Ernest Davis

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Education:

Yale University Ph.D. (Computer Science) 1984
MIT B.Sc. (Mathematics) 1977

Employment:

Computer Science Dept., New York University

Professor	2008–
Associate Professor	1989–2008
Assistant Professor	1983–1989

Computer Science Dept., Yale University

Research Assistant	1980–83
Teaching Assistant	1980–82

Computer Graphics Dept., CE Lummus Inc., Bloomfield, NJ

Program Analyst	1977–79

Math Dept. M.I.T.

Calculus Tutor	1975–77.

Honors:

Fellow AAAI	2025
Keynote Speaker, COSIT-11	2011
Outstanding Program Committee Member, AAAI-06	2006
Knowledge Representation and Reasoning Distinguished Lecturer, Universities of York and Leeds.	1996
IBM Graduate Fellowship	1982–83
NSF Graduate Fellowship	1979–82
Phi Beta Kappa	1977
Sigma Xi	1977
Putnam Fellow, Putnam Mathematical Test	1976

Professional Activities

Journal editorships

Associate editor, *Artificial Intelligence Journal,* 2016-2020.

Area editor, *ACM Transactions on Computational Logic,* 2008-2014.

Guest Editor (with L. Morgenstern), *Artificial Intelligence* vol. 153, nos. 1-2, special issue on Logical Formalizations of Commonsense Reasoning, March 2004.

Book reviews editor, *IEEE Expert,* 1994-1998.

Journal reviewing

AI Journal, JACM, International Journal of Approximate Reasoning, IEEE Transactions on Software Engineering, Cognitive Science, IEEE Transactions on Knowledge and Data Engineering, Annals of Mathematics and Artificial Intelligence, IEEE Transactions on Pattern Analysis and Machine Intelligence, Journal of Logic and Computation, ACM Computing Surveys, Computational Intelligence, Fundamenta Informaticae, Mathematical Reviews, Spatial Cognition and Computation, Computing Reviews, Journal of Philosophical Logic, Program, Comm. ACM, Applied Ontology. Behavioral and Brain Sciences, Science, Proc. National Academy of Sciences (PNAS), Information Systems, Minds and Machines, IEEE Transactions on Cognitive and Developmental Systems, International Journal of Geographical Information Science, Journal of Experimental Psychology: General, AI & Society, Trends in Cognitive Science, Knowledge-Based Systems, ACL Rolling Review, British Journal for the Philosophy of Science, World Wide Web, Digital Discovery, Artificial Intelligence Review, Journal of Intelligence, AIMS Mathematics, Cognition, Knowledge and Information Systems, Nature: Scientific Reports, npj Artificial Intelligence.

Conference and workshop chair

Co-chair and organizer (with L. Morgenstern and K. Sanders), Workshop on Knowledge, Perception, and Planning, IJCAI-89.

Co-chair (with L. Morgenstern, J. McCarthy, and R. Reiter) of the Fifth Symposium on Logical Formalizations of Commonsense Reasoning, May 2001, New York City.

Co-chair (with P. Doherty and E. Erdem) of the Tenth Symposium on Logical Formalizations of Commonsense Reasoning, March 2011, Stanford University.

Co-chair (with Mehul Bhatt and Hans Guesgen) STeDy 2012 (International Workshop on Spatio-Temporal Dynamics).

Local Arrangements Chair: IJCAI-16.

Conference program committee or referee

Area Chair: KR-16, KR-18.

Senior Program Committee: AAAI-10, and committee on NECTAR papers at AAAI-10. IJCAI-11, AAAI-23, AAAI-24, AAAI-25.

Program Committee: IJCAI-87, Second Symposium on Logical Formalizations of Commonsense Reasoning 1992, KR-94, Math and AI 1996, KR-96, AAAI-97, KR-98, AAAI-98, Commonsense 98, Formal Ontologies for Intelligent Systems 1998, IJCAI-99, AAAI-99, BISFAI-99, AAAI-00, FOIS-01, IJCAI-01, KR-02, Commonsense-03, KR-04, FOIS-04, Commonsense-05, AAAI-06, FOIS-06, KR-06, Commonsense-07, AAAI-07, KR-08, AAAI-08, Commonsense-09, FOIS-10, KR-10, KR-12, AAAI-13, Commonsense-13, IJCAI-13, Qualitative Reasoning Workshop 2013, Advances in Cognitive Systems 2014, AAAI-14, AAAI-15, Commonsense-15, Beyond Turing (AAAI Workshop) 2015, IJCAI-15, Global Conference on Artificial Intelligence (GCAI) 2015, IJCAI-17, AAAI-17, ProSocrates 2017, Cognitum 2017, Advances in Cognitive Systems 2017, Commonsense 2017, AAAI-18, ACS-18, AAAI-19, IJCAI-19, ACS-19, CogSci-20, KR-20, ACS-20, ACS-21, AAAI-22, EBeM-22 (Evaluation Beyond Metrics), ECAI-23, Joint Call for Tutorial Proposals: NAACL-HLT, ACL, EMNLP 2025.

Referee/Reviewer: IJCAI-85, IJCAI-89, IJCAI-91, IJCAI-93, IJCAI-95, IJCAI-05, Cognitive Science '05, IJCAI-07. STeDy 2010 (International Workshop on Spatio-Temporal Dynamics), STeDy 2012, CogSci-21, CogSci-22, CogSci-23, CogSci-24, SCALE-LLM-24, NAACL-25 Demo Track, CogSci-25.

Rolling reviews for ACL (Association for Computational Linguistics).

Funding reviewing: NSF, NSERC, Allen Institute.

Other

Invited participant, Workshop on Mental Models, M.I.T., March 12-13, 1990.

Epistemic Logic and Its Applications (with L. Morgenstern), Tutorial, IJCAI-93.

Second reader for chapter 1 "First Order Logic" and chapter 9 "Qualitative Reasoning" in *The Handbook of Knowledge Representation,* Frank van Harmelen, Vladimir Lifschitz, and Bruce Porter (eds.), Elsevier, Oxford, 2008.

Associate editor, ACM Computer Classification System, 2010-2011.

Reviewer, Grace Hopper Conference Scholarship proposals, 2015.

Organizing committee, Winograd Schema Challenge.

Beth Dissertation Prize Committee, 2017.

A Gentle Introduction to Deep Nets and Opportunities for the Future. Kenneth Church, Valia Kordoni, Gary Marcus, Ernest Davis, Yanjun Ma, Zeyu Chen. Tutorial, ACL 2022.

Participant, Cognitive Computational Neuroscience, General Adversarial Collaborations, "To what extent does the brain simulate the external world?", 2022.

Reviewer, Hans Sigrist Prize, 2023.

Advisory Committee, World Stories Bank.

Membership: AAAI (Association for the Advancement of Artificial Intelligence).

Ph.D. Students:

Leora Morgenstern, "Foundations of a Logic of Knowledge, Action, and Communication," September, 1988.

Leo Joskowicz, "Reasoning about Shape and Kinematic Function in Mechanical Devices," September, 1988.

Pasquale Caianiello, "Learning as the Evolution of Representation," November, 1989.

Alexander Botta, "A Theory of Natural Learning," May, 1991.

Jen-Lung Chiu, "Planning in an Imperfect World Using Previous Experiences," January 1995.

Tamir Klinger, "Adversarial Reasoning: A Logical Approach for Computer GO." January 2001.

Gedaminas Adomavicius, "Expert-Driven Validation of Set-Based Data Mining Results" (nominal co-advisor with Alex Tuzhilin.) July 2002.

Ji-Ae Shin, "TM-LPSAT: Encoding Temporal Metric Planning in Continuous Time," May 2004.

Tatiana Kichkaylo, "Construction of Component-Based Applications by Planning," (co-advisor with Vijay Karamcheti), December 2004

Ziyang Wang, "Incremental Web Search: Tracking Changes in the Web." May 2006.

Paul Bethe, "Advances in computer bridge: Techniques for a partial-information, communications-based game." January 2021.

MS theses supervised:

Yanai Lehavi, "Charlie: A Treaty Reinsurance Underwriter".

Kumar Shashi Prabh, "Performance of BLACKBOX Planning System on a Hard Problem of Satisfiability", May 2001.

Paul Bethe, "DTAC: A method for planning to claim in Bridge." May 2010.

Azam Asl, "A Qualitative Calculus for Three-Dimensional Rotations." (NYU Poly Computer Engineering Dept.) December 2011.

Emily Morton-Owens, "A tool for extracting and indexing spatio-temporal information from biographical articles in Wikipedia." May 2012.

Wei Peng, "Evaluating the commonsense reasoning abilities of pretrained language models," December 2019.

Phakphum Artkaew, "Commonsense Reasoning in Multilingual Models: Benchmarking and Merging Approaches," May 2025.

Senior theses supervised:

Yuling Gu, "Towards detecting temporal relations implicitly conveyed in text". May 2020.
Zhuoran (Jennifer) Zeng, "Physical reasoning in an open world". May 2022.

Grants:

Reasoning about Shape and Function, NSF DCR-8402309, $50,000, 12/15/84 - 5/31/86.

Physical and Spatial Reasoning with Solid Objects, NSF DCR-8603758, $82,600, 7/1/86 - 12/31/88.

Perception and Planning, (with L. Morgenstern), NSF IRI-8801529, $115,000, 7/1/88 - 12/31/90.

Perception and Planning, (renewed, with no co-PI), NSF IRI-9001447, $148,937, 8/1/90 - 7/31/93.

Knowledge Representation for Physical Reasoning, NSF IRI-9300446, $180,000, 8/93-8/96.

Physical and Spatial Reasoning across Multiple Scales, NSF IRI-9625859, $236,000, 8/96-8/99.

Commonsense Reasoning about Loosely Constrained Systems of Rigid Solid Objects, NSF IIS-0097537, $289,000, 6/01-5/04.

Automating Commonsense Reasoning for Elementary Physical Science, NSF IIS-0534809, $328,877, 2/06-8/10.

Adversarial Collaborative Research on Intuitive Physical Reasoning, NSF 2121102, co-PI with Todd Gureckis (Psychology, NYU) and Joshua Tenenbaum (Brain and Cognitive Science, MIT). $329,00 total NYU; $29,000 my part. 9/21-8/24.

Invited Talks and Panel Participation:

"Geographic Reasoning," Workshop on Naive Physics, University of Rochester, Spring 1982

"Planning and Execution in Navigation," DARPA Workshop on Planning and Robot Problem Solving, Washington D.C., May 15, 1986.

"A Logical Framework for Solid Object Physics," Workshop on Space Telerobotics, Jet Propulsion Labs, January 20-22, 1987; Workshop on Qualitative Physics, University of Illinois at Urbana, May 27-29, 1987; CIAR Graduate Student Workshop on Knowledge Representation, Edmonton, Alberta, June 6-8, 1988.

"Inferring Ignorance from the Locality of Visual Perception," IBM Watson Labs, July 1988.

"Error Correction in Cognitive Maps," SPIE Workshop on Sensor Fusion: Spatial Reasoning and Scene Interpretation, Boston, Nov. 19, 1988.

"Reasoning about Perception and Knowledge," University of Toronto, Jan. 19, 1989.

Chair, Panel on Temporal Reasoning, First International Conference on Principles of Knowledge Representation, May, 1989.

"Lucid Representations," *Bar Ilan Symposium on the Foundations of Artificial Intelligence,* Bar Ilan University, June 18, 1991 (Invited hour address); U. Connecticut at Storrs, November, 1991.

"QR work on Spatial Reasoning," IFIP Workshop on Knowledge Representation and Qualitative Reasoning, Islamorada, Fla, Feb. 1992.

Panel on "Hard Problems in Physical Reasoning," IFIP Workshop on Knowledge Representation and Qualitative Reasoning, Islamorada, Fla, Feb. 1992.

"Knowledge Preconditions for Plans," Bell Labs, April 22, 1993. IBM Watson Labs, June 1, 1993.

"Approximation and Abstraction in Solid Object Kinematics." Yale University, Dec. 1994. Rutgers University, Oct. 1995.

"The Automation of Commonsense Physical Reasoning" and "Qualitative Kinematics", Knowledge Representation and Reasoning Distinguished Lecturer, Universities of York and Leeds, May 1996.

"Formal Theories of Spatial Reasoning," NSF Workshop on Visual Cognition and Spatial Reasoning, Ellicott City, MD, May 15-17, 1997.

"Methodological Difficulties in Automating Commonsense Reasoning" Symposium on Architectures for Commonsense Reasoning, IBM Watson Labs, March 13-14, 2002.

"A First-Order Theory of Communication and Multi-Agent Plans," Computer Science Department Colloquium, City University of New York, November 11, 2004.

"Why Computers are So Stupid and What Can Be Done About It: Artificial Intelligence and Commonsense Knowledge," Palladium Lecture, Palladium Residence House, New York University, February 27, 2006.

"Commonsense Physical Reasoning: Boxes and Pitchers," IBM Watson Labs, June 6, 2007.

"Some metalogical properties of first-order languages that quantify over spatial regions." Seminar in Logic and Games, CUNY Graduate Center, October 8, 2010.

"Commonsense Reasoning about Chemistry Experiments: Ontologies and Representations", Commonsense-2009, Toronto, June 2, 2009; and University of Illinois at Chicago, April 12, 2011.

"Qualitative Spatial Reasoning in Interpreting Text and Narrative." Conference on Spatial Information Theory (Keynote address). September 13, 2011.

"Why Computers Are So Stupid and What Can Be Done About It," *Science on Saturdays,* Princeton Plasma Physics Lab, March 3, 2012.

Interviewed in *The Rise of Artificial Intelligence,* Off Book, PBS videos, produced by Lisa Romagnoli and Eric Brown, July 2013.

"The Scope and Limits of Simulation in Automated Reasoning and Cognitive Models," Seminar on Concepts and Categories, NYU Psychology Dept. March 28, 2014.

"How AI Programs Collect Concepts" Seminar on Concepts and Categories, NYU Psychology Dept. September 25, 2015.

"How Strong is the Empirical Evidence for Bayesian Models of Cognition?" with Gary Marcus. *Is the Brain Bayesian* symposium, NYU, December 4, 2015.

"Axiomatizing the Foundations of Physics, starting with the Experiments," *Computationally Assisted Mathematical Discovery and Experimental Mathematics,* May 14, 2016.

"Collecting Commonsense Inferences from Text." Cognitum 2016 (Workshop on Cognitive Knowledge Acquisition and Applications). July 11, 2016.

Moderator, Panel, "Progress and Caution in Artificial Intelligence", Blouin Creative Leadership Summit, September 2016.

"The Scope and Limits of Simulation in Automated Reasoning and Cognitive Models," Northwestern University, January 10, 2017. Cognitive AI Meetup, New York, February 23, 2017.

"Reasoning about Containers", Northwestern University, January 11, 2017. Renssalear Polytechnic, May 12, 2017.

Panel, "Getting Societal Benefits Right", SIROS-2 (Social Implications of Robotics Symposium), Brown University, March 30, 2017.

"The Logical Depth of Reasoning about Other Minds," Advances in Cognitive Systems, May 13, 2017.

"Proof Verification Technology and Physics," Google New York, Research Seminar, December 20, 2017,

"Four Challenges for Physical Reasoning," Army Research Lab, January 18, 2018.

"Building AIs with Common Sense," Princeton chapter of the ACM, May 16, 2019.

"Building Artificial Intelligence We Can Trust". Columbia University, class on Computers and Society. October 15, 2019. Columbia University, class on AI and Ethics, February 2020. MIT Task Force on the Work of the Future, MIT, May 2020. Renaissance Numérique, February 2021.

"Time and Space in Knowledge Graphs," Ontology Summit, May 2020.

"Using human skills taxonomies and tests as measures of artificial intelligence: Caveats" OECD, Expert Meeting on Skills and Tests for Assessing AI and Robotics, October 2020.

"The Scope and Limits of Simulation in Automated Physical Reasoning." Argonne National Labs, March 3, 2021.

"Automating Common Sense: Where do we stand?". Keynote address, Conference on Business Informatics, September 2, 2021.

"The Scope and Limits of Simulation in Automated Physical Reasoning." NIST, November 17, 2021.

"Common Sense and Artificial Intelligence," Cognitive Science Seminar, Rutgers, March 1, 2022.

"Artificial inteligence: Perceptions and Reality — Accomplishments, Challenges, Prospects, and Risks". Institute of International and European Affairs (Dublin). October 24, 2022

"Commonsense Physical Reasoning in Humans and Machines." Guest lecture, Mécanismes de l'intuition mathématique chez les êtres humains et les machines," Stanislas Dehaene, Collège de France, January 13, 2023

"Reconsidering *Rebooting*", University of Bamberg, May 15, 2023.

Panel, "Reliability of Current Large Language Models", NSF, September 5, 2023.

"AI and Elementary Science and Math Problems", Keynote talk, IEEE UEMCON conference, October 12, 2023.

"The Short Term Risks of Artificial Intelligence," Ethics Breakfast series, Dirah, January 21, 2024.

"AI and Math" NYU Pathways for AI, July 26, 2024

"AI and Math" Chalmers University, August 26, 2024

Panelist, "AI Reasoning", IBM, September 25, 2024

Panel chair, "Challenges in Formalizing Foundational Domains" Workshop on Translational Institute for Knowledge Axiomatization, March 3, 2025.

Publications

Where not otherwise indicated, Ernest Davis is the sole author.

Books

B.1 *Representing and Acquiring Geographic Knowledge*
Pitman Press, London, 1986

B.2 *Representations of Commonsense Knowledge*
Morgan Kaufmann, San Mateo, CA, 1990.

B.3 *Linear Algebra and Probability for Computer Science Applications.*
CRC Press, A.K. Peters, 2012.

B.4 *Verses for the Information Age.* Privately published. 2017.

B.5 *Rebooting AI: Building Artificial Intelligence We Can Trust.* By G. Marcus and E. Davis. Pantheon Press. 2019.
Translations into Chinese, Korean, and Russian.

Edited Books

E.1 *Mathematics, Substance and Surmise: Views on the Meaning and Ontology of Mathematics,* E. Davis and P. Davis (editors), Springer, 2015.

E.2 *"Will You Marry Me?" Some First-hand Accounts of Marriage Proposals, 1600-1900.* Privately published, 2020.

Journal Articles

J.1 Algorithms for Scheduling Tasks on Unrelated Processors.
By E. Davis and J. Jaffe. *JACM,* Vol. 28 No. 4, October 1981, pp. 721-736

J.2 What's the Point?
By R. Schank, G. Collins, E. Davis, P. Johnson, S. Lytinen, and B. Reiser. *Cognitive Science,* Vol. 6, No. 3, 1982

J.3 Planning and Executing Routes through Uncertain Territory.
By D. McDermott and E. Davis. *Artificial Intelligence,* vol. 22, pp. 107-156, 1984

J.4 Constraint Propagation with Interval Labels.
Artificial Intelligence, vol. 32, 1987, pp. 281-331.

J.5 A Logical Framework for Commonsense Predictions of Solid Object Behavior.
AI in Engineering, vol. 3 no. 3, 1988, pp. 125-140.

J.6 The Kinematics of Cutting Solid Objects.
Annals of Mathematics and Artificial Intelligence, vol. 9, no. 3,4, 1993, pp. 253-305.

J.7 Knowledge Preconditions for Plans.
Journal of Logic and Computation, vol. 4, no. 5, Oct. 1994, pp. 721-766

J.8 Order of Magnitude Comparisons of Distance
Journal of AI Research, vol. 10, 1999, pp. 1-38.

J.9 Constraint Networks of Topological Relations and Convexity.
By E. Davis, N.M. Gotts and A.G. Cohn. *CONSTRAINTS,* Vol. 4 No. 3, 1999, pp. 241-280.

J.10 Continuous Shape Transformations and Metrics on Regions,
Fundamenta Informaticae, Vol. 46, Nos. 1-2, 2001, pp. 31-54.

J.11 A First-Order Theory of Communication and Multi-Agent Plans.
By E. Davis and L. Morgenstern. *Journal of Logic and Computation,* Vol. 15, No. 5, 2005, pp. 701-749. This paper has two online appendices, 7 and 16 pages long respectively, at http://cs.nyu.edu/faculty/davise/commplan/commplan-appa.pdf and commplan-appb.pdf.

J.12 Knowledge and Communication: A First-Order Theory.
Artificial Intelligence, vol. 166 nos. 1-2, 2005, pp. 81-140.

J.13 Processes and Continuous Change in a SAT-Based Planner.
By J. Shin and E. Davis. *Artificial Intelligence,* vol. 166 nos. 1-2, 2005, pp. 194-253.

J.14 The Expressivity of Quantifying over Regions.
Journal of Logic and Computation, vol. 16, 2006, pp. 891-916.

J.15 Pouring Liquids: A Study in Commonsense Physical Reasoning.
Artificial Intelligence, vol. 172, 2008, pp. 1540-1578. This paper has a 18 page online appendix at http://cs.nyu.edu/faculty/davise/papers/liqAppa.pdf.

J.16 How Does a Box Work? A Study in the Qualitative Dynamics of Solid Objects.
Artificial Intelligence, **175**, 2011, pp. 299-345. This paper has a 20 page online appendix at http://cs.nyu.edu/faculty/davise/box-proof.pdf.

J.17 Preserving Geometric Properties in Reconstructing Regions from Internal and Nearby Points.
Computational Geometry: Theory and Applications, 45:5-6, 2012, 234-253.

J.18 Elementarily Equivalent Domains for Topological Languages over Regions in Euclidean Space.
Journal of Logic and Computation, 23:3, 2013, 457-471.

J.19 Qualitative Spatial Reasoning in Interpreting Text and Narrative.
Spatial Cognition and Computation, 13:4, 2013, 264-294.
Also Space, Language, and Ontology: A Response to Bateman, same issue, 315-318.

J.20 A Qualitative Calculus for Three-Dimensional Rotations.
By A. Asl and E. Davis. *Spatial Cognition and Computation,* 14:1, 2014, 18-57.

J.21 The Expressive Power of First-Order Topological Languages.
Journal of Logic and Computation, 23:5, 2013, 1107-1141.

J.22 How Robust Are Probabilistic Models of Higher-Level Cognition?
By G. Marcus and E. Davis. *Psychological Science* 24:12, 2013, 2351-2360.

J.23 The Singularity and the State of the Art in Artificial Intelligence,
ACM Ubiquity, October 2014.

J.24 The Scope and Limits of Simulation in Automated Reasoning.
By E. Davis and G. Marcus. *Artificial Intelligence,* **233**, April 2016, 60-72.

J.25 Commonsense Reasoning and Commonsense Knowledge in Artificial Intelligence.
By E. Davis and G. Marcus. *Communications of the ACM,* September 2015, 92-105.

J.26 Still searching for principles: A response to Goodman et al. (2015).
By G. Marcus and E. Davis. *Psychological Science,* 2015, 26:542-544.

J.27 Lousy advice to the love-lorn. *Communications of the ACM,* December 2017.

J.28 "Causal model" must be broadly construed.
By E. Davis and G. Marcus. (Comment on B. Lake, T. Ullmamn, J. Tenenbaum, and S. Gershman, "Building Machines that Learn and Think like People.") *Behavioral and Brain Sciences,* **40**, 2017.

J.29 Commonsense reasoning about containers using radically incomplete information.
By E. Davis, G. Marcus, and N. Frazier-Logue. *Artificial Intelligence,* July 2017, **248**, 46-84.

J.30 Logical formalizations of commonsense reasoning: A survey.
Journal of AI Research, August 2017, **59**, 651-723.

J.31 Computational limits don't fully explain human cognitive limitations.
by E. Davis and G. Marcus. (Comment on F. Lieder and T. Griffiths, "Resource-rational analysis: Understanding human cognition as the optimal use of limited computational resources") *Behavioral and Brain Sciences,* 2020, **43**.

J.32 Unanswerable questions about images and texts.
Frontiers in Artificial Intelligence, July 2020.

J.33 Broken Physics: A Conjunction-Fallacy Effect in Intuitive Physical Reasoning
by Ethan Ludwin-Peery, Neil Bramley, Ernest Davis, and Todd Gureckis. *Psychological Science,* November 2020.

J.34 Insights for AI from the Human Mind.
By G. Marcus and E. Davis. *Communications of the ACM,* January 2021, **61**(1):38-41.

J.35 Limits on Simulation Approaches in Intuitive Physics.
by Ethan Ludwin-Peery, Neil Bramley, Ernest Davis, and Todd Gureckis. *Cognitive Psychology,* Vol. 127, June 2021.

J.36 Benchmarks for Automated Commonsense Reasoning: A Survey. *ACM Surveys*, **56**:4, Article 81, Feburary 2023, 41 pages.

J.37 The Defeat of the Winograd Schema Challenge. By V. Kocijan, T. Lukasiewicz, E. Davis, G. Marcus, and L. Morgenstern. *Artificial Intelligence,* Vol. 325, December 2023.

J.38 Mathematics, word problems, common sense, and artificial intelligence. *Bulletin of the American Mathematical Society*, Vol. 61 No. 2, April 2024, 287-303.

Conference Proceedings

P.1 The MERCATOR Representation of Spatial Knowledge.
Proceedings of the 8th IJCAI, 1983

P.2 A Representation for Complex Physical Domains.
By S. Addanki and E. Davis. *Proceedings of the 9th IJCAI,* pp. 443-446, 1985

P.3 Inferring Ignorance from the Locality of Visual Perception.
Proc. AAAI-88, pp. 786-790

P.4 Error Correction in Cognitive Maps.
Proc. Workshop on Sensor Fusion: Spatial Reasoning and Scene Interpretation, SPIE, 1988.

P.5 Solutions to a Paradox of Perception with Limited Acuity.
First International Conference on Knowledge Representation and Reasoning, 1989.

P.6 The Semantics of Tasks that can be Interrupted or Abandoned.
First International Conference on AI Planning Systems, 1992, pp. 37-44.

P.7 Axiomatizing Qualitative Process Theory.
Third International Conference on Knowledge Representation and Reasoning, 1992, pp. 177-188.

P.8 Infinite Loops in Finite Time: Some Observations.
Third International Conference on Knowledge Representation and Reasoning, 1992, pp. 47-58.

P.9 Branching Continuous Time and the Semantics of Continuous Action.
Second International Conference on AI Planning Systems, 1994, pp. 231-236.

P.10 A First-Order Theory of Communicating First-Order Formulas.
Ninth International Conference on Knowledge Representation and Reasoning, 2004. pp. 235-245. [Conference-length version of J.12]

P.11 Continuous Time in a SAT-Based Planner.
By J. Shin and E. Davis. *Proc AAAI-2004.* pp. 531-536. [Conference-length version of J.13]

P.12 Ontologies and Representations of Matter.
AAAI-10.

P.13 The Winograd Schema Challenge.
By H. Levesque, E. Davis, and L. Morgenstern. *KR-2012.*

P.14 Reasoning from Radically Incomplete Information: The Case of Containers.
By E. Davis, G. Marcus, and A. Chen. *Advances in Cognitive Systems*, 2013, 273-288.

P.15 The Logical Depth of Reasoning about Other Minds. *Advances in Cognitive Systems,* 2017.

P.16 Limits on the use of simulation in physical reasoning.
By Ethan Ludwin-Peery, Neil Bramley, Ernest Davis, and Todd Gureckis. *Cognitive Science.* 2019.

P.17 A generalization test of conjunction errors in physical reasoning. (Poster)
By Ethan Ludwin-Peery, Neil Bramley, Ernest Davis, and Todd Gureckis. *Cognitive Science.* 2020.

P.18 Physical reasoning in an open world. By Zhuoran (Jennifer) Zeng and Ernest Davis. *Advances in Cognitive Systems,* 2021.

P.19 My Experience Teaching Logic in Undergraduate AI at NYU. LogTeach-22. July 2022.

Chapters in Books

C.1 Limits and Inadequacies in Artificial Intelligence.
In *No Way: On the Nature of the Impossible,* Philip Davis and David Park, (eds.), W.H. Freeman, 1987, pp. 90-110

C.2 Commonsense Reasoning.
In *The Encyclopedia of Artificial Intelligence,* Stuart Shapiro, (ed.), John Wiley and Sons, 1987, pp. 833-840.
Revised for second edition, 1990.

C.3 A Framework for Qualitative Reasoning about Solid Objects.
In J. de Kleer and D. Weld (eds.), *Readings in Qualitative Physical Reasoning,* Morgan Kaufmann, 1989, pp. 603-609.
(Modified version of [J.5])

C.4 Order of Magnitude Reasoning in Qualitative Differential Equations.
In J. de Kleer and D. Weld (eds.), *Readings in Qualitative Physical Reasoning,* Morgan Kaufmann, 1989, pp. 422-434.

C.5 Knowledge Representation.
The International Encyclopedia of the Social and Behavioral Sciences, Neil J. Smelser and Paul B. Baltes (eds), Elsevier Science Pubs, Oxford, 2001, pp. 8132-8139.
Revised for 2nd edition, 2015, Vol. 13, pp. 98-104.

C.6 Physical Reasoning.
The Handbook of Knowledge Representation, F. van Harmelen, V. Lifschitz, and B. Porter (eds.), Elsevier, Oxford, 2008, chap. 14, pp. 597-620.

C.7 Qualitative Reasoning and Spatio-Temporal Continuity.
Qualitative Spatio-Temporal Representation and Reasoning: Trends and Future Directions, S. Hazarika (ed.), IGI Global, 2012.

C.8 Introduction. In *Mathematics, Substance and Surmise: Views on the Meaning and Ontology of Mathematics,* E. Davis and P. Davis (editors), Springer, 2015.

C.9 How Should Robots Think about Space? In *Mathematics, Substance and Surmise: Views on the Meaning and Ontology of Mathematics,* E. Davis and P. Davis (editors), Springer, 2015.

C.10 Proof Verification Technology and Elementary Physics. In *Algorithms and Complexity in Mathematics, Epistemology, and Science,* N. Fillion, R. Corless, and I.S. Kotsireas (eds.) Springer, 2019.

C.11 Using human skills taxonomies and tests as measures of AI. In *AI and the Future of Skills, Vol. 1: Capabilities and Assessments.* ed. Stuart Elliott, OECD Publishing, 2021.

Other contributions to books

D.1 47 original exercises with solutions in S. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach* 3rd edn. and accompanying instructor's manual, Prentice Hall, 2009.

Reviews

R.1 Response to "Prolegomena to any future Qualitative Physics," by Elisha Sacks and Jon Doyle. *Computational Intelligence,* vol. 8, no. 2, 1991, pp. 316-318.

R.2 Review of *Mirror Worlds,* by David Gelernter, Oxford U. Press, 1991. *SIAM News,* vol. 25, no. 3, 1992, p. 6.

R.3 Response to reviews of *Representations of Commonsense Knowledge. Artificial Intelligence,* vol. 61, 1993, pp. 175-179 .

R.4 Review of *Qualitative Reasoning,* by Benjamin Kuipers, MIT Press. *IEEE Expert,* vol. 9, no. 6, 1994, pp. 70-71.

R.5 Review of *The Uncertain Reasoner's Companion: A Mathematical Perspective,* by J.B. Paris, Cambridge University Press. *IEEE Expert,* vol. 10, no. 5, 1995, pp. 78-79.

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