

CS384: Perspectives on Computing

Calvin University

Spring 2022

Instructor: [Prof. Derek Schuurman](#)

Textbook: Derek C. Schuurman, *Shaping a Digital World: Faith, Culture and Computer Technology*, InterVarsity Academic, 2013. Additional readings are assigned weekly throughout the course.

Schedule: Tuesday and Thursdays 10:30-11:45am (section A), 12:00-1:15pm (section B) in HH-334

Course Description: This course addresses social, ethical, legal, and professional issues that arise in computer science from a Reformed Christian perspective. Social issues concerning the computerization of society include privacy, security, the digital divide, and changes in the way people receive information and relate with others. Ethical discussions include a survey of ethical theories and covers professional, ethical and legal issues in areas including intellectual property, privacy, liability, and professional codes of conduct. In addition, some foundational issues are covered, including norms for design and what it means to be a person.

Prerequisite: Last year of a computing-related program.

Motivating Question:

“Does the ancient Christian faith still have anything to say to a fast-paced modern world shaped by such technology? Tertullian, a father of early Christian literature, once posed the question, “What does Athens have to do with Jerusalem?” When it comes to computer technology, we might well ask, “What does Silicon Valley have to do with Jerusalem?” In a nutshell: what do bytes have to do with Christian beliefs?” (*Shaping a Digital World*, p. 11)

Learning Outcomes:

Upon successful completion of this course, a student will be able to:

- articulate how a reformed Christian perspective informs the use, design, and norms for computer technology
- critically engage different perspectives on technology including instrumentalism, technological determinism, and technicism and explain why technology is not neutral
- discuss a variety of social, ethical, legal, theological, and philosophical issues related to computer technology
- demonstrate familiarity with professional codes of ethics
- express themselves clearly orally and succinctly in writing

Attendance/participation: Since this is a seminar-style course, you must be present to participate! Attendance in class is required and students are expected to be prepared and actively involved in discussions. Arrival to class more than 5 minutes late will be considered an absence. Students are required to follow regular weekly readings in preparation for participating in class discussions.

5-minutes with the Professor: At some point in the first month of classes, please make arrangements to meet with the professor for a short chat in which you introduce yourself and share (1) your hopes (or fears) for this course and (2) your thoughts about your future vocation after university. You will be responsible for arranging a time and setting up a calendar invite in Outlook. Ideally this will be done in person, but it may also happen over teams.

Quizzes: There will be regular, low-stakes quizzes on the weekly readings and recent course content. The purpose of these quizzes is strictly to check that you are completing the readings and following along in class. These will be given at the beginning of class and scattered throughout the semester. The lowest quiz score will be dropped. Refer to Moodle for quiz dates.

Leading a Class Discussion: Pairs of students will be required to lead one class discussion based on one of the weekly readings. This will be done in pairs at the start of a class on a date students must sign up

for. Each pair of students will give a 1-minute summary of *one* weekly reading (each group must pick a unique reading), pose an interesting *question* which arises from the reading, and lead the class in a *discussion* lasting no more than 10 minutes, and close with a brief *summary* of how this topic shows how technology is not neutral, how faith informs this topic, and a personal response. Presentations should be verbal *without using slides*. Grades will be out of a total of 5 points as follows: quality of the reading summary (1 point), quality and relevance of the question (1 point), engaging and leading the discussion (1 point), knowledge of subject matter (1 point), bringing faith to bear on the issue and illustrating how technology is value-laden (1 point). Students will be responsible for ensuring they sign up for a class discussion slot within the first two weeks of the course.

Reading Responses: Students will be required to submit reading responses to each of the weekly readings on Moodle, normally due by Tuesday morning. The reading responses will be at least 200 words in length but must not exceed 500 words. Unless otherwise specified, the responses must include the following elements under clearly labeled headings for each:

1. **Question:** What question is uppermost in your mind arising from the readings?
2. **Summary:** a brief summary of main points for all of the week's readings. The title of each reading should be clearly indicated in bold next to each summary
3. **Reflection:** reflect *briefly* on something from the reading(s) that connects with a personal experience or issue that resonated with you or with a current event in the news.

Reading responses will be marked out of three: one mark for each of the above elements. A full mark will be awarded for a satisfactory element, a half mark will be awarded for a less-than-satisfactory element, and a zero will be awarded for a missing or very poor element. A late reading response will receive a mark of zero. No late submissions will be accepted.

For the first week only, students will be required to post an introduction to themselves and reflect on whether they feel technology is neutral. For the final submission, students will be asked to reflect on the course and complete a senior survey.

Presentation: In addition to the weekly required readings, each student must read one book chosen from a list of approved books (other books on technology issues may be considered with approval from the instructor). *Students must each choose a distinct book for their class section.* Each student will be responsible for a presentation on the book they have selected sometime during the last weeks of classes. This will involve preparing a one-page summary for the class which must include the following under appropriate headings: author *background*, *abstract* of the book, *summary* of the related design norms, and a personal *response*. This summary should be uploaded to files under Teams before your presentation with a filename in the form: **student_name-book_title.pdf**. Students will be evaluated by the professor and answer questions raised by peers. Presentations should include appropriate visual aids. The date for each student's presentation will be posted on Moodle. Grading will be based on both content and delivery of the presentation.

Final Paper: Each student must also write a paper in conversation with their chosen book dealing with a contemporary technology issue. The paper should provide a thoughtful perspective on the book and the issue by identify its main ideas and presuppositions. The report should articulate a reformed Christian perspective on the topic (drawing on themes presented in your textbook) and referring to the norms as discussed in our text as well as in class. Each report should be written concisely with a suggested word count of at least 1100 words and not more than 1400. The report should include each of the following sections headings:

- **Title page:** include book title, name, and your final word count
- **Introduction:** introduce the author and subject matter
- **Summary:** overview of the book, including its main points, themes, and presuppositions on a particular technological issue. What enduring question(s) does it reflect?

- **Perspective:** a thoughtful perspective on the book that describes the worldview(s) evident in the book as well as a Reformed Christian perspective on the topic, identifying related design norms
- **Conclusion:** a concluding summary, including your own thoughts and opinions on the topic and concluding insights gleaned from the weekly reflections over the semester.

Each of these sections should be clearly labeled in **bold** with left-justified headings. Note that submitted material should be word-processed, single-sided printed pages using 12pt font, double-spaced, left-justified, and with 1-inch margins and submitted in Moodle a PDF file. Any footnotes which are included should be cited using Chicago style. Students are encouraged to make use of Calvin’s Rhetoric Center as they craft their final report. Reports will be due on the same day as your presentation.

Laptop policy: One of the concepts taught at the beginning of this course is that technology is not neutral – it embeds a bias and is value-laden. Consequently, technology in the classroom changes things. In order minimize distractions, the use of laptops and mobile devices will not be permitted during class presentations and discussions (exceptions will be made for students who require them strictly for notetaking in class).

Grading: Grading queries need to be raised within one week of the grades being posted. No grading queries will be entertained and no further work accepted after the last day of classes.

Attendance and participation	9%
5-minutes with the professor	1%
Quizzes	10%
Weekly reading responses (on Moodle)	40%
Leading a class discussion	5%
Presentation	10%
Final report	25%

Course Outline: A tentative schedule for the course is shown below. Tentative readings for each week are shown, but *the final list of readings will be posted weekly on Moodle*. It is the responsibility of each student to do the weekly readings *before* the first class of the week to enable meaningful discussions.

Week	Topics	Readings
Week 1 Jan. 11,13	Introduction to a philosophy of technology <ul style="list-style-type: none"> • technological instrumentalism and determinism • technology <i>bias</i> and <i>value-ladenness</i> • technological mediation (Don Ihde) • media ecology (Neil Postman) • 4 laws of media (Marshall McLuhan) 	<ul style="list-style-type: none"> • Psalm 8 • <i>Shaping a Digital World</i>, preface and chapter 1 • James Huggins, “The Assumptions of Computing” • John Whittle, “Is Your Software Valueless?”, <i>Computing Edge</i>, Jan. 2021, pp. 51-54. • Charles Adams, “Values and Things”, <i>Exercising our Worldview</i>, Dordt Press, 2014. • Neil Postman, “Five Things We Need to Know About Technological Change”
Week 2 Jan. 18,20	Computer technology and the Biblical story Technology and the unfolding of creation <ul style="list-style-type: none"> • cultural mandate, <i>imago Dei</i>, sabbath, reductionism, creational laws and norms Dooyeweerd’s modal aspects: an anti-reductionist view of reality 	<ul style="list-style-type: none"> • Genesis 1:28; Psalm 19 • <i>Shaping a Digital World</i>, chapter 2 • Al Wolters, <i>Creation Regained</i>, pp. 24-27, 41-48. • James Smith, “In the Beginning... was Technology”, <i>The Banner</i>, March 2016.
Week 3 Jan. 25,27	Computer technology and the fall <ul style="list-style-type: none"> • Is technology a result of the fall? • Are s/w bugs a result of the fall? Discerning <i>structure</i> and <i>direction</i> <ul style="list-style-type: none"> • how digital tech (mis)shapes us • tech and idolatry: technicism, informationism, dataism, scientism 	<ul style="list-style-type: none"> • Romans 8:22-30 • <i>Shaping a Digital World</i>, chapter 3 • Goudzwaard, <i>Idols of our Time</i>, pp 20-23. • Noah Kulwin, “The Internet Apologizes”, <i>Intelligencer</i>, April 2018. • Dickerson, “Wendell Berry, C.S. Lewis, J.R.R. Tolkien and the Dangers of a Technological Mindset”

	<ul style="list-style-type: none"> • anti-normative technology <p>The “technological mindset”</p>	<ul style="list-style-type: none"> • L.M. Sacasas, “The Materiality of Digital Culture”
Week 4 Feb. 1,3	<p>Redemption and Responsible Technology</p> <ul style="list-style-type: none"> • Structure and direction • Reformation vs. revolution <p>Normative design principles: cultural appropriateness, transparency, social norms, stewardship, aesthetics, justice, ethics, and trust</p>	<ul style="list-style-type: none"> • Col. 1:15-20; 2 Cor. 5:18-21 • <i>Shaping a Digital World</i>, chapter 4 • Charlie Adams, “Guiding Principles for an Office of Information Services”, <i>CEEC</i>, 2002, pp. 6-10. • Al Wolters, “Structure and Direction”, from <i>Creation Regained</i>, pp. 87-95. • Jacques Ellul’s “76 Reasonable Questions to Ask About Any Technology” • “The Questions Concerning Technology” by L. M. Sacasas
Week 5 Feb. 8,10	<p>Technology and the Future:</p> <ul style="list-style-type: none"> • optimism and pessimism • science fiction and popular culture <p>Progress: Epicurean, enlightenment, and modern views</p> <p>Transhumanism, posthumanism, and the singularity</p> <p>Christian eschatology and the new heavens and earth</p>	<ul style="list-style-type: none"> • 2 Peter 3:10; Rev. 21:22-27; Isaiah 60 • <i>Shaping a Digital World</i>, chapter 5 • Richard Mouw, <i>When the Kings Come Marching In</i>, pp. 17-42. • Nick Bostrom, “Transhumanist Values” • Andy Crouch, “The Bionic Man and the Body of Christ”, <i>Christianity Today</i> • Ray Kurzweil, <i>The Singularity is Near</i>, pp. 7-9.
Week 6 Feb. 15,17	<p>Professional Ethics and Responsibilities</p> <p>Approaches to Ethics:</p> <ul style="list-style-type: none"> • virtue ethics, deontology, consequentialism • virtue and Christian character <p>The ACM Code of Ethics</p> <p>Reliability and Safety issues; Case studies:</p> <ul style="list-style-type: none"> • the Therac-25 incident • VW emissions scandal • Boeing 737 Max 8 	<ul style="list-style-type: none"> • Matthew 22:36-40; Deuteronomy 22:8 • “A First Look at Ethics”, from Integrated Ethics Labs • N.T. Wright, “Paul and Christian Character” (video) • ACM Code of Ethics • N. Leveson, “The Therac-25: 30 Years Later”, <i>Computer</i>, November 2017. • “Engineers, Ethics, and the VW Scandal”, <i>IEEE Spectrum</i>. • “How the Boeing 737 Max Disaster Looks to a Software Developer”, <i>IEEE Spectrum</i>.
Week 7 Feb. 22,24	<p>Technology habits and rituals</p> <p>Social networking issues and the metaverse</p> <ul style="list-style-type: none"> • Surveillance capitalism, Digital authoritarianism, free speech • Truth, misinformation, fake news, and negative epistemology • Behavior modification <p>Virtual reality</p> <p>Technology and bias</p> <p>Big Data and the societal impact of algorithms</p> <ul style="list-style-type: none"> • impacts on justice and democracy <p>Privacy and personal information</p> <p><i>Students will participate in a 24 hour Technology fast and write about it in their weekly reflections.</i></p>	<ul style="list-style-type: none"> • Psalm 121 • James Smith, “Alternative liturgy: social media as ritual”, <i>The Christian Century</i>, 2013. • Jean Twenge, “Have Smartphones Destroyed a Generation?”, <i>The Atlantic</i>, Sep. 2017. • Nicholas Carr, “Is Google Making Us Stupid?”, <i>The Atlantic</i>, July/Aug 2008. • Cathy O’Neil, “The era of blind faith in big data must end”, TED talk • “Many Tech Experts Say Digital Disruption Will Hurt Democracy”, Pew Research • David Lyon, “Surveillance and Trust”, <i>Comment</i>, 2017. • “My Dream, My Taste” (video clip)
Spring Break – March 1, 3		
Week 8 Mar. 8,10	<p>Artificial Intelligence (AI) and machine learning</p> <p>AI Ethics</p> <p>Responsible automation</p>	<ul style="list-style-type: none"> • Psalm 139:13-18 • Schuurman, “Artificial Intelligence: Discerning a Christian Response” • AI: An Evangelical Statement of Principles • Mark Harris, “Inside the First Church of Artificial Intelligence”, <i>Wired</i>, Nov. 2017.

		<ul style="list-style-type: none"> • “Malevolent Machine Learning”, <i>CACM</i>, December 2019, pp. 13-15. • Nicolas Carr, “All Can Be Lost: The Risk of Putting Our Knowledge in the Hands of Machines”, <i>The Atlantic</i>, Nov. 2013. • “Would You Let a Robot Take Care of Your Mother?” <i>NY Times</i>, Dec. 2019.
Week 9 Mar. 15,17	Intellectual Property Issues <ul style="list-style-type: none"> • copyrights, patents, trademarks • software copyright, software patents and software API’s • Open Source and free-software philosophy and licenses 	<ul style="list-style-type: none"> • Exodus 20:15 • Intellectual Property Law: A Brief Introduction • “The patent system is broken” Electronic Frontier Foundation • “What is Free software?”, Free Software Foundation • Eric S. Raymond, <i>The Cathedral and the Bazaar</i>, (selected sections) • Crisman, “Open Source Software and Christian Thought” <i>PSCF</i>, 2015. • “Introducing Open Source and the Raspberry Pi to Schools in Developing Nations”, <i>PSCF</i>
Week 10 Mar. 24	The Christian concept of Vocation “You Are What You Love” <ul style="list-style-type: none"> • Augustine, secular liturgies, and the heart • Technology and the heart Technology, worship, and the church, Christian liturgy as resource for cultural innovation VR church Concluding thoughts	<ul style="list-style-type: none"> • Jeremiah 29:5-7 • <i>Shaping a Digital World</i>, chapter 6 • Lee Hardy, <i>The Fabric of This World</i>, pp. 93-118. • Letter to a Young Engineer, <i>Christian Courier</i> • Letter to a Young IT worker, <i>Christian Courier</i> • Jamie Smith, <i>You Are What You Love</i>, pp. 5-14, 19-25, 69-81, 171-181. • “Technology and the Church”, <i>God and Nature</i>
Weeks 11-14	Student Presentations	
May 6	Final day of class – summary and reflections, senior survey	

Academic Honesty

Students are expected to display honesty and responsibility in completing assignments. Students are responsible for understanding the information on plagiarism contained in the Student Conduct Code (Article IV. B). For more information, refer to the [Calvin plagiarism policy](#).

Communication outside of Class Times:

Important announcements will be sent via Calvin email, so students should check their Calvin email on a regular basis. Generally, the instructor will be happy to help you and welcomes you to contact me using Teams, which is my preferred way of communication outside the classroom.

Accommodations:

Calvin University will make reasonable accommodations for persons with documented disabilities. Students should notify a disability coordinator in the [Center for Student Success](#) in order to arrange accommodations. Then, come and talk to me within the first two weeks of class so we can put your accommodations in place.

Commitment to Hospitality:

It is our intent that students from all backgrounds and perspectives are well served in this course. Join me in creating a class that creates a space where we can ask honest questions and explore important ideas related to various technology issues. If you or someone else is hurt by anything said or done in class, let me know so we can work toward a remedy.

List of Approved Books for Final Paper

- Abbate, Janet, *Recoding Gender: Women's Changing Participation in Computing*, MIT Press, 2012.
- Ames, Morgan, *The Charisma Machine: The Life, Death, and Legacy of One Laptop per Child*, MIT Press, 2019.
- Borgmann, Albert, *Power Failure: Christianity in the Culture of Technology*, Brazos Press, 2003.
- Brynjolfsson, Erik and McAfee, Andrew, *The Second Machine Age: Work, Progress and Prosperity in a Time of Brilliant Technologies*, Norton, 2014.
- Campbell, Heidi and Garner, Stephen, *Networked Theology: Negotiating Faith in Digital Culture*, Baker Academic, 2016.
- Carr, Nicholas. *The Glass Cage*, W. W. Norton & Company, 2014.
- Carr, Nicholas. *The Shallows*. W. W. Norton & Company, 2010.
- Chen, Carolyn, *Work Pray Code: When Work Becomes Religion in Silicon Valley*, Princeton, 2021.
- Coeckelbergh, Mark , *AI Ethics*, MIT Press, 2020.
- Crawford, Kate, *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*, Yale University Press, 2021.
- Cusveller, Bart et al., *The Matrix Reformed: Science Fiction, Technology, and Christian Philosophy*, Dordt College Press, 2011.
- Danaher, John, *Automation and Utopia: Human Flourishing in a World without Work*, Harvard University Press, 2019.
- Deibert, Ronald, *Reset: Reclaiming the Internet for Civil Society*, House of Anansi Press, 2020.
- Dickerson, Matthew, *The Mind and the Machine*, Cascade Books, 2016.
- Dormehl, Luke, *Thinking Machines: The Quest for Artificial Intelligence and Where It's Taking Us Next*, TarcherPerigee, 2017.
- Dyer, John, *From the Garden to the City: the redeeming and corrupting power of technology*, Kregel Publications, 2011.
- Early, Justin, *The Common Rule: Habits of Purpose for an Age of Distraction*, InterVarsity Press, 2019.
- Ellul, Jacques, *The Technological Society*, Vintage Books, 1964.
- Eubanks, Virginia, *Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor*, St. Martin's Press, 2018.
- Luke Fernandez and Susan J. Matt, *Bored, Lonely, Angry, Stupid: Changing Feelings about Technology, from the Telegraph to Twitter*, Harvard University Press, 2019.
- Ford, Martin, *Rise of the Robots: Technology and the Threat of a Jobless Future*, Basic Books, 2016.
- Frischmann, Brett and Evan Selinger, *Re-Engineering Humanity*, Cambridge University Press, 2018.
- Fry, Hannah, *Hello World: Being Human in the Age of Algorithms*, W. W. Norton & Company, 2018.
- Gay, Craig, *Modern Technology and the Human Future: A Christian Appraisal*, InterVarsity Press, 2018.
- Grant, George, *Technology and Justice*, Anansi, 1986.
- Harrari, Yuval Noah, *Homo Deus: A brief history of tomorrow*, Harper, 2017.
- Hoepman, Jaap-Henk, *Privacy is Hard and Seven Other Myths*, MIT Press, 2021.
- Jacobsen, Eric O., *Three Pieces of Glass: Why We Feel Lonely in a World Mediated by Screens*, Brazos, 2020.
- Kearns, Michael and Aaron Roth, *The Ethical Algorithm: The Science of Socially Aware Algorithm Design*, Oxford University Press, 2020.
- Kleeman, Jenny, *Sex Robots and Vegan Meat: Adventures at the Frontier of Birth, Food, Sex, and Death*, Picador, 2020.
- Kurzweil, Ray, *The Singularity is Near: When Humans Transcend Biology*, Penguin, 2006.
- Lanier, Jaron, *Ten Arguments for Deleting Your Social Media Accounts Right Now*, Henry Holt and Co., 2018.
- Larson, Eric, *The Myth of Artificial Intelligence: Why Computers Can't Think the Way We Do*, Harvard, 2021.
- Lennox, John, *2084: Artificial Intelligence and the Future of Humanity*, Zondervan, 2020.
- Leonhard, Gerd, *Technology vs. Humanity: The Coming Clash between Man and Machine*, Fast Future Publishing, 2016.
- Margolis, Jane, *Stuck in the Shallow End: Education, Race, and Computing*, MIT Press, 2010.
- Markoff, John, *Machines of Loving Grace: The Quest for Common Ground between Humans and Robots*, Harper Collins, 2015.
- Mercer, Calvin and Tracy J. Trothen, *Religion and the Technological Future: An Introduction to Biohacking, Artificial Intelligence, and Transhumanism*, Palgrave Macmillan, 2021.
- McLuhan, Marshall, *Understanding Media: The Extensions of Man*, MIT Press, 1994.

Mitcham, Carl, *Thinking Through Technology: The Path Between Engineering and Philosophy*, University of Chicago Press, 1994.

Noble, Safiya Umoja, *Algorithms of Oppression: How Search Engines Reinforce Racism*, New York University Press, 2018.

O’Connell, Mark, *To Be a Machine: Adventures Among Cyborgs, Utopians, Hackers and the Futurists Solving the Modest Problem of Death*, Anchor Books, 2017.

O’Gieblyn, Meghan, *God, Human, Animal, Machine: Technology, Metaphor, and the Search for Meaning*, Doubleday, 2021.

O’Neil, Cathy, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, Crown, 2016.

Perloth, Nicole, *This Is How They Tell Me the World Ends: The Cyberweapons Arms Race*, Bloomsbury Publishing, 2021.

Postman, Neil, *Amusing Ourselves to Death: Public Discourse in the Age of Show Business*, Penguin, 1986.

Postman, Neil, *Technopoly: The Surrender of Culture to Technology*, Vintage Books, 1993.

Reich, Rob, *System Error: Where Big Tech Went Wrong and How We Can Reboot*, Harper, 2021.

Reinke, Tony, *God, Technology, and the Christian Life*, Crossway, 2022.

Richards, Jay, *The Human Advantage: The Future of American Work in an Age of Smart Machines*, Crown Forum, 2018.

Robinson, Brett, *Appletopia: media technology and the religious imagination of Steve Jobs*, Baylor University Press, 2013.

Schultze, Quentin, *Habits of the High-Tech Heart: Living Virtuously in the Information Age*, Baker Academic, 2002.

Shatzer, Jacob, *Transhumanism and the Image of God: Today's Technology and the Future of Christian Discipleship*, InterVarsity Press, 2019.

Smith, Brad, *Tools and Weapons: The Promise and the Peril of the Digital Age*, Penguin, 2019.

Solove, Daniel J., *Nothing to Hide: The False Tradeoff between Privacy and Security*, Yale University Press, 2011.

Strate, Lance, *Amazing Ourselves to Death: Neil Postman's Brave New World Revisited*, Peter Lang International Academic Publishers, 2014.

Susskind, Daniel, *A World Without Work: Technology, Automation, and How We Should Respond*, Metropolitan Books, 2020.

Tegmark, Max, *Life 3.0: Being Human in the Age of Artificial Intelligence*, Vintage, 2017.

Thacker, Jason, *The Age of AI: Artificial Intelligence and the Future of Humanity*, Zondervan, 2020.

Toyama, Kentaro, *Geek Heresy: Rescuing Social Change from the Cult of Technology*, Public Affairs, 2015.

Turkle, Sherry, *Alone Together: Why We Expect More from Technology and Less from Each Other*, Basic Books, 2011.

Turkle, Sherry, *Reclaiming Conversation: The Power of Talk in a Digital Age*, Penguin, 2015.

Vallor, Shannon, *Technology and the Virtues: A Philosophical Guide to a Future Worth Wanting*, Oxford, 2016.

Watters, Audrey, *Teaching Machines: The History of Personalized Learning*, MIT Press, 2021.

Weizenbaum, Joseph, *Computer Power and Human Reason: From Judgment To Calculation*, W.H. Freeman & Company, 1976.

Williams, Sarah, *Data Action: Using Data for Public Good*, MIT Press, 2020.

Winner, Langdon, *The Whale and the Reactor: A Search for Limits in an Age of High Technology*, University of Chicago Press, 1989.

Wu, Tom, *The Attention Merchants: The Epic Scramble to Get Inside Our Heads*, Knopf, 2016.

Wyatt, John and Stephen Williams, *The Robot Will See You Now: Artificial Intelligence and the Christian Faith*, SPCK Publishing, 2021.

Yonck, Richard, *The Heart of the Machine: Our Future in a World of Artificial Intelligence*, Arcade Publishing, 2017.

Zuboff, Shoshana, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, PublicAffairs, 2020.