

ECON 291: SOCIAL AND ECONOMIC NETWORKS

Contact information.

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Logistics.

Class times: MW (11-1)
Course website: Canvas

Motivation. Social networks pervade our social and economic lives. They play a central role in the transmission of information about job opportunities and are critical to the trade of many goods and services. They are important in determining how diseases spread, which products we buy, which languages we speak, how we vote, as well as whether or not we decide to become criminals, how much education we obtain, and our likelihood of succeeding professionally. The countless ways in which network structures affect our well-being make it critical to understand how social network structures impact behavior, which network structures are likely to emerge in a society, and why we organize ourselves as we do. This course provides an overview and synthesis of research on social and economic networks, drawing on studies by sociologists, economists, computer scientists, physicists, and mathematicians.

Prerequisites. This course is aimed at PhD students and researchers with prior knowledge of statistics/econometrics (e.g., at the first year PhD level) and who are comfortable with matrix algebra and logical proofs. For example, it will be assumed that students are very comfortable with standard concepts from linear algebra, probability theory, regression analysis, hypothesis testing, and Markov chains. Beyond those concepts, the course will be self-contained.

Grading and assignments.

- Two referee reports (20%). Pick two papers from the list below. They are due in pdf format submitted via canvas on April 20 and May 18, before class. No late assignments accepted. The reports have a page limit of 2 pages with at least 1.5 line spacing and one inch margins 12 point spacing. Longer and verbose reports are not better reports. The purpose of a report is to assess the main contribution(s) of the paper: What is (or was at the time of the writing) novel about the contribution(s) and do they provide a sufficiently large advance in our understanding of a topic for publication in a journal (you can specify the journal relative which you are judging the paper)? If there are serious deficiencies in the paper, what are they and how can they be corrected. Also, remember we don't simply judge models by their assumptions (all models are

wrong), but by what we learn from their insights and predictions. And, not all empirical analysis has to be causal. How can the new insights gained from this paper help advance our understanding of the topic?

Please do not collaborate on these. Pick any two, first report due April 20 and second due May 18.

- Beaman, BenYishay, Magruder, and Mobarak (2021) https://faculty.wcas.northwestern.edu/~lab823/BBMM_Jan2021.pdf
- Gallo, Riyanto, Roy, and Teh (2022) <https://arxiv.org/pdf/2203.04001>
- Sadler (2022b) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4032812
- Buhai and van der Leij (2020) <https://arxiv.org/pdf/2004.09293>
- He and Song (2018) <https://arxiv.org/abs/1812.04195>
- Lubold, Chandrasekhar, and McCormick (2020) <https://arxiv.org/abs/2012.10559>

- Presentations (25%):

In about 2/3 of the classes, we will have a conference-format presentation. The idea is to simulate a presentation at an NBER-like conference. One student (the “author”) will present a pre-selected paper from the syllabus (20 minutes). Another student will be a “discussant” (10 minutes). Then we will have a chance for the rest of the audience to ask questions.

We will randomly (with replacement) assign the roles throughout the term, one week in advance of the presentations. The papers that will be presented/discussed are marked with a *PRES*.

- Participation (20%).

- Paper Proposals/White-Paper (35%): Maximum of 8 pages (more is not better).

This is a short research proposal concerning either the empirical analysis of a social or economic network, a theoretical contribution, or a new method. Given the ten week horizon and other assignments in the course, you will not be expected to produce a paper or even a full-length proposal, but rather a brief outline regarding the work that you would conduct: (i) basic motivation of why this is interesting and needed, (ii) a description of the research that would be undertaken, (iii) the methods that would be employed and the challenges that would be faced, and (iv) an outline of what steps would be taken to complete the analysis. Thus, it should be well enough thought out to clear motivate and present the ideas and approach, but not a finished piece of research. This will be due at the end of finals week and *should be no longer than 8 pages* (double spaced with 1 inch margins and 12 point type including any figures and references). For a guide to writing a proposal, see: <http://www.stanford.edu/~jacksonm/nsfpost.pdf> This is more of the length of a whitepaper than

a proposal, but the guide to a proposal will help you identify the things you need to cover.

Other course policies.

- *Students with Documented Disabilities*: Students who may need an academic accommodation based on the impact of a disability must initiate the request with the Office of Accessible Education (OAE). Professional staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is made. Students should contact the OAE as soon as possible since timely notice is needed to coordinate accommodations. The OAE is located at 563 Salvatierra Walk (phone: 723-1066, URL: <http://studentaffairs.stanford.edu/oea>).
- *Late assignments*: Late assignments will not be accepted.

Readings. The readings for this class are research articles, surveys, chapters, and the text: Matthew O. Jackson (2008) *Social and Economic Networks*, Princeton University Press. The starred** readings are ones are very likely to be covered in lectures and others are less likely, but are related and might be covered in the lectures.

The readings with a *PRES* are the ones that will be presented in class.

COURSE OUTLINE.

The course will flow (roughly as follows) – but this is a live document and therefore things are subject to change.

I. Introduction, Fundamentals, Measurements (3 lectures)

- Introduction, Illustrations, Basic Measurements (1 lecture, MJ 3/28)
Examples of Networks, properties
Reading:
 - Jackson (2008) Chapters 1, 2, 3**
 - Jackson (2019)
 - Bearman, Moody, and Stovel (2004)
 - Soramäki, Bech, Arnold, Glass, and Beyeler (2007)
 - Ugander, Karrer, Backstrom, and Marlow (2011)
 - Milgram (1967)
 - Dodds, Muhamad, and Watts (2003)
 - Erdős and Rényi (1959, 1960)
 - Jackson (2008b)
 - Coleman (1988)
 - Jackson, Rodriguez-Barraquer, and Tan (2012)

- Preview of Some Economic Networks and Implications (1 lecture, AC 3/30)
“Some Thoughts on Economic Networks”
Reading:
 - Banerjee, Chandrasekhar, Duflo, and Jackson (2019b)**
- More Measurements, Centrality (1 lecture, MJ 4/4)
Centrality, Friendship Paradox
Readings:
 - Jackson (2008) Chapters 1, 2, 3**
 - Feld (1991)**
 - Borgatti and Everett (1992)
 - Bonacich (1972, 1987)**
 - Jackson (2019b)**
 - Banerjee, Chandrasekhar, Duflo, and Jackson (2013, 2019b)**
 - Kearns, Judd, Tan, and Wortman (2009)**
 - Bloch, Jackson, and Tebaldi (2016)
 - Sadler (2022a)
 - Evtushenko and Kleinberg (2021)

II. Peer Effects (1 lecture)

- Reflection problem, Intransitive triads, Causality, Panel methods, Experiments (1 lecture, AC 4/6)
Readings:
 - Jackson (2008) Chapter 13**
 - Manski (1993)**
 - Bramoullé, Djebbari, and Fortin (2009)
 - Aronow and Samii (2017)
 - Athey, Eckles, and Imbens (2018)
 - Shalizi and Thomas (2011)
 - Manresa (2013)
 - Hampole, Truffa, and Wong (2021)
 - Auerbach (2019)^{PRES}

III. Network Formation (4 lectures)

- Random networks (0.5 lecture MJ 4/11)
Reading
 - Jackson (2008) Chapters 4 and 5**
 - Bollobás (1988)
 - Watts and Strogatz (1998)**
 - Watts (1999)
 - Barabasi and Albert (1999)
 - Albert, Jeong, and Barabási (1999)

- Jackson and Rogers (2007)
- Broido and Clauset (2019)^{PRES}

- Strategic network formation (1.5 lectures MJ 4/11, 4/13)

Reading:

- Jackson (2008) Chapters 6 and 11**
- Jackson and Wolinsky (1996)**
- Bala and Goyal (2000)**
- Herings and Zhan (2021)
- Currarini, Jackson, and Pin (2009, 2010)
- Mele (2017)
- Banerjee, Breza, Chandrasekhar, Duflo, Jackson, and Kinnan (2020)
- Friebel, Lalanne, Richter, Schwardmann, and Seabright (2021)
- Mosleh, Martel, Eckles, and Rand (2021)
- Boucher, Tumen, Vlassopoulos, Wahba, Zenou et al. (2020)
- Olaizola and Valenciano (2014, 2018, 2020, 2021)

- Statistical and econometric models of network formation (2 lectures AC 4/18, 4/20)

Reading:

- Penrose (2003)**
- Bickel and Chen (2009)
- Chatterjee, Diaconis, and Sly (2010)**
- Hoff, Raftery, and Handcock (2002)
- Chatterjee and Diaconis (2013)
- Chandrasekhar (2016)
- Chandrasekhar and Jackson (2016)**
- Leung (2015)
- Leung (2019)
- McCormick and Zheng (2015)
- Breza et al. (2020)**
- Graham (2015, 2017)
- De Paula, Richards-Shubik, and Tamer (2018)
- Mele (2017)
- Badev (2021) Comola and Prina (2021)^{PRES}

IV. Contagion and Diffusion (2 lectures)

- Contagion, SIS, SIR, Bass (1 lecture MJ 4/25)

Reading:

- Jackson (2008) Chapter 7**
- Jackson and Yariv (2011)
- Jackson and Lopez-Pintado (2013)
- Merlino, Pin, and Tabasso (2020)^{PRES}

- Diffusion, Identifying seeds (1 lecture AC 4/27)

Reading:

- Jackson (2008) Chapter 7**
- Golub and Sadler (2016)**
- Banerjee, Chandrasekhar, Duflo, and Jackson (2019b)**
- Beaman, BenYishay, Magruder, and Mobarak (2021)**
- Banerjee, Chandrasekhar, Duflo, and Jackson (2013)**
- Jackson and Storms (2017)
- Akbarpour, Malladi, and Saberi (2017)
- Sadler (2022b)
- Stoica, Han, and Chaintreau (2020)^{PRES}

V. Learning and Information Aggregation (3 lectures)

- Bayesian learning, Boundedly rational learning, (1 lecture, MJ 5/2)

Reading:

- Jackson (2008) Chapter 8**
- Banerjee (1992)**
- Bikhchandani, Hirshleifer, and Welch (1992)**
- Golub and Sadler (2016)**
- Bala and Goyal (1998)**
- DeMarzo, Vayanos, and Zwiebel (2003)
- Acemoglu and Autor (2011)
- Mossel, Sly, and Tamuz (2014)
- Mossel, Mueller-Frank, Sly, and Tamuz (2020)
- Board and Meyer-ter Vehn (2021)
- Bikhchandani, Hirshleifer, Tamuz, and Welch (2021)
- Pedersen (2021)^{PRES}

- Information Aggregation: Frictions and Experiments (1 lecture AC 5/4)
Coarsenings, Complexity, Experimental Evidence of Frictions, Awareness, Endogenous Communication, Reputation and Image Concerns

Reading:

- Sadler (2017)**
- Banerjee, Breza, Chandrasekhar, and Mobius (2019a)**
- Grimm and Mengel (2020)
- Chandrasekhar, Larreguy, and Xandri (2013)
- Mueller-Frank and Neri (2013)
- Banerjee, Breza, Chandrasekhar, and Golub (2018) Gallo et al. (2022)
- García-Jimeno, Iglesias, and Yildirim (2022)^{PRES}

- Speed of Convergence, Information Aggregation (1 lecture MJ 5/9)

Reading:

- Jackson (2008) Chapter 8**
- Golub and Jackson (2010)**
- Golub and Jackson (2012)**
- Mossel, Sly, and Tamuz (2015)
- Kuchler and Stroebele (2021)
- Sethi and Yildiz (2016)
- Jackson, Malladi, and McAdams (2021)
- Mostagir and Siderius (2022b)
- Mostagir and Siderius (2022a)^{PRES}

VI. Games played on networks (3 lectures)

- Games of complements, substitutes (1 lecture MJ 5/11) Reading:
 - Jackson (2008) Chapter 9**
 - Ballester, Calvó-Armengol, and Zenou (2006)**
 - Galeotti, Goyal, Jackson, Vega-Redondo, and Yariv (2010)
 - Jackson and Zenou (2014)**
 - Centola, Eguíluz, and Macy (2007)
 - Centola (2011)
 - Parise and Ozdaglar (2020)
 - Sadler and Golub (2021)^{PRES}
- Informal Insurance, Giving, Reputation (1.5 Lectures AC 5/16, 5/18)
 - Reading:
 - Jackson (2008) Chapter 9**
 - Ligon and Schechter (2012)
 - Ambrus, Mobius, and Szeidl (2014)
 - Ambrus, Mobius, and Szeidl (2014)
 - Jackson, Rodriguez-Barraquer, and Tan (2012)
 - Goeree et al. (2010)
 - Leider et al. (2009)**
 - Breza and Chandrasekhar (2016)**
 - Chandrasekhar, Kinnan, and Larreguy (2018)
 - Bloch, Genicot, and Ray (2008)
 - Eubank, Kronick et al. (2021)^{PRES}
- Public Goods (0.5 Lectures AC 5/18)
 - Bramoullé and Kranton (2007)
 - Galeotti, Goyal, Jackson, Vega-Redondo, and Yariv (2010)
 - Bramoullé and Kranton (2014)
 - Bramoullé, Kranton, and D'amours (2014)
 - Elliott and Golub (2012)
 - Acemoglu, García-Jimeno, and Robinson (2015)^{PRES}

VII. Networked Markets (3 lectures)

- Labor Markets, homophily and inequality (1 lecture MJ 5/23)

Reading:

- Jackson (2008) Chapter 10**
- Granovetter (1973)**
- Montgomery (1991)
- Calvo-Armengol and Jackson (2004, 2007)**
- Bolte, Immorlica, and Jackson (2020)
- Beaman and Magruder (2012)
- Munshi (2003)
- Pallais and Sands (2016)
- Jackson (2021)
- Buhai and van der Leij (2020)
- Egger, Auer, and Kunz (2022)^{PRES}

- Financial Networks (1 lecture AC 5/25)

Reading:

- Allen and Gale (2000)
- Eisenberg and Noe (2001)
- Gai and Kapadia (2010)
- Elliott, Golub, and Jackson (2014)**
- Acemoglu, Ozdaglar, and Tahbaz-Salehi (2015)**
- Jackson and Pernoud (2021a,b,c)**
- Wang (2017)
- Roukny, Battiston, and Stiglitz (2018)
- Gofman (2017)
- Kanik (2020)^{PRES}

- Supply Chains (1 lecture MJ 6/1)

Readings:

- Carvalho and Tahbaz-Salehi (2019)
- Carvalho et al. (2021)
- Acemoglu et al. (2012)
- Chaney (2014)
- Jackson and Kanik (2020)
- Elliott, Golub, and Leduc (2022)^{PRES}
- Elliott and Jackson (2022)

REFERENCES

- Acemoglu, Daron and David Autor. 2011. “Chapter 12 – Skills, Tasks and Technologies: Implications for Employment and Earnings.” *Handbook of Labor Economics* 4B:1043–1171. ([document](#))
- Acemoglu, Daron, Vasco M. Carvalho, Asuman Ozdaglar, and Alireza Tahbaz-Salehi. 2012. “The network origins of aggregate fluctuations.” *Econometrica* 80:1977–2016. ([document](#))
- Acemoglu, Daron, Camilo García-Jimeno, and James A Robinson. 2015. “State capacity and economic development: A network approach.” *American Economic Review* 105 (8):2364–2409. ([document](#))
- Acemoglu, Daron, Asuman Ozdaglar, and Alireza Tahbaz-Salehi. 2015. “Systemic Risk and Stability in Financial Networks.” *The American Economic Review* 105 (2):564–608. ([document](#))
- Akbarpour, Mohammad, Suraj Malladi, and Amin Saberi. 2017. “Diffusion, Seeding and the Value of Network Information.” *mimeo: Stanford University* . ([document](#))
- Albert, Réka, Hawoong Jeong, and Albert-László Barabási. 1999. “Internet: Diameter of the world-wide web.” *nature* 401 (6749):130–131. ([document](#))
- Allen, Franklin. and Douglas Gale. 2000. “Financial Contagion.” *Journal of Political Economy* 108 (1):1–33. ([document](#))
- Ambrus, Attila, Markus Mobius, and Adam Szeidl. 2014. “Consumption Risk-Sharing in Social Networks.” *American Economic Review* 104 (1):149–82. ([document](#))
- Aronow, Peter M and Cyrus Samii. 2017. “Estimating average causal effects under general interference, with application to a social network experiment.” *The Annals of Applied Statistics* 11 (4):1912–1947. ([document](#))
- Athey, Susan, Dean Eckles, and Guido W Imbens. 2018. “Exact p-values for network interference.” *Journal of the American Statistical Association* 113 (521):230–240. ([document](#))
- Auerbach, Eric. 2019. “Testing for Differences in Stochastic Network Structure.” *arXiv preprint arXiv:1903.11117* . ([document](#))
- Badev, Anton. 2021. “Nash equilibria on (un) stable networks.” *Econometrica* 89 (3):1179–1206. ([document](#))
- Bala, V. and S. Goyal. 1998. “Learning from neighbours.” *Review of Economic Studies* 65 (3):595–621. ([document](#))
- . 2000. “A noncooperative model of network formation.” *Econometrica* 68 (5):1181–1229. ([document](#))
- Ballester, C., A. Calvó-Armengol, and Y. Zenou. 2006. “Who’s who in networks, wanted: the key player.” *Econometrica* 74 (5):1403–1417. ([document](#))
- Banerjee, Abhijit, Emily Breza, Arun G Chandrasekhar, and Benjamin Golub. 2018. “When less is more: Experimental evidence on information delivery during India’s demonetization.” Tech. rep., National Bureau of Economic Research, DOI 10.3386/w24679. ([document](#))
- Banerjee, Abhijit, Emily Breza, Arun G. Chandrasekhar, and Markus Mobius. 2019a. “Naive learning with uninformed agents.” Tech. rep., National Bureau of Economic Research, DOI 10.3386/w25497. ([document](#))

- Banerjee, Abhijit, Arun G. Chandrasekhar, Esther Duflo, and Matthew O. Jackson. 2019b. “Using gossips to spread information: Theory and evidence from two randomized controlled trials.” *The Review of Economic Studies* 86 (6):2453–2490. ([document](#))
- Banerjee, Abhijit V. 1992. “A simple model of herd behavior.” *The Quarterly Journal of Economics* :797–817. ([document](#))
- Banerjee, Abhijit V., Emily Breza, Arun G. Chandrasekhar, Esther Duflo, Matthew O. Jackson, and Cynthia Kinnan. 2020. “Changes in Social Network Structure in Response to Exposure to Formal Credit Markets.” *SSRN paper 3245656* . ([document](#))
- Banerjee, Abhijit V., Arun G. Chandrasekhar, Esther Duflo, and Matthew O. Jackson. 2013. “Diffusion of Microfinance.” *Science* 341 (6144):DOI: 10.1126/science.1236498, July 26 2013. ([document](#))
- Barabasi, Albert-Llászlo and Reka Albert. 1999. “Emergence of scaling in random networks.” *Science* 286 (5439):509. ([document](#))
- Beaman, Lori, Ariel BenYishay, Jeremy Magruder, and Ahmed Mushfiq Mobarak. 2021. “Can network theory-based targeting increase technology adoption?” *American Economic Review* 111 (6):1918–43. ([document](#))
- Beaman, Lori A. and Jeremy Magruder. 2012. “Who gets the job referral? Evidence from a social networks experiment.” *American Economic Review* 102 (7):3574–3593. ([document](#))
- Bearman, Peter S., James Moody, and Katherine Stovel. 2004. “Chains of Affection: The Structure of Adolescent Romantic and Sexual Networks.” *American Journal of Sociology* 110:1:44–91. ([document](#))
- Bickel, Peter J and Aiyou Chen. 2009. “A nonparametric view of network models and Newman–Girvan and other modularities.” *Proceedings of the National Academy of Sciences* 106 (50):21068–21073. ([document](#))
- Bikhchandani, Sushil, David Hirshleifer, Omer Tamuz, and Ivo Welch. 2021. “Information cascades and social learning.” Tech. rep., National Bureau of Economic Research. ([document](#))
- Bikhchandani, Sushil, David Hirshleifer, and Ivo Welch. 1992. “A theory of fads, fashion, custom, and cultural change as informational cascades.” *Journal of political Economy* 100 (5). ([document](#))
- Bloch, F., G. Genicot, and D. Ray. 2008. “Informal insurance in social networks.” *Journal of Economic Theory* 143 (1):36–58. ([document](#))
- Bloch, Francis, Matthew O. Jackson, and Pietro Tebaldi. 2016. “Centrality Measures in Networks.” <http://ssrn.com/abstract=2749124> . ([document](#))
- Board, Simon and Moritz Meyer-ter Vehn. 2021. “Learning dynamics in social networks.” *Econometrica* 89 (6):2601–2635. ([document](#))
- Bollobás, Béla. 1988. “The chromatic number of random graphs.” *Combinatorica* 8 (1):49–55. ([document](#))
- Bolte, Lukas, Nicole Immorlica, and Matthew O. Jackson. 2020. “The Role of Referrals in Inequality, Immobility, and Inefficiency in Labor Markets.” *SSRN*: <https://dx.doi.org/10.2139/ssrn.3512293> . ([document](#))

- Bonacich, Philip. 1972. “Factoring and weighting approaches to status scores and clique identification.” *Journal of Mathematical Sociology* 2(1):113–120. ([document](#))
- . 1987. “Power and centrality : a family of measures.” *American Journal of Sociology* 92:1170–1182. ([document](#))
- Borgatti, Stephen P. and Martin G. Everett. 1992. “Notions of position in social network analysis.” *Sociological methodology* :1–35. ([document](#))
- Boucher, Vincent, Semih Tumen, Michael Vlassopoulos, Jackline Wahba, Yves Zenou et al. 2020. “Ethnic mixing in early childhood.” Tech. rep., CEPR Discussion Papers. ([document](#))
- Bramoullé, Y., H. Djebbari, and B. Fortin. 2009. “Identification of peer effects through social networks.” *Journal of Econometrics* 150 (1):41–55. ([document](#))
- Bramoullé, Y. and R. Kranton. 2007. “Risk-sharing networks.” *Journal of Economic Behavior & Organization* 64 (3-4):275–294. ([document](#))
- Bramoullé, Yann and Rachel Kranton. 2014. “Strategic Interaction and Networks.” *American Economic Review* 104:3:898–930. ([document](#))
- Bramoullé, Yann, Rachel Kranton, and Martin D’amours. 2014. “Strategic interaction and networks.” *American Economic Review* 104 (3):898–930. ([document](#))
- Breza, Emily and Arun G. Chandrasekhar. 2016. “Social networks, reputation and commitment: Evidence from a savings monitors experiment.” *National Bureau of Economic Research working paper no 21169* . ([document](#))
- Breza, Emily, Arun G Chandrasekhar, Tyler H McCormick, and Mengjie Pan. 2020. “Using aggregated relational data to feasibly identify network structure without network data.” *American Economic Review* 110 (8):2454–84. ([document](#))
- Broido, Anna D and Aaron Clauset. 2019. “Scale-free networks are rare.” *Nature communications* 10 (1):1–10. ([document](#))
- Buhai, Sebastian and Marco van der Leij. 2020. “A social network analysis of occupational segregation.” *Arxiv* <https://doi.org/10.48550/arXiv.2004.09293> . ([document](#))
- Calvo-Armengol, Antoni and Matthew O. Jackson. 2004. “The effects of social networks on employment and inequality.” *The American Economic Review* 94 (3):426–454. ([document](#))
- . 2007. “Networks in labor markets: Wage and employment dynamics and inequality.” *Journal of Economic Theory* 132 (1):27–46. ([document](#))
- Carvalho, Vasco M, Makoto Nirei, Yukiko U Saito, and Alireza Tahbaz-Salehi. 2021. “Supply chain disruptions: Evidence from the great east japan earthquake.” *The Quarterly Journal of Economics* 136 (2):1255–1321. ([document](#))
- Carvalho, Vasco M and Alireza Tahbaz-Salehi. 2019. “Production networks: A primer.” *Annual Review of Economics* 11:635–663. ([document](#))
- Centola, D. 2011. “An experimental study of homophily in the adoption of health behavior.” *Science* 334(6060):1269–1272. ([document](#))
- Centola, Damon, Víctor M. Eguíluz, and Michael W. Macy. 2007. “Cascade dynamics of complex propagation.” *Physica A: Statistical Mechanics and its Applications* 374 (1):449–456. ([document](#))
- Chandrasekhar, A.G., H. Larreguy, and J.P. Xandri. 2013. “Testing Models of Social Learning on Networks: Evidence from a Framed Field Experiment.” *mimeo: Stanford*

- University* . (document)
- Chandrasekhar, Arun G. 2016. “Econometrics of Network Formation.” *Oxford handbook on the economics of networks*, <https://web.stanford.edu/~arungc/NetworkFormation.pdf> . (document)
- Chandrasekhar, Arun G. and Matthew O. Jackson. 2016. “A network formation model based on subgraphs.” *SSRN paper no 2660381* . (document)
- Chandrasekhar, Arun G, Cynthia Kinnan, and Horacio Larreguy. 2018. “Social networks as contract enforcement: Evidence from a lab experiment in the field.” *American Economic Journal: Applied Economics* 10 (4):43–78. (document)
- Chaney, Thomas. 2014. “The network structure of international trade.” *The American Economic Review* 104 (11):3600–3634. (document)
- Chatterjee, S., P. Diaconis, and A. Sly. 2010. “Random graphs with a given degree sequence.” *Arxiv preprint arXiv:1005.1136* . (document)
- Chatterjee, Sourav and Persi Diaconis. 2013. “Estimating and understanding exponential random graph models.” *The Annals of Statistics* 41 (5):2428–2461. (document)
- Coleman, James S. 1988. “Social Capital in the Creation of Human Capital.” *American Journal of Sociology* 94 (1):S95–S120. (document)
- Comola, Margherita and Silvia Prina. 2021. “Treatment effect accounting for network changes.” *Review of Economics and Statistics* 103 (3):597–604. (document)
- Currarini, Sergio, Matthew O. Jackson, and Paolo Pin. 2009. “An economic model of friendship: Homophily, minorities, and segregation.” *Econometrica* 77 (4):1003–1045. (document)
- . 2010. “Identifying the roles of race-based choice and chance in high school friendship network formation.” *Proceedings of the National Academy of Sciences* 107 (11):4857–4861. (document)
- De Paula, Áureo, Seth Richards-Shubik, and Elie Tamer. 2018. “Identifying preferences in networks with bounded degree.” *Econometrica* 86 (1):263–288. (document)
- DeMarzo, P.M., D. Vayanos, and J. Zwiebel. 2003. “Persuasion Bias, Social Influence, and Unidimensional Opinions*.” *Quarterly journal of economics* 118 (3):909–968. (document)
- Dodds, Peter S., Roby Muhamad, and Duncan J. Watts. 2003. “An Experimental Study of Search in Global Social Networks.” *Science* 301:827–829. (document)
- Egger, Dennis, Daniel Auer, and Johannes Kunz. 2022. “Effects of Migrant Networks on Labor Market Integration, Local Firms and Employees.” *Working Paper* . (document)
- Eisenberg, Larry and Thomas H. Noe. 2001. “Systemic Risk in Financial Systems.” *Management Science* 47:236–249. (document)
- Elliott, M. and B. Golub. 2012. “A Network Approach to Public Goods.” *mimeo: Caltech* . (document)
- Elliott, Matthew, Benjamin Golub, and Matthew O. Jackson. 2014. “Financial Networks and Contagion.” *American Economic Review* 104(10):3115–3153. (document)
- Elliott, Matthew, Benjamin Golub, and Matt V. Leduc. 2022. “Supply network formation and fragility.” *Available at SSRN 3525459* . (document)

- Elliott, Matthew L. and Matthew O. Jackson. 2022. “Globalizing Supply Chains: The Impact on Fragility and Innovation.” *mimeo* . (document)
- Erdős, Paul and Alréd Rényi. 1959. “On random graphs.” *Publ. Math. Debrecen* 6 (290–297):156. (document)
- . 1960. “On the evolution of random graphs.” *Publ. Math. Inst. Hung. Acad. Sci* 5 (1):17–60. (document)
- Eubank, Nicholas, Dorothy Kronick et al. 2021. “Friends Don’t Let Friends Free Ride.” *Quarterly Journal of Political Science* 16 (4):533–557. (document)
- Evtushenko, Anna and Jon Kleinberg. 2021. “The paradox of second-order homophily in networks.” *Scientific Reports* 11 (1):1–10. (document)
- Feld, Scott L. 1991. “Why Your Friends Have More Friends Than You Do.” *American Journal of Sociology* 96:6:1464–1477. (document)
- Friebel, Guido, Marie Lalanne, Bernard Richter, Peter Schwardmann, and Paul Seabright. 2021. “Gender differences in social interactions.” *Journal of Economic Behavior & Organization* 186:33–45. (document)
- Gai, Prasanna and Sujit Kapadia. 2010. “Contagion in financial networks.” *Proceedings of the Royal Society A* 466:2401–2423. (document)
- Galeotti, Andrea, Sanjeev Goyal, Matthew O. Jackson, Fernando Vega-Redondo, and Leeat Yariv. 2010. “Network games.” *Review of Economic Studies* 77:218–244. (document)
- Gallo, Edoardo, Yohanes E Riyanto, Nilanjan Roy, and Tat-How Teh. 2022. “Cooperation and punishment mechanisms in uncertain and dynamic networks.” *arXiv preprint arXiv:2203.04001* . (document)
- García-Jimeno, Camilo, Angel Iglesias, and Pinar Yildirim. 2022. “Information Networks and Collective Action: Evidence from the Women’s Temperance Crusade.” *American Economic Review* 112 (1):41–80. (document)
- Goeree, J.K., M.A. McConnell, T. Mitchell, T. Tromp, and L. Yariv. 2010. “The 1/d law of giving.” *American Economic Journal: Microeconomics* 2 (1):183–203. (document)
- Gofman, Michael. 2017. “Efficiency and stability of a financial architecture with too-interconnected-to-fail institutions.” *Journal of Financial Economics* 124 (1):113–146. (document)
- Golub, Benjamin and Matthew O. Jackson. 2010. “Naive Learning in Social Networks and the Wisdom of Crowds.” *American Economic Journal: Microeconomics* 2 (1):112–149. (document)
- . 2012. “How Homophily Affects the Speed of Learning and Best-Response Dynamics.” *Quarterly Journal of Economics* 127 (3):1287–1338. (document)
- Golub, Benjamin and Evan Sadler. 2016. “Learning in Social Networks.” *The Oxford Handbook of the Economics of Networks*, doi: 10.1093/oxfordhb/9780199948277.013.12 . (document)
- Graham, Bryan S. 2015. “Methods of identification in social networks.” *Annu. Rev. Econ.* 7 (1):465–485. (document)
- . 2017. “An econometric model of network formation with degree heterogeneity.” *Econometrica* 85 (4):1033–1063. (document)

- Granovetter, Mark S. 1973. “The Strength of Weak Ties.” *The American Journal of Sociology* 78 (6):1360–1380. ([document](#))
- Grimm, Veronika and Friederike Mengel. 2020. “Experiments on belief formation in networks.” *Journal of the European Economic Association* 18 (1):49–82. ([document](#))
- Hampole, Menaka, Francesca Truffa, and Ashley Wong. 2021. “Peer effects and the gender gap in corporate leadership: Evidence from MBA students.” <https://www.menakahampole.com/>. ([document](#))
- He, Xiaoqi and Kyungchul Song. 2018. “Measuring diffusion over a large network.” *arXiv preprint arXiv:1812.04195*. ([document](#))
- Herings, P and Yang Zhan. 2021. “The computation of pairwise stable networks.” *Yang, The Computation of Pairwise Stable Networks (February 1, 2021)*. ([document](#))
- Hoff, Peter D., Adrian E. Raftery, and Mark S. Handcock. 2002. “Latent Space Approaches to Social Network Analysis.” *Journal of the American Statistical Association* 97:460:1090–1098. ([document](#))
- Jackson, Matthew O. 2008. *Social and economic networks*. Princeton: Princeton University Press. ([document](#))
- . 2008b. “Average Distance, Diameter, and Clustering in Social Networks with Homophily.” In *the Proceedings of the Workshop in Internet and Network Economics (WINE 2008), Lecture Notes in Computer Science, also: arXiv:0810.2603v1*, edited by C. Papadimitriou and S. Zhang. Springer-Verlag, Berlin Heidelberg. ([document](#))
- . 2019. *The Human Network: How Your Social Position Determines Your Power, Beliefs, and Behaviors*. Pantheon Books: New York. ([document](#))
- . 2019b. “The Friendship Paradox and Systematic Biases in Perceptions and Social Norms.” *Journal of Political Economy* 127 (2):777–818. ([document](#))
- . 2021. “Inequality’s Economic and Social Roots: The Role of Social Networks and Homophily.” *SSRN: https://dx.doi.org/10.2139/ssrn.3795626*. ([document](#))
- Jackson, Matthew O and Zafer Kanik. 2020. “How automation that substitutes for labor affects production networks, growth, and income inequality.” *SSRN https://ssrn.com/abstract=3375523*. ([document](#))
- Jackson, Matthew O. and Dunia Lopez-Pintado. 2013. “Diffusion and Contagion in Networks with Heterogeneous Agents and Homophily.” *Network Science* 1:1:49–67. ([document](#))
- Jackson, Matthew O., Suraj Malladi, and David McAdams. 2021. “Learning Through the Grapevine: The Impact of Noise and the Breadth and Depth of Social Networks.” *SSRN: https://ssrn.com/abstract=3269543*. ([document](#))
- Jackson, Matthew O. and Agathe Pernoud. 2021a. “Systemic Risk in Financial Networks: A Survey.” *Annual Review of Economics* 13:171–202. ([document](#))
- . 2021b. “Credit Freezes, Equilibrium Multiplicity, and Optimal Bailouts in Financial Networks.” *SSRN: https://ssrn.com/abstract=3735251*. ([document](#))
- . 2021c. “Investment Incentives and Regulation in Financial Networks.” *SSRN: https://dx.doi.org/10.2139/ssrn.3311839*. ([document](#))
- Jackson, Matthew O., Tomas R. Rodriguez-Barraquer, and Xu Tan. 2012. “Social Capital and Social Quilts: Network Patterns of Favor Exchange.” *American Economic Review* 102 (5):1857–1897. ([document](#))

- Jackson, Matthew O. and Brian W. Rogers. 2007. “Meeting strangers and friends of friends: How random are social networks?” *The American economic review* 97 (3):890–915. ([document](#))
- Jackson, Matthew O. and Evan C. Storms. 2017. “Behavioral Communities and the Atomic Structure of Networks.” *Arxiv: https://arxiv.org/abs/1710.04656* . ([document](#))
- Jackson, Matthew O. and Asher Wolinsky. 1996. “A Strategic Model of Social and Economic Networks.” *Journal of Economic Theory* 71 (1):44–74. ([document](#))
- Jackson, Matthew O. and Leeat Yariv. 2011. “Diffusion, strategic interaction, and social structure.” *Handbook of Social Economics, San Diego: North Holland, edited by Benhabib, Jess and Bisin, Alberto and Jackson, Matthew O.* . ([document](#))
- Jackson, Matthew O. and Yves Zenou. 2014. “Games on Networks.” *Handbook of Game Theory, Elsevier, edited by Young, H.P. and Zamir, S.* . ([document](#))
- Kanik, Zafer. 2020. “From Lombard Street to Wall Street: systemic risk, rescues, and stability in financial networks.” *Rescues, and Stability in Financial Networks (April 30, 2020) .NET Institute Working Paper, 17-17* . ([document](#))
- Kearns, M.J., S. Judd, J. Tan, and J. Wortman. 2009. “Behavioral Experiments on Biased Voting in Networks.” *PNAS* 106:5:13471352. ([document](#))
- Kuchler, Theresa and Johannes Stroebel. 2021. “Social finance.” *Annual Review of Financial Economics* 13:37–55. ([document](#))
- Leider, Stephen, Markus Mobius, Tanya Rosenblat, and Quoc-Anh Do. 2009. “Directed altruism and enforced reciprocity in social networks.” *Quarterly Journal of Economics* 124:4:1815 – 1851. ([document](#))
- Leung, Michael P. 2015. “Two-step estimation of network-formation models with incomplete information.” *Journal of Econometrics* 188 (1):182–195. ([document](#))
- . 2019. “A weak law for moments of pairwise stable networks.” *Journal of Econometrics* . ([document](#))
- Ligon, Ethan and Laura Schechter. 2012. “Motives for sharing in social networks.” *Journal of Development Economics* 99 (1):13–26. ([document](#))
- Lubold, Shane, Arun G Chandrasekhar, and Tyler H McCormick. 2020. “Identifying the latent space geometry of network models through analysis of curvature.” *National Bureau of Economic Research* . ([document](#))
- Manresa, Elena. 2013. “Estimating the structure of social interactions using panel data.” *Unpublished Manuscript. CEMFI, Madrid* . ([document](#))
- Manski, Charles F. 1993. “Identification of endogenous social effects: The reflection problem.” *The Review of Economic Studies* :531–542. ([document](#))
- McCormick, Tyler H and Tian Zheng. 2015. “Latent surface models for networks using aggregated relational data.” *Journal of the American Statistical Association* 110 (512):1684–1695. ([document](#))
- Mele, Angelo. 2017. “A Structural Model of Segregation in Social Networks.” *Econometrica* 85 (3):825–850. ([document](#))
- Merlino, Luca P, Paolo Pin, and Nicole Tabasso. 2020. “Debunking rumors in networks.” *arXiv preprint arXiv:2010.01018* . ([document](#))
- Milgram, Stanley. 1967. “The small world problem.” *Psychology Today* . ([document](#))

- Montgomery, James D. 1991. "Social networks and labor-market outcomes: Toward an economic analysis." *The American Economic Review* 81 (5):1408–1418. ([document](#))
- Mosleh, Mohsen, Cameron Martel, Dean Eckles, and David G. Rand. 2021. "Shared partisanship dramatically increases social tie formation in a Twitter field experiment." *Proceedings of the National Academy of Sciences* 118 (7). ([document](#))
- Mossel, Elchanan, Manuel Mueller-Frank, Allan Sly, and Omer Tamuz. 2020. "Social learning equilibria." *Econometrica* 88 (3):1235–1267. ([document](#))
- Mossel, Elchanan, Allan Sly, and Omer Tamuz. 2014. "Asymptotic learning on bayesian social networks." *Probability Theory and Related Fields* 158 (1):127–157. ([document](#))
- . 2015. "Strategic learning and the topology of social networks." *Econometrica* 83 (5):1755–1794. ([document](#))
- Mostagir, Mohamed and James Siderius. 2022a. "Learning in a post-truth world." *Management Science* . ([document](#))
- . 2022b. "Naive and Bayesian Learning with Misinformation Policies." *mimeo* . ([document](#))
- Mueller-Frank, Manuel and Claudia Neri. 2013. "Social learning in networks: Theory and experiments." *Available at SSRN 2328281* . ([document](#))
- Munshi, Kaivan. 2003. "Networks in the Modern Economy: Mexican Migrants in the US Labor Market." *Quarterly Journal of Economics* 118 (2):549–599. ([document](#))
- Olaizola, Norma and Federico Valenciano. 2014. "Asymmetric flow networks." *European Journal of Operational Research* 237 (2):566–579. ([document](#))
- . 2018. "A unifying model of strategic network formation." *International Journal of Game Theory* 47 (4):1033–1063. ([document](#))
- . 2020. "Dominance of weighted nested split graph networks in connections models." *International Journal of Game Theory* 49 (1):75–96. ([document](#))
- . 2021. "Efficiency and stability in the connections model with heterogeneous nodes." *Journal of Economic Behavior & Organization* 189:490–503. ([document](#))
- Pallais, Amanda and Emily Glassberg Sands. 2016. "Why the referential treatment? Evidence from field experiments on referrals." *Journal of Political Economy* 124 (6):1793–1828. ([document](#))
- Parise, Francesca and Asuman E Ozdaglar. 2020. "Graphon Games: A Statistical Framework for Network Games and Interventions." *Available at SSRN 3437293* . ([document](#))
- Pedersen, Lasse Heje. 2021. "Game on: Social networks and markets." *Available at SSRN 3794616* . ([document](#))
- Penrose, Mathew. 2003. *Random geometric graphs*, vol. 5. OUP Oxford. ([document](#))
- Roukny, Tarik, Stefano Battiston, and Joseph E Stiglitz. 2018. "Interconnectedness as a source of uncertainty in systemic risk." *Journal of Financial Stability* 35:93–106. ([document](#))
- Sadler, Evan. 2017. "Diffusion games." *SSRN paper 2624865* . ([document](#))
- . 2022a. "Ordinal centrality." *Journal of Political Economy* 130 (4):000–000. ([document](#))
- . 2022b. "Seeding a Simple Contagion." *Available at SSRN 4032812* . ([document](#))

- Sadler, Evan and Benjamin Golub. 2021. “Games on endogenous networks.” *arXiv preprint arXiv:2102.01587* . ([document](#))
- Sethi, Rajiv and Muhamet Yildiz. 2016. “Communication with unknown perspectives.” *Econometrica* 84 (6):2029–2069. ([document](#))
- Shalizi, Cosma Rohilla and Andrew C Thomas. 2011. “Homophily and contagion are generically confounded in observational social network studies.” *Sociological methods & research* 40 (2):211–239. ([document](#))
- Soramäki, Kimmo, Morten L. Bech, Jeffrey Arnold, Robert J. Glass, and Walter E. Beyeler. 2007. “The topology of interbank payment flows.” *Physica A* 379:317–333. ([document](#))
- Stoica, Ana-Andreea, Jessy Xinyi Han, and Augustin Chaintreau. 2020. “Seeding network influence in biased networks and the benefits of diversity.” In *Proceedings of The Web Conference 2020*. 2089–2098. ([document](#))
- Ugander, Johan, Brian Karrer, Lars Backstrom, and Cameron Marlow. 2011. “The Anatomy of the Facebook Social Graph.” <http://arxiv.org/abs/1111.4503v1> . ([document](#))
- Wang, Chaojun. 2017. “Core-periphery trading networks.” *Dissertation, Stanford University* . ([document](#))
- Watts, Duncan J. 1999. *Small worlds: the dynamics of networks between order and randomness*. Princeton: Princeton University Press. ([document](#))
- Watts, Duncan J. and Steven H. Strogatz. 1998. “Collective dynamics of small-world networks.” *Nature* 393 (6684):440–442. ([document](#))