

Curriculum Vitae (4th April 2024)

(full CV at <https://artificial-intelligence.leeds.ac.uk/cv-for-tony-cohn/>)

Anthony G Cohn, FEng, CEng, CITP, FAAAI, FEurAI, FAISB, FAAIA, FIET, FBCS

Education:

1975: University of Essex, BSc honours (1st Class) in Computing Science

1983: University of Essex, PhD in Computer Science: *Mechanising a Particularly Expressive Many Sorted Logic*

Career:

1975-1976: Systems Programmer, Marconi Research Labs, Great Baddow, Essex

1979-1989: Lecturer in Computer Science, University of Warwick

1990 - 1993: Senior Lecturer, School of Computer Studies, University of Leeds

1993 - 1996: Reader in Automated Reasoning, School of Computer Studies, Univ. of Leeds

1996 - *present*: Professor of Automated Reasoning, School of Computing, Univ. of Leeds.

2012 - 2014: Honorary Adjunct Professor, University of Technology Sydney

2018 - 2023: Fellow and Alan Turing Institute, UK

2017 - *present*: Distinguished Visiting Professor, Tongji University, Shanghai.

2018 - 2021: High End Expert, Tongji University, Shanghai.

2020-2022: Adjunct Professor, Shandong University, Jinan

2019-2022: Distinguished Visiting Professor, Qingdao University of Science & Technology.

2023-2026: Foundation Models Lead at the Alan Turing Institute, London.

Selected Recent Research Grants (started since 2013):

- STRANDS (Spatio-Temporal Representations and Activities for Cognitive Control in Long-Term Scenarios), EU FP7 IP project, 1049451 euros for Leeds, PI at Leeds: A G Cohn, Co-I: A G Cohn, 1/4/13-31/5/17 (Co-ordinated by the University of Birmingham, with 6 other partners).
- Assessing the Underworld, EPSRC, £591900.09, PI at Leeds: A G Cohn, Co-Is: D R Magee, B Clarke, 01/06/2013 - 31/1/2018 (part of a Programme grant led by Prof C Rogers at Birmingham)
- National Facility for Innovative Robotic Systems, £2.6M, 01/08/2013 - 1/03/2015, PI: Dr Robert Richardson; Co-Is: Abbas Dehghani, Anne Neville, Martin Levesley, Peter Culmer, Jordan Boyle, Andrew Bell, Timothy Stevenson, Netta Cohen, Anthony Cohn, David Jayne, Ian Robertson, Steven Freear
- Balancing the impact of City Infrastructure Engineering on Natural Systems using Robots, £4,127,380, PI: P Purnell, Co-Is: M Miodownik, R Richards, A Brown, M Basheer, R Ruentes, M Dallimer A G Cohn, G Graham, N Metje, I Robertson, N Somjit, A A Delghani-Sanij, N Merat, D N Chapman, N Cohen, S D Prior, G A Dymski, J Kim, CDF Rogers, EPSRC, 4/1/16 - 3/1/2021
- Qualitative Spatial Logics for Validating Matches between Spatial Objects, RMB 280,000, PI: H Du, Co-Is: A G Cohn, N Alechina, NSFC, 1/1/2018-31/12/2020
- Humanlike physics understanding for autonomous robots, £303,127, EPSRC, PI: A G Cohn, Co-Is: M Dogar, M Mon-Williams, F Mushtaq, H Wang, M Leonetti, 1/4/18-28/2/21.
- A European AI On Demand Platform and Ecosystem, EU - European Union. £115,435, PI A G Cohn, Co-I: V Mueller, 01/01/2019- 31/12/2021,
- Understanding imprecise space and time in narratives through qualitative representations, reasoning, and visualisation, ESRC, 1/4/22 - 30/6/26, £342,492.64 (to Leeds), Investigators at Leeds: A G Cohn, J G Stell
- Evaluation of the capabilities of Large Language Models: Commonsense Reasoning – Secondment to the Alan Turing Institute, PI A G Cohn, £288,000, 1/4/23-31/3/26
- Disruptive Technologies, Alan Turing Institute, £80,000, PI: A G Cohn, 1/4/23 – 31/8/24
- Evaluating the Commonsense Reasoning Capabilities of LLMs , USD20,000 for Azure credits to conduct experiments, Accelerating Foundation Models Research Programme, Microsoft Research, 1/5/23 - 30/6/24.
- Robust inference with probabilistic answer set programs scaffolds for large language models, PI Pranava Madhyastha, Co-Is: Alessandra Russo and Anthony G Cohn, Alan Turing Institute, £483,016, 1/1/2024-31/8/2026

Selected Recent Invited Presentations at International Meetings (since 2013) :

- Invited Speaker Space, Time and Ambient Intelligence 2013 (STAMI), Bellevue, Washington.
- Invited talk at AAAI Spring Symposium on “Qualitative Representations for Robots” and “Knowledge Representation and Reasoning in Robotics”, March 2014
- Invited talk at 14th International Conference on Principles of Knowledge Representation and Reasoning (KR-14), Vienna, July 2014
- Invited talk at Social Robotics 2014, Sydney
- Invited Speaker at Advances in Cognitive Systems, Troy, New York, 2017.
- Invited Speaker at IJCAI Workshop on AI for Internet of Things, Stockholm, 2018
- Invited Speaker at R2k: Integrating Learning of Representations and Models with Deductive Reasoning that Leverages Knowledge, Workshop at KR-18, Tempe, USA.
- Invited Speaker at the International Workshop on “Spatial Language Understanding” held in conjunction with NAACL-2018, June 1–6, 2018, New Orleans, Louisiana, USA
- Invited Speaker at IROS Workshop: Robots that Learn and Reason: Towards Learning Logic Rules from Noisy Data, Madrid, 2018
- Invited Talk at QR-19, Macau, China, 2019
- Keynote talk at AISB symposium on Language Learning for Artificial Agents (L2A2), Falmouth, April 2019
- Invited Talk at KI-20 conference, Bamberg, Germany, September 2020.
- Invited talk at the 9th Annual Conference on Advances in Cognitive Systems, Nov. 2021
- Spacious Spatiality, An interdisciplinary meeting on the notions of shape, space and distance across art and science, May 2022
- QR-22, August 2022
- Invited talk at Turing Symposium on Large Language Models, February 2023
- Invited Speaker, Royal Society Yusuf Hamied Workshop for India and the UK, July 2023
- Invited talk at LOD-23, September 2023
- Keynote talk, The 2nd International Workshop on Geospatial Knowledge Graphs and GeoAI: Methods, Models, and Resources, September 2023
- Invited Keynote talk at IJCLR, Nanjing, September 2024.

Fellowships and other honours:

- Recipient of the 2021 Herbert A. Simon Prize for Advances in Cognitive Systems for my research on qualitative representation and reasoning about space and time, cognitive vision and robotics, and visually-grounded language processing.
- Elected Fellow of Asia-Pacific Artificial Intelligence Association (AAIA), FAAIA, 2021.
- Listed in *Who's Who*, from 2017
- Elected a Fellow of the Royal Academy of Engineering, 2015.
- Donald E Walker Distinguished Service Award, IJCAI-15.
- AAAI Distinguished Service Award 2012 for extraordinary and sustained service to the artificial intelligence community.
- Elected Founding Fellow of European Coordinating Committee on Artificial Intelligence (FECCAI) 1999. (Now Fellow of the European Association for Artificial Intelligence, FEurAI)
- Elected member of UKCRC (An Expert Panel of the British Computer Society, the Institution of Electrical Engineers and the Council of Professors and Heads of Computing).
- Fellow of the British Computer Society (FBCS)
- Fellow of the Institute of Electrical Engineers (IEE)/Institute of Engineering Technology (FIET)
- Fellow of the Society for the Study of Artificial Intelligence and Simulation of Behaviour (FAISB)
- Fellow of the Association for Advancement of Artificial Intelligence (FAAAI)
- The entry from the Cognitive Vision project (which I was a co-PI of) won the annual British Computer Society Machine Intelligence prize in December 2004.
- Faculty of Engineering, University of Leeds Research Excellence Award, 2006
- The VAULT system based on the MTU and VISTA projects provides the world's first real time delivery of integrated utility records nationwide and won the Built Environment category of the IET Innovation Awards in 2012 (also Highly commended in the IT category) and the 2012 NJUG Awards in the “Avoiding” Damage” category.

Best Paper Awards etc:

- British Computer Society Machine Intelligence prize in 2004
- Best poster and best presented poster runner up awards at 15th ACM International Symposium on Advances in Geographic Information Systems (ACM GIS 2007)
- Best In-Use paper at ESWC-15
- Runner up best student paper at ECAI-16
- Nominated for best paper (Resources Track) at ISWC 16
- Best paper at RoboNLP 17 Workshop at ACL-17
- Best Video at IJCAI-17
- Runner up for “best technical implementation” in the Robots for Resilient Infrastructure Challenge 2017, Weetwood Hall, Leeds.
- My PhD student Muhannad Alomari was runner up in the 2017 EurAI Best European AI Dissertation Award
- Test-of-Time Classic Paper Award for paper in KR-92 on the Region Connection Calculus (RCC), awarded 2020.

More than 30 PhD supervised successfully to completion

Journal Editorships

- Co-Editor-in-Chief, *Spatial Cognition and Computation*, 2003 –
- Co-Editor-in-Chief of *Artificial Intelligence*, 2007 – 2010, re-elected for 2nd and final term 2011-2014

Conference Chairmanships

- Programme Chair, AISB89 Conference (Silver Jubilee of SSAISB).
- Programme Chair, 11th European Conference on AI (ECAI 94), Amsterdam.
- Workshop Chair, 14th Int. Joint Conf. on AI (IJCAI95), Montreal.
- Programme Co-Chair, 6th International Conference on Principles of Knowledge Representation and Reasoning (KR'98), Trento, Italy
- Conference Chair, 7th International Conference on Principles of Knowledge Representation and Reasoning (KR'00), Breckenridge, USA.
- Conference Chair, 18th International Conference on Artificial Intelligence IJCAI'03)
- Programme Co-Chair, 7th Conference on Spatial Information Theory, (COSIT'05), USA.
- Chair of Steering Committee for Spatial Cognition Conferences (2019- ?)
- Co-Organiser, 2009 AAAI Spring Symposium on Benchmarking of Qualitative Spatial and Temporal Reasoning Systems Stanford University, CA, USA, March 23-25, 2009.
- Co-organiser of Dagstuhl Seminars: 07311 “Logic and Probability for Scene Interpretation”, 2008; 05491 “Spatial Cognition: Specialization & Integration”, 2005; 10131 Spatial Representation & Reasoning in Language : Ontologies & Logics of Space (March 2010); 10412 QSTRLib: A Benchmark Problem Repository for Qualitative Spatial and Temporal Reasoning (Oct. 2010); 14081 Robots Learning from Experiences, 2014.

SELECTED PUBLICATIONS (from a total of ~350):

My full set of publications according to Google Scholar can be found at: <http://tinyurl.com/agc-pubs>

Selected Papers in Refereed Journals:

- D A Randell & A G Cohn, Exploiting Lattices in a Theory of Space and Time, *Computers and Mathematics with Applications*, vol 23(6-9) pp 459-476, 1992.
- A G Cohn, Completing Sort Hierarchies, *Computers and Mathematics with Applications*, vol 23(6-9) pp 477-491, 1992.
- A G Cohn, D A Randell & Z Cui, Taxonomies of Logically Defined Qualitative Spatial Relations, *International Journal of Human-Computer Studies*, vol 43, Issue 5-6, pp 831-846, 1995.
- A G Cohn, B Bennett, J Gooday, N M Gotts, Qualitative spatial representation and reasoning with the region connection calculus. *Geoinformatica*, vol. 1, pp. 1-44. 1997.
- E Davis, N M Gotts, A G Cohn, Constraint networks of topological relations and convexity. *Constraints*, vol. 4, pp. 241-280. 1999.

- A Isli, A G Cohn, A new approach to cyclic ordering of 2D orientations using ternary relation algebras, *Artificial Intelligence*, vol. 122, pp. 137-187. 2000.
- A G Cohn, S M Hazarika, Qualitative spatial representation and reasoning: an overview, *Fundamenta Informaticae*, vol. 45, 1-29. 2001.
- B Bennett, A G Cohn, F Wolter, M Zakharyashev, Multi-dimensional modal logic as a framework for spatio-temporal reasoning, *App. Intelligence*, (17) 239-251. 2002.
- A G Cohn, A C Varzi, Mereotopological connection, *Journal of Philosophical Logic*, vol. 32, pp. 357-390. 2003.
- C. Needham, P. Santos, D. R. Magee, V. Devin, D. C. Hogg and A. G. Cohn, Protocols from Perceptual Observations, *Artificial Intelligence*, 167 , pp 103-136, (2005).
- Representing Moving Objects in Computer-Based Expert Systems: The Overtake Event Example N. Van de Weghe, A. G. Cohn, P. De Maeyer and F. Witlox *Expert Systems with Applications*, 29 (4),977-983, (2005).
- N. Van de Weghe, A. G. Cohn, G. De Tre and P. De Maeyer, A Qualitative Trajectory Calculus as a Basis for Representing Moving Objects in Geographical Information Systems, *Cybernetics and Control*, vol. 35, pp. 97-119. 2006.
- Implementing a qualitative calculus to analyse moving point objects, M. Delafontaine, A. G. Cohn and N. V. Weghe , *Exp. Systems with Applic.*, 38 (5), pp 5187-5196, 2011.
- Inferring additional knowledge from QTC_N relations, M. Delafontaine, P. Bogaert, A. G. Cohn, F. Witlox, P. D. Maeyer and N. V. Weghe, *Inf. Sci.*, 181 (9), 1573-1590, 2011
- Reasoning with Topological and Directional Spatial Information, S. Li and A. G. Cohn, *Computational Intelligence*, 28(4): 579-616, 2012
- A survey of qualitative spatial representations, Juan Chen, Anthony G. Cohn, Dayou Liu, Shengsheng Wang, Jihong Ouyang and Qiangyuan Yu, *Knowledge Engineering Review* 30(1): 106-136 (2015)
- Reasoning about Topological and Cardinal Direction Relations between 2-Dimensional Spatial Objects, A G Cohn, S Li, W Liu, J Renz, *Journal of Artificial Intelligence Research*, 493-532, 2014
- Learning Relational Event Models from Video, K S R Dubba, A G Cohn, D C Hogg, M Bhatt, F Dylla, *Journal of Artificial Intelligence Research*, vol 53, pp 41-115, 2015.
- Jiang, Bingbing; Li, Zhengyu; Chen, Huanhuan; Cohn, Anthony G; Latent topic text representation learning on statistical manifolds, *IEEE transactions on neural networks and learning systems*, 29(11), 5643-5654, 2018, IEEE
- Duckworth, Paul; Hogg, David C; Cohn, Anthony G; Unsupervised human activity analysis for intelligent mobile robots *Artificial Intelligence* 270 67-92 2019 Elsevier
- Akhtiamov, D., Cohn, A.G. and Dabaghian, Y. Spatial representability of neuronal activity. *Science Reports*, 11, 20957 (2021).
- M Alomari, F Li, D C. Hogg, A G. Cohn, Online perceptual learning and natural language acquisition for autonomous robots, *Art. Int.*, (303), 2022, 103637.
- Jiang, Bingbing, Xingyu Wu, Xiren Zhou, Yi Liu, Anthony G. Cohn, Weiguo Sheng, and Huanhuan Chen. Semi-Supervised Multiview Feature Selection With Adaptive Graph Learning, *IEEE Transactions on Neural Networks and Learning Systems* (2022).
- Toumpa A, Cohn AG. Object-agnostic Affordance Categorization via Unsupervised Learning of Graph Embeddings. *Journal of Artificial Intelligence Research*. 2023;77:1-38, 2023
- Adam Richard-Bollans, Lucía Gómez Álvarez, Anthony G. Cohn, Identifying and modelling polysemous senses of spatial prepositions in referring expressions, *Cognitive Systems Research*, Volume 77, 2023, Pages 45-61
- A Logic of East and West, H Du, N Alechina, A Farjudian, B Logan, C Zhou, AG Cohn, *Journal of Artificial Intelligence Research* 76, 527-565
- Ryan Burnell, Wout Schellaert, John Burden, Tomer D. Ullman, Fernando Martinez-Plumed, Joshua B. Tenenbaum, Danaja Rutar, Lucy G. Cheke, Jascha Sohl-Dickstein, Melanie Mitchell, Douwe Kiela, Murray Shanahan, Ellen M. Voorhees, Anthony G. Cohn, Joel Z. Leibo, Jose Hernandez-Orallo, Rethink reporting of evaluation results in AI. *Science*, 380(6641), pp.136-138, 2023
- Su, Hai-Long and Li, Zhi-Peng and Zhu, Xiao-Bo and Yang, Li-Na and Gribova, Valeriya and Filaretov, Vladimir Fedorovich and Cohn, Anthony G. and Huang, De-Shuang, Hierarchical Graph

Neural Network Based on Semi-Implicit Variational Inference, in IEEE Transactions on Cognitive and Developmental Systems, vol. 15, no. 2, pp. 887-895, June 2023

- Clementini, E. and Cohn, A.G., 2024. Extension of RCC*-9 to Complex and Three-Dimensional Features and Its Reasoning System. ISPRS International Journal of Geo-Information, 13(1), p.25.

Selected Refereed Articles in Published Conference and Workshop Proceedings:

- D A Randell, Z Cui and A G Cohn, A Spatial Logic based on Regions and Connection, in Proc 3rd Int. Conf on Knowledge Representation and Reasoning, Boston, pp 165 – 176, Morgan Kaufmann, San Mateo, 1992. **Test-of-time Classic paper award in 2020.**
- Dabaghian, Y; Cohn, A G; Frank, L. Topological maps from signals in: Proceedings 15th ACM International Symposium on Advances in Geographic Information Systems (ACM GIS 2007), pp. 392-395 ACM Press. 2007. **(Runner up prizes for the best poster and the best presented poster.)**
- From Video to RCC8: Exploiting a Distance Based Semantics to Stabilise the Interpretation of Mereotopological Relations M. Sridhar, A. G. Cohn and D. C. Hogg COSIT, edited by M. J. Egenhofer, N. A. Giudice, R. Moratz and M. F. Worboys, Lecture Notes in Computer Science, 6899 , pp 110-125, Springer, (2011) **(Awarded Best Paper Prize)**
- PADTUN-Using Semantic Technologies in Tunnel Diagnosis and Maintenance Domain, D Thakker, V Dimitrova, AG Cohn, J Valdes: The Semantic Web. Latest Advances and New Domains, 683-698, Vol. 9088 , Springer **(best in use paper award)**
- Duckworth, P., Alomari, M., Gatsoulis, Y., Hogg, D. C., and Cohn, A. G. (2016). Unsupervised Activity Recognition using Latent Semantic Analysis on a Mobile Robot. In G. A. Kaminka, M. Fox, P. Bouquet, E. Helermeier, V. Dignum, F. Dignum, and F. Van Harmelen (Eds.), Proceedings (pp. 1062-1070). The Hague, Netherlands: IOS Press. **(Runner up for best Student Paper Award)**
- Du, H., Dimitrova, V., Magee, D., Stirling, R., Curioni, G., Reeves, H., Clark, B., Cohn, A. (2016). An Ontology of Soil Properties and Processes. In Lecture Notes in Computer Science Vol. 9982 (pp. 30-37). Kobe, Japan: Springer Verlag (Germany): Series. **(Nominated for best Resources Track Paper Award)**
- Alomari, M., Duckworth, P., Hawasly, M., Hogg, D. C., & Cohn, A. G. (2017). Natural Language Grounding and Grammar Induction for Robotic Manipulation Commands. In Proceedings of the First Workshop on Language Grounding for Robotics (pp. 35-43). Vancouver, BC: The Association for Computational Linguistics. **(Best Paper Award)**
- H Hua, D Li, R Li, P Zhang, J Renz, and A G Cohn , Towards Explainable Action Recognition by Salient Qualitative Spatial Object Relation Chains, AAAI-22, 2022
- Cohn, Anthony G., José Hernández-Orallo, Julius Sechang Mboli, Yael Moros-Daval, Zhiliang Xiang, and Lexin Zhou. A Framework for Categorising AI Evaluation Instruments, Proceedings of the Workshop on AI Evaluation Beyond Metrics workshop (EBEM) at IJCAI-22 (2022)
- Li, F., Hogg, D.C. and Cohn, A.G., 2024. Advancing Spatial Reasoning in Large Language Models: An In-Depth Evaluation and Enhancement Using the StepGame Benchmark. In Proceedings of the AAAI Conference on Artificial Intelligence (Vol. 38, No. 17, pp. 18500-18507).

Relevant papers currently under review

- Lin, F., La Malfa, E., Hofmann, V., Yang, E.M., Cohn, A. and Pierrehumbert, J.B., 2024. Graph-enhanced Large Language Models in Asynchronous Plan Reasoning. arXiv preprint arXiv:2402.02805. (Under review)
- La Malfa, E., Weinhuber, C., Torre, O., Lin, F., Cohn, A., Shadbolt, N. and Wooldridge, M., 2024. Code simulation challenges for large language models. arXiv preprint arXiv:2401.09074. (under review)
- La Malfa, E., Petrov, A., Frieder, S., Weinhuber, C., Burnell, R., Cohn, A.G., Shadbolt, N. and Wooldridge, M., 2023. The ARRT of Language-Models-as-a-Service: Overview of a New Paradigm and its Challenges. arXiv preprint arXiv:2309.16573. (under review)
- F Li, D C Hogg, A G Cohn, Reframing Spatial Reasoning Evaluation in Language Models: A Real-World Simulation Benchmark for Qualitative Reasoning. (under review)