Museum of Bavaria (2020 -)
McDonnell Foundation Complex Systems Advisory Panel (2016 -)
Princeton University Press European Advisory Board (2016 -)
Committee Member for the Reorientation of the Max Planck Institute for Cybernetics, Tübingen
Editor, *eLife* (2014 - 2020)

Scientific Advisory Board, Institute for Pure and Applied Mathematics, UCLA (Oct 2014 -)

Editor, *Movement Ecology* (2012 -)

Editor, *Behavioral Ecology (until mid-2011)*

Editorial Board, *Journal of Nonlinear Science*

Associate Editor, *Advances in Complex Systems*

Editorial Board, *Swarm Intelligence*

Guest Editor, *PLoS Computational Biology*

Guest Editor, *PNAS USA* (*PNAS*)

Founding Advisory Board Member, National Institute for Mathematical and Biological Synthesis (NIMBioS). University of Tennessee, Knoxville.

Scientific Management Board / International Advisory Board, "Complex agent-based dynamic networks" research group at the University of Oxford *(until 2012)*

Advisory Board. Terreform ONE, Ecological Design Group for Urban Infrastructure, Planning and Art.

Scientific Advisory Board, Lifeboat Foundation

Advisor, Harvard Business Review and the World Economic Forum, Manhattan, 2008

Advisor, Seed Business Group and the World Economic Forum, Cambridge, MA, 2008

Advisor to the NSF bio-directorate on systems biology, 2007

Adviser to the Department of Trade and Industry on 'intelligent infrastructure' (invited by Sir David King, Chief Scientific Advisor to H.M. Government), 2004

Scientific Service (Princeton University)

Graduate Student Admissions Committee & Faculty Search Committee, Department of Ecology and Evolutionary Biology, 2010; Research Computing Advisory Group, 2010-2014; Institutional Animal Care and Use Committee, 2007-2010

Television credits (IMDB)

(2018) Wie Wissen, himself

(2017) Planet Wissen, himself

(2014) PBS, Nature: The Gathering Swarms, scientific consultant

(2013) BBC, Dara O'Brien's Science Club, himself

(2012) Nova, Science Now: 'What are animals thinking?', himself

(2011) BBC, The Code, 'Prediction', himself

(2010) National Geographic, *Great Migrations*:

- Feast or Famine, scientific consultant
- Race to Survive, scientific consultant
- Need to Breed, scientific consultant

(2009) BBC, *Swarm: Nature's Incredible Invasions*:

- One Million Heads one Beautiful Mind, scientific consultant
- When Worlds Collide, scientific consultant

(2004) BBC, *Massive Nature*:

- The Trap, scientific consultant.

(2000) BBC, *Predators*: Mass Attack, scientific consultant and simulation developer