

Evolutionary Transitions in Individuality Workshop (ETI2023)

Monday 22 May 2023 - Friday 26 May 2023

Scientific Programme

Participant Guidelines

Chalk Talks: Presentations are 20 minutes long, including time for discussion. We recommend 12 minutes talks and 6 minutes discussions, keeping 2 minutes for setup). We will provide a blackboard, chalks, pen and paper.

Posters: The poster session is on Tuesday at 5pm, and the posters will be up all week for discussion during coffee breaks. Posters should be in a A0-portrait format.

Contact: Feel free to contact us at workshops@evolbio.mpg.de, christian.bourrat@evolbio.mpg.de or p.bourrat@gmail.com.

Venue: The workshop will be held at the Max Planck Institute for Evolutionary Biology in Plön. Directions are available on the institute's website.

Walk and boat trip: We will have a short walk on the lake shore followed by a boat trip to the restaurant on Wednesday evening. Please bring 6.50€ in cash to cover for the boat ticket.

Farewell Barbecue: We will have a donation-based Farewell barbecue on Friday evening. Other meals and non alcoholic beverages are covered by the workshop.

Offline: The workshop is made to host interactive chalk talks and discussion about ongoing research, which is not well adapted to an hybrid online-offline format. There will be no video transmission of the talks.

Schedule

Monday

16:30 Beginning of the check-in

18:30 Dinner - Lecture hall

19:00 Introduction to the workshop

Tuesday

9:00 Welcome

9:10 **Arne Traulsen** *Growth competition between life cycles characterized by fragmentation patterns*

9:30 **Peter Conlin** *On the entrenchment of multicellularity*

9:50 **Daniel Cooney** *A PDE model for protocell evolution and the origin of chromosomes via multilevel selection*

10:10 **Joanna Summers** *The evolution of developmental regulation in a simple multicellular life cycle*

10:30 Coffee Break

11:00 **Sylvain Charlat** *Evolution in the soup: Can natural selection precede individuation? Part 1*

11:20 **Etienne Rajon** *Evolution in the soup: Can natural selection precede individuation? Part 2*

11:40 **E. Yagmur Erten** *Cancer and evolutionary transition to multicellularity*

12:00 **Phillipe Huneman** *Ecosystems and agents as two sides of a transition*

12:30 Lunch - Cafeteria

13:30 *Group Discussion* - ETI in the abstract: Individuality, Classification, Emergence

15:30 Coffee Break

16:00 *General Discussion* - ETI in the abstract: Individuality, Classification, Emergence

17:00 Poster Session - Lecture hall

18:30 Dinner - Seeprinz (Plön)

Wednesday

9:00 Welcome

9:10 **Tazio Tissot** *Synchronisation of decision behaviours and the transition from individual decisions to collective decisions*

9:30 **Richard Watson** *Higher-level individuality as a product of life-cycle synchronisation*

9:50 **Konstantinos Alexiou** *A Stochastic Multiscale Modelling Framework for the Evolution of Phenotype-Structured Cell Populations.*

10:10 **Renske Vroomans** *Emergent reproductive strategies at the transition to multicellularity*

10:30 Coffee Break

11:00 **Wenyng Shou** *Inheritance of collective-level traits*

11:20 **Jyotsna Kalathera** *Population bottlenecks drive the evolution of distinct life-history strategies in the populations of aggregative multicellular bacterium *Myxococcus xanthus**

11:40 **Ellen Clarke** *Individuals in transition*

12:00 **Paulien Hogeweg** *Who is more "Individual" ? Comparing three major transitions emerging in*

constructive evolutionary computational experiments

12:30 Lunch - Cafeteria

13:30 *Group Discussion* - Diachronic view: Mechanisms of Initiation and Maintenance - Progress of an ETI

15:30 Coffee Break

16:00 *General Discussion* - Diachronic view: Mechanisms of Initiation and Maintenance - Progress of an ETI

16:20 Departure for Fegetasche

17:00 Boat Trip - Boat Pier Fegetasche

18:30 Dinner - Landgasthaus Kasch (Timmendorf bei Malente)

Thursday

9:00 Welcome

9:10 **James Griesemer** *Conceptualizing Dynamic Developmental Scaffolds*

9:30 **Rutger Hermsen** *Emergent multilevel and multiscale selection in a simple spatial model of the evolution of altruism*

9:50 **Enrico Sandro Colizzi** *Evolution of multicellular individuality in antibiotic-producing bacteria*

10:10 **Johannes Martens** *Darwinian indivisibility, egalitarian transitions and the 3-layered model*

10:30 Coffee Break

11:00 **Afra Salazar** *(How) Can we artificially manipulate individuality in multispecies communities?*

11:20 **Christian Kost** *Do obligate dependencies fuel transitions in individuality?*

11:40 General Discussion

12:30 Lunch - Cafeteria

13:30 *Group Discussion* - Viewpoints on ETIs: Ecology, Development, Game Theory, Selection

15:30 Coffee Break

16:00 *General Discussion* - Viewpoints on ETIs: Ecology, Development, Game Theory, Selection

17:00 Wrap-up

18:00 Dinner - Brasserie am Schloss (Plön)

Friday

9:00 Welcome

9:10 **Simon van Vliet** *The role of multilevel selection in the evolution of microbial communities*

9:30 **Jordi van Gestel** *Microbial development*

9:50 **Jessica Flack** *Hourglass Emergence*

10:30 Coffee Break

11:00 *General Discussion* - The future of ETIs as a research field

12:30 Lunch - Cafeteria

13:30 *Group Discussion* - Toward a general theory of ETIs: Conditions, Quantification, Models

15:30 Coffee Break

16:00 *General Discussion* - Toward a general theory of ETIs: Conditions, Quantification, Models

17:00 Wrap-up

18:30 Dinner - Barbecue at the Institute

Poster session

Bram van Dijk *Spatial structure prevents the emergence of virulence in environmentally transmitted microbiomes*

Laura Forero-Junco *The Viral World in the Phyllosphere*

Guilhem Panneau *Microbiome, spatial organization and evolutionary transition of individuality*

Gisela Rodriguez *Short- and long-term strategies for the evolution of a specialized bacteria life cycle*

Alejandra Ramirez *Chaos and noise: disorder in population dynamics*

Tuan Pham *Double-replica theory for evolution of genotype-phenotype interrelationship*

Nikil Sharma *Evolutionary Graph Theory (EGT) aims to understand the interplay of natural selection and genetic drift in spatial structures.*

Nam Le *The Role of Plasticity in the Emergence of New Levels of Biological Individuality*

Group Discussions

Maintenance

Multicellularity

Game Theory view

Neutral processes

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We have compiled and sorted the 50 questions about evolutionary transitions in individuality deemed the most pressing/interesting according to the top-down survey addressed to all participants of the workshop. They will be used as the starting point for the group discussions.

Population Structure scaffolding