Curriculum Vitae

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Personal

Name:	Dr. rer. nat. Axel Gerhard Rossberg
Citizenship:	British, German
Current Position:	Reader in Theoretical Ecology
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Education

January '98	Doktor der Naturwissenschaften (Ph.D., physics), "summa cum laude" (beyond best regular grade)
Dissertation Title:	*The Amplitude Formalism for Pattern-Forming Systems with Spontaneously Broken Isotropy and some Applications*
10/1994 – 09/1998	Universität Bayreuth, doctoral student, Supervisor: L. Kramer
08/1994	Master of Arts, Supervisor: J. Swift
10/1993 – 09/1994	University of Texas at Austin, 2 semesters, Major: Physics, Minor: Mathematics
Thesis Title:	*Onset of Double Diffusive Convection in Hele-Shaw Geometry*
08/1992	Vordiplom (pre-diploma), "sehr gut" (best regular grade)
10/1990 – 09/1993	Universität Würzburg, 6 semesters, Major: Physics, Minor: Computer Science

Appointments

09/2015 –	Reader in Theoretical Ecology, School of Biological and Chemical Sciences, Queen Mary University London, UK
01/2013 – 08/2015	Honorary Lecturer, School of Environmental Sciences, University of East Anglia, UK
02/2014 – 08/2015	Principal Scientist at Centre for Environment, Fisheries & Aquaculture Science (Cefas), UK
01/2012 – 01/2014	Senior Scientist at Centre for Environment, Fisheries & Aquaculture Science (Cefas), UK
08/2010 – 08/2015	Senior Research Fellow (later part time) at School of Biological Sciences, Queen's University Belfast, UK
08/2008 – 07/2010	Research Fellow at School of Biological Sciences, Queen's University Belfast, UK
04/2007 – 08/2008	Research Scholar at IIASA (International Institute for Applied Systems Analysis), Austria
04/2005 – 03/2006	Part-Time Lecturer at Sophia University, Tokyo, Japan
10/2003 – 03/2007	Visiting Associate Professor at Center of Excellence "Environmental Risk Management for Bio/Eco-Systems", Yokohama National University, Japan
04/2001 – 09/2003	Researcher at Center for Data Analysis and Modeling, Universität Freiburg, Germany
10/2000 – 03/2001	Visiting Scholar at Department of Philosophy, Columbia University, New York, NY, U.S.A.
10/1998 – 09/2000	Postdoctoral Researcher at Nonlinear Dynamics Group, Kyoto University, Kyoto, Japan
10/1996 – 09/1998	Research Assistant at Department of Physics, Universität Bayreuth, Germany
10/1995 – 09/1996	Teaching Assistant at Department of Physics, Universität Bayreuth, Germany

Teaching

Postgraduate	2023 –	Developer and Program Director of new *MSc Artificial Intelligence in the Biosciences*
Postgraduate	09/2019	Biomathematics ESMTB Summer School 2019 – two lectures on Modelling in Marine Ecology: *Size-spectrum modelling* and *The inherent parameter sensitivity of marine food-web models and how to deal with it in fisheries management* (guest lectures)
Undergraduate	09/2018 –	Queen Mary University London, *Research Methods and Communication I & II*
Undergraduate	09/2017 – 08/2020	Queen Mary University London, Module Convenor for undergraduate final year research projects
Postgraduate	10/2016	Queen Mary University London, *Statistics and Bioinformatics*
Postgraduate	01/2016 – 01/2021	Queen Mary University London, *Ecological Theory and Applications*
Postgraduate	09/2015 –	Queen Mary University London, *Ecosystem Structure and Functioning*
Postgraduate	07/2014	DEVOTES Summer School at AZTI-Tecnalia, *Understanding the mechanics of marine food webs* and *Applying food-web theory for management and the Marine Strategy Framework Directive* (guest lectures)
Postgraduate	11/2013	School of Mathematics, University of East Anglia, *Why food webs are hard to model* (guest lecture)
Undergraduate	10/2010 – 12/2010	School of Biological Sciences, Queen's University Belfast, *Biochemical Methods, Experimental Design and Statistics* (lectures and practicals)
Undergraduate	04/2005 – 03/2006	Faculty of Comparative Cultural Studies, Sophia University, Tokyo, *Environmental Issues I&II* (two full-semester lectures)
Postgraduate	04/2004 – 03/2007	Graduate School of Environment and Information Sciences, Yokohama National University, *Basic Methods of Theoretical Ecology and their Application* (three full-semester lectures, in Japanese)
Postgraduate	10/2001 – 02/2002	Fakultät für Physik, Universität Freiburg, *Concepts of Nonlinear Dynamics* (full semester lecture, co-toughed with Jens Timmer, in German)
High-School	11/2001	Freiburg Seminar, City of Freiburg *The Four Capital Sins of Modeling* (in German)
Undergraduate	10/1995 – 09/1996	Department of Physics, University of Bayreuth, *Electrodynamics* (two full semester problem-solving classes, in German)

Supervision and Tutoring

2022 –	PhD	Dominik Maczik, *Evaluating Biodiversity Policies using the Lotka-Volterra Meta-community Model*.
2022 –	PDRA	Emmanuel Chibuike Nwankwo, *Mechanisms and prediction of large-scale ecological responses to environmental change* (NERC Highlights topic grant)
2021 – 2022	MSc	Yasin Bahadir Aydin, *Is there a universally preferred value for the steepness of stock-recruitment relations?* (sole supervisor)
2021 – 2022	MSc	Sara Fernández, *Modelling pollination in two different environments through the identification of self-organised patterns* (sole supervisor)
2021 – 2022	BSc	Silvia Zwierzyk-Teles, Determinants of dietary diversity across the animal kingdom (sole supervisor)
2021 – 2022	BSc	Teodora Borilova, *Determinants of pollinator interaction diversity* (sole supervisor)
2021 –	PhD	Shijun MU, *Corporate Environmental Reporting and Biodiversity-friendly Innovation: the Role of Independent Academic Directors* (2nd supervisor)

2021 –	PhD	Samuel John Shrimpton, *Predicting the response of endangered sea turtles to a changing climate*
2020 – 2022	PDRA	Chris Terry, *Mechanisms and prediction of large-scale ecological responses to environmental change* (NERC Highlights topic grant)
2020 – 2022	PDRA	Jacob Louis Dinner O'Sullivan, *Mechanisms and prediction of large-scale ecological responses to environmental change* (NERC Highlights topic grant)
2020 – 2021	MSc	Arjun Singh Padda, *What shapes the trophic pyramid of species richness - how is diversity at high trophic levels controlled by that at lower levels?*
2020 – 2021	BSc	Lili Csenge Csorba, *Evaluation of strategies to manage coral disease outbreaks*
2020	Summer Student	Emmanuel J Spelman, *Relationships between specialisation and species richness in bipartite ecological interaction networks*
2019 –	PhD	Thomas Julian Del Santo O'Neill, *Methods and policy pathways to optimise production of multiple interacting fish stocks*
2018 – 2019	MSc	Thomas Julian Del Santo O'Neill, *Assessment of management options to attain Maximum Sustainable Yield from multiple interacting stocks in the North Sea*
2017 – 2018	BSc	Bilal Ashraf Sahi, *Interaction diversity of communities residing within prey-predator, mutualistic and host-parasitic network types*
2017 – 2019	PhD	Jacob Louis Dinner O'Sullivan, *Spatially explicit theoretical community ecology*.
2016 – 2020	PhD	Orestes Gutierrez al-Khudhairy, *Ecological constraints and adaptation of attack rates*.
09/2015 –	BSc	Personal academic advisor to about 8 students per cohort
2014	Guest Student	Nao Takashina, *Maximum sustainable yield in size-structured populations*
2012	Summer Student	Rebecca Reid, *Total reproductive value as an index for stock size of commercial fish*
2009 – 2013	PhD	Tak Fung, *Sustainable fisheries and the diversity of marine communities: A theoretical investigation*, co-supervised with Keith Farnsworth
2009 – 2013	PhD	Jennifer Houle, *Size-structured modelling tools for an Ecosystem Approach to Fisheries Management*, co-supervised with Keith Farnsworth
2005 – 2007	PhD	Hiroshi Serizawa, *Mathematical analyses of spatiotemporal dynamics of colonial cyanobacteria in lake ecosystems*, co-supervised with Takashi Amemiya
2005 – 2006	Bachelor	Kaori Yanagi (Statistics of trophic interaction strengths), co-supervised with Takashi Amemiya
2004 – 2005	Bachelor	Takuo Yumura (Analysis of food-web topology), co-supervised with Takashi Amemiya
2004 – 2007	PhD	Takatoshi Enomoto (theory and experiments on bi-stability in ecosystems), co-supervised with Takashi Amemiya
2002 – 2003	Diploma	Kilian Bartholomé, *Non-linear data analysis for vortex flow-meters*, co-supervised with Jens Timmer
1997 – 1998	Diploma	Anke Lindner, *Three-dimensional Pattern formation in liquid crystals*, co-supervised with Lorenz Kramer

Research Grants

2023 – 2024	Co-PI of NERC-funded coordination function of £5M research program *Integrating Finance and Biodiversity for a Nature Positive Future*, £250k, £59k for QMUL
2023	PI of NERC-funded *Mediating the first transaction of Biodiversity Impact Credits*, £151k for QMUL
2022	PI of NERC/Finance for Biodiversity funded Knowledge Exchange Fellowship *Catalysing the emergence of a biodiversity stewardship credit market*, £61k for QMUL
2022	Co-I of UKRI funded *Bioacoustic monitoring using drones*, £47k for QMUL
2020 – 2025	PI of NERC funded *Mechanisms and prediction of large-scale ecological responses to environmental change*, £1.21M for QMUL
2019 – 2022	PI of UKRI funded LIDo iCASE studentship with Cefas to study *Methods and policy pathways to optimise production of multiple interacting fish stocks*
2016 – 2018	Co-I and WP leader in UKRI/Defra-funded *Marine Ecosystems Research Program – 'Work Package 3' (awarded separately)*, £500k, £55k for QMUL.
2015 – 2018	PI of Cefas Service contract, £75k for QMUL
2014 – 2018	Co-I and WP leader in UKRI/Defra-funded *Marine Ecosystems Research Program*, £4M (£300k for Cefas, £70k for QMUL)
2012 – 2016	EU-FP7 DEVOTES (*Innovative Tools for Understanding and Integrated Assessment of Good Environmental Status (GES) of Marine Waters*), €9M (€560k for Cefas)
2012 – 2017	Co-I for FizzyFish (*Response of ecosystems and fisheries to management in a changing environment*) Defra project to develop management options for fisheries and climate-change impacts, M1228, £1.25M for Cefas
2012 – 2016	Co-PI for MYFISH EU-FP7 collaboration to operationalise Maximum Sustainable Yield, €5M (€220k for QUB)
1998 – 2000	JSPS/Alexander von Humboldt Foundation research fellowship, ¥7,200,000 (≈£50,000)
1994 – 1996	Deutsche Forschungsgemeinschaft: research fellowship

Selected Invited Lectures

2023	Panelist speaking on *Measuring Returns of Nature* at Forestry & Agriculture Investment Summit
2023	Biodiversity Impact Credits direct markets towards rigorous science-based targets for global species extinction risk at all scales, at public workshop A Multidisciplinary Approach to Biodiversity, University of Birmingham.
2022	Ecological structural instability as a pervasive mechanism controlling ecosystem structure and dynamics, at Theo Murphy scientific meeting: Microbial Ecology for Engineering Biology, The Royal Society, Milton Hill House, Oxfordshire.
2020	How Ecological Structural Instability Explains Biodiversity Patterns: Theory and Management Implications. At Genetics, Evolution and Environment Seminar, University College London.
2018	How food webs control biodiversity in aquatic ecosystems. At Swire Institute of Marine Science, University of Hong Kong.
2016	Mechanisms structuring food webs and their quantitative signatures. Ecology & Evolution Seminar, Imperial College, London.
2015	Biodiversity - Function - Emergence. At sFIND workshop, German Centre for Integrative Biodiversity Research (iDiv), Leipzig.
2014	Beyond survival of the fittest: evolutionary adaptation of attack rates and niche widths in food webs. At workshop *Non-adaptive selection: explaining macroecological laws in ecology and evolution*, Ecolé Polytechnique Fédéralee Lausanne, Centre Interfacultaire Bernoulli, Lausanne.
2013	The role of demographic stochasticity for the formation of species. At Institute for Advanced Study, Kyushu University, Fukuoka.
2013	Mechanisms determining biodiversity in food webs. At FroSpects Workshop on Species Interactions and Speciation, Umeå University.

2013 Food webs and biodiversity. At Mathematical Ecology Seminar of Center for Ecological Research, Kyoto University, Kyoto.

2011 A new universal power law emerging in complex food webs. At ICELAB Seminar, Umeå University.

2011 Mechanisms determining biodiversity and dietary diversity in marine food webs. At symposium on *The structure and dynamics of ecological networks* at University of Fribourg.

2011 Applying a realistic food-web model to a real management problem. At symposium on *The structure and dynamics of ecological networks* at University of Fribourg.

2008 The problem of biodiversity. Invited lecture at JST Presto Symposium on Mathematical Sciences towards Environmental Problems, Sapporo.

2008 The physics of food-webs. At Hungarian Academy of Science, Budapest.

2007 Networks of complex evolving autonomes. Invited lecture at NANIA conference, Edinburgh.

2006 Yet another food-web model. Invited lecture at International Conference on Ecological Modelling, Yamaguchi.

2006 Trophic link density, the diet partitioning function, and the search for universality in ecological communities. At Japanese-Korean Joint Meeting for Mathematical Biology, Fukuoka.

2006 Encounters with the statistical mechanics of food webs. Invited lecture at International Symposium on Biodiversity and Dynamics of Communities and Ecosystems: Structures, Processes and Mechanisms, Osaka.

2005 An evolutionary mechanism that reproduces the structure of food-webs. Invited Speaker at annual meeting of Society of Evolutionary Studies of Japan, Sendai. In Japanese.

2005 An evolutionary mechanism reproducing food-web structure. At Japanese Society for Mathematical Biology, Annual Meeting, Yokohama.

2004 A generic scheme for choosing models and characterizations of complex systems. Invited lecture at International Conference on Molecular Simulation-Computational Science Workshop, Tsukuba University.

2003 Synchronization vs linear filtering for extracting phase information from noisy time series. At Society for Industrial and Applied Mathematics, Annual Meeting, Snowbird.

2001 The four capital sins of modelling. Invited lecture at Freiburg Seminar (high-school students), Freiburg. In German.

Recognition

2022	Fellow of the Higher Education Academy
2022	Invitation to a one-month visit at Center for Ecological Research, Kyoto University, Japan, funded by Japan Society for the Promotion of Science (visit cancelled because Japan closed borders due to Omicron)
2020 –	Member of Faculty Opinions
2021	1.5 months visit at Heinrich Heine University Düsseldorf, Germany, funded by Alexander von Humboldt foundation
2021 –	Fellow of UK's Alan Turing Institute
2013	The monograph *Food Webs and Biodiversity: Foundations, Models, Data*, ISBN 9-780470973-55-4, wins PROSE Award in the category "Biological Sciences"
1998	City of Bayreuth: "Best dissertation of the year"
1994 – 1996	DAAD Study Abroad Scholarship
1993 – 1994	Studienstiftung des Deutschen Volkes (German National Merit Foundation): regular fellow

Editorial Work

2015 –	Editor, *Theoretical Ecology*
2008 – 2023	Associate Editor, *The American Naturalist*
2007	Guest editor, Special Section on Current Food-Web Theory in *Ecological Complexity* 5(2), 2008 (together with Katsuhiko Yoshida)

Society Memberships

06/2010 –	British Ecological Society
08/2010 –	International Union for the Conservation of Nature
04/2008 –	The American Society of Naturalists
11/2005 – 01/2007	Ecological Society of Japan
08/2005 – 08/2015	Ecological Society of America
04/2005 – 01/2007	Society of Evolutionary Studies (Japan)
08/2004 – 08/2008	Japanese Society of Mathematical Biology
09/2000 – 10/2008	American Physical Society
02/1999 – 01/2007	Physical Society of Japan
10/1994 – 08/2008	Deutsche Physikalische Gesellschaft

Other Responsibilities

2022 –	Co-founder and co-Lead of the Biodiversity Monitoring and Assessment Interest Group of the AI-centred Alan Turing Institute.
2020 –	Co-founder and Chair of Board of Trustees of International Initiative for Theoretical Ecology (IITE)
2015 – 2018	Expert Advisor to Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), Lead Author of Regional Assessment for Europe and Central Asia
2012 – 2015	UK delegate to the expert group on Food Webs at OSPAR
2012 – 2015	Cefas representative at the Healthy and Biologically Diverse Seas Evidence Group, advising UK governmental agencies
2009 – 2015	UK delegate to the International Council for the Exploration of the Sea (ICES), contributing to numerous working groups and workshops related to marine biodiversity.
2001 – 2003	Guest-speaker program at Center for Data Analysis and Modeling, Freiburg
1996 – 1998	Administration of computing facilities at Department for Theoretical Physics, U Bayreuth

Programming Experience

C, C++, FORTRAN, R, Mathematica, Matlab, Sage, AWK, Perl, Lisp, FOURTH, Assembler.

Contributions to the X.org touchpad driver contained in all major Linux distributions.

Language Skills

German (native), English, Japanese, Portuguese