

Mathematical Models in Ecology and Evolution 2017

Programme

Minisymposia and submitted talk sessions will be in (five or six) parallel sessions. We have six rooms reserved for these talks throughout the conference. Minisymposia have been allocated to time slots and rooms, submitted talks have been allocated to sessions, time slots and rooms.

Monday 10th July

Time	Presentation	Room
08:30	Registration and pre-conference coffee	OTLT
09:00	Welcome: David Bolton (Deputy President, City, University of London) & Mark Broom (City, University of London)	OTLT
09:30	Plenary: Hanna Kokko (University of Zurich)	OTLT
10:30	Coffee Break	Great Hall
11:00	Minisymposium 1A: Collective behaviour and decision-making	A130
11:00	Minisymposium 1B: Complex ecological communities I	A109
11:00	Minisymposium 1C: Evolutionary games I	A110
11:00	Minisymposium 1D: Fitness landscapes	AG03
11:00	Minisymposium 1E: Stochastic spreading processes on networks	AG07b
13:00	Lunch Break	Great Hall
14:15	Submitted talks 2A: Mathematical genetics I	A130
14:15	Submitted talks 2B: Metapopulation models	A109
14:15	Submitted talks 2C: Evolutionary game theory I	A110
14:15	Submitted talks 2D: Life history models	AG03
14:15	Submitted talks 2E: Complex populations and networks	AG07b
16:15	Coffee Break	OTLT foyer
16:45	Plenary: Ross Cressman (Wilfrid Laurier University)	OTLT
17:45	End of day	

Tuesday 11th July

Time	Presentation	Room
08:30	Pre-conference coffee	OTLT
09:00	Plenary: Nuala Sheehan (University of Leicester)	OTLT
10:00	Coffee Break	Great Hall
10:30	Minisymposium 3A: Evolution of collective identity	A130
10:30	Minisymposium 3B: Complex ecological communities II	A109
10:30	Minisymposium 3C: Social evolution in subdivided populations	A110
10:30	Minisymposium 3D: Modelling plankton ecosystems	A111
10:30	Minisymposium 3E: Forecasting cancer evolution I	AG03
10:30	Minisymposium 3F: Evolutionary games II	AG07b
12:30	Posters and Lunch	Great Hall
14:30	Submitted talks 4A: Mathematical genetics II	A130
14:30	Submitted talks 4B: Spatial populations and animal movement I	A109
14:30	Submitted talks 4C: Medical and epidemic models I	A110
14:30	Submitted talks 4D: Population dynamics I	A111
14:30	Submitted talks 4E: Ecosystems	AG03
14:30	Submitted talks 4F: Evolutionary game theory II	AG07b
16:30	Coffee Break	Great Hall
17:00	Posters continued	Great Hall
18:00	Public Lecture: Iain Couzin (University of Konstanz, Max Planck Institute for Ornithology)	OTLT
19:00	Conference reception	OTLT foyer
20:30	End of day	

Wednesday 12th July

Time	Presentation	Room
08:30	Pre-conference coffee	OTLT
09:00	Plenary: Nick Chater (University of Warwick)	OTLT
10:00	Coffee Break	Great Hall
10:30	Minisymposium 5A: Adaptive strategies in ecological networks	A130
10:30	Minisymposium 5B: Forecasting cancer evolution II	A109
10:30	Minisymposium 5C: Game theory and the evolution of cooperation	A110
10:30	Submitted talks 5D: Mathematical genetics III	AG03
10:30	Submitted talks 5E: Hosts, parasites and pests	AG07b
12:30	Lunch Break	Great Hall
13:45	Submitted talks 6A: Evolutionary game theory III	A130
13:45	Submitted talks 6B: Spatial populations and animal movement II	A109
13:45	Submitted talks 6C: Branching processes and inference frameworks	A110
13:45	Submitted talks 6D: Medical and epidemic models II	AG03
13:45	Submitted talks 6E: Population dynamics II	AG07b
15:45	Coffee Break	OTLT foyer
16:15	Plenary: Caroline Colijn (Imperial College London)	OTLT
17:15	Close of conference	OTLT

Plenary speaker titles and abstracts

Iain Couzin

Collective Sensing and Decision-Making in Animal Groups: From Fish Schools to Primate Societies

The extraordinary synchrony of motion exhibited as a flock of birds arcs overhead, or a school of fish turns, as a ripple of light, is captivating. Like some animate fluid the individual organisms appear to move as one, their minds seemingly connected by an invisible network. Professor Couzin's lecture will provide a visual guide to collective animal behavior, using the latest imaging technologies to reveal how and why animals exhibit collective motion, the huge impact swarms have on human life, and the remarkable collective sensing and decision-making capabilities that have arisen in animal groups.

Nick Chater

The biological and social worlds: Compare and contrast

Over many centuries, parallels have been drawn between social and biological phenomena, with insights propagating in both directions. This talk highlights considers some of those parallels: e.g., biological and cultural evolution; and between the emergence of complex coordinated behaviour among biological and social agents. While the parallels are striking, there are also some sharp contrasts between explanation in the biological and social science.

Caroline Colijn

Bacterial Olympics: modelling and detecting competition to control resistance

The rise and spread of antimicrobial resistance (AMR) is one of the most pressing examples of evolution today, as we are threatened with a "post-antibiotic" era of untreatable infectious diseases. Resistance arises following selective pressure from the use of antibiotics. But once resistant strains have emerged, they can circulate alongside their drug-sensitive counterparts. It is not clear whether resistance is best controlled by reducing the selective pressure of antibiotics, or by treating aggressively to reduce opportunities for resistance to emerge.

Modelling must play a central role in answering these questions: the dynamics occur at the scale of whole populations and the time scales are too long for direct experiments. I will argue that the effectiveness of competition amongst the circulating pathogen strains is key to understanding how to control resistance, and I will describe why the whole-population scale is

essential to understanding the future of resistance. I will then move to the challenges of measuring competition. The rise of sequencing technologies present an exciting opportunity to examine the ancestry and evolution of pathogen populations in the recent past and watch as resistance evolves and spreads. I will propose ways to use this rich genomic information to understand and model competition and the future of resistance.

Ross Cressman

The evolution of cooperation: Theory and experiment

Abstract: The evolution of cooperation is still a fundamental puzzle in evolutionary biology and social science. Theory developed for the two-player Prisoners Dilemma (PD) game and Ultimatum Game (UG) or for the multi-player Public Goods Game (PGG) predicts cooperation should not evolve unless there are extending circumstances that favor cooperation such as kin selection, reciprocity (direct or indirect), graph selection, reward and/or punishment, etc. On the other hand, experiments based on these games (with either humans as participants or other species) consistently show some level of cooperation no matter what the circumstances. The theory has been developed and the experiments have been conducted by researchers in many different disciplines over many decades.

The presentation will give an overview of some recent experiments and their related theory. It will also consider in more depth progress in several directions; including the role of peer punishment in the PD game, of institutional reward and punishment in PGG, of the emergence of cooperative communities in UG, and of player control over the number of rounds that they interact with the same individual in repeated two-player games.

Hanna Kokko

Bet-hedging in evolutionary theory

Bet-hedging in biology has been called a seductive explanation, meaning that it is often applied whenever organisms appear to benefit by diversifying their portfolio of actions or traits. The real definition of bet-hedging is more stringent: a bet-hedger enjoys an evolutionary long-term advantage because its traits predict that variance in fitness is reduced (a benefit) while arithmetic fitness falls below that of a baseline (a cost) - where the baseline is a non-bet-hedger. The baseline non-bet-hedger may or may not exist in reality; bet-hedging occurs is a statement that can only be made in a comparative sense (i.e. relative to another strategy). We discuss a few examples: (1) sexual reproduction can be thought of as bet-hedging, but this may apply more strongly against certain types of asexual reproduction than others. In

simple models at least, it is difficult to explain sex purely based on bet-hedging benefits, simply because the expected cost of sex is too large. (2) Dispersal, which is costly (risky) but diversifies the fates of offspring, can be thought of as a bet-hedging strategy. Bet-hedging theory predicts that reducing variance through one route (e.g. dispersal in space, or dispersal in time i.e. dormancy) should reduce selection to reduce it through another alternative (here sex can be thought to be dispersal in identity as an allele ends up in new genetic backgrounds). Against this expectation it is curious to note a pattern in nature: facultatively sexual organisms often undergo sexual life cycles in conditions that also promote dispersal in time or space. I will ask whether we really can explain such positive correlations based on theory.

Nuala Sheehan

Reconstructing Pedigrees from Genetic Marker Data

In theory, estimating the pedigree for a given set of individuals from genetic marker data simply requires consideration of all possible relationships amongst them and then computing the likelihood for each. Due to the large number of possible pedigrees, brute force enumeration rapidly becomes impractical. Existing likelihood-based approaches to pedigree structure estimation are either restricted to small numbers of individuals or else deliver a reconstruction that will probably have high likelihood but is not guaranteed to be optimal. By encoding the pedigree learning problem as an integer linear program, we can efficiently construct large pedigrees with guaranteed maximal likelihood for the standard situation where all individuals are observed at unlinked marker loci, founder genotypes are in Hardy-Weinberg equilibrium and segregation of genes from parents to offspring is Mendelian. Since the simple factorisation of the likelihood in this setting defines a Bayesian network (BN), the reconstruction problem is equivalent to searching for an optimal BN where the search is constrained to BNs that are valid pedigrees.

The more realistic situation, where observed individuals are typically connected by (possibly many) missing individuals poses a far harder problem, however. Such applications will require efficient formulations of general purpose and graph learning algorithms. In particular, a Bayesian approach enabling the incorporation of additional prior information in a principled way would seem appropriate. Some of the issues involved and some proposed approaches to the problem will be discussed.

Session chairs

MONDAY

- 09:30 Plenary: Hanna Kokko (University of Zurich) Vincent Jansen
11:00 Minisymposium 1A: Collective behaviour and decision-making - Thomas Bose, Giovanni Reina and James Marshall
11:00 Minisymposium 1B: Complex ecological communities I - Axel Rossberg
11:00 Minisymposium 1C: Evolutionary games I - Ross Cressman, Vlastimil Krivan
11:00 Minisymposium 1D: Fitness landscapes - Luca Ferretti, Sebastian Matuszewski
11:00 Minisymposium 1E: Stochastic spreading processes on networks - Istvan Kiss
14:15 Submitted talks 2A: Mathematical genetics I Nuala Sheehan
14:15 Submitted talks 2B: Metapopulation models Joel Miller
14:15 Submitted talks 2C: Evolutionary game theory I - Stuart West
14:15 Submitted talks 2D: Life history models Hanna Kokko
14:15 Submitted talks 2E: Complex populations and networks Iain Couzin
16:45 Plenary: Ross Cressman (Wilfrid Laurier University) - Arne Traulsen

TUESDAY

- 09:00 Plenary: Nuala Sheehan (University of Leicester) - Simon Tavaré
10:30 Minisymposium 3A: Evolution of collective identity - Alex Stewart, Joshua Plotkin
10:30 Minisymposium 3B: Complex ecological communities II - Axel Rossberg
10:30 Minisymposium 3C: Social evolution in subdivided populations - Florence Débarre, Jorge Peña
10:30 Minisymposium 3D: Modelling plankton ecosystems - Andrew Morozov
10:30 Minisymposium 3E: Forecasting cancer evolution I - Kit Curtius, Trevor Graham, Weini Huang
10:30 Minisymposium 3F: Evolutionary games II - Ross Cressman, Vlastimil Krivan
14:30 Submitted talks 4A: Mathematical genetics II - Caroline Colijn
14:30 Submitted talks 4B: Spatial populations and animal movement I Stephen Cornell
14:30 Submitted talks 4C: Medical and epidemic models I Ben Allen
14:30 Submitted talks 4D: Population dynamics I Kalle Parvinen
14:30 Submitted talks 4E: Ecosystems - Jon Pitchford
14:30 Submitted talks 4F: Evolutionary game theory II - Rebecca Hoyle
18.00 Public Lecture: Iain Couzin (University of Konstanz) - Roger Crouch

WEDNESDAY

- 09:00 Plenary: Nick Chater (University of Warwick) - Andrea Baronchelli
10:30 Minisymposium 5A: Adaptive strategies in ecological networks - Anje-Margriet Neutel
10:30 Minisymposium 5B: Forecasting cancer evolution II - Kit Curtius, Trevor Graham, Weini Huang
10:30 Minisymposium 5C: Game theory and the evolution of cooperation - Isamu Okada, Tatsuya Sasaki
10:30 Submitted talks 5D: Mathematical genetics III - Reinhard Buerger
10:30 Submitted talks 5E: Hosts, parasites and pests - Rosalyn Rael
13:45 Submitted talks 6A: Evolutionary game theory III - Sergey Gavrilets
13:45 Submitted talks 6B: Spatial populations and animal movement II - Nick Chater
13:45 Submitted talks 6C: Branching processes and inference frameworks Christian Hilbe
13:45 Submitted talks 6D: Medical and epidemic models II - Sandy Anderson
13:45 Submitted talks 6E: Population dynamics II - Steve Baigent
16:15 Plenary: Caroline Colijn (Imperial College London) - Anne Kandler

Minisymposia

1A. Collective Behaviour and Decision-Making.

Organisers: Thomas Bose, Giovanni Reina and James Marshall

Time of session: Monday 11.00

1B and 3B. Coexistence in complex ecological communities (double minisymposium).

Organiser: Axel Rossberg

Time of sessions: Monday 11.00 and Tuesday 10.30

1C and 3F. Evolutionary games (double minisymposium).

Organisers: Ross Cressman, Vlastimil Krivan

Time of sessions: Monday 11.00 and Tuesday 10.30

1D. Fitness landscapes 2.0: Big data and the predictability of evolution.

Organisers: Luca Ferretti, Sebastian Matuszewski

Time of session: Monday 11.00

1E. Stochastic spreading processes on networks.

Organiser: Istvan Kiss

Time of session: Monday 11.00

3A. Evolution of collective identity.

Organisers: Alex Stewart, Joshua Plotkin

Time of session: Tuesday 10.30

3C. Social evolution in subdivided populations: Beyond the usual assumptions.

Organisers: Florence Débarre, Jorge Peña

Time of session: Tuesday 10.30

3D. Recent advances in modelling plankton ecosystems.

Organiser: Andrew Morozov

Time of session: Tuesday 10.30

3E and 5B. Forecasting cancer evolution: combining mathematical modelling and experimental/clinical data (double minisymposium).

Organisers: Kit Curtius, Trevor Graham, Weini Huang

Time of sessions: Tuesday 10.30 and Wednesday 10.30

5A. Adaptive strategies in ecological networks - drivers, dynamic constraints, and the link with data.

Organiser: Anje-Margriet Neutel

Time of session: Wednesday 10.30

5C. The second workshop on new trends in game-theoretical studies on the evolution of cooperation.

Organisers: Isamu Okada, Tatsuya Sasaki

Time of session: Wednesday 10.30

Poster presentations

- P1: Diepreye Ayabina - Detecting disruptive sites in the tuberculosis genome
- P2: Katarina Bodova - Unraveling the F-box - The evolution of F-boxes in non-self recognition self-incompatibility systems
- P3: Atheeta Ching - Diagonal Stability in Lotka-Volterra Systems
- P4: Jacob Dinner O'Sullivan - Spatially explicit theoretical community assembly
- P5: Abeer Elbahrawy - Bitcoin ecology: Quantifying and modelling the long-term dynamics of the cryptocurrency market
- P6: E. Yagmur Erten - Cell-level life history trade-offs under cancer risk
- P7: Lynn Govaert - Partitioning community trait variation into ecological and evolutionary contributions
- P8: Carolina Grejo - Evolution of species: the mutation as a strategy of survival
- P9: Orestes Gutierrez - To what degree are attack rates constrained by ecological and biological factors?
- P10: Jitesh Jhavar - Role of stochasticity in the dynamics of fish schools
- P11: Vincent Keenan - Anomalous invasion speeds in highly polymorphic populations Invasion ecology
- P12: Yoram Louzoun - Commensal pathogens as a source of a coexistence mechanism
- P13: Sebastian Matuszewski - On the (un)predictability of a large intragenic fitness landscape
- P14: Jorge Pena - The economics of egg trading revisited
- P15: Aakanksha Rathore - Spatial dynamics of Blackbuck herds
- P16: Tom Ratz - Adaptive dynamics as a tool to predict when flexible parenting evolves
- P17: Jessie Renton - Evolution in dynamic population structures
- P18: Andrew Rowntree - Stability analysis of Discrete mutualism models with delay
- P19: Zhijun Wu - Equilibrium Distribution of Populations of Biological Species on Networks of Social Sites
- P20: Mark Zimmerman - When to expect predator-prey coevolutionary arms races
- P21: Martina Testori - Psychopathic traits and cooperation in presence of facial feedback in an iterated Prisoner's Dilemma game

Monday 11.00 sessions

Minisymposium 1A: Collective Behaviour and Decision-Making

Room		A130
Andrea Baronchelli	The Spontaneous Emergence of Conventions	11.00
Andreagiovanni Reina	A model of the best-of-N nest-site selection process in honeybees	11.24
Arianna Bottinelli	The breakdown of coordination and the emergence of dangerous collective motions in high-density crowds	11.48
Colin Torney	Cues and collective decision-making in migrating ungulates	12.12
Renaud Bastien	A Simple Model of Collective Behaviour Driven by the Visual Field	12.36

Minisymposium 1B: Coexistence in complex ecological communities I

Room		A109
Geza Meszena	Mathematical niche theory	11.00
Namiko Mitarai	Assembly rules and a minimal theory for invasion and extinction in food webs	11.30
Francesco Carrara	The structure of interactions in microbial microcosms	12.00
Anette Ostling	Emergent structure and dynamics in stochastic, open, competitive communities	12.30

Minisymposium 1C: Evolutionary games I

Room		A110
Mark Broom	Modelling evolution in structured populations using multiplayer games	11.00
Karen Pattni	Evolving multiplayer networks: Modelling the evolution of cooperation in a mobile population	11.24
Rosalyn Rael	Species trait distributions in evolutionarily assembled model food webs	11.48
Li You	Game theory for modeling cancer and its treatment	12.12
Yannick Viossat	Strong forms of non-convergence to evolutionary stable states for all reasonable evolutionary dynamics	12.36

Minisymposium 1D: Fitness landscapes 2.0: Big data and the predictability of evolution

Room		AG03
Thomas Bataillon	Properties of beneficial mutations: fitness landscape models and inference from population genomics data	11.00
Guillaume Achaz	Epistatic constraints in fitness landscapes, theory and practice	11.24
Kristina Crona	Higher Order Epistasis and Evolutionary Dynamics	11.48
Ines Fragata	Sounds of silence: The fitness landscape of synonymous mutations	12.12
Richard Watson	Evolving fitness landscapes: How evolution learns to improve evolvability on rugged fitness landscapes	12.36

Minisymposium 1E: Stochastic spreading processes on networks

Room		AG07b
Chris Overton	Deterministic approximations of stochastic dynamics in evolutionary graph theory	11.00
Joel Miller	Spread of infection in random spatial networks	11.24
Robert Wilkinson	The impact of the infectious period on epidemics	11.48
Luc Berthouze	Impact of higher-order structure on critical behaviour in a complex contagion model	12.12
David Sirl	On a network epidemic model with preventative rewiring	12.36

Monday 14.15 sessions

Submitted talks 2A: Mathematical genetics I

Room		A130
Kevin Gomez	Modeling how selection in one trait interferes with adaptation in another	14.15
Salome Bourg	How evolution draws trade-offs : an evolutionary physiology model	14.35
Yoav Soen	Darwinian Selection Induces Transient Lamarckian Adaptation in a Holobiont Model	14.55
Diogo Santos	From phenotypes to fitness time is relative in evolution	15.15
Belgin Seymenoglu	Invariant manifolds of a model from population genetics	15.35
Matthew Edgington	Engineered underdominance gene drive as a tool for public health and ecology	15.55

Submitted talks 2B: Metapopulation models

Room		A109
Stephen Cornell	Optimal connectivity measures for dynamic landscape metapopulations	14.15
Philip Pollett	Metapopulations in evolving landscapes	14.35
Meike Wittmann	Eco-evolutionary buffering: rapid evolution facilitates regional species coexistence despite local priority effects	14.55
Tommi Mononen	Less severe patch-wise epidemics in dense patch clusters in comparison to sparse areas	15.15
Andrea Baronchelli	Emergence of metapopulations and echo chambers in mobile agents	15.35

Submitted talks 2C: Evolutionary game theory I

Room		A110
Matthijs van Veelen	How to test Hamiltons rule empirically	14.15
Ben Allen	Evolutionary Games on Any Graph	14.35
Shmuel Gal	Using Stochastic Games to model Predator-Prey Search-Pursuit behavior	14.55
Krzysztof Argasinski	Dynamical approach to the game theoretic selection models based on state	15.15
Coralie Fritsch	A numerical approach to determine mutant invasion fitness and evolutionary singular strategies	15.35
Vladimir Svigler	On Arbitrarily Long Periodic Orbits of Evolutionary Games on Graphs	15.55

Submitted talks 2D: Life history models

Room		AG03
Danya Rose	Ecological and social changes affecting human evolution: or grandmothers and long childhood dependency make the human life history	14.15
Ricardo Martinez-Garcia	Lack of ecological and life-history context can create the illusion of microbial social interactions	14.35
Dmitrii Logofet	Polyvariant Ontogeny in Plants: A Primary Role of the Second Positive Eigenvalue	14.55
Yuriy Pichugin	Fragmentation models and the evolution of life cycles	15.15
Simran Sandhu	Using variational principles for modelling self-replicating systems	15.35

Submitted talks 2E: Complex populations and networks

Room		AG07b
Ghjuvan Grimaud	Evolution of metabolic networks under non-balanced growth conditions	14.15
Guy Cooper	The Evolution of the Germ-Soma Divide	14.35
Jessica Barker	Context-dependent communication: costly signaling in a social network can lead to a “poverty trap”	14.55
Arnaud Dragicevic	Spacetime Discounted Value of Network Connectivity	15.15
Hiroshi Toyozumi	The Relatedness in the Field Observations and Computer Simulations: The Bias of the Observation	15.35
Elske van der Vaart	Taking Error Into Account When Fitting Models Using Approximate Bayesian Computation	15.55

Tuesday 10.30 sessions

Minisymposium 3A: Evolution of collective identity

Room		A130
Joshua Plotkin	New perspectives on cooperation in iterated games	10.30
Sergey Gavrilets	Closer than brothers: The evolutionary roots of identity fusion	10.54
Nichola Raihani	Signalling in the evolution of costly social behaviour	11.18
Vincent Jansen	Groups, words and the words that groups use	11.42
Alex Stewart	Group thinking and generosity in the evolution of cooperation	12.06

Minisymposium 3B: Coexistence in complex ecological communities II

Room		A109
Jon Pitchford	The ecological complexity of global macro-economics	10.30
Samraat Pawaar	Metabolic constraints on complex ecosystems	11.00
Gyuri Barabas	The effect of intra- and interspecific competition on coexistence in multispecies communities	11.30
Axel Rossberg	How structural instability of ecological communities manifests in nature	12.00

Minisymposium 3C: Social evolution in subdivided populations: Beyond the usual assumptions

Room		A110
Florence Débarre	Fidelity of parent-offspring transmission and the evolution of social behavior in structured populations	10.30
Charles Mullan	A kin selection perspective on multi-dimensional adaptive dynamics in subdivided Populations	10.54
Hye Jin Park	Ecological feedback on evolutionary spatial dynamics with social dilemmas	11.18
Jorge Peña	Invasion and fixation of nonlinear cooperation in subdivided populations	11.42
Antonio M. M. Rodrigues	Social evolution in a demographic context	12.06

Minisymposium 3D: Recent advances in modelling plankton ecosystems

Room		A111
Aditee Mitra	The New Mixotrophic-Paradigm in Marine Ecology	10.30
Ben Ward	An Efficient Instant Acclimation Approximation of Dynamic Phytoplankton Stoichiometry	11.00
Andrew Morozov	Imperfect prey selectivity of generalist predators promotes biodiversity and irregularity in food webs	11.30
Ivan Sudakov	Large ecosystems in a changing environment: interactions and feedbacks	12.00

Minisymposium 3E: Forecasting cancer evolution: combining mathematical modelling and experimental/clinical data I

Room		AG03
Fabian Theis	Reconstructing branching lineages in single cell genomics	10.30
Sandy Anderson	The Evolution of Colorectal Cancer Under Immune Predation	11.00
Simon Tavare	Inference from cancer sequencing data	11.30
Benjamin Werner	Forecasting resistance evolution in cancer from liquid biopsies	12.00

Minisymposium 3F: Evolutionary games II

Room		AG07b
Ross Cressman	Interaction times change evolutionary outcomes	10.30
Vlastimil Krivan	A game-theoretic approach to modeling foraging dynamics	10.54
Boyu Zhang	Extortion and contribution game: rationality versus fairness	11.18
Fei Xu	Optimal Forager against Ideal Free Distributed Prey	11.42
Jozsef Garay	Sib cannibalism as a mutualism	12.06

Tuesday 14.30 sessions

Submitted talks 4A: Mathematical genetics II

Room		A130
Reinhard Burger	Two-locus clines on the real line with a step environment	14.30
Swati Patel	Recombination rates affect eco-evolutionary feedbacks	14.50
Sviatoslav Rybnikov	Recombination rate coevolution in a quantitative trait model with diploid antagonists	15.10
Alexandre Blanckaert	The resolution of genetic incompatibility in a hybrid population	15.30
Martin Pontz	Evolutionary dynamics in the two-locus two-allele model with weak selection	15.50
Katarina Bodova	A simple approximation for the complex dynamics of quantitative traits	16.10

Submitted talks 4B: Spatial populations and animal movement I

Room		A109
Tahani Al-Karkhi	Pattern formation in a PMZC plankton model	14.30
Linke Potgieter	The development of a spatio-temporal model for investigating biological control release strategies in water hyacinth	14.50
Marie-Caroline Prima	Combining network theory and reaction-advection-diffusion modelling: a mechanistic approach for predicting animal distribution in dynamic environments	15.10
Petr Stehlik	Exponential number of stationary solutions for reaction-diffusion equations on graphs	15.30
Laura Alessandretti	Multi-scale spatio-temporal analysis of Human Mobility	15.50

Submitted talks 4C: Medical and epidemic models I

Room		A110
Christoforos Hadjichrysanthou	Within-host models of influenza A: Can simple mathematical models help?	14.30
Rebecca Chisholm	Infectious diseases dynamics in the presence of asymptomatic infections	14.50
Istvan Kiss	Mean-field Models for non-Markovian Epidemics on Networks	15.10
Ruairi Donnelly	Feedbacks between disease progress and vector aggregation, lessons from plant viruses	15.30
Robin Thompson	Accounting for donor viral diversity gives high estimates of the number of HIV founder virions in recipients	15.50
Shaher Momani	Applications of Fractional Calculus in Biological Systems: Theory and Numerics	16.10

Submitted talks 4D: Population dynamics I

Room		A111
Igor Erovenko	Dynamical Facilitation of the Ideal Free Distribution in Non-Ideal Populations	14.30
Stephen Baigent	The Ideal Free Distribution for Multiple Species	14.50
Halil Egilmez	Modelling seasonal dynamics of bacteria-phage interactions with a temperature-dependent lysogeny	15.10
Caz Taylor	A spatial network model for population dynamics of migratory species	15.30
Yoram Iouzoun	Fluctuations-induced coexistence in public goods dynamics	15.50
Krishna Dasu	Rich dynamics exhibited by predator-prey systems with mutual interference in the presence of inhibitory effect: A detailed theoretical investigation	16.10

Submitted talks 4E: Ecosystems

Room		AG03
Aisling Daly	The impact of resource dependence on the spatial population dynamics of an in silico microbial community	14.30
Thomas Bury	Regime shifts in socio-ecological systems: Silent early warning signals in the natural subsystem	14.50
Farnoush Farahpour	Eco-evolutionary dynamics in interaction space of competitive communities: How diversity emerges and persists	15.10
Surnithra Sankaran	Demographic noise promotes bistability in ecosystems	15.30
Thomas Koffel	A theoretical study of facilitative succession and ecosystem development by nitrogen fixers	15.50

Submitted talks 4F: Evolutionary game theory II

Room		AG07b
Robert Spencer	Modelling kleptoparasitism in an urban gull (Laridae) population	14.30
Esteban Vargas Bernal	Modeling sexual selection in Tungara frog and rationality of mate choice	14.50
Chakib Jerry	Commercial fishing model: Application of differential game theory	15.10
Zhijun Wu	Evolution of Cooperation Between Two Yeast Strains	15.30
Slimane BenMiled	HermaDEB: a model for the energy allocation in Hermaphrodite	15.50
Amira Kebir	When presentism and externalism meet sex changing cost to explain multiple sex change hermaphrodite	16.10

Wednesday 10.30 sessions

Minisymposium 5A: Adaptive strategies in ecological networks - drivers, dynamic constraints, and the link with data

Room		A130
Nicolas Loeuille	Effects of local negative feedbacks on the evolution of species within metacommunities	10.30
Korinna Allhoff	Selective effects of temperature on body size depend on trophic interactions and network position	11.00
Eric Tromeur	Eco-evolutionary consequences of harvesting complex food webs	11.30
Anje-Margriet Neutel	Quantitative feedback analysis as a way to study adaptive strategies in food webs	12.00

Minisymposium 5B: Forecasting cancer evolution: combining mathematical modelling and experimental/clinical data II

Room		A109
Vito Latora	The growth of spatial networks	10.30
Jacob Scott	The game's the thing: how we'll learn the evolution of the king (of maladies)	11.00
Ingmar Glauche	Lessons from clonal dynamics in diseased and non-diseased hematopoiesis	11.30
Marc Williams	Measuring and predicting clonal evolution in human cancers with genomics	12.00

Minisymposium 5C: The second workshop on new trends in game-theoretical studies on the evolution of cooperation

Room		A110
Isamu Okada	Costly reputation systems and the evolution of indirect reciprocity in the donation game	10.30
Hitoshi Yamamoto	Development of a norm ecosystem to understand different roles of social norms in indirect reciprocity	11.00
Christian Hilbe	Why we obscure positive traits and good deeds	11.30
Satosi Uchida	Games with prospect : a simple solution mechanism to social dilemma	12.00

Submitted talks 5D: Mathematical genetics III

Room		AG03
Fabio Chalub	Regularity and time-inhomogeneity in the Wright-Fisher dynamics	10.30
Max Souza	Fixation: The Fingerprint of Evolutionary Processes	10.50
Tadeas Priklopil	When does an invasion of a novel trait imply substitution?	11.10
Daniel Crouch	Statistical aspects of natural selection in relation to the evolution of sexual reproduction	11.30
Yevhen Suprunenko	A new model of isolation-by-distance that overcomes longstanding technical limitations	11.50
Veronica Miro Pina	How does geographic distance translate into genetic distance?	12.10

Submitted talks 5E: Hosts, parasites and pests

Room		AG07b
Fabio Lopes	A stochastic model for immune response with mutations and evolution	10.30
Hanna Schenk	Extinction times in host-parasite dynamics	10.50
Charlotte Ferris	Evolution of host defence in fluctuating environments	11.10
Frithjof Lutscher	Behavioural responses to resource heterogeneity can accelerate biological invasions	11.30
Ross Booton	Modelling immune function, pesticide exposure and infection in honey bee individuals	11.50
Cameline Orlando	The evolution of sheep immunity in response to nematode infection	12.10

Wednesday 13.45 sessions

Submitted talks 6A: Evolutionary game theory III

Room		A130
Caitlin Stern	The dynamics of cooperation when interactions change the rules of the game	13.45
Julian Garcia	Large-scale cooperation and antisocial Punishment	14.05
Peter Czuppon	A spatial model for selection and cooperation	14.25
Rebecca Hoyle	Modelling social influence on cooperation: the public goods game on a multiplex network	14.45
Samuel Levin	The evolution of cooperation in simple molecular replicators	15.05
Jadeep Joshi	Demographic noise and the evolution of tag based cooperation	15.25

Submitted talks 6B: Spatial populations and animal movement II

Room		A109
Jane Shaw MacDonald	Approximating Dispersal Outcomes Using Weighted Mean First Passage Times	13.45
Nurdan Cabukoglu	Animal Diffusion Model Depending on Well-being	14.05
Yi-Shan Wang	Partial differential equation techniques for analysing animal movement: A comparison of three methods	14.25
Jitesh Jhavar	Role of stochasticity in the dynamics of fish schools	14.45
Jonathan Potts	How movement responses can shape demographic dynamics in strongly competing populations	15.05

Submitted talks 6C: Branching processes and inference frameworks

Room		A110
Francisco Richter	Generalizing species diversification models	13.45
Sophie Penisson	A genealogical model for the ancestor paradox	14.05
Anne Kandler	The crucial role of rare variants for inferring transmission processes	14.25
Krzysztof Bartoszek	The Ornstein-Uhlenbeck process modelling evolution of interacting populations	14.45
Cornelia Metzigg	Phylogenetic Branching of Pathogens from Dynamic Host Contact Networks	15.05
Nicola De Maio	The Bacterial Sequential Markov Coalescent	15.25

Submitted talks 6D: Medical and epidemic models II

Room		AG03
Cristian Tomasetti	On the proportion of mutations in cancer due to normal cell division	13.45
Mark Robertson-Tessi	Tumor phenotypic plasticity, natural selection, and the microenvironment: An integrated, multiscale approach to designing better therapies	14.05
Faina Berezovskaya	Predator-Prey-Shared Resource Model in Cancer immunoediting	14.25
Daniel Nichol	Collateral Sensitivity is Contingent on the Repeatability of Evolution	14.45
Weini Huang	Revealing mutant fitness and timing by spatial mixing of sub-clones in tumour	15.05

Submitted talks 6E: Population dynamics II

Room		AG07b
John Donohue	The population-level consequences of protective parenting	13.45
Vincent Keenan	Anomalous invasion speeds in highly polymorphic populations Invasion ecology	14.05
Laurens Kilsdonk	The alternative states of monopolization	14.25
Kalle Parvinen	Environmental dimensionality	14.45
Georgy Karev	From experiment to theory: what can we learn from growth curves?	15.05

Conference delegate list

Guillaume Achaz, Flavio Affinito, Oludare Agboola, Akanksha Akanksha, Laura Alessandretti, Tahani Al-karkhi, Benjamin Allen, Korinna Allhoff, Alexander Anderson, Krzysztof Argasinski, Ben Ashby, Diepreye Ayabina, Stephen Baigent, Joseph Bailey, Gyrgy Barabas, Jessica Barker, Chris Barnes, Andrea Baronchelli, Krzysztof Bartoszek, Renaud Bastien, Thomas Bataillon, Andrew Bate, Joseph Beeken, Slimane Ben Miled, Lee Benson, Faina Berezovskaya, Luc Berthouze, Alexandre Blanckaert, Katarina Bodova, Ross Booton, Thomas Bose, Arianna Bottinelli, Freya Bottom, Salome Bourg, Mark Broom, Reinhard Buerger, Thomas Bury, Nurdan Cabukoglu, Francesco Carrara, Fabio Chalub, Nick Chater, Atheeta Ching, Rebecca Chisholm, Caroline Colijn, Guy Cooper, Stephen Cornell, Iain Couzin, Ross Cressman, Kristina Crona, Daniel Crouch, Javier Cuadrado Corz, Kit Curtius, Peter Czuppon, Aisling Daly, Krishna Kiran Vamsi Dasu, Sai Raghuram Dasu, Nicola De Maio, Florence Debarre, Jacob Dinner O'Sullivan, Ruairi Donnelly, John Donohue, Arnaud Dragicevic, Matthew Edgington, Halil I Egilmez, Abeer Elbahrawy, Natasha Ellison, Aldo Encarnacion, Igor Erovenko, E Yagmur Erten, Farnoush Farahpour, Adrien Faure, Luca Ferretti, Charlotte Ferris, Emma Fox, Ines Fragata, Coralie Fritsch, Shmuel Gal, Jzsef Garay, Julian Garcia, Sergey Gavrilets, Indra Gesink, Ingmar Glauche, Kevin Gomez, Lynn Govaert, Patrick Goymer, Trevor Graham, Devin Greene, Carolina Grejo, Ghjuvan Grimaud, Orestes Gutierrez, Christoforos Hadjichrysanthou, The Anh Han, Christian Hilbe, Rebecca Hoyle, Weini Huang, Peter Hughes, Vincent Jansen, Chakib Jerry, Jitesh Jhawar, Jaideep Joshi, Anne Kandler, Georgiy Karev, Amira Kebir, Vincent Keenan, Sarfraz Khan, Vladimir Khodygo, Laurens Kilsdonk, Istvan Kiss, Thomas Koffel, Hanna Kokko, Sandhyarani Kotapati, Vlastimil Krivan, Vito Latora, Samuel Levin, Dominic Lewis, Magnus Lindh, Remi Lodh, Nicolas Loeuille, Dmitrii O. Logofet, Fabio Lopes, Yoram Louzoun, Frithjof Lutscher, Jane Shaw MacDonald, James Marshall, Ricardo Martinez Garcia, Sebastian Matuszewski, Gza Meszena, Cornelia Metzsig, Milad Miladi, Joel Miller, Vernica Miro Pina, Namiko Mitarai, Aditee Mitra, Shaher Momani, Tommi Mononen, Andrey Morozov, Charles Mullon, Rhys Munden, Richard Muscat, Anje-Margriet Neutel, Daniel Nichol, Isamu Okada, Cameline Orlendo, Annette Ostling, Christopher Overton, Kehinde Owoye, Marina Papadopoulou, Hye Jin Park, Kalle Parvinen, Matishalin Patel, Swati Patel, Karan Pattni, Laura Mihaela Paun, Samraat Pawar, Jorge Pena, Sophie Penisson, Yuriy Pichugin, Jon Pitchford, Joshua Plotkin, Philip Pollett, Martin Pontz, Linke Potgieter, Jonathan Potts, Tadeas Priklopil, Marie-Caroline Prima, Rosalyn Rael, Nichola Raihani, Etienne Rajon, Tom Ratz, Andreagiovanni Reina, Jessie

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