Understanding Technology Disruption - MGT 833

Course Information

Course Number	MGT 833
Course Title	Understanding Technology Disruption
Term and Year	Fall 2 - 2019
Class Meeting Days/Time/Room	**Mondays & Wednesdays, 1:00PM to 2:20PM** <mark>**ROOM 2410**</mark>
Course Support	Justine Jarvie justine.jarvie@yale.edu

Contact Information

Professor	TA(s)
Name: Thomas (Tom) Gage, Lecturer in the Practice of Management **Office Location**: tbd **Email Address**: tgage@marconipacific.com Preferred or thomas.gage@yale.edu **Mobile Phone**: 301-526-7790 **Office Hours**: I will be on campus after class on Mondays, before class on Wednesdays and on some Tuesdays. Pls email or text to sched. a meeting. Pls call me on my mobile if urgent.	**Name**: Arun Venkatesan arun.venkatesan@yale.edu
Review Sessions: As needed	

Course Materials

Req-uired	*AIQ, How People and Machines are Smarter Together*, Nick Polson and James Scott, St. Martin's Press, 2018. Hardback, Paperback & Kindle available (This should be in the Bookstore. PLEASE COMPLETE BEFORE CLASS ON DEC.2, THE MONDAY AFTER THE THANKSGIVING BREAK.
	Required Reading and Optional Readings (when provided) for each class will be available by internet link and when possible loaded in Canvas as PDFs or Word Docs
	See the detailed syllabus for class assignments and readings

Course Description and Objectives

Course Description and Structure	Course Description: We are just beginning the Fourth Industrial Revolution – following on from the steam engine and mechanical production, electricity and mass production, electronics and IT. The technologies of this fourth revolution are beginning to change the economic, political and individual organization (company, government and not for profit) landscape in fundamental ways and more rapidly than ever before in history.
	MBA candidates can benefit from looking into the future through the lens of technology disruption. This can be achieved by understanding the impact of previous technologies and technological revolutions and by developing a grounding in near-term technologies and technology development. In addition, methodologies and frameworks can assist students in monitoring, determining impacts, understanding the likely timing of diffusion and developing strategies to address and take advantage of technology disruption, either by defending an incumbent position (defensive) or attacking a position, utilizing a disruptive technology (offensive).
	Technology will affect virtually every industry, every government and every citizen. Technology disruption within an industry will affect that industry (e.g., the auto industry will be impacted by automated vehicle technology). Importantly, adjacent industries will also be affected (e.g., cities will need to modify roads and the insurance industry will need to prepare for fewer accidents and lower premiums).
	This course will review five big technologies: AI, advanced internet, next generation telecommunications (including 5G, AR and VR), automated vehicles, and robotics (including 3D printing).
	An analytical framework with attendant analytical tools such as environmental scanning, use case development, scenario planning, diffusion modeling, long pole technology development and missing elements in the delivery value chain will be illustrated.
	Course Objectives: The course has five objectives that will provide the students with:
	1.) A grounding in the functionality and technical complexity of each of the five big technology disruptors; how the technology works; and what functionality it delivers.
	2.) An understanding of the integrative nature of technology development and productization. Technologies tend to work in concert. For example, small cameras, smart phone software, microchips, advanced telecommunications networks and apps all come together to deliver the smart phones we now use.

	3). An understanding of the magnitude and likely timing of the impacts of these technologies on industries, individual organizations and on society (micro [company, public sector and not-for-profits] and macro-economic impacts). Understanding timing is one of the most important questions regarding the impact of technology.
	4.) An approach to developing continued awareness of technology that is likely to affect their careers and specific industries, the public sector or not-for-profit organizations.
	5.) The ability to apply strategic frameworks, economic fundamentals and analytical tools learned in other classes to develop strategies to adopt (offense) or defend (defense) against technological disruption.

Grading Policy

Deliverables	1. Class Attendance and Participation 20%
	2. Group Project - Back Bay Battery 25%
	3. Group Project – IoT or AR/VR 20%
	4. Final Group/Individual Project 35%
	
	  1. Class attendance and participation.
	  2. Two group papers or PowerPoints will be drawn from the prior readings and class modules.
	    • PowerPoint # 1: Write up your team's findings from the Back Bay Battery Simulation. Specific questions to address will be found in the Assignments section of Canvas. DUE at 5PM on SUNDAY, Oct. 27.
	    • PowerPoint # 2: Write up your team's assessment of how to apply Internet of Things (IoT) technology and/or Augmented Reality/Virtual Reality to a data analytics opportunity in a specific industry. Specific questions to address will be found in the Assignments section of Canvas. DUE BEFORE CLASS 10:30AM on MONDAY, Nov. 11.
	  3. The Final Project will involve applying the technologies and frameworks studied to understanding how the ride sharing (MaaS) industry (e.g., Uber, Lyft, Grab, Go-Jek, Didi, Taxify and others) will evolve. Uber and LYFT have disrupted the transportation industry and also disrupted public transportation in major cities as people have opted for point-to-point travel over public transportation. But to date, Uber and Lyft have lost billions of dollars. What is the likely future of this technology? DUE by 5PM on FRIDAY, Dec. 13.
	
	This final assignment requires submission of a written paper (written text plus embedded financial analysis exhibits, charts and graphs). Length is optional but it will probably require 4 to 5 pages of text (and then additional financial analysis exhibits, charts and graphs) to

address the financial, scenario and strategic issues posed. Students are encouraged to work in groups to conduct the analysis, develop the thinking and present conclusions, BUT <u>the papers are to be submitted individually</u> with your own dash of analysis, perspective and conclusions thrown on top of your group's work. S-1s for Uber and Lyft, readings and questions to address will be posted in Canvas.

Detailed Outline of Class Sessions

<u>Oct.21.Mon.Module 1:</u> What's Going on In Tech and Why You Should Pay Attention

❖ Technology has brought us longevity, literacy and a much higher quality of life. Agricultural and manufacturing productivity have soared. New companies have been formed in almost every sector utilizing new technologies to deliver new products. The value of FAANG stocks have soared. Meanwhile corporate longevity is threatened by disruptive new entrants attacking existing business models and creating new ones.

❖ Required Readings:
1. *Inside the New Industrial Revolution,* Christopher Mims, WSJ, November 12, 2018. (Summary of Global Economic Forum [Davos] thinking). **Link or in Canvas** https://www.wsj.com/articles/inside-the-new-industrial-revolution-1542040187
2. *Q&A with Bill Gates | 2019 Breakthrough Technology | MIT Technology Review*, Bill Gates, MIT Technology Review, February 27, 2019. **Video Link Only** https://www.youtube.com/watch?v=raAkFKm9afg&feature=youtu.be
3. *The Robot Apocalypse has been Postponed*, Ross Douthat, NYT, July 23, 2019. **Link or in Canvas** https://www.nytimes.com/2019/07/23/opinion/robots-andrew-yang-democratic-debate.html?action=click&module=Opinion&pgtype=Homepage

<u>Oct.23.Wed.Module 2:</u> Disruption Theory #1

❖ Professor Clayton Christensen at HBS has done much of the seminal work on technology disruption – sustaining vs. disruptive technology and innovation. You have been exposed to this work in previous classes. We will use this class to review that material and discuss how it has affected numerous industries.

❖ Required Readings:
1. *What is Disruptive Innovation?* Clayton Christensen et. al., Harvard Business Review, December, 2015. **Link or in Canvas** https://hbr.org/2015/12/what-is-disruptive-innovation
2. *The Innovators Dilemma*, Wei Li, video summary, Jul 11, 2016. **Link Only** https://www.youtube.com/watch?v=NrC_tR8hxjQ
3. *The Rise and Fall of Blackberry: An Oral History, Felix Gillett, Diane Brady and Caroline Winter,* December 9, 2013, **Link or Canvas** https://www.bloomberg.com/news/articles/2013-12-05/the-rise-and-fall-of-blackberry-an-oral-history

❖ Optional Readings:
1. Disruptive Innovations VI, Ten More Things to Stop and Think About,

Kathleen Boyle, CFA, August, 2018, Citi. PLEASE PAY ATTENTION TO PAGES 12-17 which provide a good summary of current battery technology issues and will help you think a bit about the Back-Bay Battery Simulation that is due on Monday. YOU ARE NOT EXPECTED TO READ THIS WHOLE REPORT BUT IT MIGHT BE WORTH SKIMMING. **Link or in Canvas** https://www.citibank.com/commercialbank/insights/assets/docs/2018/Disruptive_Innovations_VI.pdf

Oct.28.Mon.Module 3: Back Bay Battery Simulation (WRITTEN ASSIGNMENT)

- ❖ This is a fun simulation regarding existing (AGM Lead Acid) batteries and new battery (SC - Supercapacitor) technology offered by Back Bay Battery to its three customer segments – Automobiles, Warehouse equipment and Uninterrupted Power Supplies. The goal is to maximize profitable growth while maintaining the AGM business and growing the SC business – like changing the tires while driving down the road. The simulation places you in the role of President at Back Bay Battery, Inc., the battery division of a billion-dollar consumer electronics manufacturer. You will have to apply strategic innovation thinking to sustain Back Bay Battery's leadership position in the market as new technologies emerge and the competitive landscape heats up. You will have to manage trade-offs between improving the company's core technology and investing in a new, potentially disruptive technology.
- ❖ You should run the sim 1 time by yourself to familiarize yourself with how the SIM works. This is not graded or reviewed by the Professor
- ❖ THEN your team can run the SIM up to 3 additional times to understand how different explicit strategies result in different outcomes (Your team leader will be the only one able access the SIM to run the additional 3 runs)
- ❖ You should form a group of two or three students to work the sim. Please be sure to put student's names on your written submission.
- ❖ Please identify your team leader by sending an email to Arun arun.venkatesan@yale.edu no later than after class on Wednesday October 23.
- ❖ Students are required to write-up their findings in a PowerPoint submission INCLUDING copies of your best run and your worst run and the explicit strategies you employed for each. Several PowerPoints will be reviewed in class so please be prepared to present. DUE by 5pm, on SUNDAY October 27

PLEASE SEE PowerPoint Assignment in Assignments for More Information

Oct.30.Wed.Module 4: Disruption Theory #2

- ❖ There are a lot of ways at looking at technology innovation beyond Christensen's classical sustaining and disruptive approach. This class will explore several other types of technology innovation paths and disruption theory.
- ❖ Required Readings:
  1. *40 Years Later, Lessons from the Rise and Quick Decline of the First "Killer App"* Christopher Mims, WSJ, July 13, 2019. **Link or in Canvas** https://hbr.org/2015/12/what-is-disruptive-innovation

2. *The New Logic of Competition,* Ryoji Kimura, et.al. BCG Henderson Institute, March 22, 2019. **Link or in Canvas** https://www.bcg.com/publications/2019/new-logic-of-competition.aspx
3. *BHAG Guide; Does your BHAG Inspire Your Company to Achieve Greatness?* Rhythm Systems. **Link or in Canvas** https://connect.rhythmsystems.com/big-hairy-audacious-goal-guide?hsCtaTracking=15ac95a0-a44e-4102-ba7b-bccf640f2bdf%7C519671a7-0587-4f38-8039-555d312a6532

Nov.4.Mon.Module 5: Telecommunications – Past and Future
- ❖ The break-up of AT&T in 1984, the development of cellular and broadband and of Internet Protocol data (IP) as well as the development of apps have fostered an unprecedented explosion of global connectivity (Metcalf's Law). Now we are on the threshold of the Internet of Things (IoT) and 5G super-fast connectivity with implications for everything being connected at light speed.
  1. Telecom.Lecture.Nov.4.Module 5. Prof. Tom Gage, 2019. **Canvas Only.** There is so much material to cover in this module that I am posting the lecture in advance of class. Please review the slides (approximately 70) and come to class identifying areas where you would like more elaboration or have specific questions or observations.
  2. *Smart Cities Aren't Just IoT, But Also Opioid Response, Transit, Streets, & People, Michael Barnard,* Cleantechnica, March 18th, 2019. **Link or In Canvas** https://cleantechnica.com/2019/03/18/smart-cities-arent-just-iot-but-also-opioid-response-transit-streets-people/

Nov.6.Wed.Module 6: Internet – Past and Future
- ❖ The commercial internet is only 30+ years old, yet it has transformed media distribution, library and casual research, taxi hailing, retail and many other industries. How did we get here, where is the internet headed and what are the major tenets of this transformative technology? Just beginning augmented and virtual reality tech are beginning to change how we see the world. Also, in parallel, quantum computing is in development with the likely promise of ultra-fast processing, delivering the backbone of advanced AI and risks to cyber-security (which we will address before the Thanksgiving recess).
- ❖ Required Readings
  1. Internet.Lecture.Nov.6.Module 6. Prof. Tom Gage, 2019. **Canvas Only.** There is so much material to cover in this module that I am posting the FIRST part of the lecture in advance of class. Please review the slides (approximately 40) and come to class identifying areas where you would like more elaboration or have specific questions or observations.
  2. *AR Will Spark the Next Big Tech Platform—Call It Mirrorworld*, Kevin Kelly, WIRED, February 12, 2019. **Link or in Canvas** https://www.wired.com/story/mirrorworld-ar-next-big-tech-platform/
  3. *A Beginner's Guide to quantum computing, Shohini Ghose, TED Talk, November 2018,* **Video Link Only** https://www.youtube.com/watch?v=QuR969uMICM
- ❖ Optional Reading:
  1. *The Coming Quantum Leap in Computing,* Massimo Russo et. al., Boston Consulting Group, May 16, 2018. **Link or in Canvas**

https://www.bcg.com/publications/2018/coming-quantum-leap-computing.aspx?utm_medium=Email&utm_source=201809COMP&utm_campaign=201809_COMP_OUTREACH_NONE_GLOBAL&utm_usertoken=0fd2a113e001597d720fe11d4b79744d7a61140c&redir=true

2. *Virtual Reality Roundup: 11 VR Examples You Need to Watch*, Caroline Forsey, Hubspot, updated October 23, 2018. **Video and Text Link** https://blog.hubspot.com/marketing/virtual-reality-videos

Nov.11.Mon.Module 7: IoT or AR/VR Group Project (WRITTEN ASSIGNMENT)

- ❖ We have reviewed telecom and the internet so now it is time to apply some of those learnings to real world examples. Students (groups of 2 or maximum 3) will develop a 4 to 6 page PowerPoint presentation using the application of IoT tech or AR/VR tech to a specific company or city problem. For example, how might IoT be used in retail to track shopper's movements in a store? How does AmazonGo work and why isn't it quite there yet? How might a city use IoT to better manage traffic flow or garbage pick-up or pothole identification? You are welcome to illustrate the example of a specific company in this space and analyze why you think their solution will or won't be successful.
- ❖ DUE BEFORE class, by 10:30AM, on Monday November 11. You are encouraged to be creative and ideate, but make sure to apply the technologies we have discussed.

PLEASE SEE PowerPoint Assignment in Assignments for More Information

Nov.13.Wed.Module 8: Methods for Understanding Tech Disruption #1

- ❖ Managing technology disruption is not an easy task. It is important to understand six aspects of this disruption: 1.) The technology itself and what functionality it can deliver; 2.) The use cases (the customer needs) that the solution can address; 3.) The parts of the technology solution still in development that "gate" its market readiness (both technical and cost gates); 4.) The timing of when the solution will be market ready; 5.) The time it takes for the solution to diffuse through the market (less expensive products can generally be adopted faster than more expensive products); 6.) The parts of the value chain that deliver the solution (e.g., resource inputs, regulation, liability coverage) which can slow down or accelerate diffusion.
- ❖ Required Readings:
    1. *The Flare and Focus of Successful Futurists*, Amy Webb, MIT Sloan Management Review, Summer 2017. **Link or in Canvas** https://sloanreview.mit.edu/article/the-flare-and-focus-of-successful-futurists/
- ❖ Optional Reading:
    1. *Application Based Clustering. Sizing the IoT Market*. Ericsson and A.D. Little, 2018. **Link or in Canvas** *https://www.ericsson.com/en/networks/trending/insights-and-reports/5g-challenges-the-guide-to-capturing-5g-iot-business-potential*. You will need to register to download this document.

Nov.18.Mon.Module 9: Vehicle Technology – Crash Avoidance, Automated, Connected, Electrified and Shared

- ❖ We are on the threshold of a major upheaval in transportation – (ACES) Automation, Connectivity, Electrification and Sharing. The core industries – vehicle OEMs, gasoline providers, property and casualty insurance companies, telecommunications and media companies will all be affected as either disruptors or "roadkill." But because transportation is so fundamental to the fabric of social and economic life virtually every industry, organization and government will have to adopt new ways of doing business in either large or small ways.
- ❖ Required Readings:
    1. *The Coming Revolution in Vehicle Technology*. Thomas Gage and Jonathan Morris. Xilinx. July 2015. **Canvas Only**
    2. *Snapshots of the Global Mobility Revolution*, Brian Loh, et. al., McKinsey Quarterly, March 2019. **Link or in Canvas** https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/snapshots-of-the-global-mobility-revolution
    3. *California PEV Infrastructure Projections 2017-2025*, Bedir et. al., California Energy Commission, Revised August 16, 2018. **Link or in Canvas** https://www.nrel.gov/docs/fy18osti/70893.pdf
- ❖ Optional Readings:
    1. *Elevating the future of mobility Passenger drones and flying cars*, Lineberger, et. al., Deloitte, January 18, 2018. **Link or in Canvas** https://www2.deloitte.com/insights/us/en/focus/future-of-mobility/passenger-drones-flying-cars.html?id=us:2pm:3ad:nytff:awa:greendot:03192019:flexxldn:altb:ros

Nov.20.Wed.Module 10: Methodologies #2 – Scenario Planning

- ❖ Continuing on from Module 9, this class will look at an additional framework for understanding the future – Scenario Planning. An abbreviated Scenario Planning exercise will be conducted in class regarding the vehicle technology future.
- ❖ Required Readings:
    1. *Scenario Planning for the Long-term* — Peter Schwartz at The Interval/The Long Now Foundation, Jun 27, 2019 **WATCH minutes 3:10 – 17:12. Video Link Only** https://www.youtube.com/watch?v=HXwS9cGF9Bk
    2. *Scenario Planning* Marconi Pacific. 2019. **Canvas Only**
    3. *Customer Portraits. Cable TV*. Marconi Pacific. Dec.2013. **Canvas Only**
- ❖ Optional Readings:
    1. See Ikea's 6 visions for How We'll Live in the Future, Elizabeth Segran, Fast Company July 31,2019. **Link or in Canvas** https://www.fastcompany.com/90383582/see-ikeas-6-visions-for-how-well-live-in-the-future?utm_campaign=eem524%3A524%3As00%3A20190731_fc&utm_medium=Compass&utm_source=newsletter
    2. Citing Climate Risk, Investors Bet Against Mortgage Market, Kate Duguid, Reuters, September 29, 2019. **Link or in Canvas** https://www.reuters.com/article/us-climatechange-mortgages/citing-climate-risk-investors-bet-against-mortgage-market-idUSKBN1WE0D3

3. *The Art of the Long View: Planning for the Future in An Uncertain World*, Peter Schwartz, Currency Doubleday, 1991. This is the seminal book on Scenario Planning: https://www.amazon.com/Art-Long-View-Planning-Uncertain/dp/0385267320

Dec.2.Mon.Module.11: AI and the Future of the World

❖ AI is likely to change everything. As the internet and IoT connect more and more sensors and devices, more data will be available that can only be economically made valuable through AI. Of course, AI is already making many decisions for us such as internet search, some vehicle control and most robotics. How does AI work, where is it headed, where is the value and what are some of the risks?
❖ Required Readings:
1. Please finish AIQ in advance of this class.
2. Watch the Video Loup Ventures Manifesto 2.0, September, 2018. **Video Link Only** https://loupventures.com/manifesto/
❖ Optional Readings:
1. *A.I. is Progressing Faster Than You Think!* Dagogo Altraide, Cold Fusion TV, YouTube. April 12, 2017. **Video Link Only** https://www.youtube.com/watch?v=mQO2PcEW9BY
2. The game of GO and the movie *AlphaGo*, September 29, 2017. **Video Link Only**
    o The trailer… https://www.alphagomovie.com/
    o The whole movie on Netflix… https://www.netflix.com/title/80190844
3. *Compassion through Computation: Fighting Algorithmic Bias,* Lecture and Q&A with Joy Buolomwini (MIT) Justine Cassell (Carnegie Mellon) and World Economic Forum (Davos 2019). **Video Link Only** https://www.youtube.com/watch?v=_sgji-Bladk

Dec.4.Wed.Module 12: Robotics and The Future of Manufacturing

❖ U.S. manufacturing capability has been hollowed out (productivity is up but manufacturing as a % of GDP and manufacturing employment have been declining for decades) as a result of a combination of offshoring and technical improvements – IT and more recently robotics. The future of manufacturing (in developed countries and perhaps in developing countries also) is likely to depend substantially on robotics and perhaps on 3D printing. What are the implications for developing world manufacturing and the possible re-shoring of manufacturing due to robotics? What are the implications for jobs? Where are the opportunities?
❖ Required Readings:
1. Interview with Rafael D'Andrea, Founder of Kiva Systems (sold to AMZ) and Professor of Dynamic Systems and Control, ETH Zurich. Boston Consulting Group Henderson Institute, January 20, 2015. **Video Link Only** https://www.bcg.com/en-us/publications/2015/technology-strategy-technology-business-transformation-dandrea-raffaello-future-robotics.aspx
2. *The Next Manufacturing Revolution is Here*, Oliver Scalabre, Boston Consulting Group, TedTalk, YouTube. May 2016. **Video Link Only** https://www.ted.com/talks/olivier_scalabre_the_next_manufacturing_revolution_is_here?language=en
❖ Optional Readings:

1. *US Manufacturing: Understanding Its Past and Its Potential Future*. Martin Neil Baily and Barry P. Bosworth. Journal of Economic Perspectives—Volume 28, Number 1—Winter 2014. **READ Only Pages 3–26. Link or in Canvas** https://www.brookings.edu/wp-content/uploads/2016/06/us-manufacturing-past-and-potential-future-baily-bosworth.pdf
2. *BOSTON DYNAMICS ROBOTS: Leading the Robotic Industry,* Inventions World, May 27, 2019. **Video Link Only** https://www.youtube.com/watch?v=uNnVtTHdF3A

Dec.9.Mon.Module13: Vehicle Technology – Ride Sharing Case

❖ Ride sharing, also known as Mobility as a Service (MaaS), has grown rapidly through a combination of low prices, ease of use via app hailing and mobile payments, as well as gig economy labor supply. But profitability has been elusive. The promise of removing the labor component through AVs could change that. But many AVs on the road (in lieu of public transportation) presents the challenge of further adding to road congestion. This case will explore corporate positioning, implications of MaaS for adjacent industries and public policy implications of MaaS, especially for cities.

❖ Required Readings:
1. *UBER. Original Pitch Deck.Dec.2008*. **Link or in Canvas** **https://techcrunch.com/gallery/here-is-ubers-first-pitch-deck/**
2. *Lyft S-1*, U.S. Securities and Exchange Commission, March 1, 2019. The IPO was priced at $72 per share, raising $2.2 billion on March 28, 2019. **Link or in Canvas** https://www.sec.gov/Archives/edgar/data/1759509/000119312519059849/d633517ds1.htm
3. *Uber S-1*, U.S. Securities and Exchange Commission, April 11, 2019. The IPO was priced at $45 per share, raising $8.1 billion on May 9, 2019 at a valuation of $82.4B. **Link or in Canvas** https://www.sec.gov/Archives/edgar/data/1543151/000119312519103850/d647752ds1.htm
4. *Will Autonomous Vehicles Derail the Train Sector?* Joel Hazan, et. al., Boston Consulting Group, September 2016. **Link or In Canvas** http://image-src.bcg.com/Images/BCG-Will-Autonomous-Vehicles-Derail-the-Train-Sector-Sep-2016_tcm30-62351.pdf

❖ Optional Readings:
Numerous optional readings will be loaded into Canvas
The work in this class will frame the issues regarding the Final assignment for the class which is due Friday December 13 COB.

Faculty Biography:
Tom Gage is Chairman and Founder of Marconi Pacific. He has practiced as a management consultant with Fortune 100 corporations for over 30 years. He was formerly SVP and General Manager at VeriSign. He was previously Vice-president and Managing Director of Gemini Consulting's C4 practice (Communications, Computing, Consumer Electronics and Content) responsible for 200 consultants in North America. He is a board member of The Yale Center for Customer Insights and of ATIS – The Alliance for Telecommunications Industry Solutions. He is

the author and Editor of two editions of Energy Primer – Solar, Water, Wind and BioFuels – and of numerous articles on telecommunications, technology business issues and vehicle automation. He holds an MPPM from the Yale School of Management and a BA from Cornell University. He has three grown children, including a SOM '14 grad and a McDonough School of Business '16 grad. He also has three stepchildren. He resides with his wife Carole, a garden designer, in Potomac, Maryland.

The instructor reserves the right to modify and/or change the syllabus as needed during the course.