

Cornell University  
ILR School

# TECHNOLOGICAL CHANGE AT WORK (TΔ@W)

ILRLR 4066 - 001 (T/Th 11:40- 12:55) (4 credits)  
Professor Adam Seth Litwin

## Course Syllabus

### Instructor

Professor Adam Seth Litwin

### Contact Information

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### Office Hours & Communication

in-person: Thursdays, 3.30-5.30pm in 363 Ives—and by appointment  
via video w/ shared screen & whiteboard: in my Zoom room using [this link](#)—by appointment only

When you have questions, ***please come to office hours!***

If you cannot do that, please direct *substantive* questions (i.e., questions about the material, e.g., “What aspects of professional work make it less amenable to automation?”) to the Substantive Questions forum on Blackboard. By posting substantive questions on Blackboard, you give other students first crack at answering. Explaining course concepts to each other requires strong understanding and the ability to explain clearly and concisely. It thus benefits both the person providing and the person receiving the answer. I will intervene to provide any necessary clarification or elaboration. Likewise, please direct all *administrative* questions (i.e., non-substantive, e.g., “Can you tell me again where to find the readings?”) to the Administrative Questions forum on Blackboard. This gives your classmates the opportunity to help you. Where confidentiality is required, the concern is unique to you, or the forum is otherwise inappropriate, please email me directly.

But as I said at the outset, ***please come to office hours!*** It’s the best way we can get to know each other.

### Learning Outcomes

As a result of participating in this course, you will be able to:

1. Assess the extent to which the present wave of emerging workplace technologies differs from previous ones.
2. Describe theorized patterns of how new technologies shape the workplace for specific social groups, and apply these theories to emerging workplace technologies.
3. Identify potential points of conflict and change in workplace hierarchy given information about how a new technology is being used in a contemporary workplace.
4. Prescribe policy responses aimed at mitigating the potentially deleterious impact of workplace technological change, and articulate the potential unintended consequences of these policies.

You will engage in individual and small-group analyses of discrete technologies as well as of specific jobs, occupations, and professions, relying on primary and secondary sources. You will

either present your findings in conventional, written form, i.e., papers, or you will have the option to use unconventional media agreed-upon with the instructor including but not limited to audio or video mashups, whiteboard animations, or the creation of interactive data dashboards.

### **Purpose and Objectives**

Computers and digital technologies including robotics, machine learning, artificial intelligence (AI), internet-enabled platforms, and other “high-tech” drivers of automation have revolutionized the nature and organization of work in the U.S., with material implications for workers and their families, among others. This upper-level seminar begins with a rhetorical inquiry into whether and when the technological change engendered by digitization and the so-called “Information Technology (IT) Revolution” benefits workers. We then consider the broader impact of recent technological advances on manufacturing and fabrication, low- and semi-skilled service work, i.e., restaurant servers and bus drivers, and even on expert and professional work like that to which most of you presumably aspire. Among the central themes is the notion that technology does not unilaterally act upon workers, their employers, or society-at-large. Rather, workers, managers, customers, institutions, and policymakers shape which advances take hold and which do not, the ways that these technologies are deployed in the workplace, and the ways that society can actively mitigate the costs to technological advancement while harnessing its benefits.

### **Prerequisites**

While there are no *formal* prerequisites for this course, it is recommended mainly for those who have completed or nearly completed their ILR core—1000-level and 2000-level coursework for undergrads and 5000-level coursework for masters students.

### **Technology-in-Class Policy**

Given the substantive focus of this course, my unilaterally dictating a rigid set of rules regarding how you can and cannot use technology would deprive us all of a learning opportunity. As a result, I would like us to work together over the first two weeks of the course developing a technology-in-class policy. I have established a [wiki/sandbox space](#) on Bb in which we can all hash this out. In general, I would suggest you consider ways we can use technology effectively in-class to raise the level of intellectual discourse as well as ways that technology could undermine the quality and effectiveness of discussions and other in-class activities.

We will iterate asynchronously as a group until February 12<sup>th</sup>, landing on a policy that we can all sign onto. I will mount the signed document on Bb.

### **Readings & Other Assigned Media**

There are two volumes that you will have to obtain on your own and read in their entirety. Each is available in every imaginable form—print, electronic, audio—and should be purchased online. While we do not explicitly discuss either of these volumes until later in the course (see below in modules #5 and #8), I suggest you start working through them right away as they can inform your thinking and your orientation to nearly all we will discuss this term. In any case, you should definitely purchase them in plenty of time for you to “consume” them before they are discussed in class. (Note that while I include links to these books in the syllabus, the links lead *not* to the resources themselves as they do for everything else on the syllabus, but merely to the Catherwood card catalog entry.)

Carr, Nicholas G. 2014. *The Glass Cage: Automation and Us*. New York: Norton.

Davenport, Thomas H., and Julia Kirby. 2016. *Only Humans Need Apply: Winners and Losers in the Age of Smart Machines*. New York: Harper.

In addition to these books, I will be asking you to read articles and to engage with other forms of media including podcasts, videos, and interactive web platforms. I will make all of these available to you electronically, and in most cases, through Bb. You will see that readings and other assigned media are organized by course module in Bb. If you have trouble with a file or a link on the syllabus or in Bb, please post that to the administrative questions discussion forum as soon as you discover it. I'll try to fix it ASAP.

### Course Requirements

- I expect you to have done the required reading and consumed the required media *prior* to our treatment of the material in class. *Your* informed and meaningful contributions to and engagement in class discussions will be the lifeblood of this course.
- Your course grade will be based on the following four items, the first three of which will be detailed separately during the first week of class:
  - i. 10-12 page individual paper—*In Hindsight*—due February 16<sup>th</sup> for **20%** of your grade
  - ii. 12-15 page group paper *or* an “alternative media” deliverable—*Sectoral Spotlight*—due March 29<sup>th</sup> for **25%** of your grade
  - iii. 20 page group paper and 20 minute group presentation—*Jobs/Occupations/Professions*—for **20%** and **15%** of your grade, respectively; presentations take place in class on April 25<sup>th</sup> and April 27<sup>th</sup> and papers are due May 5<sup>th</sup>
  - iv. Constructive engagement where applicable online and in classroom discussions and activities as well as demonstrated evidence of preparation for these discussions and activities—for **20%** of your grade

### Note on Inclusivity, Diversity, and Disabilities

Cornell University and I both strive to maintain an inclusive learning environment where diversity and individual differences are understood, respected, appreciated, and recognized *as a source of strength*. I expect you to respect differences and to demonstrate diligence in understanding how other peoples' perspectives, behaviors, and worldviews may differ from yours. You should demand the same of me.

If you have a disability-related need for reasonable academic adjustments in this course, I ask that you provide me with an accommodation letter from Student Disability Services. Please give me two weeks' notice of the need for accommodations. If you need immediate accommodation, please arrange to meet with me right away.

### Course Plan

The course plan that appears here on the syllabus is that *as it existed on the first day of class*. It is subject to change based on what I learn about you and your interests and our discovery of newly-available, relevant materials. Therefore, over the course of the term, for the most up-to-date list of required readings, media, etc., *please refer to the relevant learning module on Bb*. *I will update the Bb learning modules in real-time*, but I do not intend to make regular revisions to this syllabus.

NB: All readings and media—aside from the two books, as noted above—can be accessed freely and directly, and I have provided clickable icons on this syllabus and in Bb for doing so.

video (with audio)



interactive media



audio



reading



only linkable through  
Bb course module




web link















## Course Introduction


### Module #1: *On Which Technologies Are We Focusing, and Why Would Anyone Fear Their Impact?*

- seed questions:
  - Identify one or more jobs that did *not* exist a decade ago. What do they have in common?
  - Is the latest wave of automation and ubiquitous computing going to free workers up to create new kinds of work and to undertake new, better jobs, and thereby expand the middle class? Or, is this technology ultimately going to put people out of work?
- **TECH VIGNETTE:** The Luddites
  - Was the Luddites' fight idiotic, ill-informed, or ill-advised? Or, was it sensible? Would you have sided with them or with those against whom they were striking?
- assigned reading & media:
  - “March of the Machines” as reported by Steve Kroft on CBS’s *60 Minutes*. Includes interview with Erik Brynjolfsson and Andrew McAfee. Originally aired January 13<sup>th</sup>, 2013. [14:44]
  - “Attention White Collar Workers: The Robots Are Coming for Your Jobs” as reported by Dave Davies on NPR’s *Fresh Air*. Interview with Martin Ford, author of *Rise of the Robots: Technology and the Threat of a Jobless Future*. Originally aired May 18<sup>th</sup>, 2015. [30:33]
  - “Where Machines Could Replace Humans—and Where They Can’t (Yet)” by Michael Chui, James Manyika, and Mehdi Miremadi from the *McKinsey Quarterly*. Released July 2016.
- additional preparation for discussion:
  - Work with these interactive data provided by the McKinsey Global Institute to learn more about the “automation potential” of one or more sectors in which you have a deep interest—perhaps the one in which your mother or father works or the one in which you would like to work.

- **POST-DISCUSSION MINI-LECTURE:** The Labor Market Impact of Technological Change: Through the Lens of Substitution & Scale Effects 

 **Module #2:** *Haven't We Gone Through All of This Anxiety Numerous Times Already with Earlier Technologies?*









- seed questions:
  - What makes the latest wave of technologies similar to or different from supposedly big technological breakthroughs of earlier eras?
  - What are some patterns of technological change from the past that could suggest how present-day new technologies might affect workers and the workplace?
- **TECH VIGNETTE:** Cozmo<sup>®</sup> by Anki 
  - In what critical ways does Cozmo<sup>®</sup> differ from a forklift (aside from its diminutive stature) or even from a calculator?
- assigned reading & media:
  - *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (2014) as discussed by Erik Brynjolfsson and Andrew McAfee at Google on January 27<sup>th</sup>, 2014. [1:02:29] 
  - “The Two Faces of Technology”, part I (i.e., chapters #1, #2, and #3) of Rifkin, Jeremy. 1995. *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era*. New York: Putnam.  
  - “Human Touch Makes Robots Smarter: On Learning Context-Driven User Preferences” based on research by Ashesh Jain, Shikhar Sharma, and Ashutosh Saena. Posted on October 31<sup>st</sup>, 2013. [1:39] 
  - “Futurism: Robot Trends and Advances in 2016 and Beyond.” 
  - “Mind in Motion.” Chapter #1 from Moravec, Hans P. 1988. *Mind Children: The Future of Robot and Human Intelligence*. Cambridge, MA: Harvard.  
  - “Computer Tablets Take Over Part of Restaurant Server’s Job” as reported by Stacey Vanek Smith of Planet Money on NPR’s *Morning Edition*. Originally aired May 29<sup>th</sup>, 2015. [4:20] 
- additional preparation for discussion:
  - Get a sense of what transpires at and what emerges from the Cornell Robotic Personal Assistants Lab (RPAL). 
- guest speaker:
  - Ross Knepper, Assistant Professor of Computer Science, and director, Robotic Personal Assistants Lab (RPAL), Cornell University 
- class excursion:
  - Cornell Robotic Personal Assistants Lab (RPAL)

- **POST-DISCUSSION MINI-LECTURE:** Intentionally Inhibiting Technological Change: Some Welfare Implications 

 **Module #3:** *Stepping Back: How Do New Technologies Influence Work and Workers? Some Theories to Explain the Impact of Emerging Workplace Technologies*

- seed questions:
  - Many scholars would take issue with the very premise of this topic question on the grounds of a tacit assumption subsumed within it. What critical, unstated assumption is embedded in this question?
  - What is technological determinism, and are you a technological determinist?










**TECH VIGNETTE:** Buying a Car in the Age of the Internet 

- How do you believe the internet has reshaped the process of selling a car for the car salesperson?
- In the net, which side—if either—do you believe benefits from the use of the internet as part of the car purchasing experience?
- assigned reading & media:
  - pp. 21-39, i.e., the example of the bicycle—*not the whole chapter*—of Pinch, Trevor, and Wiebe E. Bijker. 1987 [2012]. The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other. In Wiebe E. Bijker, Thomas P. Hughes, and Trevor Pinch (Eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, pp. 11-44. Cambridge, MA: MIT.  
  - Cowan, Ruth Schwartz. 1987 [2012]. The Consumption Junction: A Proposal for Research Strategies in the Sociology of Technology. In Wiebe E. Bijker, Thomas P. Hughes, and Trevor Pinch (Eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, pp. 253-272. Cambridge, MA: MIT.  
  - Orlikowski, Wanda J. 2007. Sociomaterial Practices: Exploring Technology at Work. *Organization Studies* 28(9): 1435-1448.<sup>†</sup>  
  - Rosner, Daniela K., and Morgan Ames. 2014. “Designing for Repair? Infrastructures and Materialities of Breakdown.” In Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work, and Social Computing, pp. 319-331.<sup>†</sup>  
- guest lecturer:
  - Rohini Jalan, PhD candidate and High Road Fellow, Department of Organizational Behavior, ILR School, Cornell University.

 **Module #4:** *Are Technology and Skill-Biased Technological Change the Real Drivers of Job Loss and Inequality? How and for Whom Has Technology Changed the Wage Structure?*

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<sup>†</sup> This doctoral-level reading is intended to challenge you. You are welcome to read it *prior* to the start of the module as you would any other assigned reading or media. However, the guest lecturer plans to discuss and situate it for you in the first Module #3 class meeting, so that you can tackle it more easily in time for our subsequent class meeting.

- seed questions:
  - Is the underperformance of the U.S. economy in creating jobs during the recovery related to the adoption of new technologies in the workplace?
  - Given the complexity of factors driving inequality, what would be some reasonable steps to take in one's/your capacity as a worker, a voter, an employer, etc.?
  - Why is additive manufacturing, i.e., 3-D printing, for example, so potentially destabilizing for the labor market?
- **TECH VIGNETTE:** Trucking: Driverless, Automated, etc.  
  - Why is the automation of this one particular job—that of the truck driver—so momentous?
  - Is the phenomenon of the automation of truck driving an example of skill-biased technological change? Why or why not?
  - In the video, truck driver Scott Spendola comments, “Automation outside the terminal...I don't believe would work. You need a human being to deal with some of the problems...”. To what extent do you agree with him?
  - To the extent that some aspects of trucking remain difficult to automate, how has technological change influenced even these aspects of a truck driver's job?
- assigned reading & media:
  - “The Tech Threat, Part I” as reported by Bob Abeshouse on Al Jazeera English's *People & Power*. Originally aired May 27<sup>th</sup>, 2015. [25:00] 
  - “The Tech Threat, Part II” as reported by Bob Abeshouse on Al Jazeera English's *People & Power*. Originally aired June 3<sup>rd</sup>, 2015. [25:00] 
  - Autor, David H., Frank Levy, and Richard J. Murnane. 2002. “Upstairs, Downstairs: Computers and Skills on Two Floors of a Large Bank.” *Industrial and Labor Relations Review* 55(3): 432-447. 
  - Frey, Carl Benedikt, and Michael A. Osborne. 2013. “The Future of Employment: How Susceptible are Jobs to Computerisation?” Oxford Martin School, September. 
- additional preparation for discussion:
  - Work with these interactive data from Tableau to learn more about the predicted impact of automation—on a job-by-job basis—on U.S. employment and wages, zeroing-in on a job that you yourself may pursue. 
- guest speaker:
  - Micah Green, founder and CEO, Maidbot 
- **POST-DISCUSSION MINI-LECTURE:** The Emergence and Microeconomic Fundamentals of the Skill-Biased Technological Change Thesis 


 **Module #5:** *How Can We Mitigate the Income-Polarizing Effects of Technological Change?*

- seed questions:
  - What are the pros and cons of a guaranteed, universal basic income (UBI)?
  - Say your little sister or brother or the child of your parents' friend is about to be a Cornell freshman in the fall. What advice would you give him or her—things they








can do now to be relevant in the job market five years from now and 25 years from now? Similarly, is there anything you wish people would have advised you of a few years ago?

- **TECH VIGNETTE:** FroYo Franchising and Zume Pizza  
  - What would be the economic impact of a machine that eliminates the need for a person to dispense your frozen yogurt or to assemble and top your pizza?
  - To what extent do the comments of Julia Collins, Zume co-creator and co-CEO, suggest she is ignorant or more likely, disingenuous? Conversely, which of her comments and observations are well-informed and perhaps even prescient?
- assigned reading & media:
  - Davenport, Thomas H., and Julia Kirby. 2016. *Only Humans Need Apply: Winners and Losers in the Age of Smart Machines*. New York: Harper. 
  - “Andy Stern: Raising the Floor” as reported by Diane Rehm on NPR’s *Diane Rehm Show*. Interview with Andy Stern, author of *Raising the Floor: How a Universal Income Can Renew Our Economy and Rebuild the American Dream*. Originally aired July 11<sup>th</sup>, 2016. [49:02] 
  - “What Are the Best Arguments against the Basic Income, How Do We Address Them, and Why Are They Irrelevant?” Reddit community /r/BasicIncome. 
- additional preparation for discussion:
  - Work with the interactive map and related materials developed by NPR Planet Money to learn about the trajectory of the most common jobs in the U.S., over time and state by state. 
- **POST-DISCUSSION MINI-LECTURE:** Wages, Prices, and Productivity 









 **Module #6:** *How Have Emerging Technologies Altered the Arrangements under Which People Work (or Haven’t They)? Technologically-Facilitated Outsourcing and “Platform Capitalism” (a.k.a. the “Gig Economy”)*

- seed questions:
  - To what extent is “platform capitalism”—what others refer to as “crowd-based capitalism,” the “sharing economy,” or the “gig economy”—the future of work? To the extent that it is, should that concern us?
  - How can we leverage new technologies that enable “platform capitalism” while mitigating the downsides to those working under it?
  - When you graduate, would you prefer to be a conventional employee, a contractor, a “gig” worker, or some other designation? Why?
- **TECH VIGNETTE:** TaskRabbit 
  - Under what circumstances would you choose to become a Tasker?
  - To what extent is the TaskRabbit model of Clients (i.e., those offering and assigning tasks) and Taskers (i.e., those accepting and completing tasks) scalable and sustainable?
  - Suppose one could develop a great reputation as a Tasker, enough so to reliably earn enough to eat, pay rent, etc. How would their bundle of tasks—performing dozens of different duties each week—differ from a conventional job?






- assigned reading & media:
  - Weil, David. 2014. “Mending the Fissured Workplace.” In *What Works for Workers? Public Policies and Innovative Strategies for Low-Wage Workers*, edited by Stephanie Luce, Jennifer Luff, Joseph A. McCartin, and Ruth Milkman, pp. 108-133. New York: Russell Sage.  
  - Schor, Juliet. 2014. “Debating the Sharing Economy.” *Great Transition Initiative Essays*, October. 
  - Smith, Aaron. 2016. “Gig Work, Online Selling and Home Sharing.” Pew Research Center: Washington, November 17<sup>th</sup>. 
  - Mishel, Lawrence. 2015. “Uber Is Not the Future of Work.” *The Atlantic*, November 16<sup>th</sup>. 
  - Kessler, Sarah. 2014. “Pixel and Dime: On (Not) Getting by in the Gig Economy.” *Fast Company*, March 18<sup>th</sup>. 
  - Silverman, Jacob. 2014. “The Crowdsourcing Scam.” *The Baffler*. 

 **Module #7:** *But, We'll All Be Safe for a While, Right? What Is the Potential Impact of Recent and Imminent Technological Change on Professionals and Other Purveyors of Expert Labor?*

- seed questions:
  - How do you *believe* emerging technologies will transform the work of human experts?
  - How would you *wish* for technology to reshape expert labor, and what sorts of institutions could we fashion to encourage that reality?
- **TECH VIGNETTE:** Wordsmith® from Automated Insights    
  - Based on what this technology does well, do you expect professional jobs will disappear, or do you expect they will evolve? If you expect them to evolve, consider precisely in what ways they might do so.
- assigned reading & media:
  - *The Future of the Professions: How Technology Will Transform the Work of Human Experts* (2015) as discussed by Richard Susskind and Daniel Susskind at Oxford University on November 4<sup>th</sup>, 2015. [1:28:17] 
  - Pasquale, Frank. 2016. “Automating the Professions: Utopian Pipe Dream or Dystopian Nightmare?.” In *Los Angeles Review of Books*. Originally posted on March 15<sup>th</sup>. 
  - Hunt, Gordon. 2016. “Check Out These 10 Jobs of the Future.” In *Silicon Republic*. Originally posted August 10<sup>th</sup>, 2016. 
  - “‘Robot Lawyer’ Makes the Case against Parking Tickets” as reported by Arezou Rezvani on NPR’s *All Things Considered*. Originally aired January 16<sup>th</sup>, 2017. [4:44] 

 **Module #8:** *In What Ways Does Technology Make Us Worse at What We Do? A Foray into Workers' "Micro" Interactions with New Technologies*

- seed questions:
  - How are today's emerging forms of automation similar to earlier tools that have changed the way we do work, e.g., the wheel, the lever, the calculator, etc.? How do they differ?
  - In what ways if any would you be a *better* student were the internet *never* invented?
  
- **TECH VIGNETTE:** Fly-by-Wire   
  - How is flight safety *enhanced* by this form of automation? In what ways does fly-by-wire *hinder* flight safety?
  - An hour and a half into your trans-Atlantic flight, the flight attendant comes on the loud speaker with bad news. S/he can either announce 1.) "The fly-by-wire system is completely down and will be for the remainder of the flight." or 2.) "Both the pilot and the co-pilot are unconscious and will be for the remainder of the flight." As a passenger who enjoys living, which would you prefer? Is there any additional information you would want to know before answering the question?
  
- assigned reading & media:
  - Carr, Nicholas G. 2014. *The Glass Cage: Automation and Us*. New York: Norton. 