

# Bernardo Gonçalves

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Brazilian citizen. Born on June 21, 1982.

## Short biography

I am a computer scientist, philosopher and historian specializing in the conceptual foundations of AI & machine learning. My approach is analytical and historiographical. I have 10+ years of experience with AI theory, systems, and applications, and I observe closely the potential and implications of computing, AI & machine learning in society. My work has appeared in *AI & Society*, *Artificial Intelligence*, *IJAR*, *Computing in Science & Engineering*, *Proceedings of the VLDB*.

My current project is entitled 'The Future of AI: the Logical Structure of Alan Turing's Argument' (supported by The São Paulo State Research Foundation under grant #19/21489-4). I have been studying Alan Turing's life and works, with an emphasis on his contributions to the mind-machine controversy in England (1946-1952) and his views about the future capabilities of digital computers. These are articulated in the vivid image of the Turing Test, as detailed in my forthcoming book *The Turing Test Argument* (Routledge, under contract).

Previously, I have worked in the design, development, and deployment of AI systems as a permanent research scientist at IBM Research (2016-2020), and have contributed to large joint-development projects with oil & gas companies such as Galp Energy, Schlumberger, and Gazprom Neft.<sup>1</sup>

I earned my second Ph.D., in Philosophy (University of São Paulo, 2021), as a result of a recent career shift from computer science, the field in which I earned my first Ph.D., in Computational Modeling (National Laboratory for Scientific Computing, 2015), and my M.Sc. and B.Sc. degrees. In the year 2015, I have been a visiting scholar in the Department of Computer Science at the University of Michigan. Also, I am a member of the Association for the History and Philosophy of Science of the Southern Cone (AFHIC), and a former member of the Science, Technology & Society group *Scientiae Studia* at the University of São Paulo (2017-2020).

## 1) Employment

FEB. 2016–OCT. 2020



IBM Research | Research staff member

R&D on the design and deployment of artificial intelligence systems customized for large global industries - majorly the oil & gas industry and digital agriculture




Reference #1 - Research Lab Director: Dr. Ulisses Mello ([ulissesm@us.ibm.com](mailto:ulissesm@us.ibm.com))

Reference #2 - Senior Research Manager: Dr. Rogerio de Paula ([ropaula@br.ibm.com](mailto:ropaula@br.ibm.com))

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<sup>1</sup>For an early 2017 snapshot of my professional page from the Internet Archive, please cf. <http://web.archive.org/web/20170115141702/http://researcher.watson.ibm.com/researcher/view.php?person=br-bng>.

## 2) Education and Research Training

- CURRENT**  **Postdoctoral fellowship**, University of São Paulo, Polytechnic School  
Research topic: The future of artificial intelligence: the structure of Alan Turing's argument  
Supervisor: Prof. Fabio G. COZMAN (fgcozman@usp.br)
- MAR. 2021**  **Ph.D. degree in Philosophy**, University of São Paulo  
Thesis: "Machines will think: structure and interpretation of Alan Turing's imitation game". Supervisor: Prof. Edelcio DE SOUZA (edelcio.souza@usp.br)
- FEB. 2016**  **Postdoctoral fellowship**, University of Michigan, Computer Science Department  
Research topic: Probabilistic models for disambiguation of natural language queries  
Supervisor: Prof. H. V. JAGADISH (jag@umich.edu)
- JAN. 2015**  **Ph.D. degree in Computational Modeling**, National Laboratory for Scientific Computing  
Thesis: "Managing large-scale scientific hypotheses as uncertain and probabilistic data  
Supervisor: Prof. Fabio PORTO (fporto@lncc.br)
- MAY 2009**  **Master's degree in Computer Science**, Federal University of Espírito Santo  
Thesis: "An ontological theory of the electrocardiogram with applications"  
Supervisor: Prof. Giancarlo GUIZZARDI (giancarlo.guizzardi@unibz.it)
- FEB. 2007**  **Bachelor's degree in Computer Science**, Federal University of Espírito Santo  
Scientific initiation: "Ontologies and knowledge-based systems"  
Supervisor: Prof. Giancarlo GUIZZARDI (giancarlo.guizzardi@unibz.it)

### Awards and grants

- 2020. The São Paulo Research Foundation (FAPESP) post-doctoral fellowship (<http://fapesp.br/en/postdoc>)
- 2016. Nomination by LNCC for the national award for Ph.D. dissertations
- 2015. The Brazilian Research Council (CNPq) post-doctoral fellowship abroad
- 2013. IBM Ph.D. Fellowship Award 2013-2014 (<http://www.research.ibm.com/university/awards/fellowships.html>)
- 2013. FAPERJ 'Strict A' Ph.D. Fellowship (granted by the Rio de Janeiro State Research Funding Agency).
- 2009. CNPq RHAЕ (Human resources in strategic areas), a.k.a. 'researcher in the enterprise'
- 2007. Coordination for the Improvement of Higher Education Personnel (Masters degree scholarship)

## 3) Research, inventions and media record

### Books



B. Gonçalves. *The Turing Test Argument*. London, NY: Routledge, 2023 (forthcoming)

*Ph.D. theses*

1. B. Gonçalves. *Machines will think: structure and interpretation of Alan Turing's imitation game*. Ph.D. Thesis. School of Philosophy, Languages and Human Sciences, University of Sao Paulo, Sao Paulo. Defended and approved on 9 March 2021. doi:[10.11606/T.8.2021.tde-10062021-173217](https://doi.org/10.11606/T.8.2021.tde-10062021-173217)
2. B. Gonçalves. *Managing large-scale scientific hypotheses as uncertain and probabilistic data*. Ph.D. thesis. National Laboratory for Scientific Computing (LNCC), Brazil. Defended and approved on 28 January 2015. Preprint available at: <http://arxiv.org/abs/1501.05290>.

*Working papers in the conceptual foundations and history of AI*

1. B. Gonçalves. 'Dystopian or Utopian? Two Images of Alan Turing'. Preprint available at: <http://philsci-archive.pitt.edu/20533/>.
2. B. Gonçalves. 'Turing's Philosophy of Science for Intelligence'.
3. B. Gonçalves. 'The Turing Test is a Thought Experiment'.
4. B. Gonçalves. 'Can machines think? The Controversy that Led to the Turing Test'. *AI & Society*. ISSN: 0951-5666. JCR Impact Factor: 1.605. doi: [10.1007/s00146-021-01318-6](https://doi.org/10.1007/s00146-021-01318-6)

*Selected publications in computer science journals*

1. B. Gonçalves, F. Porto. A note on the complexity of the causal ordering problem. *Artificial Intelligence* 238: 154-65, 2016. ISSN: 0004-3702. **JCR Impact Factor: 9.088**. doi:[10.1016/j.artint.2016.06.004](https://doi.org/10.1016/j.artint.2016.06.004)
2. B. Gonçalves, H. V. Jagadish. Bsmooth: learning from user feedback to disambiguate query terms in interactive data retrieval. *International Journal of Approximate Reasoning*, 101: 10-30, 2018. ISSN: 0888-613X. **JCR Impact Factor: 3.816**. doi:[10.1016/j.ijar.2018.06.003](https://doi.org/10.1016/j.ijar.2018.06.003)
3. B. Gonçalves, F. Porto. Managing scientific hypotheses as uncertain and probabilistic data with support for predictive analytics. *IEEE Computing in Science & Engineering* 17(5): 35-43, 2015. ISSN: 1521-9615. **JCR Impact Factor: 2.080**. doi:[10.1109/MCSE.2015.102](https://doi.org/10.1109/MCSE.2015.102)
4. B. Gonçalves, F. Porto. Y-DB: Managing scientific hypotheses as uncertain data, *Proceedings of the Very Large Data Bases Endowment* 7(11): 959-62, 2014. ISSN: 2150-8097. **JCR Impact Factor: 2.862**. doi:[10.14778/2732967.2732971](https://doi.org/10.14778/2732967.2732971)
5. B. Gonçalves, G. Guizzardi and J.G. Pereira Filho. Using an ECG reference ontology for semantic interoperability of ECG data. *Journal of Biomedical Informatics* 44(1): 126-36, 2011. ISSN: 1532-0464. **JCR Impact Factor: 6.317**. doi:[10.1016/j.jbi.2010.08.007](https://doi.org/10.1016/j.jbi.2010.08.007)
6. Bruno S. P. M. Correa, B. Gonçalves, Iuri M. Teixeira, Antônio T. A. Gomes, and Artur Ziviani. AToMS: a ubiquitous teleconsultation system for supporting AMI patients with prehospital thrombolysis. *International Journal of Telemedicine and Applications*, 2011. doi:[10.1155/2011/560209](https://doi.org/10.1155/2011/560209)

*Selected publications in computer science conferences*

7. B. Gonçalves, F. Cozman. The Future of AI: Neat or Scruffy? In: Britto A., Valdivia Delgado K. (eds) *The Brazilian Conference on Intelligent Systems*. (BRACIS 2021). Lecture Notes in Computer Science, vol 13074. Springer, doi:[10.1007/978-3-030-91699-2\\_13](https://doi.org/10.1007/978-3-030-91699-2_13)
8. M. Vasconcelos, C. Cardonha, B. Gonçalves. Modeling epistemological principles for bias mitigation in AI systems: an illustration in hiring decisions. *Proceedings of the 2018 AAAI/ACM Conference on AI, Ethics, and Society*, p. 323-329. doi:[10.1145/3278721.3278751](https://doi.org/10.1145/3278721.3278751)
9. B. Gonçalves. Show me the material evidence: initial experiments on evaluating hypotheses from user-generated multimedia data. *IEEE Proceedings of the International Symposium on Multimedia*, San Jose, December 2016. doi:[10.1109/ISM.2016.0145](https://doi.org/10.1109/ISM.2016.0145)

10. Breno W. S. R. Carvalho, Aline Paes, B. Gonçalves. Augmenting linguistic semi-structured data for machine learning: a case study using Framenet. *Proceedings of the International Conference on Machine Learning Techniques and NLP (MLNLP 2020)*, October 2020, Sydney, Australia. doi:[10.5121/csit.2020.101201](https://doi.org/10.5121/csit.2020.101201)
11. B. Gonçalves, F. Porto. A lattice-theoretic approach for representing and managing hypothesis-driven research. *Proceedings of AMW (International Workshop on Foundations of Data Management)*, Puebla, Mexico, 2013. Available at: <http://ceur-ws.org/Vol-1087/paper3.pdf>.
12. B. Gonçalves, F. Porto. Research Lattices: Towards a scientific hypothesis data model. *ACM Proceedings of SSDBM (International Conference on Scientific & Statistical Database Management)*, Baltimore, USA, 2013. doi:[10.1145/2484838.2484861](https://doi.org/10.1145/2484838.2484861)
13. B. Gonçalves, et al. On the semantic engineering of scientific hypotheses as linked data. *Proceedings of Linked Science, co-located with ISWC (Intl. Conference on the Semantic Web)*, Boston, USA, 2012. Available at: <http://ceur-ws.org/Vol-951/paper2.pdf>.
14. F. Porto, A.M. de C. Moura, B. Gonçalves, R. Costa, S. Spaccapietra. "A scientific hypothesis conceptual model". In: Castano S., Vassiliadis P., Lakshmanan L.V., Lee M.L. (eds) *Advances in Conceptual Modeling*. ER 2012. Lecture Notes in Computer Science, vol 7518. Springer, Berlin, Heidelberg. doi:[10.1007/978-3-642-33999-8\\_13](https://doi.org/10.1007/978-3-642-33999-8_13)
15. B. Gonçalves, et al. An ontology-based application in heart electrophysiology: Representation, reasoning and visualization on the web. *Proceedings of ACM Symposium on Applied Computing*, Hawaii, March 2009. doi:[10.1145/1529282.1529456](https://doi.org/10.1145/1529282.1529456)
16. B. Gonçalves, et al. ECG data provisioning for telehomecare monitoring. *Proceedings of ACM Symposium on Applied Computing*, March 2008. doi:[10.1145/1363686.1364004](https://doi.org/10.1145/1363686.1364004)
17. B. Gonçalves, et al. A service architecture for sensor data provisioning for context-aware mobile applications. *Proceedings of ACM Symposium on Applied Computing*, March 2008. doi: [10.1145/1363686.1364155](https://doi.org/10.1145/1363686.1364155)

### *Patents granted and/or filed in the United States Patent and Trademark Office*

13. V. F. de Santana, B. Gonçalves, A. P. D. Binotto, A. P. Appel, R. L. de F. Cunha. Maintaining a knowledge database based on user interactions with a user interface. 2021/8/12 US20210248482A1, publication date: 12 August 2021. <http://patents.google.com/patent/US20210248482A1>.
14. C. H. Cardonha, J. L. G. Diaz, B. Gonçalves, M. A. Vasconcelos. System, method and computer program product for dispatching of medical emergencies and wait time control. US20180089377A1, publication date: 29 March 2018. <http://patents.google.com/patent/US20180089377A1>.
15. C. H. Cardonha, B. Gonçalves, J. L. G. Diaz, M. A. Vasconcelos. Data-driven Urban Interventions Based on Crowdsourcing. US Patent App. US20180225613A1, publication date: 9 August 2018. <http://patents.google.com/patent/US20180225613A1>.

### *Press and social media*

B. Gonçalves. 'The first 60 years of feats of artificial intelligence: revisiting the predictions of Herbert Simon' (in Portuguese). *O Estado de S. Paulo*, April 12, 2018. Available at: <https://estadodaarte.estadao.com.br/os-primeiros-60-anos-de-feitos-da-inteligencia-artificial-revisitando-as-previsoes-de-herbert-simon/>. (This is a large newspaper in Brazil.)

Member of roundtable podcast 'Artificial intelligence' (in Portuguese). Jointly with Prof. Fabio Cozman (USP) and Prof. Renata Wasserman (USP), on March 23 of 2018. Available at: <http://oestadodaarte.com.br/inteligencia-artificial/>.

## 4) Selected courses taught, oral communications and organization of events

### *Graduate courses*

B. Gonçalves. PCS5786 'The future of artificial intelligence: from the Turing test to superintelligent machines'. Polytechnic School, University of São Paulo. March to July 2021.

### *Undergraduate courses*

B. Gonçalves. INF022774 'Introduction to computer science'. Computer Science Department, Federal University of Espírito Santo, March to July 2008.

### *Organization of academic events*

B. Gonçalves, P. Mariconda. Symposium 'Artificial intelligence: philosophical, historical and social aspects', in *XI Meeting of the Association for Philosophy and History of Science of the Southern Cone*. Buenos Aires (Argentina), June of 2018. Available at: <<http://www.afhic.com/es/encuentros-anteriores/encuentro/simposios/#asp>>.

D. C. Martins-Jr., C. S. Santos, B. Gonçalves. *eScience International Workshop*, Federal University of ABC, São Paulo. June of 2017. Available at: <<http://poscomp.ufabc.edu.br/eventos/workshop-de-esience/>>.

### *Consulting and member of advisory committees*

São Paulo Research Foundation (FAPESP): 2017-2022.

## 5) Research profile

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Google Scholar: <<http://scholar.google.com/citations?user=udofaJwAAAAJ>>

CNPq Lattes (for Brazilians): <<http://lattes.cnpq.br/3537386106760841>>