## Graphical Models and Causal Inference

## Elina Robeva

- 1. Overview
- 2. Undirected graphical models definitions
- 3. Conditional independence axioms
- 4. Equivalence of definitions, Gaussian distributions
- 5. Properties of Gaussians, Maximum likelihood estimation
- 6. Maximum Likelihood Estimation for Gaussian graphical models
- 7. MLE for Gaussian graphical models; Chordal graphs
- 8. Learning the graph for Gaussian graphical models, Discrete graphical models
- 9. Maximum Likelihood Estimation for Log-linear models
- 10. Learning Undirected Graphs
- 11. Learning Undirected Graphs; Introduction to causality
- 12. Directed graphical models
- 13. Markov equivalence. Directed Gaussian graphical models
- 14. Directed Gaussian graphical models
- 15. Learning directed acyclic graphs from observations
- 16. Structural equation models and interventions
- 17. Identification of causal effects from observations
- 18. Counterfactuals, Instrumental variables, and Linear Causal Models
- 19. Materials

September 4, 2025