Network Science (S37)
18 – 22 July 2022

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Saturday 16 & Sunday 17 July 2022		
Time	**Activity**	**Description**
12.00 – 18.00	Key pick up (if you booked housing)	*You will find the exact key pick up location in the pre-departure information, which becomes available after you have paid the course fee.*

Day 1: Introduction to networks and network description

Day	Time	Type	Description	Location
Monday	09:30 - 10:00	Introduction	Introduction to the summer school & getting to know each other	Sjoerd Groenmangebouw, room C020
	10:00 - 11:00	Lecture	Introductions to networks. Types of networks and types of analysis	
	11:00 - 12:30	Computer Lab	Load and visualize networks	
	12:30 – 13:00	Plenary Discussion	Participants and teachers discuss and present their solutions.	
	13:00 – 14:00	Lunch Break	In Educatorium	
	14:00 - 15:00	Lecture	Describing network positions and connection to social science theories	
	15:00 - 16.30	Computer Lab	Calculate centrality measures	
	16:30 - 17:00	Plenary Discussion	Participants and teachers discuss and present their solutions	

Day 2: Network formation models

Day	Time	Type	Description	Location
Tuesday	09:30 - 10:00	Introduction	Recap from previous day	Sjoerd Groenmangebouw, room C020
	10:00 - 11:00	Lecture	Generative models and null models: random graphs, preferential attachment, small-world	
	11:00 - 12:30	Computer Lab	Testing hypothesis and comparing models	
	12:30 – 13:00	Plenary Discussion	Participants and teachers discuss and present their solutions.	
	13:00 – 14:00	Lunch Break	In Educatorium	
	14:00 - 15:00	Lecture	Statistical approaches to network analysis.	
	15:00 - 16.30	Computer Lab	Relational Event Model (REM)	
	16:30 - 17:00	Plenary Discussion	Participants and teachers discuss and present their solutions.	

Day 3: Network inference and machine learning approaches

Day	Time	Type	Description	Location
Wednesday	09:30 - 10:00	Introduction	Recap from previous day	Sjoerd Groenmangebouw, room C020
	10:00 - 11:00	Lecture	Community structure in networks	
	11:00 - 12:30	Computer Lab	Fitting a stochastic block model	
	12:30 – 13:00	Plenary Discussion	Participants and teachers discuss and present their solutions.	
	13:00 – 14:00	Lunch Break	In Educatorium	
	14:00 - 15:00	Lecture	Node embeddings and GNNs	
	15:00 - 16.30	Computer Lab	Link prediction challenge	
	16:30 - 17:00	Plenary Discussion	Participants and teachers discuss and present their solutions	

Day 4: Networks to represent models

Day	Time	Type	Description	Location
Thursday	09:30 - 10:00	Introduction	Recap from previous day	Sjoerd Groenmangebouw, room C020
	10:00 - 11:00	Lecture	Introduction to Probabilistic Graphical Models	
	11:00 - 12:30	Computer Lab	Inferring networks using Graphical LASSO	
	12:30 – 13:00	Plenary Discussion	Participants and teachers discuss and present their solutions.	
	13:00 – 14:00	Lunch Break	In Educatorium	
	14:00 - 15:00	Lecture	Bayesian Networks	
	15:00 - 16.30	Computer Lab	Inferring networks using Bayesian Networks	
	16:30 - 17:00	Plenary Discussion	Participants and teachers discuss and present their solutions.	

Day 5: Dynamics in networks

Day	Time	Type	Description	Location
	09:30 - 10:30	Lecture	Information diffusion in social networks (Simple diffusion model)	Sjoerd Groenmangebouw, room C020
	10:30 - 12:30	Computer Lab	Simulation of simple diffusion and the strength of weak ties	
	12:30 – 13:00	Plenary Discussion	*Participants and teachers discuss and present their solutions.*	
	13:00 – 14:00	Lunch Break	In Educatorium	
	14:00 - 15:00	Lecture	Diffusion of complex behaviour in social networks (Threshold model)	
	15:00 - 16.30	Computer Lab	Simulation of complex behaviour in social networks through seeding	
	16:30 - 17:00	Plenary Discussion	*Participants and teachers discuss and present their solutions.*	