

Hunter College's SCI 111: Brains, Minds, and Machines

Working bibliography

This material was used in preparation of the course in 2016 and 2017.

Key to notation:

* material at an appropriate level for undergraduates

 video

interactive online material

The brain

Neurons

 *Boyden, E. A light switch for neurons (2011) TED2011. https://www.ted.com/talks/ed_boyden

A fast-paced sequence of explanatory videos on what neurons are and how they work

 *Crash Course, The Nervous System, Part 1, (2015). https://www.youtube.com/watch?v=qPix_X-9t7E

 *Crash Course, The Nervous System, Part 2 - Action! Potential! (2015)

https://www.youtube.com/watch?v=OZG8M_ldA1M

 *Crash Course, The Nervous System, Part 3 - Synapses! (2015)

<https://www.youtube.com/watch?v=VitFvNvRIIY>

Gelbard-Sagiv, H., Mukamel, R., Harel, M., Malach, R., & Fried, I. (2008). Internally generated reactivation of single neurons in human hippocampus during free recall. *Science*, 322(5898), 96-101.

Gross, C. G. (2008). Single neuron studies of inferior temporal cortex. *Neuropsychologia*, 46(3), 841-852.

Ison, M. J., Quiroga, R. Q., & Fried, I. (2015). Rapid encoding of new memories by individual neurons in the human brain. *Neuron*, 87(1), 220-230.

*Jabr, F. (2012) Know Your Neurons: The Discovery and Naming of the Neuron. *Scientific American*.

<http://blogs.scientificamerican.com/brainwaves/know-your-neurons-the-discovery-and-naming-of-the-neuron/>

*Jabr, F. (2012) Know Your Neurons: How to Classify Different Types of Neurons in the Brain's Forest

Scientific American.<http://blogs.scientificamerican.com/brainwaves/know-your-neurons-classifying-the-many-types-of-cells-in-the-neuron-forest/>

*Jabr, F. (2012) Know Your Neurons: Meet the Glia *Scientific American*.

<http://blogs.scientificamerican.com/brainwaves/know-your-neurons-meet-the-glia/>

Koch, C., & Segev, I. (2000). The role of single neurons in information processing. *Nature Neuroscience*, 3, 1171-1177.

Segev, I., & London, M. (2000). Untangling dendrites with quantitative models. *Science*, 290 (5492) 744-750.

Brain structure

#*3D brain app (online or free and downloadable for multiple platforms). <http://www.g2conline.org/2022>

Amunts, K., Schleicher, A., Ditterich, A., & Zilles, K. (2003). Broca's region: cytoarchitectonic asymmetry and developmental changes. *Journal of Comparative Neurology*, 465(1), 72-89

Angier, N. (2016) New Ways into the Brain's 'Music Room'
http://www.nytimes.com/2016/02/09/science/new-ways-into-the-brains-music-room.html?_r=0

*Bolte, J., Herculao-Houzel, S., & Kanwisher N.
<http://www.npr.org/programs/ted-radio-hour/384949524/the-unknown-brain>

*Herculano-Houzel, S. What is so special about the human brain? (2013) TEDGlobal.
https://www.ted.com/talks/suzana_herculano_houzel_what_is_so_special_about_the_human_brain?language=en

Norman-Haignere, S., Kanwisher NG, McDermott J.H. (2015) Distinct Cortical Pathways for Music and Speech Revealed by Hypothesis-Free Voxel Decomposition *Neuron* 88(6):1281-1296.
<http://www.ncbi.nlm.nih.gov/pubmed/26687225>

*Kanwisher, N. Modular Design of the Human Brain.
<http://nancysbraintalks.mit.edu/video/modular-design-human-brain>

*Kanwisher, N. The Neuroanatomy Lesson (Director's Cut).
<http://nancysbraintalks.mit.edu/video/neuroanatomy-lesson-directors-cut>

*Kanwisher, N. (2015) What's special about human brains?
<http://cbmm.mit.edu/video/whats-special-about-human-brains>

Mishkin, M., & Ungerleider, L. G. (1982). Contribution of striate inputs to the visuospatial functions of parieto-preoccipital cortex in monkeys. *Behavioural brain research*, 6(1), 57-77.
2 pathways for visual information

Mishkin, M. Ungerleider, L.G., & Macko, K.A. (1983) Object vision and spatial vision: Two cortical pathways. *Trends in neuroscience* 6:414-417.

Measuring brain activity

Calamante, F., Masterton, R. A., Tournier, J. D., Smith, R. E., Willats, L., Raffelt, D., & Connelly, A. (2013). Track-weighted functional connectivity (TW-FC): a tool for characterizing the structural-functional connections in the brain. *NeuroImage*, 70, 199-210

*Gabrieli, J. Tools of Neuroscience: MEG
http://www.learner.org/courses/neuroscience/common_includes/si_flowplayer.html?pid=2446

*Kanwisher, N. (2014) What is fMRI? <https://www.youtube.com/watch?v=VjaX2hYOTX8>

*Kanwisher, N. (2014). Explaining a very simple fMRI experiment
<https://www.youtube.com/watch?v=R7shsdmn48k>

University of Cambridge, Detailed article on EEG and MEG,
<http://imaging.mrc-cbu.cam.ac.uk/meg/IntroEEGMEG>

*Video on alpha isolation
<http://bcs.wiley.com/he-bcs/Books?action=mininav&bcsId=8985&itemId=1118468066&assetId=379253&resourceId=37205>

*Videos on MRI

<https://www.youtube.com/watch?v=Ok9ILYzmaY>

<http://bcs.wiley.com/hebcs/Books?action=mininav&bcsId=8985&itemId=1118468066&assetId=379251&resourceId=37205>

<http://bcs.wiley.com/hebcs/Books?action=mininav&bcsId=8985&itemId=1118468066&assetId=379252&resourceId=37205>

Functional specificity

 *Kanwisher, N. (2016) Functional specificity in the human brain

<http://cbmm.mit.edu/video/functional-specificity-human-brain-very-brief-history>

 *Kanwisher, N. (2015) Functional specificity: What it means and what it doesn't

<https://www.youtube.com/watch?v=ptu-3HisxQk>

 *Kanwisher, N. (2015) Why use function regions of interest (fROIs)?

<http://cbmm.mit.edu/video/why-use-functional-regions-interest-frois>

*Kanwisher, N. (2010). Functional specificity in the human brain: a window into the functional architecture of the mind. *Proceedings of the National Academy of Sciences*, 107(25), 11163-11170.

Mapping the brain

 *Boyden E. A light switch for the brain http://www.ted.com/talks/ed_boyden/transcript?language=en#t-334141

 *Boyden, E. A New way to study the brain's invisible secrets. (2016) TEDSummit.

http://www.ted.com/talks/ed_boyden_baby_diapers_inspired_this_new_way_to_study_the_brain#t-220188

 Boyden E. Tools for mapping and repairing the brain (2015)

<http://cbmm.mit.edu/video/tools-mapping-and-repairing-brain-part-1>

<http://cbmm.mit.edu/video/tools-mapping-and-repairing-brain-part-2>

<http://cbmm.mit.edu/video/tools-mapping-and-repairing-brain-part-3>

*Colapinto, J. Lighting the Brain: Karl Deisseroth and the optogenetics breakthrough. (2015) *The New Yorker*.
<http://www.newyorker.com/magazine/2015/05/18/lighting-the-brain>

Dean, T. Scalable Neuroscience and the Brain Activity Mapping Project.

<http://cs.brown.edu/people/tld/note/blog/13/07/26/>

 *Kanwisher, N. Discovering a face-specific region with fMRI.

<http://web.mit.edu/bcs/nklab/nancysbraintalks/discovering-a-face-specific-region-with-fmri.shtml>

O'Keefe, J. & Nadel L. (1978) The Hippocampus as a Cognitive Map. Clarendon Press.

Prevedel, R., Yoon, Y.-G., Hoffman, M., Pak, N., Wetzstein, G., Kato, S., Schrodel, T., Raskar, R., Zimmer, M., Boyden, E. S., Vaziri, A. (2014) Simultaneous whole-animal 3D imaging of neuronal activity using light-field microscopy. *Nature Methods* 11:727-730.

*Singer, E. Mapping the Brain to Build Better Machines: A race to decipher the brain's algorithms could revolutionize machine learning. (2016) *Quanta magazine* <https://www.quantamagazine.org/mapping-the-brain-to-build-better-machines-20160406>

Changes in the brain

Amihai, I., & Kozhevnikov, M. (2015). The influence of Buddhist meditation traditions on the autonomic system and attention. *BioMed Research International*, 2015.

Davidson, R. J., & Lutz, A. (2008). Buddha's brain: Neuroplasticity and meditation. *IEEE Signal Processing Magazine*, 25(1), 176.

Demertzi, A., Ombergen, A., Tomilovskaya, E., Jeurissen, B., Pechenkova, E., Perri, C., & Sijbers, J. (2016). Cortical reorganization in an astronaut's brain after long-duration spaceflight. *Brain Structure and Function*, 221(5), 2873-2876.

Lutz, A., Greischar, L. L., Rawlings, N. B., Ricard, M., & Davidson, R. J. (2004). Long-term meditators self-induce high-amplitude gamma synchrony during mental practice. *Proceedings of the National academy of Sciences of the United States of America*, 101(46), 16369-16373.

*Reynolds, G. (2016) Which Type of Exercise Is Best for the Brain? *The New York Times*
http://well.blogs.nytimes.com/2016/02/17/which-type-of-exercise-is-best-for-the-brain/?_r=0

*Goldman, J. (February, 2012) Desert Ants Are Better Than Most High School Students at Trigonometry. *Scientific American*, <https://blogs.scientificamerican.com/thoughtful-animal/desert-ants-are-better-at-trigonometry-than-most-high-school-students/>

The mind

Cognitive fun! <http://cognitivefun.net/profile> (2012)

*Koch, C., & Tononi, G. (2011). A test for consciousness. *Scientific American*, 304(6), 44-47.

Gopnik, A., O'Grady, S., Lucas, C.G., Griffiths, T.L., Wente, A., Bridgers, S., Aboody, R., Fung, H., & Dahl, R.E. (2017) Changes in cognitive flexibility and hypothesis search across human life history from childhood to adolescence to adulthood. *PNAS*, 114 (30) 7892-7899.

*Gopnik, A. (2011) What do babies think? TEDGlobal 2011
http://www.ted.com/talks/alison_gopnik_what_do_babies_think

*Gopnik, A. & Griffiths, T. What Happens to Creativity as We Age? (August 19, 2017) New York Times.
<https://www.nytimes.com/2017/08/19/opinion/sunday/what-happens-to-creativity-as-we-age.html>

Lau HC, Rogers RD, Haggard P, Passingham RE. Attention to intention. *Science* 2004 Feb 20; 303(5661):1208-10.

*Saxe, R. How we read each other's minds. TEDGlobal 2009. Jill Bolte-Taylor and her stroke, Suzana Herculano-Houzel and her brain in a blender, Nancy Kanwisher on mapping the brain, and Rebecca Saxe on what other people are thinking
https://www.ted.com/talks/rebecca_saxe_how_brains_make_moral_judgments?language=en

*Schulz, L. (2015) The surprisingly logical minds of babies
https://www.ted.com/talks/laura_schulz_the_surprisingly_logical_minds_of_babies?language=en#t-34148

Free will

BBC, The Neuroscience of Free Will, <https://vimeo.com/106089707>

- Brasil-Neto, J. P., Pascual-Leone, A., Valls-Sole, J., Cohen, L. G., & Hallett, M. (1992). Focal transcranial magnetic stimulation and response bias in a forced-choice task. *Journal of Neurology, Neurosurgery & Psychiatry*, 55(10), 964-966.
- Desmurget, M., Reilly, K. T., Richard, N., Szathmari, A., Mottolese, C., & Sirigu, A. (2009). Movement intention after parietal cortex stimulation in humans. *Science*, 324(5928), 811-813.
- Libet, B. (1999). Do we have free will? *Journal of consciousness studies*, 6(8-9), 47-57.
- Liu, J., & Newsome, W. T. (2000). Somatosensation: Touching the mind's fingers. *Current Biology*, 10(16), R598-R600.
- Sirigu, A., Daprati, E., Ciancia, S., Giraux, P., Nighoghossian, N., Posada, A., & Haggard, P. (2004). Altered awareness of voluntary action after damage to the parietal cortex. *Nature neuroscience*, 7(1), 80-84.
- Sirigu, A., Duhamel, J. R., Cohen, L., & Pillon, B. (1996). The mental representation of hand movements after parietal cortex damage. *Science*, 273(5281), 1564.
- Thaler, D., Chen, Y. C., Nixon, P. D., Stern, C. E., & Passingham, R. E. (1995). The functions of the medial premotor cortex. *Experimental Brain Research*, 102(3), 445-460.
- *Wegner, D. M. (2003). The mind's best trick: how we experience conscious will. *Trends in cognitive sciences*, 7(2), 65-69.
- Wheeler, M. E., Petersen, S. E., & Buckner, R. L. (2000). Memory's echo: vivid remembering reactivates sensory-specific cortex. *Proceedings of the National Academy of Sciences*, 97(20), 11125-11129.
- ### Memory
- *Horowitz, A. How to Memorize Everything (2011) *The New York Times*.
http://www.nytimes.com/2011/03/13/books/review/book-review-moonwalking-with-einstein-by-joshua-foer.html?pagewanted=all&_r=0.
- *Memory techniques not the answer to memory challenges
<https://edubloxtutor.com/memory-techniques-not-answer-memory-challenges/>
- *NOVA scienceNOW (2009) The man who couldn't remember. <http://www.pbs.org/wgbh/nova/body/corkin-hm-memory.html>
- Redondo, R. L., Kim, J., Arons, A. L., Ramirez, S., Liu, X., & Tonegawa, S. (2014). Bidirectional switch of the valence associated with a hippocampal contextual memory engram. *Nature*, 513(7518), 426-430.
- ## The computer
- ### Fundamentals
- *Binary representation
http://homepage.cs.uri.edu/book/binary_data/binary_data.htm
- *Encoding audio and video
<http://www.bbc.co.uk/education/guides/z7vc7ty/revision/1>

*Technical implementation (hardware requirements)
<http://www.bbc.co.uk/education/guides/zwbk87h/revision/1>

Computer thought

•Bundy, A. Smart Machines Are Not a Threat to Humanity (2017) *Communications of the ACM* 60 (2).
<http://cacm.acm.org/magazines/2017/2/212436-smart-machines-are-not-a-threat-to-humanity/fulltext>

* Davis, E. & Marcus, G. (2015). Commonsense Reasoning and Commonsense Knowledge in Artificial Intelligence. *CACM* 58(8). 92-103.

*How machine learning works (2015). *The Economist*.
<http://www.economist.com/blogs/economist-explains/2015/05/economist-explains-14?zid=291&ah=906e69ad01d2ee51960100b7fa502595>

*Mukherjee, S. A.I. versus M.D.: What happens when diagnosis is automated? (2017) *The New Yorker*.
<https://www.newyorker.com/magazine/2017/04/03/ai-versus-md>

🎥 *Watson and Jeopardy (2011). <https://www.youtube.com/watch?v=P0Obm0DBvwI>

Neural networks and deep learning

🎥 *Deep Learning TV (2015) Deep Learning Simplified
The series intro: <https://www.youtube.com/watch?v=b99UVkWzYTQ>
What is a Neural Network <https://www.youtube.com/watch?v=P2HPcj8lRJE>
What is a Neural Network https://www.youtube.com/watch?v=CEv_0r5huTY

Nielsen, M. Neural networks and deep learning (free online book) <http://neuralnetworksanddeeplearning.com/>

🎥 *Oolution Technologies (2013) Neural Networks, A Simple Explanation
https://www.youtube.com/watch?v=gcK_5x2KsLA

🎥 *Predictive Analytics Solutions (2015) Neural Network in Two and Half Minutes
https://www.youtube.com/watch?v=i6ECFrV_BVA

Tensorflow playground. For use with open source software library for numerical computation using data flow graphs. <http://playground.tensorflow.org>

Tomasello, M. (2008). Why don't apes point? *Trends in Linguistics Studies and Monographs*, 197, 375.

Synthetic therapy

*Bohannon, J. (2015) The synthetic therapist. *Science* 17 Jul 2015: Vol. 349, Issue 6245, pp. 250-251.

Colby, K. (1971) Artificial Paranoia. *Artificial Intelligence* 2(1), pp. 1–25.

*Weizenbaum, J. (1966) ELIZA — A Computer Program for the Study of Natural Language Communication between Man and Machine. *Communications of the Association for Computing Machinery* 9: 36-45.

Vision

Vision and the brain

Baker, C. (2012) Basics, Visual Processing, and Lateral Geniculate Nucleus LGN. Visual Processing in the Primate Brain. Chapter 4 in *Handbook of Psychology, Behavioral Neuroscience* 3: 81.

 *Hubel & Wiesel (2013) https://www.youtube.com/watch?v=y_l4kQ5wjiw#t=84.02101

Kanwisher, N., & Dilks, D. D. (2013). The functional organization of the ventral visual pathway in humans. *The new visual neurosciences*, 733-748.

 *Botto, B. Optical illusions show how we see (2009) TEDGlobal.

https://www.ted.com/talks/beau_lotto_optical_illusions_show_how_we_see?language=en

Mather G, Pavan A, Campana G, Casco C (2008) The motion after-effect reloaded. *Trends in Cognitive Sciences*, 12, 481-487. http://www.georgemather.com/PDF/Mather_et.al_2008.pdf

Mishkin, M., Ungerleider, L. G., & Macko, K. A. (1983). Object vision and spatial vision: two cortical pathways. *Trends in neurosciences*, 6, 414-417.

*Sacks, O. (2012) Altered States: Self experiments in chemistry. *The New Yorker*. August 27, 2012.
<https://www.newyorker.com/magazine/2012/08/27/changed-states-3>

*Sacks, O. (2002). The case of Anna H.: Why was she losing her ability to recognize familiar objects by sight? *The New Yorker*, October 2, 2002. <https://www.newyorker.com/magazine/2002/10/07/the-case-of-anna-h>

*Sacks, O. (1993). To See and Not See. *The New Yorker*, May 10, 1993.
<https://www.newyorker.com/magazine/1993/05/10/to-see-and-not-see>

Vision and the mind

Face recognition

#*How well do you recognize faces? http://www.faceblind.org/facetests/ff/ff_intro.php

##How well do you remember faces?

<http://www.bbk.ac.uk/psychology/psychologyexperiments/experiments/facememorytest/startup.php>

<https://people.eecs.berkeley.edu/~efros/courses/AP06/.../0412.context.torralba.ppt>
The impact of context

*Sacks, O. (1995). The landscape of his dreams. *An anthropologist on Mars*, 153-187.

*Sacks, O. (2003). The mind's eye. *New Yorker*, July 28, 2003, 48-59.
<https://www.newyorker.com/magazine/2003/07/28/the-minds-eye>

Visual Categorization with Random Projection Rosa Arriaga, David Rutter, Maya Cakmak, Santosh Vempala, *Neural Computation*. 2015 Oct;27(10):2132-47.

Vision and the computer

* Hsu, J. (2016) Digital Baby Project's Aim: Computers That See Like Humans
<http://spectrum.ieee.org/tech-talk/computing/software/digital-baby-project-aims-for-computers-to-see-like-humans>

 *Li, F-F. How we're teaching computers to understand pictures. TED2015.
https://www.ted.com/talks/fei_fei_li_how_we_re_teaching_computers_to_understand_pictures?language=en

Russakovsky, O., Deng, J., Su, H., Krause, J., Satheesh, S., Ma, S., Huang, Z., Karpathy, A., Khosla, A., Bernstein, M., Berg, A. C., & Li, F.-F. (2015). Imagenet large scale visual recognition challenge. *International Journal of Computer Vision*, 115(3), 211-252.

Szeliski, R. (2010) *Computer Vision: Algorithms and Applications*. Springer. <http://szeliski.org/Book/>

 *Urmson, C. How a driverless car sees the road. TED2015.
https://www.ted.com/talks/chris_urmon_how_a_driverless_car_sees_the_road

Navigation

Navigation and the brain

Chadwick, M.J., Jolly, A.E.J., Amos, D.P., Hassabis, D. & Spiers, H.J. (2015) A Goal Direction Signal in the Human Entorhinal/Subiculum Region. *Current Biology* 25(1):87-92.

Chrastil, E.R. (2012) Neural evidence supports a novel framework for spatial navigation. *Psychonomic Bulletin and Review* 20(2): 208-227.

Chrastil, E.R. & Warren, W.H. (2015) Active and Passive Spatial Learning in Human Navigation: Acquisition of Graph Knowledge. *Journal of Experimental Psychology: Learning, memory and cognition* 41(4):1162-78.

Chrastil, E.R. & Warren, W.H. (2013) Active and Passive Spatial Learning in Human Navigation: Acquisition of Survey Knowledge. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 0278-7393/13/\$12.00 DOI: 10.1037/a0032382 2013, Vol. 39, No. 5, 1520–1537

*Foster, D.J. & Knierim, J.J. (2012) Sequence learning and the role of the hippocampus in rodent navigation. *Current Opinion in Neurobiology* 22:294-300.

Howard, L. R., Javadi, A. H., Yu, Y., Mill, R. D., Morrison, L. C., Knight, R., ... & Spiers, H. J. (2014). The hippocampus and entorhinal cortex encode the path and Euclidean distances to goals during navigation. *Current Biology*, 24(12), 1331-1340.

*Kiehn, O. & Forssberg, H. (2014) The Brain's Navigational Place and Grid Cell System (scientific background for the 2014 Nobel Prize in Physiology or Medicine)
https://www.nobelprize.org/nobel_prizes/medicine/laureates/2014/advanced-medicineprize2014.pdf

Maguire, E. A., Gadian, D. G., Johnsrude, I. S., Good, C. D., Ashburner, J., Frackowiak, R. S., & Frith, C. D. (2000). Navigation-related structural change in the hippocampi of taxi drivers. *Proceedings of the National Academy of Sciences*, 97(8), 4398-4403.

Muller, R. U., & Kubie, J. L. (1987). The effects of changes in the environment on the spatial firing of hippocampal complex-spike cells. *The Journal of Neuroscience*, 7(7), 1951-1968.

Olafsdottir, H. F., Barry, C., Saleem, A. B., Hassabis, D., & Spiers, H. J. (2015). Hippocampal place cells construct reward related sequences through unexplored space. *Elife* 4.

Spiers, H. J., & Gilbert, S. J. (2015). Solving the detour problem in navigation: a model of prefrontal and hippocampal interactions. *Frontiers in human neuroscience*, 9, 125.

Spiers, H. J., & Maguire, E. A. (2007). A navigational guidance system in the human brain. *Hippocampus*, 17(8), 618-626.

Taube, J. S., Muller, R. U., & Ranck, J. B. (1990). Head-direction cells recorded from the postsubiculum in freely moving rats. I. Description and quantitative analysis. *The Journal of Neuroscience*, 10(2), 420-435.

*Wilson, M. Reading the Minds of Rats (2016). TEDx talks,
https://www.youtube.com/watch?v=Vf_m65MLdLI

Yoder, R. M., Clark, B. J., & Taube, J. S. (2011). Origins of landmark encoding in the brain. *Trends in neurosciences*, 34(11), 561-571.

Navigation and the mind

Foo, P., Duchon, A., Warren Jr, W. H., & Tarr, M. J. (2007). Humans do not switch between path knowledge and landmarks when learning a new environment. *Psychological research*, 71(3), 240-251.

Foo, P., Warren Jr, W. H., Duchon, A., & Tarr, M. J. (2005). Do humans integrate routes into a cognitive map? Map- versus landmark-based navigation of novel shortcuts. *Journal of Experimental Psychology Research: Learning, Memory, and Cognition*, 31(2), 195-215.

Rexrode, J. (2008) Rat maze. <https://www.youtube.com/watch?v=Ma8HCM3Z5Ic>

Tolman, E. C. (1948). Cognitive maps in rats and men. *Psychological Review*, 55, 189-208.

Worboys, M., Duckham, M., & Kulik, L. (2004). Commonsense notions of proximity and direction in environmental space. *Spatial cognition and computation*, 4(4), 285-312.

Navigation and the computer

Culotta, A., Kumar, N. R., & Cutler, J. (2015). Predicting the Demographics of Twitter Users from Website Traffic Data. In *Proceedings of AAAI* (pp. 72-78).

*Epstein, S. L., Aroor, A., Evanusa, M., Sklar, E. and Parsons, S. (2015). Navigation with Learned Spatial Affordances. In *Proceedings of 37th Annual Conference of the Cognitive Science Society*, Pasadena.

Keane, E. F., Johnston, S., Bhandari, S., Barr, E., Bhat, N. D. R., Burgay, M., & Petroff, E. (2016). The host galaxy of a fast radio burst. *Nature*, 530(7591), 453-456.

Kuipers, B., Tecuci, D.G., & Stankiewicz, B.J. (2003). The skeleton in the cognitive map: A computational hypothesis. *Environment and Behavior* 35(1): 80-106.

Torrens, P. M., Nara, A., Li, X., Zhu, H., Griffin, W. A., & Brown, S. B. (2012). An extensible simulation environment and movement metrics for testing walking behavior in agent-based models. *Computers, Environment and Urban Systems*, 36(1), 1-17.

Wei, Y., Brunskill, E., Kollar, T., & Roy, N. (2009). Where to go: Interpreting natural directions using global inference. In *Robotics and Automation, 2009. ICRA'09. IEEE International Conference on* (pp. 3761-3767). IEEE.

Face recognition

Face recognition in the brain

Blanz, V. & Vetter, T. (1999). A morphable model for the synthesis of 3D faces." *Proceedings of the 26th annual conference on Computer graphics and interactive techniques*. ACM Press/Addison-Wesley Publishing Co.

Carey, S., & Diamond, R. (1977). From piecemeal to configurational representation of faces. *Science*, 195(4275), 312-314.

*Connor, C. E. (2005). Neuroscience: Friends and grandmothers. *Nature*, 435(7045), 1036-1037.

 *Kanwisher, N. Discovering a Face Specific Region with fMRI.

<http://web.mit.edu/bcs/nklab/nancysbraintalks/discovering-a-face-specific-region-with-fmri.shtml>

 *Kanwisher, N. How early does face perception develop in childhood?

<http://web.mit.edu/bcs/nklab/nancysbraintalks/how-early-does-face-perception-develop-in-childhood.shtml>

 *Kanwisher, N. (2014) What Happens When You Stimulate the Face Area?

<https://www.youtube.com/watch?v=0XJNB68eWkk>

Kubota, J. T., Banaji, M. R., & Phelps, E. A. (2012). The neuroscience of race. *Nature neuroscience*, 15(7), 940-948.

Leopold, D.A., O'Toole, A.J., Vetter, T. & Blanz, V. (2001) Prototype-referenced shape encoding revealed by high-level aftereffects. *Nature Neuroscience* 5(1).

Face recognition in the mind

Bruce, V., Henderson, Z., Greenwood, K., Hancock, P. J., Burton, A. M., & Miller, P. (1999). Verification of face identities from images captured on video. *Journal of Experimental Psychology: Applied*, 5(4), 339.

Duchaine, B., & Nakayama, K. (2006). The Cambridge Face Memory Test: Results for neurologically intact individuals and an investigation of its validity using inverted face stimuli and prosopagnosic participants. *Neuropsychologia*, 44(4), 576-585.

Farroni, T., Menon, E., & Johnson, M. H. (2006). Factors influencing newborns' preference for faces with eye contact. *Journal of experimental child psychology*, 95(4), 298-308.

Jenkins, R., White, D., Van Montfort, X., & Burton, A. M. (2011). Variability in photos of the same face. *Cognition*, 121(3), 313-323.

 *Kanwisher, N. What is the role of experience in the development of face recognition?

<http://web.mit.edu/bcs/nklab/nancysbraintalks/what-is-the-role-of-experience-in-the-development-of-face-recognition.shtml>

 *Kanwisher, N. (2014) What You Can Learn from Studying Behavior

<https://www.youtube.com/watch?v=44TmLNsvIV0>

McKone, E., Crookes, K., Jeffery, L., & Dilks, D. D. (2012). A critical review of the development of face recognition: Experience is less important than previously believed. *Cognitive neuropsychology*, 29(1-2), 174-212.

*Prosopagnosia (2009). <https://www.youtube.com/watch?v=vwCrxomPbtY>

Face recognition in the computer

*Harris, D. (March 17, 2015) Google: Our new system for recognizing faces is the best one ever *Fortune*, <http://fortune.com/2015/03/17/google-facenet-artificial-intelligence/>

Jenkins, R., & Burton, A. M. (2008). 100% accuracy in automatic face recognition. *Science*, 319(5862), 435-435.

Kemelmacher-Shlizerman, I., Seitz, S. M., Miller, D., & Grossard, E. (2016) The MegaFace Benchmark: 1 Million Faces for Recognition at Scale. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*.

*Langston, J. (2016) How well do facial recognition algorithms cope with a million strangers? <http://www.washington.edu/news/2016/06/23/how-well-do-facial-recognition-algorithms-cope-with-a-million-strangers/>

Leiobo, J.Z., Liao, Q., & Poggio, T. (2014) Subtasks of Unconstrained Face Recognition. Proceedings of the 2014 International Conference on Computer Vision Theory and Applications (VISAPP).

*NPR Science (2009) Ants that Count! <https://www.youtube.com/watch?v=7DDF8WZFnoU>

Parvizi, J., Jacques, C., Foster, B. L., Withoft, N., Rangarajan, V., Weiner, K. S., & Grill-Spector, K. (2012). Electrical stimulation of human fusiform face-selective regions distorts face perception. *Journal of Neuroscience*, 32(43), 14915-14920.

*Quiroga, R. Q., Fried, I., & Koch, C. (2013). Brain cells for grandmother. *Scientific American*, 308(2), 30-35.

*Quiroga, R. Q., Reddy, L., Kreiman, G., Koch, C., & Fried, I. (2005). Invariant visual representation by single neurons in the human brain. *Nature*, 435(7045), 1102-1107.

Russell, R., Duchaine, B., & Nakayama, K. (2009). Super-recognizers: People with extraordinary face recognition ability. *Psychonomic bulletin & review*, 16(2), 252-257.

*Sacks, O. (2010). Face-Blind: Why are some of us terrible at recognizing faces? *The New Yorker*, August 30, 2010. <https://www.newyorker.com/magazine/2010/08/30/face-blind>

Schroff, F., Kalenichenko, D., & Philbin, J. (2015). FaceNet: A unified embedding for face recognition and clustering. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition* (pp. 815-823).

Serre, T., Kreiman, G., Kouh, M., Cadieu, C., Knoblich, U., & Poggio, T. (2007). A quantitative theory of immediate visual recognition. In *Progress in Brain Research* 165. Cisek, P., Drew, T., & Kalaska, J.F., eds.

*Siegel, R. & Silverman, A. (April 3, 2017) Pittsburgh Offers Driving Lessons for Uber's Autonomous Cars, *NPR: All Things Considered*. <https://www.npr.org/sections/alltechconsidered/2017/04/03/522099560/pittsburgh-offers-driving-lessons-for-ubers-autonomous-cars>

Sinha, P., Balas, B., Ostrovsky, Y., Russell, R. (2006) Proceedings of the IEEE 94 (11), 1948-1962.
Face recognition by humans: Nineteen results all computer vision researchers should know about

*Sinha, P. (2009) How brains learn to see.
https://www.ted.com/talks/pawan_sinha_on_how_brains_learn_to_see#t-30694

Tsao, D. Y., Freiwald, W. A., Tootell, R. B., & Livingstone, M. S. (2006). A cortical region consisting entirely of face-selective cells. *Science*, 311(5761), 670-674.

Tsao, D. Y., & Livingstone, M. S. (2008). Mechanisms of face perception. *Annual review of neuroscience*, 31, 411.

Turk, M., & Pentland, A. (1991). Eigenfaces for recognition. *Journal of cognitive neuroscience*, 3(1), 71-86.

Valentine, T. (1991) A unified account of the effects of distinctiveness, inversion, and race in face recognition. *The Quarterly Journal of Experimental Psychology* 43.2: 161-204.

Language

Language and the brain

*Anwar, Y. (2016) Scientists map brain's thesaurus to help decode inner thoughts. Berkeley News, April 27. <http://news.berkeley.edu/2016/04/27/brain-thesaurus/>

*Berzak, Y., Nakamura, C., Flynn, S., & Katz, B. (2017) Predicting Native Language from Gaze. In *Proceedings of the Association for computational Linguistics*, pp.541-551.

*Berzak, Y., Reichart, R., Katz, B. Reconstructing Native Language Typology from Foreign Language Usage. (2014) *Proceedings of the Conference on Computational Natural Language Learning (CoNLL)*.

*Bolte-Taylor, J. My Stroke of Insight (2008) TED2008.
https://www.ted.com/talks/jill_bolte_taylor_s_powerful_stroke_of_insight

*Carey, B. (2016) This is your Brain on Podcasts. *The New York Times*, April 28. <http://www.nytimes.com/2016/04/29/science/this-is-your-brain-on-podcasts.html>

Fedorenko, E., Behr, M. K., & Kanwisher, N. (2011). Functional specificity for high-level linguistic processing in the human brain. *Proceedings of the National Academy of Sciences*, 108(39), 16428-16433.

Fedorenko, E., Duncan, J., & Kanwisher, N. (2012). Language-selective and domain-general regions lie side by side within Broca's area. *Current Biology*, 22(21), 2059-2062.

Fedorenko, E., & Kanwisher, N. (2009). Neuroimaging of language: why hasn't a clearer picture emerged? *Language and Linguistics Compass*, 3(4), 839-865.

*Fluent Aphasia (Wernicke's Aphasia) (2015) <https://www.youtube.com/watch?v=3oef68YabD0>

Gilbert, A. L., Regier, T., Kay, P., & Ivry, R. B. (2006). Whorf hypothesis is supported in the right visual field but not the left. *Proceedings of the National Academy of Sciences of the United States of America*, 103(2), 489-494.

Huth, A. G., de Heer, W. A., Griffiths, T. L., Theunissen, F. E., & Gallant, J. L. (2016). Natural speech reveals the semantic maps that tile human cerebral cortex. *Nature*, 532(7600), 453-458.

*Koch, C. & Tononi, G. A test for consciousness (June, 2011). Scientific American.

 *Kuhl, P. (2010) The linguistic genius of babies.

http://www.ted.com/talks/patricia_kuhl_the_linguistic_genius_of_babies

Mahon, B. Z., & Caramazza, A. (2009). Concepts and Categories: A Cognitive Neuropsychological Perspective. *Annual Review of Psychology*, 60, 27–51. <http://doi.org/10.1146/annurev.psych.60.110707.163532>

Mitchell, T. M., Shinkareva, S. V., Carlson, A., Chang, K. M., Malave, V. L., Mason, R. A., & Just, M. A. (2008). Predicting human brain activity associated with the meanings of nouns. *Science*, 320 (5880), 1191-1195.

Mosher, V. A., Liebenthal, E., & Goodyear, B. G. (2014). Active and Passive fMRI for Presurgical Mapping of Motor and Language Cortex.

Language and the mind

Bateman, J. A., Hois, J., Ross, R., & Tenbrink, T. (2010). A linguistic ontology of space for natural language processing. *Artificial Intelligence*, 174(14), 1027-1071.

Bloom, P. (2000). *How children learn the meanings of words* Cambridge, MA: MIT press.

 *Just, M. & Mitchell, T. Thought reading demonstration. (2009)

https://www.youtube.com/watch?v=JVLu5_hvr8s

 *Linguistic Society of America, "The Human Language" Series Part 1: What Is a Word? (2013)

<https://www.youtube.com/watch?v=Gbk5ULhjHI4> (about 3 minutes)

 *Linguistic Society of America, "The Human Language" Series Part 2: What Does Alike Mean? (2013)

<https://www.youtube.com/watch?v=FNgenY00uoI> (about 3.5 minutes)

Prasada, S. (2014) Semantic Development. In *Encyclopedia of Language Development*, Brooks, P.J. & Kempe, V., editors. 527-533.

Language and the computer

#*What are the best intelligent chatbots available online? <https://chatbotsmagazine.com/which-are-the-best-intelligent-chatbots-or-ai-chatbots-available-online-cc49c0f3569d>

*Lohr, S. Aiming to Learn as We Do, a Machine Teaches Itself (2010) *The New York Times*, <http://www.nytimes.com/2010/10/05/science/05compute.html>

Marcus, G. F. (1998). Can connectionism save constructivism? *Cognition*, 66(2), 153-182.

Rohde, D. L., & Plaut, D. C. (1999). Language acquisition in the absence of explicit negative evidence: How important is starting small? *Cognition*, 72(1), 67-109.

Sakas, W. G. (2008, June). Psychocomputational linguistics: a gateway to the computational linguistics curriculum. In *Proceedings of the Third Workshop on Issues in Teaching Computational Linguistics* (pp. 120-128). Association for Computational Linguistics.

 *Wada, J. Brain Hemisphere Specializations (2007) <https://www.youtube.com/watch?v=sBbilBZ46Eg>

Understanding science

*How science works. Understanding Science. University of California Museum of Paleontology (2018)
http://undsci.berkeley.edu/article/howscienceworks_01

*The real process of science. Understanding Science. University of California Museum of Paleontology (2018)
http://undsci.berkeley.edu/article/0_0_0/howscienceworks_02

*Misconceptions about science University of California Museum of Paleontology (2018)
<http://undsci.berkeley.edu/teaching/misconceptions.php#a1>

*The scientific community: Diversity makes the difference. University of California Museum of Paleontology (2018) http://undsci.berkeley.edu/article/0_0_0/socialsideofscience_02

*Johnson, G. Unraveling the Ties of Altitude, Oxygen and Lung Cancer. *The New York Times*, January 26, 2016.

*Sacks, O. (1999) Brilliant Light: A chemical boyhood. *The New Yorker*, December 20, 1999.
<https://www.newyorker.com/magazine/1999/12/20/brilliant-light>

Texts

Goldstein, E. B. *Cognitive Psychology*, 4th edition. Cengage.

*Bermúdez, José Luis (2010). *Cognitive science: an introduction to the science of the mind*. 2nd edition. Cambridge: Cambridge University Press.

Goodfellow, I., Bengio, Y. & Courville, A. (2016) *Deep Learning*, MIT Press.

Postle, B.R. (2015) *Essentials of Cognitive Neuroscience*,

Frankish, K. & Ramsey, W. (2012) *The Cambridge Handbook of Cognitive Science*, Cambridge University Press