

Introduction to Computational Social Science

Summer Institute in Computational Social Science @ CU Boulder
August 13th, 2018



University of Colorado
Boulder

SICSS

Overview

- What is computational social science?
- Why the Summer Institute in Computational Social Science (SICSS)?
- Logistics: schedule, materials, topics, visiting speakers, feedback



University of Colorado
Boulder

SICSS

What is computational social science?

<https://github.com/compsocialscience/summer-institute/blob/master/2018/materials/day1-intro-ethics/02-intro-computational-social-science.pdf>



University of Colorado
Boulder

SICSS

What is computational social science?

“Anything that is cool” - Matt Salganik

<https://github.com/compsocialscience/summer-institute/blob/master/2018/materials/day1-intro-ethics/02-intro-computational-social-science.pdf>



University of Colorado
Boulder

SICSS

Case Study #1

ECONOMICS

Predicting poverty and wealth from mobile phone metadata

Joshua Blumenstock,^{1*} Gabriel Cadamuro,² Robert On³

Science, 350(6264), 1073-1076, 2015

<https://github.com/compsocialscience/summer-institute/blob/master/2018/materials/day1-intro-ethics/02-intro-computational-social-science.pdf>



University of Colorado
Boulder

SICSS

Case Study #2

Forecasting elections with non-representative polls

Wei Wang^{a,*}, David Rothschild^b, Sharad Goel^b, Andrew Gelman^{a,c}

^a Department of Statistics, Columbia University, New York, NY, USA

^b Microsoft Research, New York, NY, USA

^c Department of Political Science, Columbia University, New York, NY, USA

International Journal of Forecasting, 31(3), 980-991, 2015



University of Colorado
Boulder

SICSS

Case Study #3

REPORTS

Experimental Study of Inequality and Unpredictability in an Artificial Cultural Market

Matthew J. Salganik,^{1,2*} Peter Sheridan Dodds,^{2*} Duncan J. Watts^{1,2,3*}

Science, 311(5762), 854-856, 2006



University of Colorado
Boulder

SICSS

What is computational social science?

- Often involves ethical/privacy questions that are now considered complex
- Combines *readymades* and *custommades* (Salganik 2017)
- Involves five key communities: social science, data science, business people, privacy advocates, policy makers

<https://github.com/compsocialscience/summer-institute/blob/master/2018/materials/day1-intro-ethics/02-intro-computational-social-science.pdf>



University of Colorado
Boulder

SICSS

What is computational social science to you?

The Fringe Effect: Civil Society Organizations and the Evolution of Media Discourse about Islam since the September 11th Attacks

Christopher A. Bail^a

Computational Social Science

David Lazer,¹ Alex Pentland,² Lada Adamic,³ Sinan Aral,^{2,4} Albert-László Barabási,⁵ Devon Brewer,⁶ Nicholas Christakis,¹ Noshir Contractor,⁷ James Fowler,⁸ Myron Gutmann,³ Tony Jebara,⁹ Gary King,¹ Michael Macy,¹⁰ Deb Roy,² Marshall Van Alstyne^{2,11}

Using Facebook ad data to track the global digital gender gap

Masoomali Fatehkia ^a, Ridhi Kashyap ^{b,*}, Ingmar Weber ^c

Big Data,
Digital Media,
and
Computational
Social Science:
Possibilities and
Perils

By
DHAVAN V. SHAH,
JOSEPH N. CAPPELLA,
and
W. RUSSELL NEUMAN

“Voters of the Year”: 19 Voters Who Were Unintentional Election Poll Sensors on Twitter

William Hobbs, Lisa Friedland, Kenneth Joseph, Oren Tsur, Stefan Wojcik, David Lazer

Birds of the Same Feather Tweet Together: Bayesian Ideal Point Estimation Using Twitter Data

Pablo Barberá

Creating Social Contagion Through Viral Product Design: A Randomized Trial of Peer Influence in Networks

Sinan Aral, Dylan Walker

Impact of heterogeneity and socioeconomic factors on individual behavior in decentralized sharing ecosystems

Arnaud Gavaldà-Miralles^{a,b,c}, David R. Choffnes^d, John S. Otto^e, Mario A. Sánchez^e, Fabián E. Bustamante^e, Luís A. N. Amaral^{c,f,g,h}, Jordi Duch^{a,1}, and Roger Guimerà^{b,i}

Women through the glass ceiling: gender asymmetries in Wikipedia

Claudia Wagner^{1,2*} , Eduardo Graells-Garrido³, David Garcia⁴ and Filippo Menczer⁵



University of Colorado
Boulder

SICSS

Social scientists ↔ Data / computer scientists

Computer science	Social science
Study anything	Study social things
Methods driven	Question driven
Large found data	Small designed data
Prediction	Explanation

http://videolectures.net/icml2015_wallach_social_science/
<https://github.com/compsocialscience/summer-institute/blob/master/2018/materials/day1-intro-ethics/02-intro-computational-social-science.pdf>



University of Colorado
Boulder

SICSS

Why SICSS?

- Goal #1: Provide state of the art training
- Goal #2: Challenge disciplinary divides
- Goal #3: Reach a broad audience
- Goal #4: Open-source
- Goal #5: Teach the Teachers

https://cbail.github.io/Why_SICSS.html#/



University of Colorado
Boulder

SICSS

Schedule & Materials

- Online: <https://compsocialscience.github.io/summer-institute/2018/boulder/#schedule>
- Topics:
 - Ethics (Brian)
 - Collecting Digital Trace Data (Allie & Yotam)
 - Network Analysis (Aaron & Dan)
 - Automated Text Analysis (Allie & Brian)
 - Experiments & Causal Inference (Brian & Amanda)
- Organized around skill-based lectures, small group activities, and research talks



University of Colorado
Boulder

SICSS

Schedule & Materials

Discuss -sion	Lectures & Group Activities	Research Talks
Discuss -sion	Lectures & Group Activities	Research Talks
Discuss -sion	Lectures & Group Activities	Research Talks
Discuss -sion	Lectures & Group Activities	Research Talks
Discuss -sion	Lectures & Group Activities	Research Talks

Materials for the group activities and slides will be posted the day of:

[https://compsocialscience.github.io/
summer-institute/2018/boulder/
#schedule](https://compsocialscience.github.io/summer-institute/2018/boulder/#schedule)



University of Colorado
Boulder

SICSS

Speakers



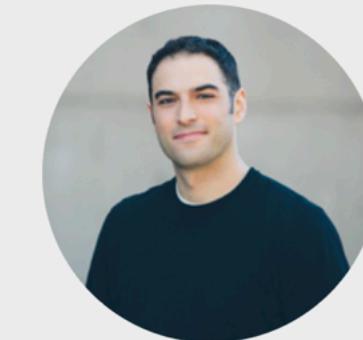
Aaron Clauset

Aaron Clauset is an Assistant Professor in the Department of Computer Science and the BioFrontiers Institute at the University of Colorado Boulder, and is External Faculty at the Santa Fe Institute. He received a PhD in Computer Science, with distinction, from the University of New Mexico, a BS in Physics, with honors, from Haverford College, and was an Omidyar Fellow at the prestigious Santa Fe Institute. In 2016, he was awarded the Erdos-Renyi Prize in Network Science. Clauset is an internationally recognized expert on network science, computational social science, and machine learning for complex systems. His work has appeared in many prestigious scientific venues, including Nature, Science, PNAS, JACM, WWW, ICWSM, STOC, SIAM Review, and Physical Review Letters. His work has also been covered in the popular press by the Wall Street Journal, The Economist, Discover Magazine, New Scientist, Wired, Miller-McCune, the Boston Globe and The Guardian.



Yotam Shmargad

Yotam Shmargad is a computational social scientist with an interest in political networks and privacy. In his research, he runs experiments, links and analyzes large datasets, and uses natural experiments to study how digital media augment the patterns of connectivity between people – the size, density, and diversity of our social networks – and the implications that these bigger networks have for our social and political lives. Shmargad's recent projects look at how political candidates can overcome financial shortcomings with Twitter, and how the partisan composition of one's social network influences the information they choose to share online. Before joining the University of Arizona as an Assistant Professor, Shmargad received his PhD in Marketing from Northwestern University's Kellogg School of Management. He holds an MS in Operations Management from Columbia University and a BS in Mathematics from UCLA.



Jake Hofman

Jake Hofman is a Senior Researcher at Microsoft Research in New York City, where he works in the field of computational social science. Prior to joining Microsoft, he was a Research Scientist in the Microeconomics and Social Systems group at Yahoo! Research. He holds a B.S. in Electrical Engineering from Boston University and a Ph.D. in Physics from Columbia University. He is an Adjunct Assistant Professor of Applied Mathematics and Computer Science at Columbia University and runs Microsoft's Data Science Summer School to promote diversity in computer science. His work has been published in journals such as Science, Proceedings of the National Academy of Sciences, and Management Science, and has been featured in popular outlets including The New York Times, The Wall Street Journal, The Financial Times, and The Economist.



Daniel Larremore

Daniel Larremore is an Assistant Professor in the Department of Computer Science and the BioFrontiers Institute at the University of Colorado at Boulder. His research develops statistical and inferential methods for analyzing large-scale network data, and uses those methods to solve applied problems in diverse domains, including public health and academic labor markets. In particular, his work focuses on generative models for networks, the ongoing evolution of the malaria parasite and the origins of social inequalities in academic hiring and careers. Prior to joining the University of Colorado faculty, he was an Omidyar Fellow at the Santa Fe Institute 2015-2017 and a post-doctoral fellow at the Harvard T.H. Chan School of Public Health 2012-2015. He obtained his Ph.D. in Applied Mathematics from the University of Colorado at Boulder in 2012, and holds an undergraduate degree from Washington University in St. Louis.



Chenhao Tan

Chenhao Tan is an assistant professor of computer science at University of Colorado Boulder. He obtained his PhD degree in the Department of Computer Science at Cornell University and bachelor's degrees in computer science and in economics from Tsinghua University. Prior to joining CU Boulder, he spent a year at University of Washington as a postdoc. His research interests include natural language processing and computational social science. He has published papers primarily at ACL and WWW, and also at KDD, WSDM, ICWSM, etc. His work has been covered by many news media outlets, such as the New York Times and the Washington Post. He also won a Facebook fellowship and a Yahoo! Key Scientific Challenges award.



Amanda Stevenson

Amanda Jean Stevenson is a sociologist trained in demographic and computer science methods. She studies the impacts of and responses to abortion and family planning policy. She is an Assistant Professor of Sociology at the University of Colorado Boulder. In her current research, she uses demographic methods to study the impacts of reproductive health policies, and computational and qualitative methods to study social responses to these policies. At Boulder she leads a team using massive administrative data at the Census Bureau to evaluate the life course consequences of access to (as opposed to use of) highly effective contraception. And she contributes to a variety of ongoing evaluations of reproductive health policies and develops new strategies for measuring fertility with administrative data. Another line of research examines the social responses to reproductive health policies. In a current project, she uses Twitter responses, website content, media coverage, and in-depth interviews to examine the social movement response to Texas' 2013 abortion restrictions.



University of Colorado
Boulder

SICSS

Feedback

- Daily surveys: Keep, stop, start format
- Overall survey at the completion of the workshop
- Reach out to Brian (Brian.Keegan@Colorado.EDU) or Allie (Allison.Morgan@Colorado.EDU) for more immediate feedback



University of Colorado
Boulder

SICSS

Your Responsibilities

Be open, patient, generous, and help foster togetherness.

Let's start!



https://cbail.github.io/Why_SICSS.html#/



University of Colorado
Boulder

SICSS