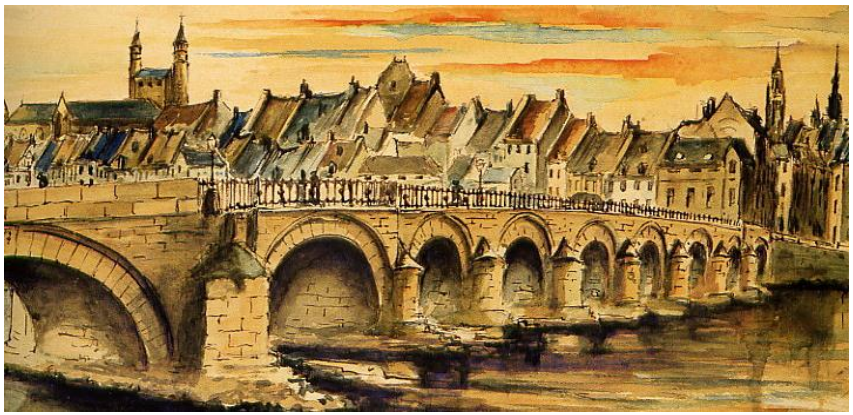
Population Models based on Evolutionary Game Theory



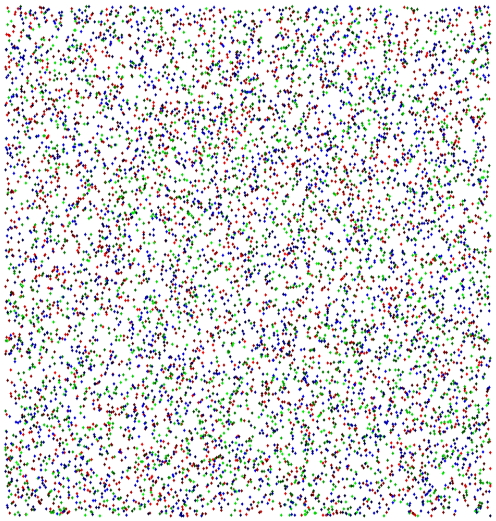
Frank Thuijsman

Area of Expertise

- **Mathematics** of Operations Research
- Stochastic Game Theory (Markov Games)
- Evolutionary Game Theory and Population Dynamics
- Models based on Darwinian fitness maximization
  1. Replicator models with *fitness* changing in time
     - $\dot{p}_k = p_k \left(e_k A p^\top - p A p^\top \right)$
  2. Replicator models with fitness based on many interactions
  3. Replicator models with local interactions in grid space
  4. *Replicator models with local interactions, continuous space*
  5. *Transmission models with local interactions in networks*
  6. Agent based models (used in study on sex choice in wasps)
  7. Theoretical biology (foraging behaviour, tree sex systems)

Global vs. Local Interactions in *Continuous* Space

$$\begin{matrix} & \blacksquare & \blacksquare & \blacksquare \\ \blacksquare \\ \blacksquare \\ \blacksquare \end{matrix} \begin{pmatrix} 2 & 0 & 1 \\ 2.5 & 1 & 0 \\ 0 & 2.5 & 1.5 \end{pmatrix}$$



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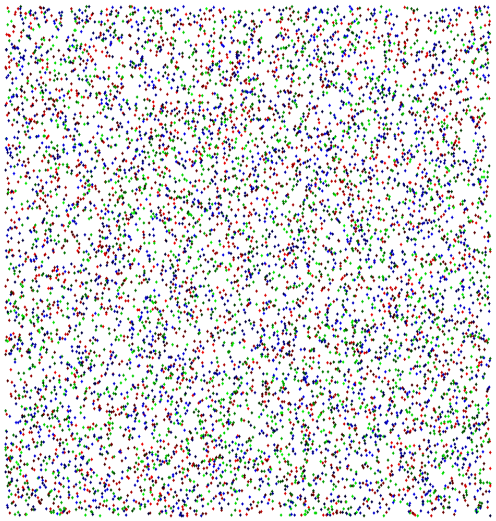
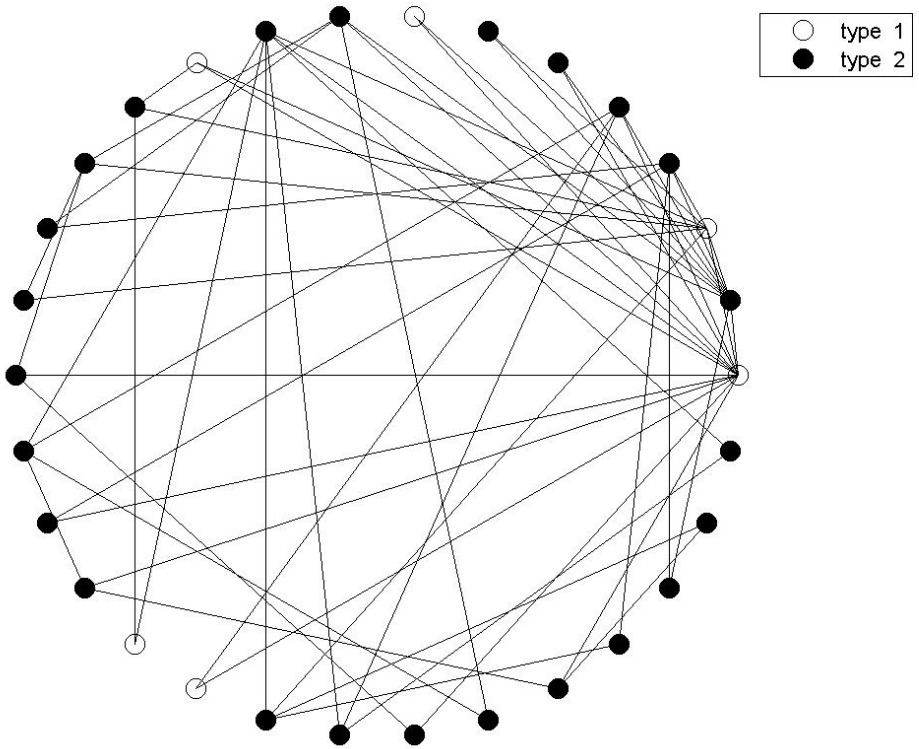


Simulation Study on Spread in Networks



	P	R
P	$6, 6$	$0, 3$
R	$3, 0$	$4, 4$

Initially 20% P, type 1, white

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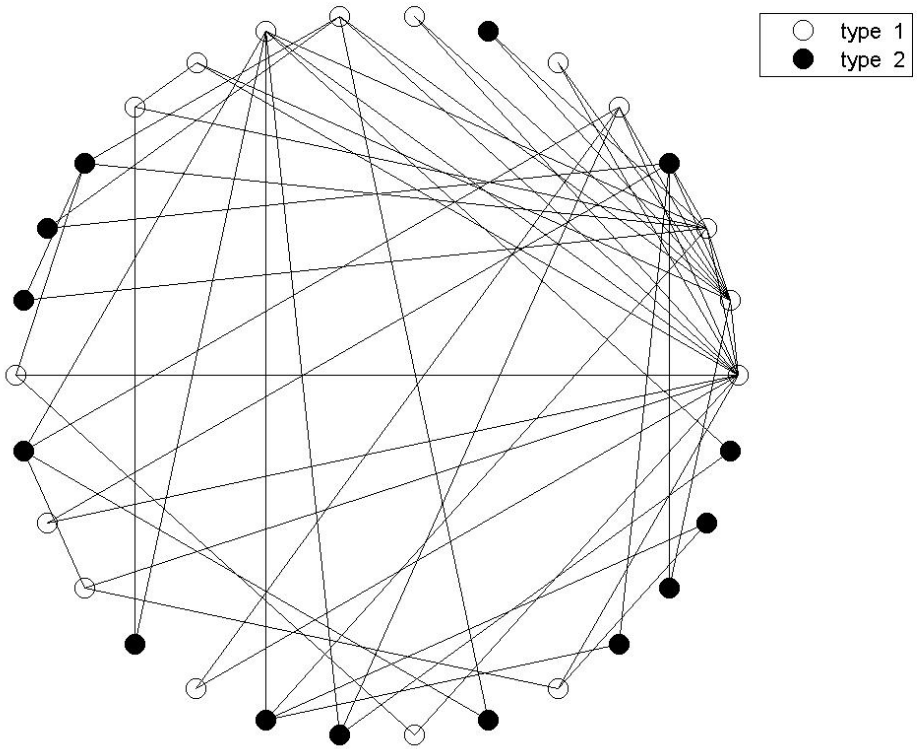

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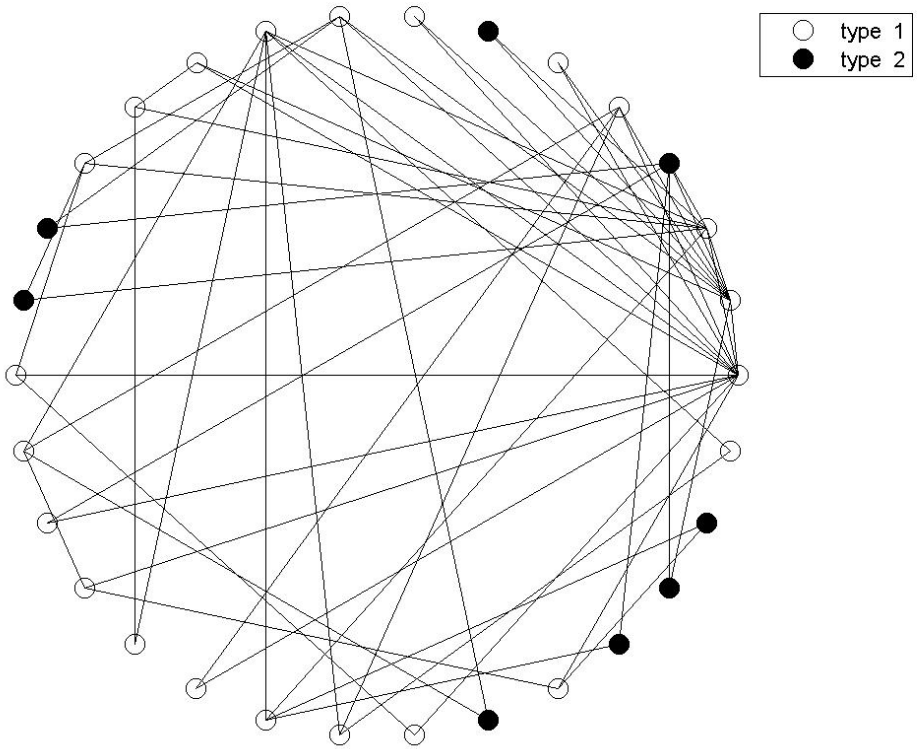

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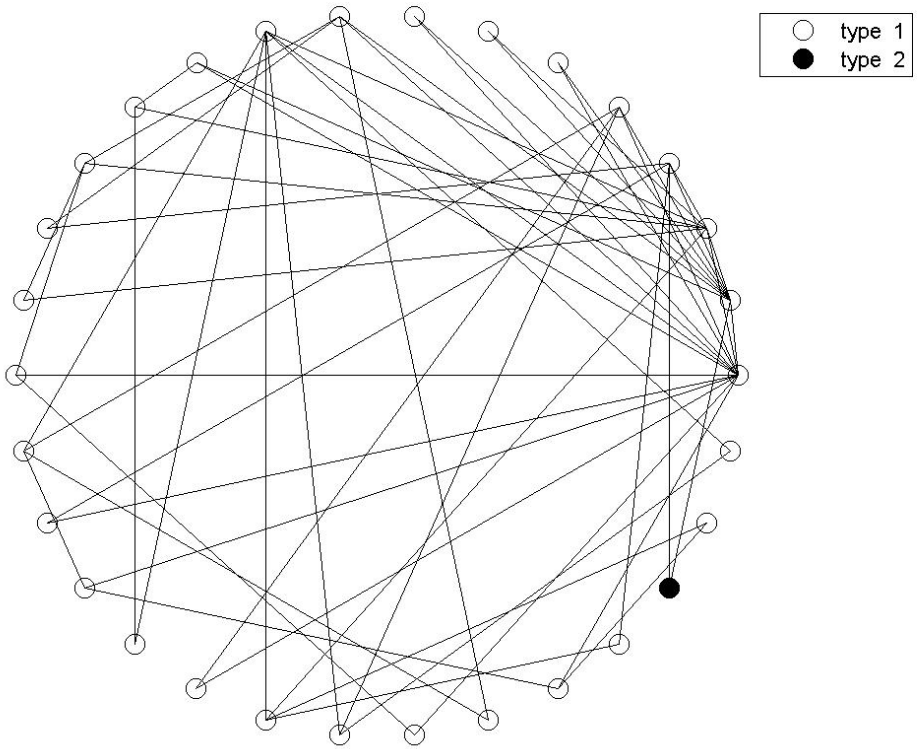

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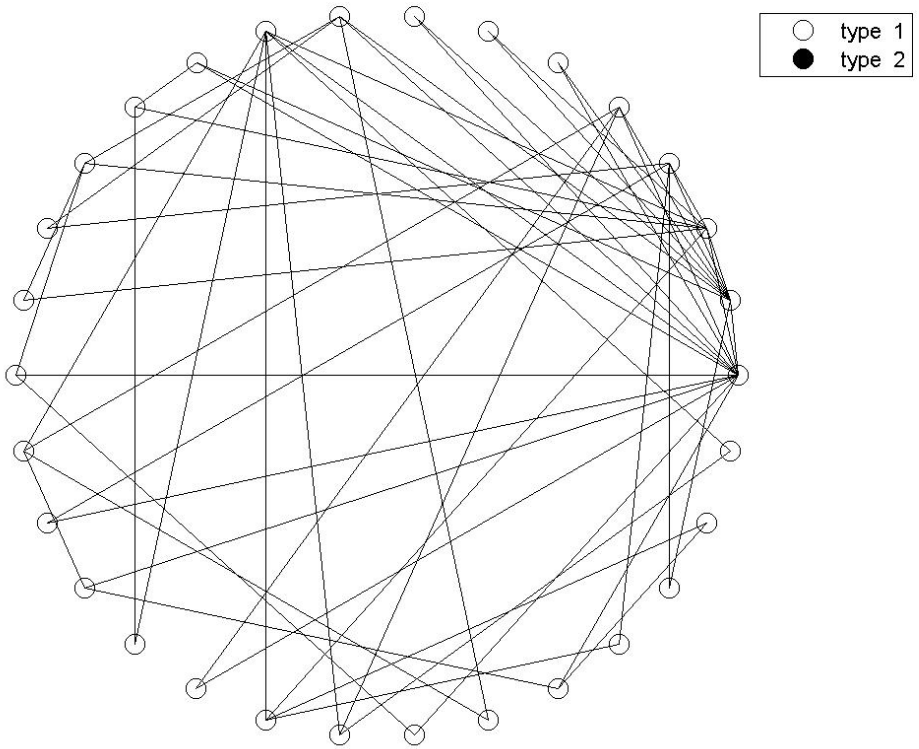

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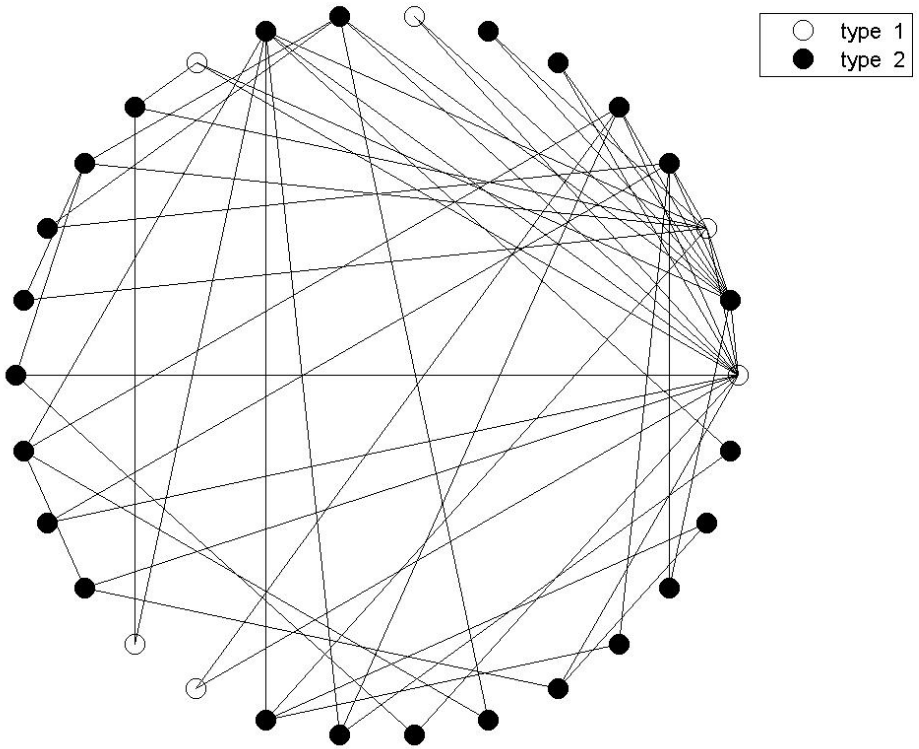

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Regression Analysis
and
Classification Tree Analysis
on millions of networks

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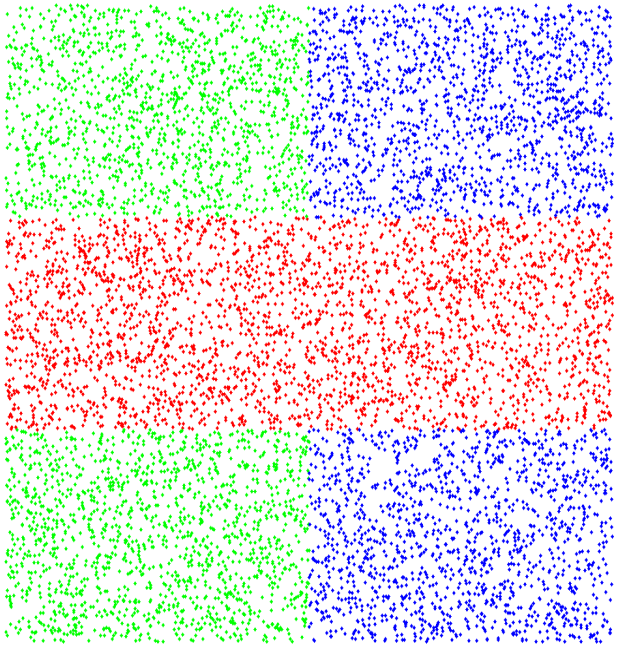
Maastricht Local Interactions Team

- Abhimanyu Khan (SBE)
- Ronald Peeters (DKE)
- Katharina Schüller (DKE)
- Mandy Tak (DKE)
- Philippe Uyttendaele (DKE)
- Li You (DKE)



Thank you for your attention!
Any comment is welcome!
Papers are available!

Slideshows were highly reduced for email distribution!