****Preliminary Draft, All Subject to Change****

# Comm Studies 394: Human/Algorithm Interaction

## Computational Actors, Human Values, and the Emerging Space Between

**Tuesdays & Thursdays 3:30 – 4:50 pm** **Kresge Centennial Hall 3-410**
**Instructor: Mike DeVito, PhD Student** devitom@u.northwestern.edu **Office: Francis Searle 2-115**

## Course Description

Algorithms, or, more broadly, systems driven by computational actors, are everywhere, and right now we're all trying to figure out just how much influence they do (and should) have over our lives. It seems like a new question, a new problem, but it can also be seen as an extension of a debate that's been raging about computers specifically since the 1950s and technology in general since a very dangerous external memory technology known as "writing" debuted. The latest iteration of this debate involves all computerized decision making and content recommendation systems, from Facebook's News Feed and Netflix's recommendations, to automatic stock microtransactions that have sent the stock market into a temporary tailspin and search engine results that determine what is or is not "true" for a large portion of the world. Computationally-driven systems are in newsrooms, in government offices, in our homes, and in our phones. We're in a synthesis with these computational actors, for better or worse, and understanding them is a huge step towards understanding the modern world on a deeper level.

This course is a tour through the three-way interplay between algorithmically-driven systems, individual human experience and values, and large-scale social structures. We will start broad and philosophical, then take a deep dive to highlight direct impacts on daily life and dispel some of the key myths that surround these technological interlocutors. Practical impacts we will cover include the role of algorithms in search, the news, the economy, culture (high-, middle-, and low-brow), and your personal information flows. Myths we will tackle include the fiction of algorithmic fairness, the impenetrability of the corporate veil of secrecy that is the "black box," and the notion that algorithms are fundamentally an area of concern for computer scientists alone.

Along the way, in keeping with the mission of the junior writing seminar, we will deconstruct key articles the literature to identify what makes "good academic writing," including literature reviews that look to the past while setting up future research, and methods proposals that set you, the researcher, up for success. This will culminate in your own 20-page research proposal. We will take the explicit position that there is, in fact, no such thing as "good writing" – only low-fidelity drafting, an openness to feedback, and a passion for editing. As such, our focus will be on getting ideas on paper, and then helping each other iterate and turn these ideas into a solid written foundation for scientific inquiry through workshopping and in-depth feedback. You won't leave this class a good writer; you'll leave this class a good editor, and that's even better.

## Course Learning Objectives

By the end of this course, students will be able to:

1. Explain and enact the principles of effective and efficient academic feedback, editing, and revision.
2. Identify the markers of and support required for an effective academic argument.
3. Identify and explain the influential role that algorithmically-driven computational systems play in day-to-day human life through the lens of the sociotechnical system.
4. Identify and explain how human values affect technology, and how algorithmically-driven systems scale human values.
5. Write and revise a research study proposal, including a thorough literature review and proposed methods section.

## Evaluation/Grades

Students will be graded in accordance with the standard School of Communication letter grading system. The final grade will be calculated based off of the grades for individual assignments according to the chart at right. Full assignment descriptions will be distributed before each assignment is due; use these well, as they are the criteria on which you will be graded and, therefore, a literal guidebook to receiving full credit. The plurality of the class grade comes from the final research proposal paper assignment, which includes responding to peer and instructor comments on the earlier drafts of both the literature review and methods sections. Again, take these comments seriously; they are your literal guide to a good grade on the final paper.

**Final Grade Calculation**

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| Discussion Posts | 20% |
| Literature Review Draft | 10% |
| Methods Section Draft | 10% |
| Final Presentation | 5% |
| Final Paper | 35% |
| Participation | 20% |

**Participation:** Note that, as this is a discussion and group work-heavy class, participation is vital, and accounts for a large part of your final grade, both in terms of pre-discussion preparation (discussion posts, see below) and actual work in the class itself. “Participation” is defined in this context as making useful, intelligent contributions that demonstrate critical thinking and boost the overall level of discussion in class. This can take many forms: making well-thought-out comments in discussion, providing useful insights from the texts, taking a leadership role in group activities, making relevant real-world connections to the literature in discussion or online, attending office hours with insightful and detailed questions, etc. In all situations, I prefer that you speak wisely instead of frequently, and will grade according to this principle. If you have concerns about how you can participate in class, please speak to me. You will receive feedback in the middle of the quarter on your participation thus far.

## Major Assignment Descriptions

Full descriptions of each assignment and grading rubrics will be distributed via Canvas at least two weeks in advance of each due date.

**Discussion Posts:** As this is a seminar class, discussion is key. To help you organize your thoughts on the readings before class, you will have a short (~250 word) discussion post due by 9 am on each class day. You will have a choice of multiple key discussion questions for each class, and should respond to one of these (or connect multiple questions – both approaches are appreciated when done well). On days when the

readings are topic-based material, students should synthesize the day's reading and use it to address the discussion question(s), bringing in outside material and experiences where appropriate. On days when the readings are process-based (e.g., writing/editing), students should connect the readings to their own process and issues/experiences from their own writing, especially trouble spots and questions. In both cases, the point is to get ready to participate well in class, so we are starting from a place where everyone has something to say. This will let us have deeper discussions and work with more advanced ideas. Discussion posts will all be read by the instructor, who will use them to help shape the day's agenda. You are also encouraged to read each other's posts and come ready to respond. *(As an aside: there are few ways to shine in class participation that are quite as effective as doing a little extra research after reading your classmates' posts and being ready to respond to them directly in class.)*

**In-Class Workshops:** As a major part of the participation grade, students must be well prepared to participate in our two in-class writing workshops. For each workshop, every student will bring an up-to-date draft of their work on the current assignment (literature review or methods section) for group discussion. Students will be broken into smaller groups (2-3 people) before class, and every member of the group must post their draft to Canvas for the other members of the group by at least 48 hours before the workshop for in-depth review. Reviewers should make detailed commentary using track changes or printed margin notes, and provide a number of high-level comments and recommendations. The workshop will largely consist of sharing and working through these comments as a team.

**Final Research Proposal Paper:** The centerpiece of the course and final project is a long-form research proposal of at least 20 pages. This fulfills the writing requirement for Comm Studies 394, and will also prepare the student to pursue independent research or an honors thesis during senior year. This project is both an opportunity to dive into an area of the student's personal research interests and a chance to thoroughly prepare for and think through the research process. The topic of the research proposal is largely up to the individual student; so long as it falls widely within the umbrella of communication-based study of or with computational systems, it will suffice. Any topic within this umbrella that can be proved to be of consequence is acceptable; any method that can be proved to be appropriate to the topic is fair game. However, these choices must be clearly justified, as this is a key part of the research process, and scope must be taken into account. The research paper will be written iteratively throughout the quarter, in four major parts:

1. <u>The Proposal Proposal:</u> A short (maximum five pages) document that states the topic the student wishes to explore, a few specific questions within this topic area, each with an argument that can be made around that question, a brief summary of key texts the student has already read in the area and how they relate to the questions, at least two potential methods with brief justification, and a statement of why this area of exploration is worth pursuing. After feedback, the argument advanced in this proposal will become the basis of the final paper's introduction and framing section.
2. <u>The Literature Review:</u> Based on feedback from the initial proposal, research your topic in-depth, identifying, recounting, and synthesizing academic sources into a document (10-15 pages) that both establishes the state of your topic area in relation to your guiding question and establishes and supports the larger argument you wish to make in your paper. Evaluate the literature you have found critically, point out gaps, and establish why your question will fill these gaps.

3. The Methods Section: Based on feedback on your initial proposal and your literature review, produce a document (5-7 pages) that explains the methods you will use to investigate your research question, and justifies them in light of the nature of your question and the state of the literature. Address the potential impact of what you expect to find in light of the generalizability of your methods, and note any potential limitations to this method and how you intend to address them.
4. The Final Research Proposal: Based on the feedback on your initial proposal, literature review, and methods section, construct a final research proposal (20-25 pages) that marries your literature review to your methods section, adds an introduction that sets up both while foreshadowing key concepts for readers, and relates your research to the larger field. Include a brief section on next steps after this research project, and any potential monetary, equipment, or personnel support you will need to carry out the research you propose. Make sure prior feedback is integrated into your final project, as evidence of revision is a non-trivial part of your grade.

## General Course Format

This course meets twice weekly, and attendance is required at each class. Most weeks will consist of a lecture/discussion/student presentation day and a discussion/activity/workshop day. Each week will begin with two short student presentations, each of which will briefly explain and then critique (including writing style) one of the week's readings. There will then be a lecture or discussion that synthesizes and expands on the readings, including the introduction of ongoing research in relevant areas, followed by an extended discussion, workshop, or activity period that will comprise roughly half the class time in any one week.

All readings and course assignments that are not linked in this syllabus will be posted to the class Canvas site. There is no text required for purchase in this class. A general reference that you should lean on heavily both in competing your paper assignment and evaluating research is the USC social science research paper guide at http://libguides.usc.edu/writingguide.

## Course Schedule, Readings, and Assignment Due Dates

Reading assignments must be completed before the first class of each week; assignments are due at the beginning of the last class of each week unless otherwise noted. Due dates in bold. All dates and readings are subject to change, and all changes will be announced via Canvas.

| | Learning Objective | Readings | Activities/Assignments |
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| 1/9 | Students will be able to articulate what they hope to get out of this class. | • Syllabus<br>• Tips for Writing Student Learning Objectives | • Intros/Syllabus Review<br>• Personal Learning Objectives activity |
| 1/11 | Students will be able to define "technology" and speak to the importance of writing in that light. | • Ong, W. (1982) Writing Restructures Consciousness. Chapter 4 of Orality & Literacy: The Technologizing of the World | • Discussion: What's a technology, what's just "human stuff?"<br>• Discussion: Why write? |

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| 1/16 | Students will be able to articulate a basic position on their personal vision for human/computer interaction. | • Licklider, J. C. (1960). Man-computer symbiosis. IRE Transactions on Human Factors in Electronics, (1), 4-11. | • Discussion: Symbiosis – how far have we come, and how far should we go? |
| 1/18 | Students will be able to articulate what makes a scientific article "good" in terms of argument and writing. | • COR Chapter 7: Making Good Arguments<br>• COR Chapter 2: Connecting with Your Readers | • Short Lecture: What even, like, **is** research?<br>• Discussion: What makes research writing "good?"<br>• Short Lecture: If your first draft isn't crap, you overthought it |
| 1/22 | Students will be able to successfully identify where algorithms intersect with their daily life. | • Gillespie, Tarleton. 2014. "The Relevance of Algorithms." In *Media Technologies: Essays on Communication, Materiality, and Society*, edited by Tarleton Gillespie, Pablo Boczkowski, and Kirsten Foot, 167-194. Cambridge, MA: MIT Press. http://culturedigitally.org/2012/11/the-relevance-of-algorithms/ | • Discussion: Computational actors in your lives<br>• Pair Activity: Are you ever actually alone? |
| 1/25 | Students will be able to successfully articulate a research problem they are interested in pursuing. | • USC Guide: Writing A Research Proposal libguides.usc.edu/writingguide/researchproposal<br>• Craft of Research Chapter 3: Topics to Questions<br>• **Assignment: Bring at least 3 possible research proposal topics to class** | • Discussion: Where research comes from<br>• Short Lecture: Starting the final project now<br>• Pair activity: Topics to Questions |
| 1/30 | Students will be able to explain how the flow of information is affected by algorithms, feedback loops, and filter bubbles | • Eli Pariser Ted Talk http://ed.ted.com/lessons/beware-online-filter-bubbles-eli-pariser<br>• Bucher, T. (2012). Want to be on the top? Algorithmic power and the threat of invisibility on Facebook. *New Media & Society*, *14*(7), 1164-1180.<br>• DeVito, M.A. (2016) From Editors to Algorithms: A Values-Based Approach to Understanding Story Selection in the Facebook News Feed. *Digital Journalism,* ahead-of-print. | • Lecture: News, Politics & The Bubble<br>• Discussion: Computational Gatekeeping<br>• Activity: Map your gatekeepers |

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| 2/1 | Students will be able to identify positive and negative attributes in literature reviews and their sourcing. | • Craft of Research Chapter 5 & 6: Finding and Using Sources | • Lecture: "The Literature"<br>• Discussion: Sourcing<br>• **Due: Paper Proposal Proposal** |
| 2/6 | Students will be able to identify the presence of value judgements in technological systems. | • Friedman, B., & Kahn Jr, P. H. (2003). Human values, ethics, and design. The Human-Computer Interaction Handbook, 1177-1201. | • Discussion: Whose values?<br>• Discussion: Moral & ethical obligations for technology |
| 2/8 | Students will be able to identify the biases and values embedded in algorithms and their sources.<br>Students will be able to identify possible biases in their own research design. | • Friedman, B., & Nissenbaum, H. (1996). Bias in computer systems. *ACM Transactions on Information Systems*, *14*(3), 330-347.<br>• Bozdag, E. (2013). Bias in algorithmic filtering and personalization. *Ethics and information technology, 15*(3), 209. | • Talk: Algorithmic Values<br>• Activity: System Value Deconstruction |
| 2/13 | Students will be able to explain how algorithms act as structural factors in our communication infrastructure and culture. | • Napoli, P. M. (2014). Automated media: An institutional theory perspective on algorithmic media production and consumption. *Communication Theory, 24*(3), 340-360.<br>• Hallinan, B., & Striphas, T. (2014). Recommended for you: The Netflix Prize and the production of algorithmic culture. *New Media & Society.*<br>• Mager, A. (2012). Algorithmic ideology: How capitalist society shapes search engines. *Information, Communication & Society*, *15*(5), 769-787. | • Lecture: The new media institution & its masters<br>• Group Activity: Make a better Netflix/Amazon recommender engine – what are your cultural assumptions?<br>• **Post working draft of literature review to Canvas by 7pm** |
| 2/15 | Students will be able to evaluate the literature reviews of their peers. | • **Read your assigned partner's draft and make comments** | • Group Writing Workshop: Literature Reviews |
| 2/20 | Students will be able to articulate several emerging approaches to human-centered algorithm design. | • CHI 2017 Workshop Intro by Marco Gillies: What Is Human-Centered Machine Learning? https://medium.com/human-centered-machine- | • **Due: Literature review draft**<br>• Discussion: Should humans be at the center? |

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| | | learning/what-is-human-centred-machine-learning-a2f8f8170f73<br>• Baumer, E. P. (2017). Toward human-centered algorithm design. *Big Data & Society*, *4*(2). | |
| 2/22 | Students will be able to explain the basics of a digital research method of their choice to their peers. | • Choose a Chapter: Digital Research Confidential<br>• USC Guide: The Methodology http://libguides.usc.edu/writingguide/methodology | • Short Presentations: Digital Methods Roulette<br>• Short Lecture: Scope yourself before you nope yourself |
| 2/27 | Students will be able to articulate the pros and cons of transparency as an approach to monitoring computational influence. | • Ananny, M., & Crawford, K. (2016). Seeing without knowing: Limitations of the transparency ideal and its application to algorithmic accountability. *new media & society*, 1461444816676645.<br>• Diakopoulos, Nicholas. "Accountability in algorithmic decision making." *Communications of the ACM* 59.2 (2016): 56-62. | • Discussion/Debate: Does transparency work?<br>• **Post working draft of methods section to Canvas by 7 pm** |
| 3/1 | Students will be able to evaluate the proposed methods of their peers. | • **Read your assigned partner's draft and make comments** | • Group Writing Workshop: Proposed Methods |
| 3/6 | Students will be able to articulate how trust in algorithmic systems breaks down. | • DeVito, M. A., Gergle, D., & Birnholtz, J. (2017, May). Algorithms ruin everything: #RIPTwitter, Folk Theories, and Resistance to Algorithmic Change in Social Media. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (pp. 3163-3174). ACM.<br>• Dietvorst, B. J., Simmons, J. P., & Massey, C. (2015). Algorithm aversion: People erroneously avoid algorithms after seeing them err. *Journal of Experimental Psychology: General*, *144*(1), 114. | • Discussion: The Algohaters<br>• Exercise: When do you trust?<br>• **Due: Proposed Methods section draft** |
| 3/8 | Students will be able to identify possible ethical pitfalls of research on and using algorithms.<br>Students will be able to identify possible ethical | • Kramer, A. D., Guillory, J. E., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. *Proceedings of the National Academy of Sciences*, *111*(24), 8788-8790.<br>• Editorial Expression of Concern: http://www.pnas.org/content/111/29/10779.1.full | • Discussion: Human Subjects & Algorithmic Manipulation<br>• Group Activity: Algorithmic Allegories<br>• Guest Q&A: Jeff Hancock (if he's available) |

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| | implications of their own proposed research. | • Harvard Law Case Study: Algorithmic Allegories (read overview and hypothetical scenario assigned to your group) | |
| 3/13 | Students will be able to give constructive feedback on peer work, and integrate such feedback into their own writing. | • Craft of Research Chapters 13 and 16: Revising<br>• Handout: Giving constructive feedback | • Discussion: Revision, your feelings, and how they just ruin everything |
| 3/15 | Students will be able to succinctly explain a research design. | • Presentations | • **Final paper presentations** |

**Final paper is due via Canvas by 9 a.m. on 3/22**

## Attendance

Attendance at all classes is strictly required. This is a seminar based heavily on discussion and groupwork, and requires your full, informed participation every single class period. If you cannot attend class for emergency reasons (e.g., serious health concerns), academic reasons (e.g., you are presenting at a key conference in your field), or documented, university-excused events (e.g., a sport game), **you must inform the instructor via email before your absence**. Unexcused absences will negatively affect your participation grade, with increasing severity in the case of repeated absences.

## Late Work

One of the best ways to stay on target for a good grade in this class is to not be late with work. Your written work will be shared with peers; turning in a draft late not only hurts your chance to get feedback, but also effectively leaves your assigned partner for the week in the lurch. As such, the late work policy in this class is simple: for each day an assignment is late without being explicitly excused by the instructor, a full letter grade will be subtracted. This means that a piece of B+ work that is turned in one minute after the deadline is now a C+ at best. If you do have a legitimate emergency (e.g., serious health problems, death in the family, tsunami in Lake Michigan, etc.) you must inform the instructor, **in writing (email) and beforehand**, to ask for an extension. The terms of the extension will be negotiated on a case-by-case basis, and work turned in late on an extension is an automatic failure.

## Instructor Bio

**Mike DeVito** is a third-year doctoral student in the Media, Technology, and Society program at Northwestern and a Cognitive Science specialist. He is currently attached to the Social Media Lab under Professor Jeremy Birnholtz. His HCI-based research centers around user perceptions of algorithmically-driven technology, including folk theories of algorithmic systems, effects on cognition and information flows, and formation and presentation of the self-concept through social media. He currently publishes work on these topics in venues such as the

ACM CHI and CSCW conferences. Prior to coming to Northwestern, Mike worked as Managing Editor for the new media sustainability collaborative Planet Forward and earned both an M.A. in Media and Public Affairs and a B.A. in Journalism and Mass Communication from The George Washington University.

## Students with Disabilities

Any student requesting accommodations related to a disability or other condition is required to register with AccessibleNU (accessiblenu@northwestern.edu; 847-467-5530) and provide professors with an accommodation notification from AccessibleNU, preferably within the first two weeks of class. All information will remain confidential.
For more information visit: http://www.northwestern.edu/accessiblenu/faculty/general-information/index.html

## Academic Integrity at Northwestern

Students are expected to comply with University regulations regarding academic integrity. ( http://www.northwestern.edu/provost/policies/academic-integrity/) If you are in doubt about what constitutes academic dishonesty, speak to the instructor before the assignment is due and/or examine the University web site. Academic dishonesty includes, but is not limited to cheating on an exam (e.g., copying others' answers, providing information to others, using a crib sheet) or plagiarism of a paper (e.g., taking material from readings without citation, copying another student's paper). Failure to maintain academic integrity on an assignment will result in a loss of credit for that assignment—at a minimum. Other penalties may also apply, including academic suspension. The guidelines for determining academic dishonesty and procedures followed in a suspected incident of academic dishonesty are detailed on the website.
For more information, visit:
http://www.communication.northwestern.edu/files/ProceduresAllegedAcademicDishonesty.pdf

## Sexual Harassment Policy

It is the policy of Northwestern University that no member of the Northwestern community—students, faculty, administrators, staff, vendors, contractors, or third parties—may sexually harass any other member of the community. Sexual harassment is any unwelcome conduct of a sexual nature, which includes, but is not limited to, unwelcome sexual advances; the use or threatened use of sexual favors as a basis for academic or employment decisions; conduct that creates a hostile, intimidating, or offensive academic or working environment; conduct that has the effect of unreasonably interfering with an individual's work performance; and other verbal, nonverbal, or physical conduct of a sexual nature that is sufficiently severe, persistent, or pervasive to limit a person's ability to participate in or benefit from an educational program or activity. Sexual harassment is a type of conduct prohibited under the University's Policy on Sexual Misconduct, Stalking, and Dating and Domestic Violence, which can be found at www.northwestern.edu/policies For more information, visit:
http://www.northwestern.edu/sexual-harassment

## Course Costs

Northwestern University is committed to ensuring that all of our students, regardless of socioeconomic background, have access to resources and support to ensure their academic, personal, and professional success. The University recognizes the unique barriers that low-income and/or first-generation students may encounter in pursuing a college education, and Northwestern is diligently putting the appropriate structures into place to ensure our students can successfully navigate the university experience. If financial barriers are preventing you from obtaining class materials or participating in class activities, please notify me as soon as possible. I may be able to assist you in obtaining materials or making alternative arrangements.

## Diversity/Safe Space

I am firmly committed to diversity and equity whereby barriers are removed to create space for all individuals to fully engage in all areas of campus life. Each student's voice has something of value to contribute and students are therefore encouraged to communicate and participate during class meetings. We must take care to respect the individual backgrounds, personal identities, intellectual approaches, and demographics expressed by everyone. Individual differences can deepen our understanding of one another and the world around us, thus making us global citizens. I strongly adhere to Northwestern University's non-discrimination policy (http://www.northwestern.edu/hr/equlopp-access/equal-employment-opportunity/nondiscrimination.html) and reserve our classroom as a safe space for unique and meaningful dialogue. Remember to keep confidential all issues of a personal or professional nature that are discussed in class.

## Research Opportunities

Working on research projects provides direct experience in the production of knowledge and serves as an important credential for admission to graduate study as well as other vocational opportunities. It's also surprisingly fun. If you are interested in participating in research as an undergraduate student, including in my lab, the Social Media Lab, please come to office hours or make an appointment to discuss possibilities with me. We can talk about your research interests and which labs and projects in the Comm Studies department might be a good match for you. To work as a research assistant you must be reliable, capable of paying close attention to detail, able to work as part of a team, and ethical in your interactions with research participants. You need to be able to make a commitment of at least 10 hours a week for one or more quarters. Pay and course credit are both available to students working in the lab.