



Network Science (S37)
10 – 14 July 2023

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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 Groenman building room C028
	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: Statistical and machine learning approaches

Day	Time	Type	Description	Location
Tuesday	09:30 - 10:30	Lecture	Statistical Approaches to Network Analysis: REM, ERGM, SOAM.	Sjoerd Groenman building room C028
	10:30 - 12:30	Computer Lab	Relational Event Model (REM)	
	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 3: Network inference/reconstruction

Day	Time	Type	Description	Location
Wednesday	09:30 - 10:30	Lecture	Introduction to Probabilistic Graphical Models	Sjoerd Groenman building room C028
	10:30 - 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 4: Network formation models and community detection

Day	Time	Type	Description	Location
Thursday	09:30 - 10:30	Lecture	Generative models and null models: random graphs, preferential attachment, small-world	Sjoerd Groenman building room C028
	10:30 - 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	Community structure in networks	
	15:00 - 16.30	Computer Lab	Fitting a stochastic block model	
	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 Groenman building room C028
	10:30 - 12:30	Computer Lab	Simulation of simple diffusion and the strength of weak ties	
	12:30 - 13:00	Plenary Discussion	<i>Participants and teachers discuss and present their solutions.</i>	
	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	<i>Participants and teachers discuss and present their solutions.</i>	

For information about the Social Programme, please visit the [Utrecht Summer School website!](#)