Honors Computational Social Science (ISS 4304), 3 credits

Instructor: Kevin Lanning

Term: Fall 2021

Office: WB 213; Office hours Monday & Tuesday 2-5

Class Meeting Days/Time: MW 1230-150

Class Location: WB 105   
Phone: 561-594-1018

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instructor website: wise.fau.edu/~lanning   
\*\*\*course website: will be available at <https://kevinlanning.github.io>

syllabus: **honors computational social science**

# course description and objectives

New technologies have created new opportunities for the understanding of social behavior, and, with it, new threats to privacy and equality. In ISS 4304, we will (a) review selected examples of computational research from the social sciences, and (b) gain training in methods such as natural language analysis and social network analysis in the service of (c) research projects in which students will collaboratively implement these techniques in case studies of social phenomena. Objectives include greater mastery of the aforementioned techniques, of the R programming language and reproducible methods, and consideration of the responsibilities of data analysis and data stewardship in the contemporary world.

The course is intended to serve students in all concentrations of the Wilkes Honors College, particularly those in the behavioral and social sciences of economics, psychology, linguistics, geography, anthropology, and sociology, as well as students anticipating working in data-intensive careers.

We will primarily be working using a variety of tools for statistical computing, including the R programming language and Gephi (a tool for network visualization). In addition, we'll use the Slack platform for communication and collaboration and spreadsheets such as Excel or Google Sheets.

# selected student learning outcomes

The course is intended to count towards FAU's Undergraduate Research Certificate program by virtue of its emphases on

* helping students to formulate questions (students will formulate research questions, scholarly or creative problems with integration of fundamental principles and knowledge in a manner appropriate to Computational Social Science),
* critical thinking (students will apply critical thinking skills to evaluate information, their own work, and the work of others),
* ethical conduct (students will identify significant ethical issues in research and inquiry in Computational Social Science),
* as well as helping them to develop plans of action - in essence, programs - to address research and inquiry questions or scholarly problems, and finally,
* communication, ranging from annotating code to facilitate reproducibility to designing data visualizations which are clear, effective, and truthful.

# note of honors distinction

The course receives honors credit by virtue of its small class size, by virtue of a dialectic approach in the classroom structure, and by the fact that students receive extensive exposure to supplementary materials and primary sources. This course differs substantially from a non-Honors course in that (a) the expectations for participation in class discussions will be greater than in a typical undergraduate course with a larger number of students, (b) class projects will be undertaken in heterogeneous groups in which students will be teaching and learning from their peers as well as the instructor, (c) assignments and expectations will be, to some extent, tailored to the backgrounds and interests of the individual student (d) the data sets we will collaboratively examine will be chosen to foster disciplinary breadth.

# course prerequisites/co-requisites

STA 2023 (or equivalent) and COP 3073 (or equivalent), or permission of instructor, are prerequisites~~.~~

# required texts and materials

Barabási, A.-L. (2016). [*Network science*](networksciencebook.com). Cambridge university press. . (free online or not-for-free in hardcopy)

Easley, D., & Kleinberg, J. (2010). *Networks, crowds, and markets* (Vol. 8). Cambridge university press Cambridge. (free online or not-for-free in hardcopy)

Salganik, M. (2019). [*Bit by Bit: Social Research in the Digital Age*](https://www.bitbybitbook.com/en/1st-ed/preface/). Princeton University Press. (free online or not-for-free in hardcopy)

Wickham, H., & Grolemund, G. (2016). [*R for data science: Import, tidy, transform, visualize, and model data*](https://r4ds.had.co.nz/). O’Reilly Media, Inc. (free online or not-for-free in hardcopy)

Additional sources are listed in [references](https://kevinlanning.github.io/DataSciSpring2018/references) below; all are or should be available on Canvas. You will also need access to a laptop computer running either Windows or Mac OS. (If you don’t have access to a laptop for everyday use, please see me as soon as possible; I will try to secure one on your behalf).

# requirements / course evaluationand grading

Grades will be based on a 100-point scale, with points earned by participation, homework and quizzes, a term project, and a final exam.

Participation (20 points). Attendance is a necessary but not sufficient part of class participation. Your participation grade will be based also on the extent to which you contribute to our class by asking constructive questions and helping us solve the numerous challenges which we collectively will face. This will be assessed, in part, with brief quizzes on an intermittent basis throughout the term.

Self-assessments (30 points). Students will be asked to provide three structured, evidence-based self-assessments in the class.

Two term projects (40 points). Learning is social. The term projects will be collaborative projects which you will undertake with two to four of your peers. Each project will include a short paper (~ 12 pages) and serve as the basis for an informative presentation to the class. In order for us to assess your individual contributions and to minimize social loafing, I ask that all meetings and communications among group members be undertaken on the [Slack](https://faudatascience.slack.com/) platform, and that, in addition to the paper, all group members sign a 1-page cover page describing the primary contribution and percent effort of each person. You'll present your projects in class; the first near the middle of the term, the second towards the end of the term.

A final exam (10 points). This will include questions about the technical and ethical challenges in working with social data.

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| course grading scale | | |
| A 93 or more | C 73 to 76 | *note that in borderline cases, students may receive the higher of two grades if there is evidence of sustained effort and/or improvement over the course of the term* |
| A- 90 to 92 | C- 70 to 72 |
| B+ 87 to 89 | D+ 67 to 69 |
| B 83 to 86 | D 63 to 66 |
| B- 80 to 82 | D- 60 to 62 |
| C+ 77 to 79 | F 59 or less |

### additional selected university & college policies

**classroom etiquette/disruptive behavior policy statement:** Disruptive behavior is defined in the FAU Student Code of Conduct as "… activities which interfere with the educational mission within classroom." Students who disrupt the educational experiences of other students and/or the instructor's course objectives in a face-to-face or online course are subject to disciplinary action. Such behavior impedes students' ability to learn or an instructor's ability to teach. Disruptive behavior may include, but is not limited to non-approved use of electronic devices (including cellular telephones); cursing or shouting at others in such a way as to be disruptive; or, other violations of an instructor's expectations for classroom conduct. For more information, please see the [FAU Office of Student Conduct](http://www.fau.edu/studentconduct/).

**code of academic integrity policy statement:** Students at Florida Atlantic University should endeavor to maintain the highest ethical standards. Academic dishonesty is a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive to the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf) and the WHC code at <http://www.fau.edu/honors/academics/honor-code.php>.

[**Plagiarism**](http://libguides.fau.edu/c.php?g=325629&p=2352760) is the deliberate use and appropriation of another's work without identifying the source and trying to pass off such work as one's own. Any student who fails to give full credit for ideas or materials taken from another has plagiarized. This includes all discussion board posts, journal entries, wikis, and other written and oral presentation assignments. Plagiarism is unacceptable in the University community. Academic work must be an original work of your own thought, research, or self-expression. When students borrow ideas, wording, or organization from another source, they must acknowledge that fact in an appropriate manner. If in doubt, cite your source.

**accessibility policy statement:** In compliance with the Americans with Disabilities Act Amendments (ADAAA), students who require special accommodations to properly execute coursework due to a disability, must register with Student Accessibility Services (SAS) located in theBoca Raton, Davie, and Jupiter campuses and follow all SAS procedures. For additional information, please consult [Student Accessibility Services](http://www.fau.edu/sas). (Boca Raton: (561) 297-3880, Fax: (561) 297-2184, TTY: 711; Davie: (954) 236-1222, Fax: (954) 236-1123, TTY: 711, Jupiter: (561) 799-8721, Fax: (561) 799-8721, TTY: 711

**grade appeal process:** You may request a review of the final course grade when you believe that one of the following conditions apply: There was a computational or recording error in the grading, the grading process used non-academic criteria, there was a gross violation of the instructor's own grading system. [Chapter 4 of the University Regulations](http://www.fau.edu/regulations/chapter4/index.php) contains information on the grade appeals process.

**religious accommodation policy statement:** In accordance with rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs with regard to admissions, registration, class attendance, and the scheduling of examinations and work assignments. For further information, please see [Academic Policies and Regulations](http://www.fau.edu/academic/registrar/FAUcatalog/academics.php).

**university approved absence policy statement:** In accordance with rules of the Florida Atlantic University, students have the right to reasonable accommodations to participate in University approved activities, including athletic or scholastics teams, musical and theatrical performances and debate activities. It is your responsibility to notify the instructor at least one week prior to missing any course assignment.

**drops/withdrawals:** You are responsible for completing the process of dropping or withdrawing from a course. Please click on the following link for more information on dropping and/or withdrawing from a course. Please consult the [FAU Registrar Office](http://www.fau.edu/registrar/registration/faqs.php) for more information.

**counseling and psychological services (CAPS) center:** Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to \_<http://www.fau.edu/counseling/>.

***COVID-19 statement:*** All students in face-to-face classes are required to wear masks during class, and students must sanitize their own workstations upon entering the classroom. Taking these measures supports the safety and protection of the FAU community. Students who do not adhere to these rules will be asked to leave the classroom and/or be removed from the course. Students experiencing flu-like symptoms (fever, cough, shortness of breath), or students who have come in contact with an infected person should immediately contact FAU Student Health Services (561-297-3512).

# course outline / schedule

**All content is subject to change.** Please monitor the Slack channel for the latest updates (<https://honorscollege.slack.com/>).

Weeks 1-3

Watching: SICSS Bootcamp

/ doing

Reading: Lazer, Stephens-Davidowitz, review of other classes in Computational Social Science (<http://bit.ly/CSSSyllabi>).

No class on Monday of Week 3 – Labor Day; Skype with Stephens-Davidowitz on Wednesday 9/4.

You can anticipate one or more quizzes on *Everybody Lies.*

Week 4-5

**First self-assessment (9/18, 10%).***What have you learned in the class so far, e.g., how much progress have you made towards data literacy (in R), in helping your classmates learn, and how much have you contributed to our developing definition of computational social science.*

Reading: Methods in Computational Social Science (Salganik Chapters 1 – 4, and additional papers).

Week 6-8

Reading: Introduction to networks (Easley and Kleinberg 1-3, Barabási 1-4, and additional papers).

Week 9

**Small group project #1: Network analysis (10/14, 20%)**. Presentations and additional readings

Week 10-12

Introduction to text analysis: Benoit and additional papers.

**Second self-assessment (10/30, 10%).**

Week 13

**Small group project #2: Text analysis (11/13, 20%).**No class on Monday of Week 13 – Veterans' Day.

Week 14-15

Ethics and review: Salganik, Chapter 6 and additional papers.  
If there is interest, we will do a collaborative write-up on the place and nature of computational social science in our curriculum and society.

Week 16

**Final exam and third self-assessment (12/6, total of 20%).**

Additional references\*

Apicella, C. L., Marlowe, F. W., Fowler, J. H., & Christakis, N. A. (2012). Social networks and cooperation in hunter-gatherers. *Nature*, *481*(7382), 497–501. https://doi.org/10/fz3v4v

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Benoit, Kenneth. (2019). *Text as data: An overview*.

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Burt, R. S., Kilduff, M., & Tasselli, S. (2013). Social Network Analysis: Foundations and Frontiers on Advantage. *Annual Review of Psychology*, *64*(1), 527–547. https://doi.org/10.1146/annurev-psych-113011-143828

Cacioppo, J. T., Fowler, J. H., & Christakis, N. A. (2009). Alone in the crowd: The structure and spread of loneliness in a large social network. *Journal of Personality and Social Psychology*, *97*(6), 977–991. https://doi.org/10.1037/a0016076

Cartwright, D., & Harary, F. (1977). A graph theoretic approach to the investigation of system-environment relationships. *Journal of Mathematical Sociology*, *5*(1), 87–111.

Christakis, N. A., & Fowler, J. H. (2013). Social contagion theory: Examining dynamic social networks and human behavior. *Statistics in Medicine*, *32*(4), 556–577. https://doi.org/10/ck2j

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DiMaggio, P., & Garip, F. (2012). Network Effects and Social Inequality. *Annual Review of Sociology*, *38*(1), 93–118. https://doi.org/10/gf6kjc

Giles, J. (n.d.). *FROM E-MAILS TO SOCIAL NETWORKS, THE DIGITAL TRACES LEFT BY LIFE IN THE MODERN WORLD ARE TRANSFORMING SOCIAL SCIENCE.* 3.

Gosling, S. D., & Mason, W. (2015). Internet Research in Psychology. *Annual Review of Psychology*, *66*(1), 877–902. https://doi.org/10/gfppbf

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Jones, N. M., Wojcik, S. P., Sweeting, J., & Silver, R. C. (2016). Tweeting negative emotion: An investigation of Twitter data in the aftermath of violence on college campuses. *Psychological Methods*, *21*(4), 526–541. https://doi.org/10.1037/met0000099

Kern, M. L., Eichstaedt, J. C., Schwartz, H. A., Park, G., Ungar, L. H., Stillwell, D. J., … Seligman, M. E. P. (2014). From “Sooo excited!!!” to “So proud”: Using language to study development. *Developmental Psychology*, *50*(1), 178–188. https://doi.org/10.1037/a0035048

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Lanning, K., Pauletti, R. E., King, L. A., & McAdams, D. P. (2018). Personality development through natural language. *Nature Human Behaviour*, *2*(5), 327–334. https://doi.org/10/gf5298

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Watts, D. J. (2004). The “New” Science of Networks. *Annual Review of Sociology*, *3*, 243–270.

\*We will read *all* of only a few of these (Stephens-Davidowitz and a few papers), *most* of a few more (including Salganik), *some* of most (including Barabási), and probably *none* of those remaining. This will depend upon your interests as they develop over the first half of the term.

References

Main texts

Barabási, A.-L. (2016). *Network science*. Cambridge university press.

Salganik, M. (2019). *Bit by Bit: Social Research in the Digital Age*. Princeton University Press. (free online or not-for-free in hardcopy)

Wickham, H., & Grolemund, G. (2016). *R for data science: Import, tidy, transform, visualize, and model data*. O’Reilly Media, Inc. (free online or not-for-free in hardcopy)

Overview - 1

Lazer, D., Pentland, A., Adamic, L., Aral, S., Barabási, A.-L., Brewer, D., Christakis, N., Contractor, N., Fowler, J., & Gutmann, M. (2009). Computational social science. *Science*, *323*(5915), 721–723. <https://doi.org/10/c9w2g3>

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Giles, J. (2012, August 22). *Computational social science: Making the links* [News]. Nature. <https://doi.org/10.1038/488448a>

Grimmer, J. (2015). We Are All Social Scientists Now: How Big Data, Machine Learning, and Causal Inference Work Together. *PS: Political Science & Politics*, *48*(1), 80–83. <https://doi.org/10/gdxwjp>

Lazer, D., Hargittai, E., Freelon, D., Gonzalez-Bailon, S., Munger, K., Ognyanova, K., & Radford, J. (2021). Meaningful measures of human society in the twenty-first century. *Nature*, *595*(7866), 189–196. <https://doi.org/10.1038/s41586-021-03660-7>

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Nature. (2021, July 1). The powers and perils of using digital data to understand human behaviour (Editorial). *Nature*, *595*(7866), 149–150.

Sadowski, J., Viljoen, S., & Whittaker, M. (2021). Everyone should decide how their digital data are used—Not just tech companies. *Nature*, *595*(7866), 169–171. <https://doi.org/10.1038/d41586-021-01812-3>

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Big data

Althoff, T., Sosič, R., Hicks, J. L., King, A. C., Delp, S. L., & Leskovec, J. (2017). Large-scale physical activity data reveal worldwide activity inequality. *Nature*, *547*(7663), 336–339. <https://doi.org/10/gbmk93>

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Hao, K. (2021, March 11). How Facebook got addicted to spreading misinformation. *MIT Technology Review*. <https://www.technologyreview.com/2021/03/11/1020600/facebook-responsible-ai-misinformation/>

Lazer, D., & Radford, J. (2017). Data ex Machina: Introduction to Big Data. *Annual Review of Sociology*, *43*(1), 19–39. <https://doi.org/10/gcv947>

Ledford, H. (2020). How Facebook, Twitter and other data troves are revolutionizing social science. *Nature*, *582*(7812), 328–330. <https://doi.org/10.1038/d41586-020-01747-1>

Stephens-Davidowitz, S., & Varian, H. (2014). A hands-on guide to Google data. *Mountain View, CA*.

Dynamical systems

Coleman, P. T., Vallacher, R. R., Nowak, A., & Bui-Wrzosinska, L. (2007). Intractable Conflict as an Attractor: A Dynamical Systems Approach to Conflict Escalation and Intractability. *American Behavioral Scientist*, *50*(11), 1454–1475. <https://doi.org/10/c99wp6>

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Networks: General/introduction

Baronchelli, A., Ferrer-i-Cancho, R., Pastor-Satorras, R., Chater, N., & Christiansen, M. H. (2013). Networks in Cognitive Science. *Trends in Cognitive Sciences*, *17*(7), 348–360. <https://doi.org/10.1016/j.tics.2013.04.010>

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Milgram, S. (1967). The small world problem. *Psychology Today*, *2*(1), 60–67.

Watts, D. J. (2004). The “New” Science of Networks. *Annual Review of Sociology*, *3*, 243–270.

Networks: Depicting

Bastian, M., Heymann, S., & Jacomy, M. (2009, March 19). Gephi: An Open Source Software for Exploring and Manipulating Networks. *Third International AAAI Conference on Weblogs and Social Media*. Third International AAAI Conference on Weblogs and Social Media. <https://www.aaai.org/ocs/index.php/ICWSM/09/paper/view/154>

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Networks: Cooperation

Apicella, C. L., Marlowe, F. W., Fowler, J. H., & Christakis, N. A. (2012). Social networks and cooperation in hunter-gatherers. *Nature*, *481*(7382), 497–501. <https://doi.org/10/fz3v4v>

Networks: Contagion

Bond, R. M., Fariss, C. J., Jones, J. J., Kramer, A. D. I., Marlow, C., Settle, J. E., & Fowler, J. H. (2012). A 61-million-person experiment in social influence and political mobilization. *Nature*, *489*(7415), 295–298. <https://doi.org/10/f3689v>

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Networks as tools for multivariate analysis

Boschloo, L., van Borkulo, C. D., Rhemtulla, M., Keyes, K. M., Borsboom, D., & Schoevers, R. A. (2015). The Network Structure of Symptoms of the Diagnostic and Statistical Manual of Mental Disorders. *PLOS ONE*, *10*(9), e0137621. <https://doi.org/10/gfsz67>

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Networks: Graphs and balance

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Networks as tools for understanding academic communities

Lanning, K. (2017). What is the Relationship Between “Personality” and “Social” Psychologies? Network, Community, and Whole Text Analyses of The Structure of Contemporary Scholarship. *Collabra: Psychology*, *3*(1), 8. <https://doi.org/10/gf5299>

Language analysis: Intro and overview

Benoit, K. (2019). *Chapter 28 Text as data: An overview*. 50.

Danescu-Niculescu-Mizil, C., Sudhof, M., Jurafsky, D., Leskovec, J., & Potts, C. (2013). A computational approach to politeness with application to social factors. 10.

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