

Geoffrey Hinton

Geoffrey Everest Hinton CC FRS FRSC^[11] (born 6 December 1947) is a British-Canadian cognitive psychologist and computer scientist, most noted for his work on artificial neural networks. Since 2013, he has divided his time working for Google (Google Brain) and the University of Toronto. In 2017, he co-founded and became the Chief Scientific Advisor of the Vector Institute in Toronto.^{[12][13]}

With David Rumelhart and Ronald J. Williams, Hinton was co-author of a highly cited paper published in 1986 that popularized the backpropagation algorithm for training multi-layer neural networks,^[14] although they were not the first to propose the approach.^[15] Hinton is viewed as a leading figure in the deep learning community.^{[16][17][18][19][20]} The dramatic image-recognition milestone of the AlexNet designed in collaboration with his students Alex Krizhevsky^[21] and Ilya Sutskever for the ImageNet challenge 2012^[22] was a breakthrough in the field of computer vision.^[23]

Hinton received the 2018 Turing Award, together with Yoshua Bengio and Yann LeCun, for their work on deep learning.^[24] They are sometimes referred to as the "Godfathers of AI" and "Godfathers of Deep Learning",^{[25][26]} and have continued to give public talks together.^{[27][28]}

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Education

Hinton was educated at King's College, Cambridge, graduating in 1970 with a Bachelor of Arts in experimental psychology.^[1] He continued his study at the University of Edinburgh where he was awarded a Ph.D. in artificial intelligence in 1978 for research supervised by Christopher Longuet-Higgins.^{[3][29]}

<div>Geoffrey Hinton</div> <div>CC FRS FRSC</div>	
	
Hinton in 2013	
Born	<div>Geoffrey Everest Hinton</div> <div>6 December 1947^[1]</div> <div><u>Wimbledon, London</u></div>
Education	<div><u>University of Cambridge</u> (BA)</div> <div><u>University of Edinburgh</u> (PhD)</div>
Known for	<div><u>Applications of backpropagation</u></div> <div><u>Boltzmann machine</u></div> <div><u>Deep learning</u></div> <div><u>Capsule neural network</u></div>
Awards	<div><u>AAAI Fellow</u> (1990)</div> <div><u>Rumelhart Prize</u> (2001)</div>

Career and research

After his Ph.D., he worked at the [University of Sussex](#) and, (after difficulty finding funding in Britain),^[30] the [University of California, San Diego](#) and [Carnegie Mellon University](#).^[1] He was the founding director of the [Gatsby Charitable Foundation Computational Neuroscience Unit](#) at [University College London](#)^[1] and is currently^[31] a professor in the computer science department at the [University of Toronto](#). He holds a [Canada Research Chair](#) in Machine Learning and is currently an advisor for the *Learning in Machines & Brains* program at the [Canadian Institute for Advanced Research](#). Hinton taught a free online course on Neural Networks on the education platform [Coursera](#) in 2012.^[32] Hinton joined [Google](#) in March 2013 when his company, DNNresearch Inc., was acquired. He is planning to "divide his time between his university research and his work at Google".^[33]

Hinton's research investigates ways of using neural networks for machine learning, memory, perception and symbol processing. He has authored or co-authored over 200 peer reviewed publications.^{[2][34]}

While Hinton was a professor at [Carnegie Mellon University](#) (1982–1987), [David E. Rumelhart](#) and Hinton and [Ronald J. Williams](#) applied the [backpropagation algorithm](#) to multi-layer neural networks. Their experiments showed that such networks can learn useful internal representations of data.^[14] In an interview of 2018,^[35] Hinton said that "[David E. Rumelhart](#) came up with the basic idea of backpropagation, so it's his invention." Although this work was important in popularizing backpropagation, it was not the first to suggest the approach.^[15] Reverse-mode automatic differentiation, of which backpropagation is a special case, was proposed by [Seppo Linnainmaa](#) in 1970, and [Paul Werbos](#) proposed to use it to train neural networks in 1974.^[15]

During the same period, Hinton co-invented [Boltzmann machines](#) with [David Ackley](#) and [Terry Sejnowski](#).^[36] His other contributions to neural network research include [distributed representations](#), [time delay neural network](#), mixtures of experts, [Helmholtz machines](#) and [Product of Experts](#). In 2007 Hinton coauthored an unsupervised learning paper titled *Unsupervised learning of image transformations*.^[37] An accessible introduction to Geoffrey Hinton's research can be found in his articles in *Scientific American* in September 1992 and October 1993.^[38]

In October and November 2017 respectively, Hinton published two open access research papers^{[39][40]} on the theme of capsule neural networks, which according to Hinton are "finally something that works well."^[41]

[IJCAI Award for Research Excellence](#) (2005)
[IEEE Frank Rosenblatt Award](#) (2014)
[James Clerk Maxwell Medal](#) (2016)
[BBVA Foundation Frontiers of Knowledge Award](#) (2016)
[Turing Award](#) (2018)
[Princess of Asturias Award](#) (2022)

Scientific career

Fields	Machine learning Neural networks Artificial intelligence Cognitive science Object recognition ^[2]
Institutions	University of Toronto Google Carnegie Mellon University University College London University of California, San Diego
Thesis	<i>Relaxation and its role in vision</i> (http://hdl.handle.net/1842/8121) (1977)
Doctoral advisor	Christopher Longuet-Higgins ^{[3][4][5]}
Doctoral	Richard Zemel ^[6]

Notable former PhD students and postdoctoral researchers from his group include [Peter Dayan](#),^[42] [Sam Roweis](#),^[42] [Max Welling](#),^[42] [Richard Zemel](#),^{[3][6]} [Brendan Frey](#),^[7] [Radford M. Neal](#),^[8] [Yee Whye Teh](#), [Ruslan Salakhutdinov](#),^[9] [Ilya Sutskever](#),^[10] [Yann LeCun](#),^[43] [Alex Graves](#),^[42] and [Zoubin Ghahramani](#).

Honours and awards

Hinton was elected a [Fellow of the Royal Society \(FRS\)](#) in 1998.^[11] He was the first winner of the [Rumelhart Prize](#) in 2001.^[44] His certificate of election for the Royal Society reads:

Geoffrey E. Hinton is internationally distinguished for his work on artificial neural nets, especially how they can be designed to learn without the aid of a human teacher. This may well be the start of autonomous intelligent brain-like machines. He has compared effects of brain damage with effects of losses in such a net, and found striking similarities with human impairment, such as for recognition of names and losses of categorization. His work includes studies of mental imagery, and inventing puzzles for testing originality and creative intelligence. It is conceptual, mathematically sophisticated and experimental. He brings these skills together with striking effect to produce important work of great interest.^[45]

In 2001, Hinton was awarded an [Honorary Doctorate](#) from the [University of Edinburgh](#).^[46] He was the 2005 recipient of the [IJCAI Award for Research Excellence](#) lifetime-achievement award.^[47] He has also been awarded the 2011 [Herzberg Canada Gold Medal for Science and Engineering](#).^[48] In 2013, Hinton was awarded an [Honorary Doctorate](#) from the [Université de Sherbrooke](#).^[49]

In 2016, he was elected a foreign member of [National Academy of Engineering](#) "For contributions to the theory and practice of artificial neural networks and their application to speech recognition and computer vision".^[50] He also received the 2016 [IEEE/RSE Wolfson James Clerk Maxwell Award](#).^[51]

He has won the [BBVA Foundation Frontiers of Knowledge Award](#) (2016) in the Information and Communication Technologies category "for his pioneering and highly influential work" to endow machines with the ability to learn.^[52]

Together with [Yann LeCun](#), and [Yoshua Bengio](#), Hinton won the 2018 [Turing Award](#) for conceptual and engineering breakthroughs that have made deep neural networks a critical component of computing.^{[53][54][55]}

students	Brendan Frey ^[7] Radford M. Neal ^[8] Yee Whye Teh Ruslan Salakhutdinov ^[9] Ilya Sutskever ^[10]
Other notable students	Yann LeCun (postdoc) Peter Dayan (postdoc) Max Welling (postdoc) Zoubin Ghahramani (postdoc) Alex Graves (postdoc)
Website	www.cs.toronto.edu/~hinton/ (http://p://www.cs.toronto.edu/~hinton/)



From left to right [Russ Salakhutdinov](#), [Richard S. Sutton](#), [Geoffrey Hinton](#), [Yoshua Bengio](#) and [Steve Jurvetson](#) in 2016

In 2018, he was awarded a Companion of the Order of Canada.^[56] In 2022 he received the Princess of Asturias Award in the category "Scientific Research".^[57]

Personal life

Hinton is the great-great-grandson of the mathematician and educator Mary Everest Boole and her husband, the logician George Boole,^[58] whose work eventually became one of the foundations of modern computer science. Another great-great-grandfather was the surgeon and author James Hinton,^[59] who was the father of Charles Howard Hinton. Hinton's father was Howard Hinton.^{[1][60]} His middle name comes from another relative, George Everest.^[30] He is the nephew of the economist Colin Clark.^[61] He lost his first wife to ovarian cancer in 1994.^[62]

Views

Hinton moved from the U.S. to Canada in part due to disillusionment with Ronald Reagan-era politics and disapproval of military funding of artificial intelligence.^[30]

Hinton has petitioned against lethal autonomous weapons. Regarding existential risk from artificial intelligence, Hinton typically declines to make predictions more than five years into the future, noting that exponential progress makes the uncertainty too great.^[63]

Hinton is optimistic about AI's impact on the job market: "The phrase 'artificial general intelligence' carries with it the implication that this sort of single robot is suddenly going to be smarter than you. I don't think it's going to be that. I think more and more of the routine things we do are going to be replaced by AI systems — like the Google Assistant." ^[64]

Hinton argues that AGI won't so much make humans redundant. Rather, he says, it will remain for the most part myopic in its understanding of the world — at least in the near future. He believes that it'll continue to improve our lives in small but meaningful ways. "[AI in the future is] going to know a lot about what you're probably going to want to do and how to do it, and it's going to be very helpful. But it's not going to replace you," he said. "If you took [a] system that was developed to be able to be very good [at driving], and you sent it on its first date, I think it would be a disaster." And for dangerous tasks currently performed by humans, that's a step in the right direction, according to Hinton. ^[65]

References

1. Anon (2015) "Hinton, Prof. Geoffrey Everest" (<https://www.ukwhoswho.com/view/article/oup-ww/whoswho/U20261>). *Who's Who*. *ukwhoswho.com* (online Oxford University Press ed.). A & C Black, an imprint of Bloomsbury Publishing plc. (Subscription or UK public library membership (<https://www.ukwhoswho.com/page/subscribe#public>) required.) doi:10.1093/ww/9780199540884.013.20261 (<https://doi.org/10.1093%2Fww%2F9780199540884.013.20261>) (subscription required)
2. Geoffrey Hinton (<https://scholar.google.com/citations?user=JicYPdAAAAAJ>) publications indexed by Google Scholar
3. Geoffrey Hinton (<https://mathgenealogy.org/id.php?id=50071>) at the Mathematics Genealogy Project
4. Geoffrey E. Hinton's Academic Genealogy (<http://phdtree.org/scholar/hinton-geoffrey-e/>)

5. Gregory, R. L.; Murrell, J. N. (2006). "Hugh Christopher Longuet-Higgins. 11 April 1923 -- 27 March 2004: Elected FRS 1958". *Biographical Memoirs of Fellows of the Royal Society*. **52**: 149–166. doi:10.1098/rsbm.2006.0012 (<https://doi.org/10.1098%2Frsbm.2006.0012>).
6. Zemel, Richard Stanley (1994). *A minimum description length framework for unsupervised learning* (PhD thesis). University of Toronto. OCLC 222081343 (<https://www.worldcat.org/oclc/222081343>). ProQuest 304161918 (<https://search.proquest.com/docview/304161918>).
7. Frey, Brendan John (1998). *Bayesian networks for pattern classification, data compression, and channel coding* (PhD thesis). University of Toronto. OCLC 46557340 (<https://www.worldcat.org/oclc/46557340>). ProQuest 304396112 (<https://search.proquest.com/docview/304396112>).
8. Neal, Radford (1995). *Bayesian learning for neural networks* (PhD thesis). University of Toronto. OCLC 46499792 (<https://www.worldcat.org/oclc/46499792>). ProQuest 304260778 (<https://search.proquest.com/docview/304260778>).
9. Salakhutdinov, Ruslan (2009). *Learning deep generative models* (PhD thesis). University of Toronto. ISBN 9780494610800. OCLC 785764071 (<https://www.worldcat.org/oclc/785764071>). ProQuest 577365583 (<https://search.proquest.com/docview/577365583>).
10. Sutskever, Ilya (2013). *Training Recurrent Neural Networks* (PhD thesis). University of Toronto. OCLC 889910425 (<https://www.worldcat.org/oclc/889910425>). ProQuest 1501655550 (<https://search.proquest.com/docview/1501655550>).
11. Anon (1998). "Professor Geoffrey Hinton FRS" (<https://web.archive.org/web/20151103005016/https://royalsociety.org/people/geoffrey-hinton-11624/>). London: Royal Society. Archived from the original (<https://royalsociety.org/people/geoffrey-hinton-11624/>) on 3 November 2015. One or more of the preceding sentences incorporates text from the royalsociety.org website where:

"All text published under the heading 'Biography' on Fellow profile pages is available under Creative Commons Attribution 4.0 International License." -- "Royal Society Terms, conditions and policies" (<https://web.archive.org/web/20161111170346/https://royalsociety.org/about-us/terms-conditions-policies/>). Archived from the original on 11 November 2016. Retrieved 9 March 2016.

12. Hernandez, Daniela (7 May 2013). "The Man Behind the Google Brain: Andrew Ng and the Quest for the New AI" (<https://www.wired.com/wiredenterprise/2013/05/neuro-artificial-intelligence/all/>). *Wired*. Retrieved 10 May 2013.
13. "Geoffrey E. Hinton – Google AI" (<https://ai.google/research/people/GeoffreyHinton>). *Google AI*.
14. Rumelhart, David E.; Hinton, Geoffrey E.; Williams, Ronald J. (9 October 1986). "Learning representations by back-propagating errors". *Nature*. **323** (6088): 533–536. Bibcode:1986Natur.323..533R (<https://ui.adsabs.harvard.edu/abs/1986Natur.323..533R>). doi:10.1038/323533a0 (<https://doi.org/10.1038%2F323533a0>). ISSN 1476-4687 (<https://www.worldcat.org/issn/1476-4687>). S2CID 205001834 (<https://api.semanticscholar.org/CorpusID:205001834>).
15. Schmidhuber, Jürgen (1 January 2015). "Deep learning in neural networks: An overview". *Neural Networks*. **61**: 85–117. arXiv:1404.7828 (<https://arxiv.org/abs/1404.7828>). doi:10.1016/j.neunet.2014.09.003 (<https://doi.org/10.1016%2Fj.neunet.2014.09.003>). PMID 25462637 (<https://pubmed.ncbi.nlm.nih.gov/25462637>). S2CID 11715509 (<https://api.semanticscholar.org/CorpusID:11715509>).

16. "Geoffrey Hinton was briefly a Google intern in 2012 because of bureaucracy – TechCrunch" (<https://techcrunch.com/2017/09/14/geoffrey-hinton-was-briefly-a-google-intern-in-2012-because-of-bureaucracy/>). *techcrunch.com*. Retrieved 28 March 2018.
17. Somers, James. "Progress in AI seems like it's accelerating, but here's why it could be plateauing" (<https://www.technologyreview.com/s/608911/is-ai-riding-a-one-trick-pony/>). *MIT Technology Review*. Retrieved 28 March 2018.
18. "How U of T's 'godfather' of deep learning is reimagining AI" (<https://www.utoronto.ca/news/how-u-t-s-godfather-deep-learning-reimagining-ai>). *University of Toronto News*. Retrieved 28 March 2018.
19. "'Godfather' of deep learning is reimagining AI" (<https://phys.org/news/2017-11-godfather-deep-reimagining-ai.html>). Retrieved 28 March 2018.
20. "Geoffrey Hinton, the 'godfather' of deep learning, on AlphaGo" (<http://www.macleans.ca/society/science/the-meaning-of-alphago-the-ai-program-that-beat-a-go-champ/>). *Macleans.ca*. 18 March 2016. Retrieved 28 March 2018.
21. Gershgorn, Dave (18 June 2018). "The inside story of how AI got good enough to dominate Silicon Valley" (<https://qz.com/1307091/the-inside-story-of-how-ai-got-good-enough-to-dominate-silicon-valley/>). *Quartz*. Retrieved 5 October 2018.
22. Krizhevsky, Alex; Sutskever, Ilya; Hinton, Geoffrey E. (3 December 2012). "ImageNet classification with deep convolutional neural networks" (<http://dl.acm.org/citation.cfm?id=2999134.2999257>). Nips'12. Curran Associates Inc.: 1097–1105.
23. "How a Toronto professor's research revolutionized artificial intelligence | Toronto Star" (<http://www.thestar.com/news/world/2015/04/17/how-a-toronto-professors-research-revolutionized-artificial-intelligence.html>). *thestar.com*. Retrieved 13 March 2018.
24. 27 Mar, Emily Chung · CBC News · Posted; March 27, 2019 6:00 AM ET | Last Updated. "Canadian researchers who taught AI to learn like humans win \$1M award | CBC News" (<https://www.cbc.ca/news/technology/turing-award-ai-deep-learning-1.5070415>). *CBC*. Retrieved 27 March 2019.
25. Ranosa, Ted (29 March 2019). "Godfathers Of AI Win This Year's Turing Award And \$1 Million" (<https://www.techtimes.com/articles/240511/20190329/godfathers-of-ai-win-this-year-s-turing-award-and-1-million.htm>). *Tech Times*. Retrieved 5 November 2020.
26. Shead, Sam. "The 3 'Godfathers' Of AI Have Won The Prestigious \$1M Turing Prize" (<https://www.forbes.com/sites/samshead/2019/03/27/the-3-godfathers-of-ai-have-won-the-prestigious-1m-turing-prize/>). *Forbes*. Retrieved 5 November 2020.
27. Ray, Tiernan. "Nvidia's GTC will feature deep learning cabal of LeCun, Hinton, and Bengio" (<https://www.zdnet.com/article/nvidias-gtc-will-feature-deep-learning-cabal-of-lecun-hinton-bengio/>). *ZDNet*. Retrieved 7 April 2021.
28. "50 Years at CMU: The Inaugural Raj Reddy Artificial Intelligence Lecture" (<https://www.cs.cmu.edu/events/raj-reddy-50>). *cs.cmu.edu*. Retrieved 2 March 2022.
29. Hinton, Geoffrey Everest (1977). *Relaxation and its role in vision* (PhD thesis). University of Edinburgh. hdl:1842/8121 (<https://hdl.handle.net/1842%2F8121>). OCLC 18656113 (<https://www.worldcat.org/oclc/18656113>). EThOS uk.bl.ethos.482889 (<http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.482889>). 
30. Smith, Craig S. (23 June 2017). "The Man Who Helped Turn Toronto into a High-Tech Hotbed" (<https://www.nytimes.com/2017/06/23/world/canada/the-man-who-helped-turn-toronto-into-a-high-tech-hotbed.html>). *The New York Times*. Retrieved 27 June 2017.
31. <https://www.cs.toronto.edu/~hinton/fullcv.pdf>
32. "Archived copy" (<https://web.archive.org/web/20161231174321/https://www.coursera.org/learn/neural-networks>). Archived from the original (<https://www.coursera.org/learn/neural-networks>) on 31 December 2016. Retrieved 30 December 2016.

33. "U of T neural networks start-up acquired by Google" (<http://media.utoronto.ca/media-releases/u-of-t-neural-networks-start-up-acquired-by-google/>) (Press release). Toronto, ON. 12 March 2013. Retrieved 13 March 2013.
34. Geoffrey Hinton (<https://www.scopus.com/authid/detail.url?authorId=7006699573>) publications indexed by the Scopus bibliographic database. (subscription required)
35. Ford, Martin (2018). *Architects of Intelligence: The truth about AI from the people building it*. Packt Publishing. ISBN 978-1-78913-151-2.
36. Ackley, David H; Hinton Geoffrey E; Sejnowski, Terrence J (1985), "A learning algorithm for Boltzmann machines", *Cognitive science*, Elsevier, 9 (1): 147–169
37. Hinton, Geoffrey E. "Geoffrey E. Hinton's Publications in Reverse Chronological Order" (<http://www.cs.toronto.edu/~hinton/papers.html>).
38. "Stories by Geoffrey E. Hinton in Scientific American" (<https://www.scientificamerican.com/author/geoffrey-e-hinton/>). *Scientific American*.
39. Sabour, Sara; Frosst, Nicholas; Hinton, Geoffrey. October 2017. "Dynamic Routing Between Capsules" (<https://arxiv.org/abs/1710.09829>)
40. "Matrix capsules with EM routing" (<https://openreview.net/forum?id=HJWLfGWRb¬Id=HJWLfGWRb>) 3 November 2017. OpenReview.net
41. Geib, Claudia. 2 November 2017. "We've Finally Created an AI Network That's Been Decades in the Making" (<https://futurism.com/weve-finally-created-an-ai-network-thats-been-decades-in-the-making/>) Futurism.com
42. "Geoffrey Hinton's postdocs" (<http://www.cs.toronto.edu/~hinton/postdocs.html>). Geoffrey Hinton.
43. "Yann LeCun's Research and Contributions" (<http://yann.lecun.com/ex/research/index.html>). *yann.lecun.com*. Retrieved 13 March 2018.
44. "Current and Previous Recipients" (https://web.archive.org/web/20170302000053/http://rumelhartprize.org/?page_id=12). David E. Rumelhart Prize. Archived from the original (http://rumelhartprize.org/?page_id=12) on 2 March 2017.
45. Anon (1998). "Certificate of election EC/1998/21: Geoffrey Everest Hinton" ([https://web.archive.org/web/20170505114828/https://collections.royalsociety.org/Dserve.exe?dsqIni=Dserve.ini&dsqApp=Archive&dsqDb=Catalog&dsqCmd=show.tcl&dsqSearch=\(RefNo==%27EC%2F1998%2F21%27\)\)](https://web.archive.org/web/20170505114828/https://collections.royalsociety.org/Dserve.exe?dsqIni=Dserve.ini&dsqApp=Archive&dsqDb=Catalog&dsqCmd=show.tcl&dsqSearch=(RefNo==%27EC%2F1998%2F21%27)))). London: Royal Society. Archived from the original ([https://collections.royalsociety.org/Dserve.exe?dsqIni=Dserve.ini&dsqApp=Archive&dsqDb=Catalog&dsqCmd=show.tcl&dsqSearch=\(RefNo==%27EC%2F1998%2F21%27\)\)](https://collections.royalsociety.org/Dserve.exe?dsqIni=Dserve.ini&dsqApp=Archive&dsqDb=Catalog&dsqCmd=show.tcl&dsqSearch=(RefNo==%27EC%2F1998%2F21%27)))) on 5 May 2017.
46. "Distinguished Edinburgh graduate receives ACM A.M. Turing Award" (<https://www.ed.ac.uk/informatics/news-events/stories/2019/distinguished-edinburgh-graduate-receives-acm-tur>). *The University of Edinburgh*. Retrieved 9 April 2019.
47. "IJCAI Awards | IJCAI" (<https://www.ijcai.org/awards>). *www.ijcai.org*. Retrieved 5 August 2021.
48. "Artificial intelligence scientist gets M prize" (<http://www.cbc.ca/technology/story/2011/02/14/science-herzberg-hinton-artificial-intelligence.html#ixzz1DxUEvAcQ>). *CBC News*. 14 February 2011.
49. "Geoffrey Hinton, keystone researcher in artificial intelligence, visits the Université de Sherbrooke" (<https://www.usherbrooke.ca/actualites/relations-medias/communiqués/communiqués-détails/c/24638/>). Université de Sherbrooke. 19 February 2014.
50. "National Academy of Engineering Elects 80 Members and 22 Foreign Members" (<https://www.nae.edu/Projects/MediaRoom/20095/149240/149788.aspx>). NAE. 8 February 2016.
51. "2016 IEEE Medals and Recognitions Recipients and Citations" (https://www.ieee.org/about/awards/2016_ieee_medal_and_recognition_recipients_and_citations_list.pdf) (PDF). *IEEE*. Retrieved 7 July 2016.

52. "The BBVA Foundation bestows its award on the architect of the first machines capable of learning the way people do" (<https://www.bbva.com/en/bbva-foundation-bestows-award-architect-first-machines-capable-learning-way-people/>). BBVA Foundation. 17 January 2017.
53. "Vector Institutes Chief Scientific Advisor Dr.Geoffrey Hinton Receives ACM A.M. Turing Award Alongside Dr.Yoshua Bengio and Dr.Yann Lecun" (<https://vectorinstitute.ai/2019/03/27/vector-institutes-chief-scientific-advisor-dr-geoffrey-hinton-receives-acm-a-m-turing-award-alongside-dr-yoshua-bengio-and-dr-yann-lecun/>). NAE. 27 March 2019.
54. "Three Pioneers in Artificial Intelligence Win Turing Award" (<https://www.nytimes.com/2019/03/27/technology/turing-award-hinton-lecun-bengio.html>). *New York Times*. 27 March 2019. Retrieved 27 March 2019.
55. "Fathers of the Deep Learning Revolution Receive ACM A.M. Turing Award - Bengio, Hinton and LeCun Ushered in Major Breakthroughs in Artificial Intelligence" (<https://www.acm.org/media-center/2019/march/turing-award-2018>). *Association for Computing Machinery*. 27 March 2019. Retrieved 27 March 2019.
56. "Governor General Announces 103 New Appointments to the Order of Canada, December 2018" (<https://www.gg.ca/en/media/news/2018/governor-general-announces-103-new-appointments-order-canada>). 21 December 2018.
57. Princess of Asturias Awards 2022 (<https://www.fpa.es/en/princess-of-asturias-awards/laureates/2022-geoffrey-hinton-yann-lecun-yoshua-bengio-and-demis-hassabis.html?especifica=0&idCategoria=0&anio=2022&especifica=0>)
58. "Geoffrey Hinton: The story of the British 'Godfather of AI' - who's not sat down since 2005" (<https://news.sky.com/story/the-story-of-the-british-godfather-of-ai-whos-not-sat-down-since-2005-12249571>). *Sky News*. Retrieved 7 April 2021.
59. The Isaac Newton of logic (<http://www.cse.buffalo.edu/~rapaport/111F04/boole.html>)
60. Salt, George (1978). "Howard Everest Hinton. 24 August 1912-2 August 1977". *Biographical Memoirs of Fellows of the Royal Society*. **24**: 150–182. doi:10.1098/rsbm.1978.0006 (<https://doi.org/10.1098/rsbm.1978.0006>). ISSN 0080-4606 (<https://www.worldcat.org/issn/0080-4606>).
61. Shute, Joe (26 August 2017). "The 'Godfather of AI' on making machines clever and whether robots really will learn to kill us all?" (<https://www.telegraph.co.uk/technology/2017/08/26/godfather-ai-making-machines-clever-whether-robots-really-will/>). *The Telegraph*. Retrieved 20 December 2017.
62. Shute, Joe (26 August 2017). "The 'Godfather of AI' on making machines clever and whether robots really will learn to kill us all?" (<https://www.telegraph.co.uk/technology/2017/08/26/godfather-ai-making-machines-clever-whether-robots-really-will/>). *The Telegraph*. Retrieved 30 January 2018.
63. name="fogofprogress">Hinton, Geoffrey. "Lecture 16d The fog of progress" (<https://www.cs.toronto.edu/~hinton/coursera/lecture16/lec16.pdf>) (PDF).
64. "Geoffrey Hinton and Demis Hassabis: AGI is nowhere close to being a reality" (<https://venturebeat.com/2018/12/17/geoffrey-hinton-and-demis-hassabis-agi-is-nowhere-close-to-being-a-reality/>). *venturebeat*.
65. "Geoffrey Hinton and Demis Hassabis: AGI is nowhere close to being a reality" (<https://venturebeat.com/2018/12/17/geoffrey-hinton-and-demis-hassabis-agi-is-nowhere-close-to-being-a-reality/>). *venturebeat*.

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