

## RISE project 690817: FourCModelling

### Year 4 workshop report

The fourth annual workshop for the FourCModelling project took place at Kasteel Vaalsbroek organised by Maastricht University in the Netherlands on July 8-11, 2019. The workshop again contained a number of central elements, including 25 presentations. There was a focus on integrating the research between the different work packages and how to continue our joint research after the end of the project including new grant applications, as well as on dissemination and communication. Events included:

- (i) specialist sessions on the background and research carried out to date on each of WPs 1-4; as usual these were comprised of a central main talk and associated smaller talks from project participants;
- (ii) sessions including presentations of related work from researchers from outside of the project. This year we had 33 participants in the workshop, including 15 from outside of the project, many of whom had attended previous workshops of ours;
- (iii) three keynote presentations: by Gerardo Chowell-Puente and External Advisory Board members Michael Hochberg and Arne Traulsen;
- (iv) extensive research discussion sessions with a focus on exploring synergies in the project, and the development of research for the unifying WP5, which was the central focus of the meeting;
- (v) the establishment of a Zenodo community for the project and uploading of research articles (a number had been added prior to the meeting, and many more were adding at the meeting, with others to add subsequently);
- (vi) project review including reports from all of the WP coordinators on any issues relating to non-research aspects (and research aspects not already discussed in the main presentations);
- (vii) planning for the close of the grant at the end of 2019, including final plans for the last secondments and budgetary aspects.

A full programme for this event is also attached.

Once again we had an enjoyable and successful meeting, and we would like to thank all of the participants for contributing to our workshop.

**4<sup>th</sup> FourCModelling Workshop**  
**July 8 – July 11, 2019**  
**Castle Vaalsbroek, Vaals, The Netherlands**

**Monday, July 8, 2019**

Chairs: Mark Broom & Kateřina Staňková

09:00 – 09:10	Welcome by Kasteel Vaalsbroek
09:10 – 09:20	Welcome by Mark Broom
09:20 – 10:00	Mark Broom: Modelling evolution in structured populations involving multiplayer interactions (WP1)
10:00 – 10:40	Ross Cressman & Vlastimil Křivan: Evolutionary games with time constraints (WP2)
10:40 – 11:00	<i>Coffee break</i>
11:00 – 11:40	Selcuk Candan and Maria Luisa Sapino: Modeling Complex Dynamic Systems (WP3)
11:40 – 12:20	Joel Brown & Kateřina Staňková: Understanding cancer through evolutionary game theory - we have come a long way (WP4)
12:20 – 13:30	<i>Lunch</i>
13:30 – 13:55	Zhijun Wu: Social Grouping as a Multi-Player Evolutionary Game
13:55 – 14:20	Martina Testori: How do individuals personality traits influence the community survival? An IBM model
14:20 – 15:20	Discussions in groups per workpackage
15:50 – 16:10	<i>Coffee break</i>
16:10 – 17:10	Discussions in groups per workpackage
17:10 – 17:35	Igor Erovenko: The effect of network topology on the evolution of cooperation in a mobile population
17:35 – 18:00	Silvestro Poccia: Frequently Recurring Contextually-Distinct Multi-Variate Motif
18:00 – 20:00	<i>Dinner</i>
20:00 – 21:00	Discussion of the consortium (open to everyone)

**Tuesday, July 9, 2019**

Chairs: Vlastimil Křivan & Maria Luisa Sapino

09:00 – 09:45	Arne Traulsen: Evolutionary dynamics on small networks (keynote)
09:45 – 10:45	Discussion between workpackage groups: WP1 & WP2, WP3 & WP4
10:45 – 11:05	<i>Coffee break</i>
11:05 – 11:30	Fei Xu: Evolutionary prey pairing strategy against optimal foragers
11:30 – 11:55	Monica Salvioli: Honey, I shrunk the cod – Evolutionary management of fisheries
11:55 – 12:20	Katharina Schüller: Surplus ovules permit female choice in oak trees
12:20 – 13:30	<i>Lunch</i>
13:30 – 14:30	Discussion between workpackage groups: WP1 & WP3, WP2 & WP4
14:30 – 14:55	Yuriy Pichugin: Evolution of primitive life cycles
14:55 – 15:20	Yuanxiao Gao: Interacting cells driving the evolution of multicellular life cycles
15:20 – 15:45	Gijs Schoenmakers: Stochastic Game Theory and the 4C's
15:45 – 16:05	<i>Coffee break</i>
16:05 – 17:05	Discussion between workpackage groups: WP1 & WP4, WP2 & WP3
17:05 – 17:30	Johann Bauer: The Stabilisation of Equilibria in Evolutionary Game Dynamics

	through Mutation
17:30 – 17:55	Péter Bayer: Best-response Dynamics in Directed Network Games
18:00 – 20:00	<i>Dinner</i>
20:00 – 21:00	Discussion of consortium (open to everyone)

## Wednesday, July 10, 2019

Chairs: Joel Brown & Ross Cressman

09:00 – 09:45	Michael Hochberg: How Evolution and Environment Shape Cancer (keynote)
09:45 – 10:45	General discussions
10:45 – 11:05	<i>Coffee break</i>
11:05 – 11:30	Jessica Cunningham: Development of Optimized Integrated Metastatic Management for Advanced Prostate Cancer
11:30 – 11:55	Indra Gesink: Mathematical modelling for adaptive cancer treatment
11:55 – 12:20	Yannick Viossat: Simple models of adaptive therapy
12:20 – 13:30	<i>Lunch</i>
13:30 – 14:30	Discussions in groups per workpackage
14:30 – 14:55	Marius Ochea: Imitation Dynamics in Evolutionary Oligopoly Games
14:55 – 15:20	Tamas Varga: A density dependent territorial-nomad model with different territorial strategies
15:20 – 15:45	Jozsef Garay: Kleptoparasitism - Optimal forager faces game theoretical conflict with others
15:45 – 16:05	<i>Coffee break</i>
16:05 – 17:00	Discussing future common research
17:00 – 18:00	Discussions/open access publication
18:00 – 20:00	<i>BBQ</i>

## Thursday, July 11, 2019

Chairs: Mark Broom & Kateřina Staňková

08:45 – 09:30	Gerardo Chowell-Puente: Mathematical modeling to investigate, forecast and control epidemics (keynote)
09:30 – 10:45	General discussions
10:45 – 11:05	<i>Coffee break</i>
11:05 – 12:25	Overview of the results of group discussions
12:20 – 13:30	<i>Lunch</i>
13:30 – 15:45	Discussion: Further grant opportunities
15:45 – 16:05	<i>Coffee break</i>
15:45 – 18:00	Remaining issues to discuss, closing the workshop
18:00 – 20:00	<i>Dinner</i>

### Additional information:

- All talks and main discussion sessions will take place in the meeting room called 'Vaalsbroekerhof'. This meeting room has its own bar, where coffee breaks will take place.
- Wednesday BBQ will take place in 'Tuinkamer' (Garden room). If the weather is fine, we will have the BBQ on the terrace of the Tuinkamer, otherwise we will relocate indoors.
- Breakfasts, lunches, and dinners (except of the BBQ) will take place in the hotel restaurant 'De Kruidentuin'.
- If you get lost somewhere on your way to Vaalsbroek, call Kateřina on 0031646066671.