

**Note:** Enrollment in this course will be subject to a lottery. Students who attend the first meeting (on 9/6) will be given priority in the lottery.

## **Government 1093 / SCRB 60**

### **Ethics, Biotechnology, and the Future of Human Nature**

**Professors Douglas A. Melton and Michael J. Sandel**

**Fall semester 2016**

Tuesday 2:00pm - 3:59pm

Sever Hall 113

The course explores the moral, political, and scientific implications of new developments in biotechnology. Does science give us the power to alter human nature? If so, how should we exercise this power? Topics include genetic engineering, sex selection, “designer babies,” the genetics of sports, eugenics, genetic discrimination, bringing extinct species back to life, human-animal hybrids, bionic soldiers and robotic warriors, life extension and immortality.

#### **Course requirements**

The course depends on informed participation and discussion; students who enroll should be prepared to keep up with course readings and assignments on a weekly basis.

- Four short papers (900-1000 words each): 40 percent of course grade
- Attendance at all lectures, and attendance and participation in weekly discussion sections: 30 percent of course grade
- Take-home final exam: 30 percent of course grade

The take-home final exam will be posted at 10:00am on Dec. 5, and due no later than 10:00am on Dec. 7.

Papers should present a well-reasoned response to one of the questions assigned for a given week, drawing upon relevant course readings and, if you wish, arguments presented in lecture.

Students may choose which weeks to submit papers, subject to the following requirements:

The due date for each paper is the Sunday night (10:00 p.m.) following the class on the topic you choose. Papers should be submitted as email attachments to your teaching fellow.

Students are encouraged to schedule their papers at reasonable intervals and not leave them all to the last few weeks of the semester. You may write on any topics from Week 2 to Week 12. Papers on Week 12 topics receive a one-day extension (due to Thanksgiving), and are due at 10:00pm on Monday, Nov. 28. Your choice of paper topics for the semester must be submitted by email to your section leader by 10:00pm on Sept 25.

**Bonus offer:** As a practice opportunity, and as encouragement to begin writing sooner rather than later, any student who submits a paper by 10:00pm on Sunday, Sept. 25, will have the option of counting the grade on that paper or dropping it and writing four other papers.

#### **Course policies**

- No laptops, cell phones, or mobile devices of any kind may be used during class. Note takers will be provided for those students who have an AEO documented need for one; please contact the Head Teaching Fellow if you have such a need.
- Students are expected to arrive on time and to remain seated until the end of class. This is a matter of common courtesy and to avoid distracting others. Any student who, for a compelling reason, must leave class early on a given day should contact the Head Teaching Fellow in advance.
- If it is necessary to lottery the course, preference will be given to those who attend the first class.
- This course will not be offered pass/fail

**AEO:** Any student needing academic adjustments or accommodations is requested to present their letter from the Accessible Education Office (AEO) and speak with the head teaching fellow by the end of the second week of the term. Failure to do so may result in the Course Head’s inability to respond in a timely manner. All discussions will remain confidential, although AEO may be consulted to discuss appropriate implementation.

#### **Collaboration policy**

Students are strongly encouraged to discuss their papers with one another. This is a good way of testing your arguments and anticipating possible objections. The best papers typically result from sustained discussion with classmates and others. You should make sure, however, that your written work is your own. Please indicate, in footnotes, or informally in the text, or in a separate acknowledgement statement, the names of those with whom you have discussed any ideas, arguments, or insights that figure prominently in your paper.

#### **Course administration**

- The Head Teaching Fellow is Lowry Pressly (email: [pressly@fas.harvard.edu](mailto:pressly@fas.harvard.edu))
- The Bioethics Blog can be found at: <http://beta.blogs.harvard.edu/k98926>

#### **Readings**

The following books are available for purchase in paperback at the Harvard Coop. They can also be ordered from online booksellers, and are available on reserve in Lamont Library. Other assigned readings are available in electronic form; simply click on the links included in the syllabus.

Daniel J. Kevles, *In the Name of Eugenics*

Michael Sandel, *The Case against Perfection: Ethics in the Age of Genetic Engineering* \*

Ronald Green, *Babies by Design: The Ethics of Genetic Choice*

\*Author's royalties from course sales to be donated

## Schedule of topics

Sept. 6 Introduction: Ways to make a baby  
Sept. 13 Designer babies I: Embryo screening and sex selection  
Sept. 20 Designer babies II: Gene editing, therapy v. enhancement  
Sept. 27 GM animals: De-extinction, chimeras, hybrids, mosquitoes  
Oct. 4 Creating life in the lab: Synthesizing the human genome  
Oct. 11 The genetics of sports: What's fair?  
Oct. 18 Intelligence, memory, and the ethics of forgetting  
Oct. 25 Eugenics, old and new  
Nov. 1 Life extension and the meaning of mortality  
Nov. 8 Frankenfood: Stem cell burgers, featherless chickens  
Nov. 15 The future of AI: Robots as soldiers, teachers, companions  
Nov. 22 Big data and its discontents: Privacy, surveillance, discrimination  
Nov. 29 What's natural? Biotechnology and the future of human nature

### (1) Introduction: Ways to make a baby

Is it wrong to try to conceive a deaf child? Is there a moral difference between conceiving a deaf child and making a child deaf at birth? Is there anything wrong with using a Nobel Prize sperm donor in hopes of conceiving a brilliant child? What are the new technologies of reproduction, and what ethical questions do they pose?

Margaret Driscoll, "Why We Chose Deafness for our Children," *Sunday Times*, April 14, 2002.

[https://canvas.harvard.edu/files/2750328/download?download\\_frd=1](https://canvas.harvard.edu/files/2750328/download?download_frd=1)

Darshak M. Sanghavi, "Wanting Babies Like Themselves, Some Parents Choose Genetic Defects," *The New York Times*, December 5, 2006.

[http://www.nytimes.com/2006/12/05/health/05essa.html?\\_r=1&scp=3&sq=Darshak+Sanghavi&st=nyt&oref=slogin#](http://www.nytimes.com/2006/12/05/health/05essa.html?_r=1&scp=3&sq=Darshak+Sanghavi&st=nyt&oref=slogin#)

### (2) Designer babies I: Embryo screening and sex selection

Is embryo screening to avoid having a child with disabilities morally desirable? What about embryo screening to choose whether to have a boy or a girl? If it were possible to choose the sexual orientation of one's child, would it be objectionable to do so? Should parents try to select children with the best possible genetic endowment?

Sumathi Reddy, "Fertility Clinics Let You Select Your Baby's Sex," *Wall Street Journal*, Aug. 17, 2015:

<http://search.proquest.com.ezp-prod1.hul.harvard.edu/docview/1704386277/fulltext/AE49C3260B6243BDPQ/1?accountid=11311>

Julian Savulescu, "Parent planning: We should be allowed to choose our children's sex," *The Ethics Centre (Australia)*, 17 Sept., 2015:

<http://www.ethics.org.au/on-ethics/blog/september-2015/parent-planning-%E2%80%93-we-should-be-allowed-to-choose-o>

Tamara Kayali Browne, "Parent planning: We shouldn't be allowed to choose our children's sex," *The Ethics Centre (Australia)*, 16 Sept., 2015:

<http://www.ethics.org.au/on-ethics/blog/september-2015/parent-planning-%E2%80%93-we-shouldn%E2%80%99t-be-allowed-to-choos>

Nicholas Eberstadt, "The Global War Against Baby Girls," *New Atlantis*, Fall 2011:

<http://www.thenewatlantis.com/publications/the-global-war-against-baby-girls>

Scott Baldauf, "India's 'Girl Deficit' Deepest Among Educated," *Christian Science Monitor*, January 13, 2006.

<http://search.proquest.com.ezp-prod1.hul.harvard.edu/docview/405547785?OpenUrlRefId=info:xri/sid:primo&accountid=11311>

Edward Stein, "Choosing the Sexual Orientation of Children," *Bioethics*, vol. 12, no. 1, 1998.

<http://onlinelibrary.wiley.com.ezp-prod1.hul.harvard.edu/doi/10.1111/1467-8519.00089/epdf>

McDougall, "Acting Parentally: An Argument Against Sex Selection," *Journal of Medical Ethics*, vol. 31, 2005.

<http://jme.bmj.com.ezp-prod1.hul.harvard.edu/content/31/10/601.full>

Julian Savulescu, "Procreative Beneficence: Why We Should Select the Best Children," *Bioethics*, October 2001, vol. 15, no. 5, pp. 413-426.

<http://onlinelibrary.wiley.com.ezp-prod1.hul.harvard.edu/doi/10.1111/1467-8519.00251/epdf>

Emma Green, "Should Women be Able to Abort a Fetus Simply Because it is Female?," *The Atlantic*, May 2016:

<http://www.theatlantic.com/politics/archive/2016/05/sex-disability-race-selective-abortion-indiana/482856/>

Tamar Lewin, "Ohio Bill Would Ban Abortion if Down Syndrome is Reason," *New York Times*, Aug. 22, 2015:

<http://www.nytimes.com/2015/08/23/us/ohio-bill-would-ban-abortion-if-down-syndrome-is-reason.html>

Steve Silberman, "Neurodiversity Rewires Conventional Thinking about Brains," *WIRED*, April 16, 2013:

<http://www.wired.com/2013/04/neurodiversity/>

### (3) Designer babies II: Gene editing, therapy v. enhancement

What is the moral difference, if any, between embryo screening to avoid genetic disorders and the use of gene editing (CRISPR) to do so? Is there a moral difference between selecting children with desirable genetic traits through embryo screening (PGD) and engineering children with desirable genetic traits through gene editing? Is there a moral difference between genetic engineering to cure or prevent disease and genetic engineering to make a child taller, stronger, or smarter? Do parents have a moral responsibility to improve their children's life prospects through genetic engineering (provided it is safe)?

**David Cyranoski and Sara Reardon, “Chinese scientists genetically modify human embryos,” *Nature*, 22 April 2015:**

<http://www.nature.com.ezp-prod1.hul.harvard.edu/news/chinese-scientists-genetically-modify-human-embryos-1.17378>

David Cyranoski and Sara Reardon, “Embryo editing sparks epic debate,” *Nature*, 30 April 2015:

<http://www.nature.com.ezp-prod1.hul.harvard.edu/news/embryo-editing-sparks-epic-debate-1.17421>

Antonio Regalado, “Engineering the perfect baby,” *MIT Technology Review*, March 5, 2015:

<https://www.technologyreview.com/s/535661/engineering-the-perfect-baby/>

**Erika Check Hayden, “Should you edit your children’s genes?” *Nature*, 23 February 2016:**

<http://www.nature.com.ezp-prod1.hul.harvard.edu/news/should-you-edit-your-children-s-genes-1.19432>

Julian Savulescu, “New Breeds of Humans: The Moral Obligation to Enhance,” *Ethics, Law and Moral Philosophy of Reproductive Biomedicine*, vol. 1, no. 1, March 2005.

[https://canvas.harvard.edu/files/2755257/download?download\\_frd=1](https://canvas.harvard.edu/files/2755257/download?download_frd=1)

Ronald Green, *Babies by Design*, ch. 3-6.

Michael J. Sandel, *The Case Against Perfection*, ch. 1, 3.

Recommended further resources (optional):

CRISPR: Compilation of articles (2015-2016) in *Nature*:

<http://www.nature.com.ezp-prod1.hul.harvard.edu/news/crispr-1.17547>

Video animation:

**“Genetic Engineering Will Change Everything Forever” CRISPR, by Kurzgesagt “In a Nutshell:**

<https://www.youtube.com/watch?feature=youtu.be&v=jAhjPd4uNFY&app=desktop>

#### **(4) GM animals: De-extinction, chimeras, hybrids, mosquitoes**

Should we try to revive extinct species, such as dodo birds, passenger pigeons, and woolly mammoths? What about Neanderthals? What, if anything, is wrong with the creation of transgenic animals, or human-animal hybrids? Do we have an ethical obligation to preserve the diversity of species? Should we use genetic engineering to eradicate mosquitoes?

##### De-extinction

Hillary Rosner, “Tweaking Genes to Save Species,” *New York Times*, April 16, 2016:

<http://www.nytimes.com/2016/04/17/opinion/sunday/tweaking-genes-to-save-species.html>

Elizabeth Weise, “Should we bring back the passenger pigeon and the woolly mammoth?,” *USA Today*, June 2, 2013:

<http://www.lexisnexis.com.ezp-prod1.hul.harvard.edu/lnacui2api/api/version1/getDocCui?oc=00240&hnsd=f&hgn=t&lni=58JX-J931-JCBD-V2PH&hns=t&perma=true&hv=t&hl=t&csi=8217&secondRedirectIndicator=true>

George Church and Ed Regis, *Regenesi: How Synthetic Biology Will Re-invent Nature and Ourselves*, excerpt:

<http://www.regenesisthebook.com/?p=4>

Jason Mark, “Back from the Dead,” *Earth Island Journal*, Autumn 2013:

[http://www.earthisland.org/journal/index.php/eij/article/back\\_from\\_the\\_dead](http://www.earthisland.org/journal/index.php/eij/article/back_from_the_dead)

Revive and Restore website, The Long Now Foundation:

<http://longnow.org/revive/>

“Species Projects”:

<http://longnow.org/revive/projects/>

“Candidate Species”:

<http://longnow.org/revive/candidates/>

“Bringing Back the Passenger Pigeon”:

<http://longnow.org/revive/passenger-pigeon-workshop/>

[For optional readings, see bibliography at: <http://longnow.org/revive/octreading/>]

Alta Charo & Henry T. Greely, “CRISPR Critters and CRISPR Cracks,” *American Journal of Bioethics*, Nov. 12, 2015:

<http://www.tandfonline-com.ezp-prod1.hul.harvard.edu/doi/pdf/10.1080/15265161.2015.1104138>

##### Chimeras

Gina Kolata, “N.I.H. May Fund Human-Animal Stem Cell Research,” *New York Times*, Aug. 4, 2016:

<http://www.nytimes.com/2016/08/05/health/stem-cell-research-ban.html>

Rob Stein, “In Search for Cures, Scientists Create Embryos That Are Both Animal and Human,” *NPR*, May 18, 2016:

<http://www.npr.org/sections/health-shots/2016/05/18/478212837/in-search-for-cures-scientists-create-embryos-that-are-both-animal-and-human>

Antonio Regalado, "Human-Animal Chimeras are Gestating on U.S. Research Farms," *MIT Technology Review*, Jan. 6, 2016:

<https://www.technologyreview.com/s/545106/human-animal-chimeras-are-gestating-on-us-research-farms/>

Jason Scott Robert and Francoise Baylis, "Crossing Species Boundaries" *American Journal of Bioethics*, Summer 2003, 3(3):1

<http://www.tandfonline.com.ezp-prod1.hul.harvard.edu/doi/abs/10.1162/15265160360706417>

Commentaries on Robert and Baylis, *American Journal of Bioethics*, Summer 2003, 3(3):

Bernard E. Rollin, "Ethics and Species Integrity" <https://muse-jhu.edu.ezp-prod1.hul.harvard.edu/article/47001>

Robert Streiffer, "In Defense of the Moral Relevance of Species Boundaries" <https://muse-jhu.edu.ezp-prod1.hul.harvard.edu/article/47006>

Josephine M. Johnston, Christopher Eliot, "Chimeras and Human Dignity" <http://www.tandfonline.com.ezp-prod1.hul.harvard.edu/doi/abs/10.1162/15265160360706714>

[Optional reading]

Franz Kafka, "A Report for an Academy," in Kafka, *The Metamorphosis, In the Penal Colony, and Other Stories* (New York: Scribner Paperback Fiction, 2000).

## Mosquitoes

Archie Bland, "Should we wipe mosquitoes off the face of the Earth?" *The Guardian*, 10 Feb. 2016:

<https://www.theguardian.com/global/2016/feb/10/should-we-wipe-mosquitoes-off-the-face-of-the-earth>

## (5) Creating life in the lab: Synthesizing the human genome (with George Church)

What are the potential benefits of the attempt to synthesize the human genome? What are the strongest ethical arguments against it, and how compelling are they?

Andrew Pollack, "Scientists Announce HGP-Write, Project to Synthesize the Human Genome," *New York Times*, June 2, 2016:

[http://www.nytimes.com/2016/06/03/science/human-genome-project-write-synthetic-dna.html?\\_r=0](http://www.nytimes.com/2016/06/03/science/human-genome-project-write-synthetic-dna.html?_r=0)

Ewen Callaway, "Plan to synthesize human genome triggers mixed response," *Nature*, 2 June 2016: <http://www.nature.com/news/plan-to-synthesize-human-genome-triggers-mixed-response-1.20028>

Sharon Begley and Ike Swetlitz, "Audacious project plans to create human genome from scratch," *STAT*, June 2, 2016:

<https://www.statnews.com/2016/06/02/project-human-genome-synthesis/>

Jef D. Boeke, George Church, et al., "The Genome Project-Write," *Science*, 8 July 2018:

<http://science.sciencemag.org.ezp-prod1.hul.harvard.edu/content/353/6295/126.full>

Antonio Regalado, "Ethical Questions Loom Over Efforts to Make a Human Genome from Scratch," *MIT Technology Review*, May 25, 2016:

<https://www.technologyreview.com/s/601540/ethical-questions-loom-over-efforts-to-make-a-human-genome-from-scratch/>

Sharon Begley, "George Church has a wild idea to upend evolution," *STAT*, May 16, 2016: <https://www.statnews.com/2016/05/16/george-church-profile/>

## (6) The genetics of sports: What's fair?

Provided they are safe, should performance-enhancing drugs and genetic technologies be permitted in the Olympics and professional sports? Should biomedical technology aim only at repairing injury and curing disease, or also at improving the human body and extending its capacities? Do natural genetic differences give some athletes an unfair advantage?

Christina Farr, "Do Olympians Have Better Genes Than You and Me?" *Fast Company*, August 6, 2016:

<https://www.fastcompany.com/3062037/body-os/how-much-of-olympic-performance-is-due-to-great-dna>

"Future humans could be much faster than Usain Bolt or Michael Phelps," *South China Morning Post*, August 23, 2016:

<http://www.scmp.com/tech/science-research/article/2007599/humans-future-could-be-much-faster-usain-bolt-or-michael>

Jerome Longman, "Understanding the Controversy Over Caster Semenya," *New York Times*, Aug. 18, 2016:

<http://www.nytimes.com/2016/08/20/sports/caster-semenya-800-meters.html>

Helen Thompson, "Performance enhancement: Superhuman athletes," *Nature*, vol. 487, 19 July 2012.

<http://www.nature.com/news/performance-enhancement-superhuman-athletes-1.11029>

Lee Sweeney, "Gene Doping," *Scientific American*, vol. 291, July 2004.

<http://www.nature.com.ezp-prod1.hul.harvard.edu/scientificamerican/journal/v291/n1/pdf/scientificamerican0704-62.pdf>

Theodore Friedmann, "How Close Are We to Gene Doping?" *Hastings Center Report*, March-April 2010.

[http://muse.jhu.edu.ezp-prod1.hul.harvard.edu/journals/hastings\\_center\\_report/v040/40.2.friedmann.html](http://muse.jhu.edu.ezp-prod1.hul.harvard.edu/journals/hastings_center_report/v040/40.2.friedmann.html)

Malcolm Gladwell, "Drugstore Athlete," *The New Yorker*, Sept. 10, 2001.

<http://archives.newyorker.com.ezp-prod1.hul.harvard.edu/default.aspx?i=2001-09-10#folio=052>

Savulescu, B. Foddy, M. Clayton, "Why We Should Allow Performance Enhancing Drugs in Sports," *British Journal of Sports Medicine*, 2004.

<http://bjsm.bmj.com.ezp-prod1.hul.harvard.edu/content/38/6/666.full.pdf+html>

Thomas H. Murray, "Making Sense of Fairness in Sports," *Hastings Center Report*, March-April 2010.

[http://muse.jhu.edu.ezp-prod1.hul.harvard.edu/journals/hastings\\_center\\_report/v040/40.2.murray.html](http://muse.jhu.edu.ezp-prod1.hul.harvard.edu/journals/hastings_center_report/v040/40.2.murray.html)

Michael J. Sandel, *The Case against Perfection*, ch. 2 ("Bionic Athletes").

Jere Longman, "Debate on Amputee Sprinter: Is He Disabled or Too-Abled?," *The New York Times*, May 15, 2007.

[http://www.nytimes.com/2007/05/15/sports/othersports/15runner.html?  
\\_r=1&scp=1&sq=Jere+Longman+Amputee+Sprinter&st=nyt&oref=slogin](http://www.nytimes.com/2007/05/15/sports/othersports/15runner.html?_r=1&scp=1&sq=Jere+Longman+Amputee+Sprinter&st=nyt&oref=slogin)

Joshua Robinson, "Ruling Halts Amputee Sprinter's Olympic Bid," *The New York Times*, January 15, 2008.

<http://www.nytimes.com/2008/01/15/sports/othersports/15track.html?scp=1&sq=Joshua+Robinson+Amputee+Sprinter%27s&st=nyt>

Celeste Biever, "Disability in a Different Light: Artificial Ways of Restoring Body Function Are Challenging Ideas of What It Means To Be 'Normal,'" *New Scientist*, May 26, 2007.

<http://search.proquest.com.ezp-prod1.hul.harvard.edu/docview/200491183?OpenUrlRefId=info:xri/sid:primo&accountid=11311>

## **(7) Cognitive enhancement, memory, and forgetting**

How likely is the prospect of genetic enhancement of intelligence? Is it desirable? If it were possible to find a drug or genetic intervention that improved memory, would it be desirable? Is there anything objectionable about drugs that erase certain traumatic memories? Can "cruise control for pedestrians" be a desirable alternative to maps and GPS devices?

Maria Konnikova, "Hacking the Brain: How we might make ourselves smarter in the future," *The Atlantic*, June 2015:

<http://www.theatlantic.com/magazine/archive/2015/06/brain-hacking/392084/>

John Bohannon, "Gene Us: Why Are Some People So Smart?" *Wired*, July 16, 2013: <http://www.wired.com/wiredscience/2013/07/genetics-of-iq/>

Stephen S. Hall, "The Quest for a Smart Pill," *Scientific American*, Sept. 2003:

<http://www.nature.com.ezp-prod1.hul.harvard.edu/scientificamerican/journal/v289/n3/pdf/scientificamerican0903-54.pdf>

Jonah Lehrer, "The Forgetting Pill Erases Painful Memories Forever," *WIRED*, March 2012:

[http://www.wired.com/2012/02/ff\\_forgettingpill/](http://www.wired.com/2012/02/ff_forgettingpill/)

Jerry Adler, "Erasing Painful Memories," *Scientific American*, May 2012, Vol. 306, Issue 5: <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=74610281&site=ehost-live&scope=site>

Adam Piore, "Totaling Recall," *Scientific American Mind*, Jan/Feb 2012, Vol. 22, Issue 6:

<http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=72129658&site=ehost-live&scope=site>

Michael Henry, Jennifer R. Fishman, Stuart J. Youngner, "Propranolol and the Prevention of Post-Traumatic Stress Disorder: Is it Wrong to Erase the "Sting"?"

*American Journal of Bioethics*, Sept. 1, 2007: <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=26542608&site=ehost-live&scope=site>

**Nick Bilton, "Computer-Brain Interfaces Making Big Leaps," *N.Y. Times*, Aug. 4, 2013:**

<http://bits.blogs.nytimes.com/2013/08/04/disruptions-rather-than-time-computers-might-become-panacea-to-hurt/>

**James Gorman, "Scientists Trace Memories of Things That Never Happened," *N.Y. Times*, July 25, 2013:**

<http://www.nytimes.com/2013/07/26/science/false-memory-planted-in-a-mouse-brain-study-shows.html>

Nick Stockton, "Scientists Are Using Electrodes to Remote-Control People," *WIRED*, April 20, 2015:

<http://www.wired.com/2015/04/scientists-using-electrodes-remote-control-people/>

[Optional:]

Documentary film: "DNA Dreams" (2013), Director: Bregtje van der Haak:

<http://vimeo.com/65811205>

Max Pfeiffer, et al., "Cruise Control for Pedestrians: Controlling Walking

Direction using Electrical Muscle Stimulation," *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 2015:

<http://hci.uni-hannover.de/papers/pfeiffer2015CHICruise.pdf>

## **(8) Eugenics, old and new**

What is eugenics? Are eugenic practices morally objectionable only insofar as they are coercive (as with forced sterilization policies), or are voluntary measures to improve human genetic endowments also objectionable? Does voluntary genetic enhancement amount to "free market" eugenics? What about shopping for sperm with particular traits?

Fraser Nelson, "The Return of Eugenics," *The Spectator*, 2 April 2016:

<http://www.spectator.co.uk/2016/04/the-return-of-eugenics/>

Carolyn Abraham, "Unnatural Selection: Is Evolving Reproductive Technology Ushering in a New Age of Eugenics?," *Globe and Mail*



(Toronto), Jan. 7, 2012.

<http://www.theglobeandmail.com/life/parenting/pregnancy/pregnancy-trends/unnatural-selection-is-evolving-reproductive-technology-ushering-in-a-new-age-of-eugenics/article2294636/>

David Plotz, "The Rise of the Smart Sperm Shopper," *Slate*, April 20, 2001. <http://www.slate.com/id/104633/>

Daniel J. Kevles, *In the Name of Eugenics*, pp. 1-192, 251-301.

Michael J. Sandel, *The Case against Perfection*, ch. 4-5.

#### Optional reading

Allen Buchanan, et al., *From Chance to Choice*, ch. 2.

Gregory Stock, *Redesigning Humans*, ch. 9.

William Kristol and Eric Cohen, eds., *The Future is Now*, pp. 3-25, 33-46.

### **(9) Life extension and immortality**

Should biomedical research aim at increasing the human life span? Would postponing death diminish the meaning of life? What is "digital immortality"?

Zoe Corbyn, "Live for ever: Scientists say they'll soon extend life ~well beyond 120," *The Observer* (London), 11 Jan. 2015:

<https://www.theguardian.com/science/2015/jan/11/sp-live-forever-extend-life-calico-google-longevity>

Betsy Isaacson, "Silicon Valley is Trying to Make Humans Immortal" And Finding Some Success," *Newsweek*, March 5, 2015:

<http://www.newsweek.com/2015/03/13/silicon-valley-trying-make-humans-immortal-and-finding-some-success-311402.html>

Ariana Eunjung Cha, "Tech Titans' Latest Project: Defy Death," *Washington Post*, April 4, 2015:

<http://www.washingtonpost.com/sf/national/2015/04/04/tech-titans-latest-project-defy-death/>

David Gelles, "Immortality 2.0," *The Futurist*, Jan.-Feb. 2009. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=35537376&site=ehost-live&scope=site>

Larry S. Templin, "Is Living Longer Better?," *Journal of Applied Philosophy*, vol. 25, no. 3, 2008.

<http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=33017768&site=ehost-live&scope=site>

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### **(10) Frankenfood?: Stem cell burgers, featherless chickens**

If you were a vegetarian opposed, in principle, to eating meat, would it be ethical to eat a hamburger that contained no meat from a cow, but that was grown in the lab from stem cells? Provided it is safe, is there anything objectionable about genetically modified food? Provided it does not cause suffering, is there anything wrong with genetically altering animals to make food production more efficient?

The \$300,000 hamburger

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#### **(11) AI: Killer robots, self-driving cars, robotic pets and friends**

What is the ethical status of "killer robots"? Is it objectionable for robots and unmanned drones to replace human soldiers in fighting wars? What ethical principles should be programmed into self-driving cars? Are robotic pets and friends morally objectionable? If so, on what grounds?

#### Killer robots and drones

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Robotic pets and friends

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Lauren Walker, Hello Barbie, Your Child's Chattiest and Riskiest Christmas Present, *Newsweek*, Dec. 15, 2015:

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## **(12) Big data and its discontents: Privacy, surveillance, discrimination**

### Part 1

Have digital technologies, social apps, and big data rendered privacy obsolete? Does big data help overcome discrimination, or is it an instrument of discrimination? Should the law treat personal data as a commodity, to be bought and sold? Is "dataism" an alternative value system to humanism?

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Natasha Singer, "Sharing Data, but not Happily," *New York Times*, June 4, 2015:

[http://www.nytimes.com/2015/06/05/technology/consumers-conflicted-over-data-mining-policies-report-finds.html?\\_r=0](http://www.nytimes.com/2015/06/05/technology/consumers-conflicted-over-data-mining-policies-report-finds.html?_r=0)

### Part 2: Tracking health data, driving habits

Is there anything wrong with health insurers offering discounts to policy-holders who agree to wear Fitbits or other wearable devices that send data about exercise, diet, sleep, and other behavior to the insurance company? Should employers be allowed to make similar offers to their workers? Does it matter whether the employer gives bonuses for wearing the devices or imposes fines for not wearing them?



Should auto insurers be allowed to offer discounts to drivers who agree to install devices on their cars that monitor their driving behavior—how fast they drive, how hard they brake, and where they go? Is there anything wrong with Uber displaying the location of Uber users in a city or a neighborhood, provided the data is anonymous?

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