

# Economics & Computation

⊕ SS 2018

**Overview session (Vorbesprechung)**

Jan 24, 2018

Florian Brandl

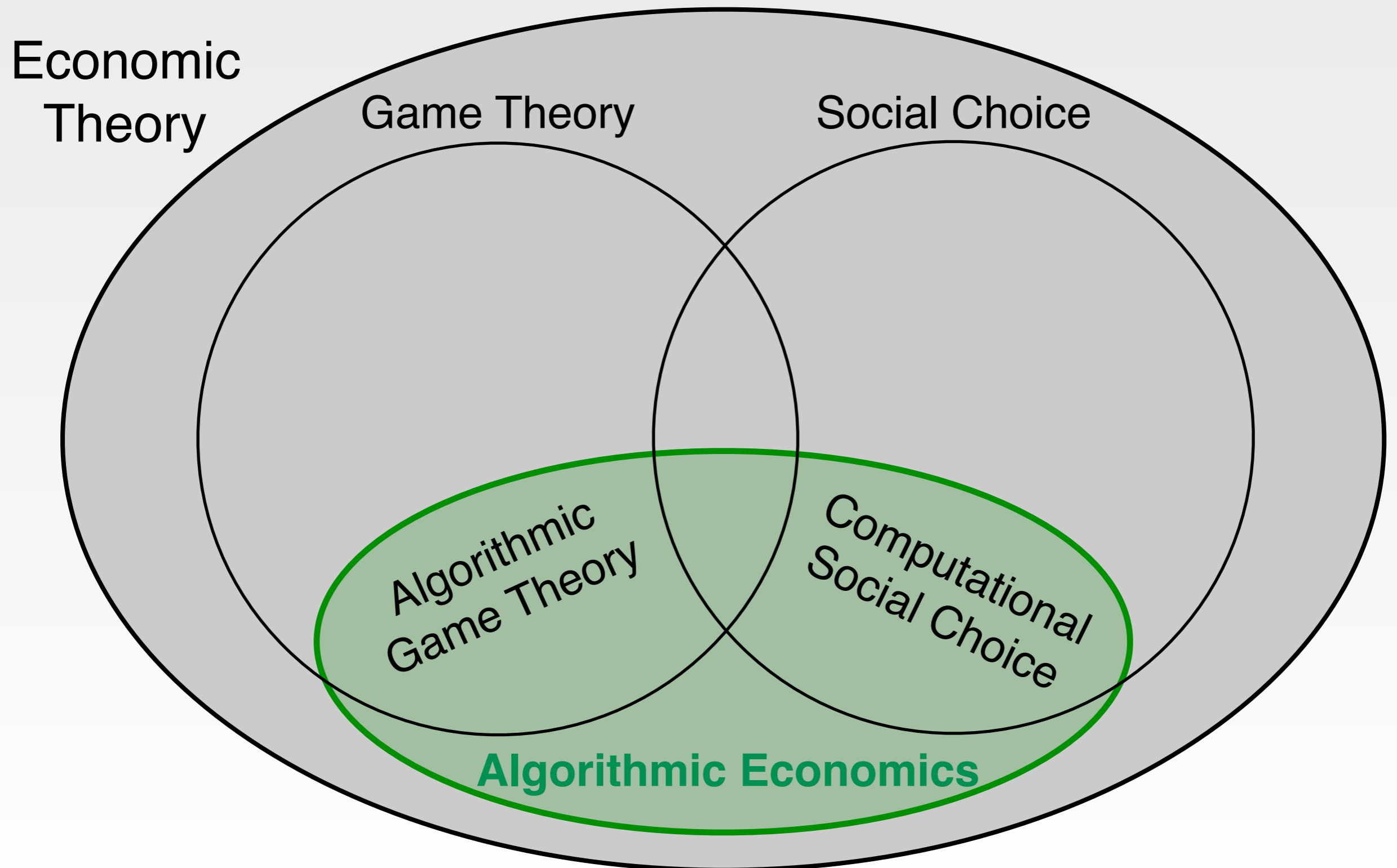
Christian Stricker

# Plan for Today

- Introduction
- Organization of the seminar
- Articles to be chosen from
  - ▶ Mechanism design
  - ▶ (Algorithmic) game theory
  - ▶ Voting theory
  - ▶ Randomized social choice
- Registration/application procedure
- Your questions



# The Big Picture



# Related Courses

- Summer semesters
  - ▶ Course & Tutorial “[Algorithmic Game Theory](#)” (Brandt)
    - Utility theory, normal-form games, stable matchings
  - ▶ Course & Tutorial “[Operations Research \(WI IV\)](#)” (Bichler)
    - Decision theory, linear programming, discrete optimization
  - ▶ Seminar “[Economics and Computation](#)” (Brandt)
    - **Advanced research seminar (master level)**
- Winter semesters
  - ▶ Course & Tutorial “[Computational Social Choice](#)” (Brandt)
    - Rational choice, voting rules, impossibility theorems
  - ▶ Course & Tutorial “[Auction Theory & Market Design](#)” (Bichler)
    - Combinatorial auctions, spectrum license auctions, procurement
  - ▶ Seminar “[Markets, Algorithms, Incentives, and Networks](#)” (Brandt)
    - Introductory seminar (bachelor level)



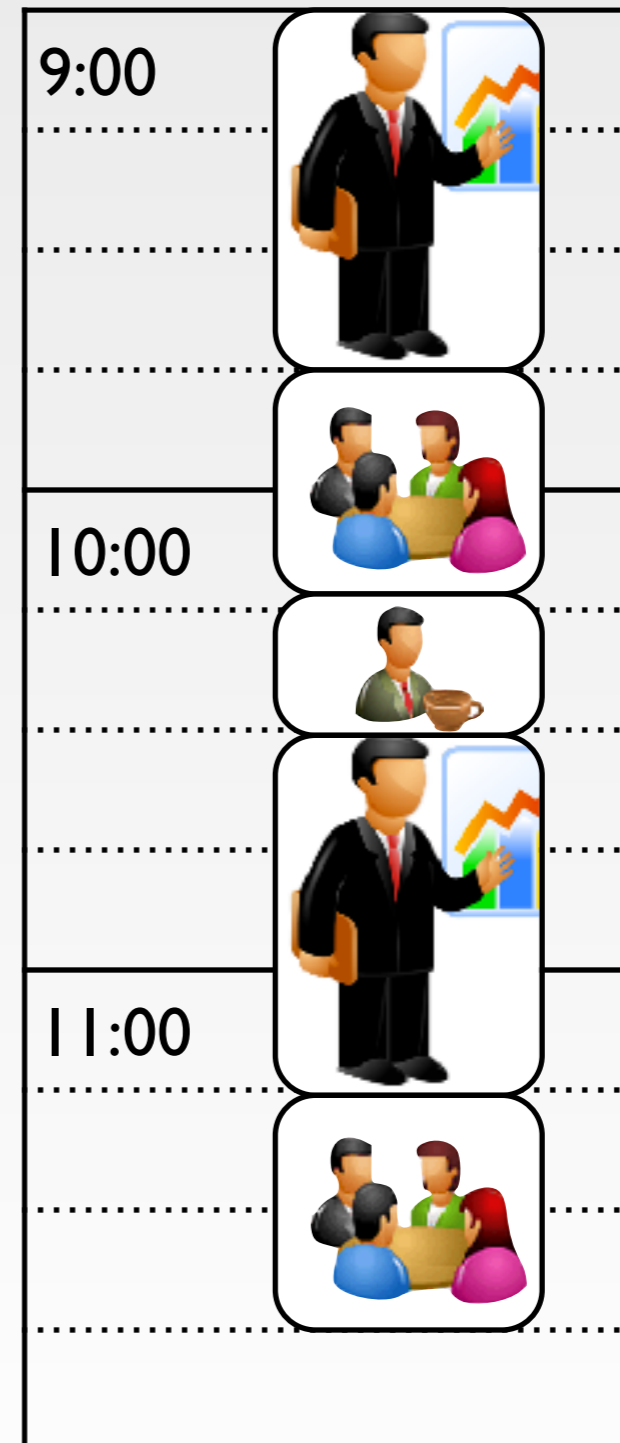
# Dates

Date	Time	Talks	Room
Wed, January 24 ✓	13:00 - 14:00	(overview meeting)	01.10.011
Wed, April 18	13.00 - 14.00	(first meeting)	01.10.033
Wed, May 09	09.00 - 17.00	1 - 5	01.10.033
Fri, June 08	09.00 - 17.00	6 - 10	01.10.033



# Rough Schedule

- First session
  - ▶ Talk (~45 min)
  - ▶ Feedback (~10 min)
  - ▶ Discussions (~20 min)
- Break
- Second session
  - ▶ Talk
  - ▶ Feedback
  - ▶ Discussions



# In order to pass you need to...

- Attend all meetings
  - ▶ You may only be absent if you have a *good* reason
- Write an abstract/hand-out for your talk/topic
  - ▶ To better prepare the audience for your talk
  - ▶ E.g., general introduction, notation, theorem statements
- Read the papers and abstracts of your peers before their talk
  - ▶ Prepare issues for discussion
- Give a good talk (in English)
- Participate in discussions
- Chair a session
  - ▶ Introduce speaker, keep track of time, moderate discussion
  - ▶ More than process moderation



# Do I have to meet my supervisor?

No, but it is **highly recommended**

- 3 weeks before your talk:  
    discuss general plan of abstract & talk
- 1 week before your talk:  
    send slides (if you plan to use slides)
- **You** are the expert on your paper!





# Mechanism Design (1/2)

- A. Abdulkadiroglu and T. Sönmez. **House allocation with existing tenants.** Journal of Economic Theory, 88(2):233–260, 1999.
- A. Abdulkadiroglu and T. Sönmez. **School choice: A mechanism design approach.** American Economic Review, 93(3):729–747, 2003.
- M. Balinski and T. Sönmez. **A tale of two mechanisms: Student placement.** Journal of Economic Theory, 84(1):73–94, 1999.
- S. J. Brams and A. D. Taylor. **An envy-free cake division protocol.** The American Mathematical Monthly, 102(1):9–18, 1995.
- U. Endriss, N. Maudet, F. Sadri, and F. Toni. **Negotiating socially optimal allocations of resources.** Journal of Artificial Intelligence Research, 25:315–348, 2006.
- R. W. Irving. **An efficient algorithm for the “stable roommates” problem.** Journal of Algorithms, 6(4):577–595, 1985.



# Mechanism Design (2/2)

- M. O. Jackson and A. Wolinsky. **A strategic model of social and economic networks.** Journal of Economic Theory, 71(1):44–74, 1996.
- E. Maskin. **Nash equilibrium and welfare optimality.** Review of Economic Studies, 66(26):23–38, 1999.
- N. Nisan and A. Ronen. **Algorithmic mechanism design.** Games and Economic Behavior, 35(1):166–196, 2001.
- A. D. Procaccia and J. Wang. **Fair enough: Guaranteeing approximate maximin shares.** In Proceedings of the 15th ACM Conference on Economics and Computation (ACM-EC), pages 675–692, 2014.
- T. Roughgarden and É. Tardos. **How bad is selfish routing?** Journal of the ACM, 49(2): 236–259, 2002.
- T. Sandholm. **Algorithm for optimal winner determination in combinatorial auctions.** Artificial Intelligence, 135(1–2):1–54, 2002.



# (Algorithmic) Game Theory

- A. Bogomolnaia and M. O. Jackson. **The stability of hedonic coalition structures.** Games and Economic Behavior, 38(2):201–230, 2002.
- X. Deng and C. H. Papadimitriou. **On the complexity of cooperative solution concepts.** Mathematics of Operations Research, 12(2):257–266, 1994.
- D. C. Fisher and J. Ryan. **Optimal strategies for a generalized “scissors, paper, and stone” game.** American Mathematical Monthly, 99(10):935–942, 1992.
- J. Hajduková. **Coalition formation games: A survey.** International Game Theory Review, 8(4):613–641, 2006.
- J. A. Kroll, I. C. Davey, and E. W. Felten. **The economics of Bitcoin mining, or Bitcoin in the presence of adversaries.** In Proceedings of the 12th Workshop on the Economics of Information Security (WEIS 2013), 2013.
- D. Monderer and L. S. Shapley. **Potential games.** Games and Economic Behavior, 14(1):124–143, 1996.



# Voting

- J. Bartholdi, III, C. A. Tovey, and M. A. Trick. **The computational difficulty of manipulating an election.** *Social Choice and Welfare*, 6(3):227–241, 1989.
- F. Brandt and C. Geist. **Finding strategyproof social choice functions via SAT solving.** *Journal of Artificial Intelligence Research*, 55:565–602, 2016.
- V. Conitzer, T. Sandholm, and J. Lang. **When are elections with few candidates hard to manipulate?** *Journal of the ACM*, 54(3), 2007.
- J. Duggan and T. Schwartz. **Strategic manipulability without resoluteness or shared beliefs: Gibbard-Satterthwaite generalized.** *Social Choice and Welfare*, 17(1):85–93, 2000.
- P. Tang and F. Lin. **Computer-aided proofs of Arrow’s and other impossibility theorems.** *Artificial Intelligence*, 173(11):1041–1053, 2009.
- H. P. Young. **Optimal voting rules.** *Journal of Economic Perspectives*, 9(1):51–64, 1995.



# Randomized Social Choice

- S. Barberà. **Majority and positional voting in a probabilistic framework.** Review of Economic Studies, 46(2):379–389, 1979.
- A. Bogomolnaia and H. Moulin. **A new solution to the random assignment problem.** Journal of Economic Theory, 100(2):295–328, 2001.
- P. C. Fishburn. **Probabilistic social choice based on simple voting comparisons.** Review of Economic Studies, 51(167):683–692, 1984.
- P. C. Fishburn. **SSB utility theory: An economic perspective.** Mathematical Social Sciences, 8(1):63–94, 1984.
- A. Gibbard. **Manipulation of schemes that mix voting with chance.** Econometrica, 45(3):665–681, 1977.
- M. D. Intriligator. **A probabilistic model of social choice.** Review of Economic Studies, 40(4):553–560, 1973.



# Registration

- Email to [brandfl@in.tum.de](mailto:brandfl@in.tum.de) **and** [stricker@in.tum.de](mailto:stricker@in.tum.de)
  - ▶ Name, (brief) background (incl. relevant courses), motivation (up to 250 words)
  - ▶ 2 - 5 papers you are interested in (from the list of articles)
    - ▶ Additionally, you can also propose 1 - 2 papers of your own choice
  - ▶ **Rank the seminar** in the matching system (computer science)
- **Deadline: Sunday, January 28, 11:59pm**
  - ▶ Notifications until February 1 (mathematics) and February 21 (computer science) including assignment of papers and supervisors
  - ▶ Registration in TUMonline will be taken care of by the end of February
- Seminar homepage: <http://dss.in.tum.de/teaching>

