

Department of Geography & Planning
UNIVERSITY OF TORONTO
Geography of Innovation
GGR 251
Winter 2020
(To be revised)

Instructor: Jun Zhang
Office: Sidney Smith Hall, Room 5025B
Office Hours: Wednesday, 10:30-12:30 PM
(or by appointment)
Phone: 416-978-2958
E-Mail: zhang@geog.utoronto.ca

Lecture Hours: Tuesday, 1:00-3:00 PM
Lecture Room: LM 162 (Lash Miller Chemical Laboratories, 80 St. George Street)

TA Information:

Jordan Ali: jordan.ali@mail.utoronto.ca
Hanna Kim: hnn.kim@mail.utoronto.ca

Course Description

This course aims to understand the spatial disparities and dynamics of technological innovation. Employing an interdisciplinary approach, we explore how key technological sectors are initiated in different economic and institutional contexts, how they change through time, and how they are influenced by market competition and institutional arrangements at different geographic scales.

Innovation has become a major field of study in a number of social science disciplines, geography included. Contemporary economic geographic studies have greatly enriched our understanding of the innovation process by drawing attention to geographic proximity and knowledge spillovers. However, our knowledge about the deep causality of spatially uneven practice and performance of innovation remains fairly limited. Frequently either a firm-centric or state-centric framework is adopted in existing analyses of innovation. In this course, we seek to draw attention to the interplay between business firms and state institutions.

In contrast to the commonly found theoretical-oriented approaches and standing-alone case studies, this course takes an empirical, comparative and global approach to explore how new technologies, new firms and new markets rise and fall (or rise again) within actually-existing geographic, historical, and globally-interactive contexts. Whenever possible, we take an explicit comparative and relational angle to examine the variegated and interlinked emergence, development and innovative performance of the same sector in different regions and nations. Attention is drawn to the geo-historical dynamics of the electronics sectors, especially. Other major sectors such as automobiles and biotechnology are also examined.

Starting with a critical scrutiny of the iconic Silicon Valley, we examine and compare various cases at multiple analytical levels, historical periods and geographic scales. Over the course of the term, we will cover technological innovation and economic transformation in both the core

countries (especially the U.S. and Japan) and major emerging economies, especially those in East Asia. We also explore the key role of universities and finance for innovation, and draw attention to the dark side of financialization that may divert resources away from ‘creative destruction’ to ‘destructive creation’.

Course Evaluation

The course evaluation will be based on the following aspects:

| | |
|-----|---|
| 10% | Film Review I (600-800 words, due Week 4, Jan. 28 6pm on Quercus) |
| 10% | Research Proposal (400-500 words + bibliography, due Week 6, Feb. 11 6pm on Quercus) |
| 10% | Film Review II (600-800 words, due Week 10, March 17 6pm on Quercus) |
| 30% | Research Paper (1400-1600 words + reference, due Week 12, March 31 6pm on Quercus) |
| 40% | Final Exam |

Film Review I:

The Social Network is a 2010 American biographical drama film directed by David Fincher and written by Aaron Sorkin. It is adapted from Ben Mezrich's 2009 book *The Accidental Billionaires: The Founding of Facebook, A Tale of Sex, Money, Genius, and Betrayal* (New York: Doubleday). The film portrays the founding of social networking website Facebook and the resulting lawsuits. Although the film is dramatized and not entirely fact-based, it is still very stimulating in making sense of technological entrepreneurship and the geography of innovation in the context of this course. Your review essay is expected to be **600-800 words** and address at least THREE of the following FIVE questions (but NOT to make it a list of Q&A):

- 1) According to the film, where did Zuckerberg's idea for Facebook.com come from and how it has evolved over time?
- 2) From the film, what did you learn about the gap between a creative idea and a profitable business organization?
- 3) What did you learn from the film about the issue of intellectual property rights (IPRs) for technological entrepreneurship? Do you think that the Winklevoss brothers deserve the settlement with Zuckerberg which valued \$466 million, since they think that Zuckerberg stolen the ideas in ConnectU?
- 4) Why did Facebook move from Boston to Silicon Valley rather than New York City?
- 5) According to the film, what role did venture capitalists play to the growth of Facebook?

Furthermore, you are encouraged in your review to make connections to key concepts and theories appeared in the course materials and discussed in class.

This film has been placed on Course Reserves at Media Commons (VideoDVD 756617) in Robarts Library.

Film Review II:

The Inventor: Out for Blood in Silicon Valley

This is a 2019 American documentary film, directed and produced by Alex Gibney. The film is considered a companion piece to the book by John Carreyrou (2018): *Bad Blood: Secrets and Lies in a Silicon Valley Startup* (New York: Alfred A. Knopf). The film revolves around the rise and fall of Elizabeth Holmes, who dropped out of Stanford University at 19 to start blood-testing startup Theranos, and grew the company to a valuation of \$9 billion. She became the world's youngest female billionaire and heralded as the next Steve Jobs. Then, just two years later, her multibillion-dollar company was dissolved, and she will now face a trial over 'massive fraud' in July 2020.

Guideline for film review II will be provided shortly.

Research Project: Geography and Technological Innovation

Students are expected to develop an empirical research project centered on the geography of technological innovation and an explanatory argument based on the “geography as accessibility” approach as discussed in class. The empirical research should examine a particular technological sector, e.g., personal computer, Internet, mobile telecom, software, video game, automobile, biotech, clean energy, precision machinery, aerospace, etc., or a particular business firm specialized in one of such sectors. The semiconductor sector is excluded since it will be extensively covered in lectures. Here a technology sector is broadly defined as an industrial sector involving substantive research and development (R&D) activities, which may or may not be conducted in-house by business firms. If your choice is a sector, your geographic scope can be either a city/region or a nation, and you are expected to document and explain the sector’s origination and evolution in that particular territory. If your choice is a firm, other than a general account of the firm’s history, you are expected to focus on the origination, evolution and spatial trajectory of just one primary technological product that the firm is good at producing, since the firm could be a transnational conglomerate with many different subsidiary companies and/or product lines, such as Samsung Group and Samsung Electronics.

In any case, your chosen territory or firm should have achieved some identifiable success, as leader or follower, in the technological sector in question. You are expected to briefly summarize the major technological development and economic performance milestones of the sector/firm, as well as its evolving spatial pattern. Of course there can always be the crucial contribution from some scientific or technological geniuses and smart business strategies, your explanation should focus instead on geographic factors. Your explanatory argument should take a “geography as accessibility” perspective, and engage at least TWO of the following elements (which are not necessarily mutually exclusive, and some may be the cause of others): 1) accessibility to favorable resource endowments; 2) accessibility to tangible inputs, especially capital; 3) accessibility to intangible inputs, especially knowledge; 4) accessibility to public infrastructure and facilities; 5) accessibility to key business partners and suppliers; 6) accessibility to markets and/or clients; 7) accessibility to a favorable labor pool; 8) accessibility to social/business networks; 9) accessibility to enabling state institutions and policies, and 10) accessibility to favorable cultural norms and conventions.

Research Proposal: The proposal should 1) identify and justify your chosen technological sector, territory or business firm; 2) put forward a general explanatory argument from a ‘geography as accessibility’ perspective regarding the success of your chosen case; 3) provide a

basic structure of the argument to be advanced; 4) list three academic sources to be used; and 5) give an annotated bibliography offering a brief overview of the three sources. Your larger research paper should develop a thesis related to the tentative explanatory argument stated in the research proposal and the comments received on it. Though it is OK if you believe it is necessary to change your mind after further studies. Developing a strong thesis is crucial for the success of your essay. You will receive assistance from the instructor and TA on this along the way. For some tips on developing a strong thesis, please visit the following site:

<http://www.writing.utoronto.ca/advice/planning-and-organizing/thesis-statements> For more information on U of T writing resources and support, see www.writing.utoronto.ca and <http://geography.utoronto.ca/departement/resources-for-dept/wit-program/>

Research Paper: The length of the paper is expected to be **1400-1600 words**. It is expected to rigorously follow your revised proposal after digesting comments and feedbacks from the instructor and/or TA. More detailed guidelines and assistance will be provided later.

Assignment submission and late penalty

You must submit all your assignments on designated channels in digital form on Quercus. The penalty for late assignments is 5% per day, with the weekend counting as one day. Nothing will be accepted one week after the deadline unless you have made previous arrangements with the instructor (e.g., due to illness). If there is a legitimate reason delaying your submission, you should inform the instructor via email before the due date. Be sure to keep electronic copies of your assignments. Students are strongly advised to keep all rough and draft work as well as hard copies of their research papers and assignments until the marked assignments have been returned and the grades been posted on ROSI.

Extensions will be granted sparingly in the case of illness, and you must present me with a completed U of T medical certificate (<http://www.illnessverification.utoronto.ca/>). Please consult your college registrar should you be having difficulties during term that prevent you from completing your course work due to extenuating circumstances. Further information can be found at the following link: <http://www.artsandscience.utoronto.ca/ofr/calendar/rules.htm#term>

Schedule and Readings (To be revised!)

| Week (date) | Theme | Readings |
|--------------------|--|---|
| Week 1: Jan. 7 | Introduction | Salter&Oliver 2014 |
| Week 2: Jan. 14 | Geography and Innovation | Asheim&Gertler 2005; Feldman&Kogler 2010 |
| Week 3: Jan 21 | Silicon Valley: the Global Icon of Innovation | Saxenian 1991; Lécuyer 2000 |
| Week 4: Jan 28 | Silicon Valley and <i>the Military-Industrial-Academic Complex</i> | Leslie 2000; Mazzucato 2013 |
| Week 5: Feb. 4 | “Silicon Valleys East”: Japan and Singapore | Angel 1994; Mathews 1999 |

| | | |
|---------------------|--|---|
| Week 6: Feb. 11 | “Silicon Valleys East”: South Korea and Taiwan | Hwang&Choung 2014; Dicken 2007 |
| Feb. 18 | Reading Week | |
| Week 7: Feb. 25 | Innovation in the Auto Industry: Toyota | Bernstein 1995; Fine&Raff 2002 |
| Week 8: Mar. 3 | Innovation in Biotech: San Diego | Walshok&Lee 2014; Cortright&Mayer 2002 |
| Week 9: Mar. 10 | University and Innovation | Fishman et al. 2014; Bramwell&Wolfe 2008 |
| Week 10: Mar. 17 | Finance and Innovation | Lazonick 2007; Kenney&Florida 2000 |
| Week 11: Mar. 24 | Innovation Corrupted? | Healy&Palepu 2003; Lazonick 2014 |
| Week 12: Mar. 31 | Summary and Review | |

Contacting me: I expect students to take advantage of my office hours to discuss the course. Please come to office hours or make an appointment if you wish to discuss matters related to the class. Try not to ask questions by email that is difficult to respond briefly. I will try to get back to you within 48 hours. Students should use their U of T email account in all course correspondence, and emails should include GGR251 in the subject line.

Use of electronic devices: I expect cell phones and other communications devices to be either turned off or in silent mode. Do not answer your phone or text message during class. Although you may want to use your electronic devices to read papers, take notes and so on, I would strongly recommend you to stay away from them as much as possible. It is better that you can keep yourself and your classmates away from unnecessary distractions.

Plagiarism: All cases of suspected plagiarism are taken very seriously. It is your responsibility to know and follow University rules and regulations including those that cover plagiarism, missed exams, etc. Plagiarism is quoting (or paraphrasing!) the work of an author (including the work of a fellow student) without a proper citation. If you use word-for-word copy of text from source, you must use quotations marks along with citation. Students should not submit any academic work for which credit has previously been obtained or is being sought. Please consult the “Rules and Regulations” section of the Arts and Science Calendar (www.artsandscience.utoronto.ca/ofr/calendar/rules.htm) for further information and check the ‘How not-to plagiarize’ website at <http://www.writing.utoronto.ca/advice/using-sources/how-notto-plagiarize>

Accessibility: If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: disability.services@utoronto.ca or visit <http://studentlife.utoronto.ca/accessibility>

Topics and Required Readings

Week 1 Introduction: Making Sense of Innovation, Geographically (Jan. 7)

Salter, Ammon and Alexy, Oliver 2014. "The nature of innovation," pp. 26-50, in *The Oxford Handbook of Innovation Management*, Mark Dodgson, David M. Gann, and Nelson Phillips (eds.), Oxford: Oxford University Press.

Week 2 Geography and Innovation (Jan. 14)

Asheim, Bjørn T. and Gertler, Meric S. 2005. "The geography of innovation: regional innovation systems," pp. 291–317, in Jan Fagerberg, David C. Mowery and Richard R. Nelson (eds.), *The Oxford Handbook of Innovation*, Oxford: Oxford University Press.

Feldman, Maryann P. and Dieter F. Kogler 2010. "Stylized facts in the geography of innovation," pp. 381-410, in Bronwyn H. Hall And Nathan Rosenberg (eds.) *Handbook of the Economics of Innovation*, Volume 1, Amsterdam: North Holland.

Week 3 Silicon Valley: the Global Icon of Innovation (Jan. 21)

Saxenian, AnnaLee 1991. The origins and dynamics of production networks in Silicon Valley, *Research Policy* 20: 423-437.

Lécuyer, Christophe 2000. "Fairchild semiconductor and its influence," pp. 158-183, in Lee, Chong-Moon, Miller, W.F., Hancock, M.G., and Rowen, H.S. (eds.) *The Silicon Valley Edge: A Habitat for Innovation and Entrepreneurship*. Stanford, Calif.: Stanford University Press.

Week 4 Silicon Valley and the Military-Industrial-Academic Complex (Jan. 28)

Leslie, Stuart 2000. "The biggest 'angel' of them all: the military and the making of Silicon Valley," pp. 48–67 in Martin Kenney (ed.) *Understanding Silicon Valley: The Anatomy of an Entrepreneurial Region*. Stanford: Stanford University Press.

Mazzucato, Mariana 2013. *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*. London: Anthem Press. Chapter 5: The state behind the iPhone, pp. 87-112.

Week 5 "Silicon Valleys East": Japan and Singapore (Feb. 4)

Angel, David 1994. *Restructuring for Innovation: The Remaking of the U.S. Semiconductor Industry*. New York: The Guilford Press. Chapter 3: The challenge of global competition, pp. 63-88.

Mathews, John A. 1999. A silicon island of the east: creating a semiconductor industry in Singapore, *California Management Review* 41: 55-78.

Week 6 Silicon Valleys East: South Korea and Taiwan (Feb. 11)

Hwang, Hye-Ran & Jae-Yong Choung 2014. The co-evolution of technology and institutions in the catch-up process: the case of the semiconductor industry in Korea and Taiwan, *Journal of Development Studies* 50: 1240-1260.

Dicken, Peter 2007. *Global Shift: Mapping the Changing Contours of the World Economy*, 5th edition. New York: Guilford. Chapter 11: 'Chips with everything': the semiconductor industry, pp. 317-346.

Week 7 Toyota and Innovation in the Auto Industry (Feb. 25)

Bernstein, Jeffrey 1995. "Toyoda automatic looms and Toyota automobiles," Chapter 11 of McCraw, T. K. (eds.) *Creating modern capitalism: how entrepreneurs, companies, and countries triumphed in three industrial revolutions*. Cambridge: Harvard University Press, pp. 396-438.

Fine, Charles H. and Daniel M.G. Raff 2002. "Automobiles", pp. 416-432 in Steil, Benn, David G. Victor, and Richard R. Nelson (eds.) *Technological Innovation and Economic Performance*. Princeton: Princeton University Press.

Week 8 San Diego and Innovation in Biotech (March 3)

Walshok, Mary and Carolyn Lee 2014. "The partnership between entrepreneurial science and entrepreneurial business: A study of integrated development at UCSD and San Diego's high-tech economy", pp. 129-155, in Thomas J. Allen and Rory O'Shea (eds.) *Building Technology Transfer within Research Universities: An Entrepreneurial Approach*, Cambridge: Cambridge University Press.

Cortright, Joseph and Mayer, Heike 2002. *Signs of Life: The Growth of Biotechnology Centers in the U.S.*. Washington, DC: Center on Urban and Metropolitan Policy, The Brookings Institution.

Week 9 University and Innovation (March 10)

Fishman, Elliot A., Rory P. O'Shea, and Thomas J. Allen 2014. "Creating the MIT entrepreneurial ecosystem," pp. 60-86, in Thomas J. Allen and Rory O'Shea (eds.) *Building Technology Transfer within Research Universities: An Entrepreneurial Approach*, Cambridge: Cambridge University Press.

Bramwell, Allison and David A. Wolfe 2008. Universities and regional economic development: the entrepreneurial University of Waterloo, *Research Policy* 37: 1175-87.

Week 10 Finance and Innovation (March 17)

Lazonick, Williams 2007. The U.S. Stock market and the governance of innovative enterprise, *Industrial and Corporate Change* 16: 983-1035.

Kenney, Martin and Richard Florida 2000. "Venture capital in Silicon Valley: fueling new firm formation", pp. 98-123 in Martin Kenney (ed.) *Understanding Silicon Valley: The Anatomy of an Entrepreneurial Region*, Stanford: Stanford University Press.

Week 11 Innovation Corrupted? (March 24)

Healy, Paul M. and Krishna G. Palepu 2003. The fall of Enron, *Journal of Economic Perspectives* 17: 3–26.

Lazonick, Williams 2014. Profits without prosperity: stock buybacks manipulate the market and leave most Americans worse off, *Harvard Business Review*, September, pp. 46-55.

Week 12 Conclusion and Review (March 31)