Ben Goertzel, Ph.D.

Cross-disciplinary scientist, engineer, entrepreneur, manager, writer, speaker

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Educational Qualification:

Ph.D. in Mathematics, 1989
Temple University, Philadelphia
Dissertation title: "A Multilevel Approach to Global Optimization."

B.A. in Mathematics, 1985
Simon's Rock College, Great Barrington MA

Scientific Record:

- 9 authored books in AI, cognitive science
- 6 edited scientific books
- > 100 scientific papers in refereed journals and conferences
- Dozens of journalistic articles on science and technology topics
- Founded and steers the Artificial General Intelligence conference series; organizer of multiple workshops on AI, future technology, linguistics, bioinformatics, etc.
- Leader of the OpenCog open-source project for AI, NLP and cognitive robotics
- ***See curriculum vita (at the end of this document) for details***

Core Competencies:

- *Expertise in multiple scientific areas* including but not limited to (in alphabetical order): **artificial intelligence, bioinformatics, cognitive and perceptual psychology, cognitive robotics, computational finance, data mining, natural language processing, pure and applied mathematics, simulation modeling, systems biology, text mining**
- Expertise in many aspects of *computer graphics and game development*, including "serious games" for training purposes
- *Teaching*, in multiple subjects (mathematics, computer science, psychology, business) at levels from remedial to graduate
- *Software design*, including object-oriented and generic design patterns, and design for digital and parallel architectures
- *Programming* in Java and C++, mainly on Unix platforms
- *Experience managing and leading software teams* carrying out both research and product development, mainly using an agile development methodology
- *Upper management experience*: CTO experience managing 80+ technical people; and CEO experience in small software businesses
- *Excellent writing skills* – both technical and scientific writing, and extensive journalistic writing

- *Sales* – experience selling software services and enterprise software to government agencies, corporations and universities
- *Event planning* – have organized two international conferences and a number of workshops
- *Public speaking* – dozens of speeches, in front of large and diverse audiences

Work Experience:

Chief Technology Officer, 2010 to present
Genescient Corp, Irvine, CA

- Leadership of effort applying machine learning technology to analyze genomic data regarding long-lived fruit flies, incorporating mouse and human data as appropriate
- Development of novel techniques for discovering drug targets and drugs based on genomic data
- Development of biopharma-oriented business models and strategies based on the results of statistical and machine learning analysis of genomic data

CEO and Chief Scientist, 2001 to present
Novamente LLC, Rockville MD

- Overall business management
- Led a team including 15 programmers and scientists, plus 2 sales/marketing staff
- Developed multiple novel algorithms for machine learning, probabilistic reasoning, and natural language processing
- Created the Novamente PetBrain software for controlling virtual pets in games and virtual worlds, to be launched in an online children's game in April 2010
- Created two cognitive architectures: the Novamente Cognition Engine and the open-source OpenCog engine
- Launched the OpenCog open-source AI project (http://opencog.org)
- Created the (now open-source) RelEx system for English language parsing, semantic analysis and generation
- Secured 20+ AI software consulting contracts for corporate and government customers, on projects including:
  - StockMood.com, a website for analyzing the sentiment of financial news, which won the Thomson Reuters award at TechCrunch 2008
  - Intelligent virtual dogs in virtual worlds for Electric Sheep Company
  - Interactive natural language search and knowledge entry tools for US Army Intelligence, via a subcontract to Object Sciences Corp.
  - Language processing tools underlying smart.fm's language learning website
  - Datamining software for multiple customers in the medical, marketing, financial and other sectors
  - News-based and quantitative prediction systems for stocks and futures
  - Automated scientific discovery from biomedical text, for the NIH Clinical Center
  - Spatiotemporal reasoning architecture for IARPA
  - Metalearning project for IARPA (subcontract to Dartmouth College)
  - ICARUS brain simulation project for IARPA (subcontract to Lockheed Martin)
  - Partnership on game AI with Hong Kong Polytechnic University

CEO and Chief Scientist, 2002 to present
Biomind LLC, Rockville MD

- Overall business management
- Led a team including 7 programmers and biologists, plus 1 sales staff
- Developed multiple novel algorithms for analyzing microarray and SNP data
- Applied these methods to make multiple important discoveries, e.g.
  - The genetic cause for Parkinson's Disease in heteroplasmic mitochondrial mutations
  - The genetic basis of Chronic Fatigue Syndrome in mutations in genes coding for neurotransmitters
- Led the creation of the ArrayGenius product for microarray data analysis
- Sold ArrayGenius to customers including the NIH and CDC
- Led the creation of the analytics module of the the ImmPort web portal for NIH-NIAID
- Launched the OpenBiomind open-source toolkit for analyzing microarray, SNP and other biological data
- Raised >$400K in angel funding

Research Associate Professor, 2005-2006
Applied Research Lab for National and Homeland Security
Virginia Tech National Capitol Region

- Evaluated AI and language processing software products for use in the NSA
- Developed technology providing superior automated "entity extraction" from text
- Developed unique adaptive text search technology based on specific NSA requirements

Research Associate Professor of Computer Science, 2001-2002
University of New Mexico, Albuquerque NM

- Carried out research in AI and bioinformatics
- Taught artificial intelligence

Chief Technology Officer, 1997-2001
Webmind Inc. (initially named Intelligenesis Corp.), New York City

- Managed 80+ scientists and engineers
- Managed research projects in multiple AI areas including machine learning, natural language processing, reasoning, and artificial general intelligence
- Managed development of several products including
  - Webmind Market Predictor (a text-based trading system, now in use at Advanced Prediction Corp.)
  - Webmind Classification System (a system for classifying texts based on topic and sentiment)
  - Webmind Recommendation System, a fuzzy recommendation system for websites
- Helped raise $21M in angel and venture money
- Created and presented numerous business plans and customer presentations

Associate Professor, 1997-1998
College of Staten Island, City University of New York

- Carried out AI research
- Taught software development, AI and analysis of algorithms

Research Fellow in Cognitive Science, 1995-1996
University of Western Australia, Perth

- Carried out research in multiple areas including:
    - Artificial intelligence and mathematical psychology
    - Nonlinear modeling of human vision and olfaction
    - Neural net modeling of insect cognition and olfaction
    - Ecological modeling
- Designed and taught interdisciplinary undergraduate courses in cognitive science and neural networks
- Co-founded an interdisciplinary degree program in cognitive science

Senior Lecturer in Computer Science, 1994
Waikato University, Hamilton, New Zealand

- Carried out research in multiple areas including:
    - Artificial intelligence and mathematical psychology
    - Fractal graphics
    - Algorithmic music composition
- Taught computer graphics and user interface programming
- Co-founded an interdisciplinary degree program in cognitive science

Assistant Professor of Mathematics, 1989-1993
University of Nevada, Las Vegas

- Carried out research in multiple areas including:
    - Artificial intelligence and mathematical psychology
    - Nonlinear dynamics
- Taught computer graphics and user interface programming
- Co-founded an interdisciplinary degree program in cognitive science

Curriculum Vita

Following is my academic "Curriculum Vita", consisting of a list of my books and papers and related accomplishments.

- Patent
- Conference Leadership
- Research Grants and Government Contracts
- Public Speaking
- Publications: Books
- Publications: Journal and Conference Papers
- Journalistic Articles

PATENT

United States Patent 6532449: "Method of numerical time series prediction based on non-numerical time series," was granted to myself and Lisa Pazer in 2001. The target application for this patent was the prediction of financial markets based on patterns observed in online news.

CONFERENCE LEADERSHIP

2011
- **AGI-11** (Fourth Conference on Artificial General Intelligence), *Organizing Committee*: August 2011, Google campus, Mountain View CA
- **Humanity+ Hong Kong**, *Conference Co-chair*: November 2011, Hong Kong Polytechnic University

2010

- **Humanity+ @ CalTech**, *Conference Co-chair*: Pasadena, California, December 2010
- **AGI-10** (Third Conference on Artificial General Intelligence), *Organizing Committee*: March 2010, Lugano
- **AGI-10 Workshop on the Future of AGI and Roadmaps to AGI**, *Organizer*
- **ICAI 2010** (International Conference on Advanced Intelligence), *Program Committee Co-Chair*, August 2010. Beijing
- **BICA-10** (First Conference on Biologically Inspired Computing Architectures), *Organizing Committee*, November 2010, Washington DC

2009
- **AGI-09** (Second Conference on Artificial General Intelligence), *Conference Chair*: March 2009, Washington DC
- **First AGI Summer School**, Xiamen University, Xiamen, China, June-July 2009
- **Machine Consciousness Workshop** (post-conference workshop to Toward a Science of Consciousness 2009), June 2009, Hong Kong

2008
- **AGI-08** (First Conference on Artificial General Intelligence; agi-08.org), *Program Committee Co-chair, Organizing Committee Member*: March 2008, Memphis Tennessee
- **WCCI 2008, Special Session on Human-Level AI**, *Co-chair*: June 2008, Hong Kong

2006

- **AGI-06** (Workshop on Artificial General Intelligence), *Conference Chair*: March 2006, Bethesda Maryland
- **ACL (Association for Computational Linguistics), Bio-NLP Workshop**, *Co-chair*: July 2006, New York

RESEARCH GRANTS AND GOVERNMENT CONTRACTS

(Note: most of my work in the period 2001- has been commercially rather than research grant or government funded.)

- **2011-2012**. DARPA DCAPS program (involving using machine learning to predict suicidal behavior among military personnel). I am a consultant on the project; the prime is Poulin Holdings.
- **2010-2014**: IARPA Icarus (Integrated Cognitive-Neuroscience Architectures for Understanding Sensemaking). My company Novamente LLC is a subcontractor to Lockheed Martin on this grant.
- **2010-2011**. IARPA grant for Metalearning; I am a consultant on the "Dartmouth Metalearning Working Group" grant, a one-year grant funded under IARPA's open BAA
- **2010-2012:** Hong Kong Innovation in Technology Foundation (ITF) grant for "A Software Toolkit for Artificial General Intelligence in Video Games," a collaborative grant between Hong Kong Polytechnic University and my company Novamente LLC, funding 7 programmers to create video game characters controlled by the OpenCog AI system
- **2009-2012:** Chinese NSF Grant for "Imitation and Reinforcement Learning in a Humanoid Robot", for work at Xiamen University, in the Artificial Brain Lab of which I am co-supervisor
- **2008**: IARPA contract for "Change Detection"; work exploring the application of spatial, temporal and contextual inference for detecting patterns and resolving queries related to large, heterogeneous knowledge stores
- **2008**: US Air Force (AFOSR/AOARD) grant for research involving the use of AI agents in a 3D simulation world to engage in game-playing behavior with humans of different cultures, with a purpose of studying cross-cultural behavior patterns
- **2008-2010**: Research grant for AGI R&D, from Enhanced Education
- **2005-2009**: Contracts and purchase orders from the *National Institutes of Health (NIAID)*, under the BISTI program, for software and services related to the ImmPort portal for analysis of immunological microarray and SNP data
- **2005**: Contract from NIH Clinical Center for the creation of a prototype software system carrying out information extraction from biomedical research abstracts
- **2003-2004:** Contracts and purchase orders from the *Centers for Disease Control and Prevention*, for analysis of microarray, SNP and clinical data regarding Chronic Fatigue Syndrome
- **2003-2004**: Contracts for natural language processing software development, from Object Sciences Corporation, largely via a contract vehicle funded through INSCOM (US Army intelligence)
- **2001**: *$100K* grant from *Jeffrey Epstein Foundation*, for artificial general intelligence research
- **1996-99**: Together with Dr. Steve Lewandowsky and Michael Kalish I raised significant funding for computer equipment and computer support personnel for the UWA Cognitive Science Programme, from the *University of Western Australia Initiatives Fund*,.
- **1993-96**: I obtained several small research grants from *University of Nevad*a, *Waikato University* and the *Australian Research Council*

PUBLIC SPEAKING

In addition to academic conferences, in the period since 2005 I have given roughly 5 invited talks per year at various commercial and nonprofit conferences, including but not limited to:

- futurist conferences such as Singularity Summit, Transvision, Convergence, Accelerating Change, World Future Society, Humanity+, etc.

- biomedical conferences such as those organized by the Cambridge Healthtech Institute
- government-funded science and technology workshops such as those organized at MITRE, NR, etc.

I have also done some invited speaking for private government or corporate audiences, generally on future-of-technology themes.

PUBLICATIONS: BOOKS

In Preparation

1. Goertzel, Ben, Cassio Pennachin and Nil Geisweiller. *Building Better Minds, A Practical Path to Artificial General Intelligence*
2. Goertzel, Ben, Stephan Vladimir Bugaj and Lisa Rein. *Faster Than You Think: How Artificial General Intelligence May Soon Change Everything*
3. Goertzel, Ben, Lucio Coelho and Cassio Pennachin. *Intelligent Genomics: Deriving Biological Meaning from Gene Expression and Mutation Data Using Classification Model Ensembles and Network Analysis*

To Appear

1. Goertzel, Ben, Cassio Pennachin, Lucio Coelho, Murilo Queiroz, Predrag Janicic, Nil Geisweiller. *Real-World Reasoning: Spatial, Temporal and Spatiotemporal Logic,* Atlantis Press (distributed by Springer)

Authored Books

1. Goertzel, Ben (2010). *A Cosmist Manifesto: Practical Philosophy for the Posthuman Age*. Humanity+ Press.
2. Goertzel, Ben, Matthew Ikle', Izabela Freire Goertzel and Ari Heljakka (2008). *Probabilistic Term Logic*. Springer Verlag
3. Goertzel, Ben (2006). *The Hidden Pattern: A Patternist Philosophy of Mind,* Brown-Walker Press
4. Goertzel, Ben and Stephan Vladimir Bugaj (2006). *The Path to Posthumanity*. Academica Press
5. Goertzel, Ben (2002). *Creating Internet Intelligence*. Plenum Press
6. Goertzel, Ben (1997). *From Complexity to Creativity*. Plenum Press
7. Goertzel, Ben (1997). *Chaotic Logic*. Plenum Press
8. Goertzel, Ted and Ben Goertzel (1995). *Linus Pauling: A Life in Science and Politics*. Basic Books
9. Goertzel, Ben (1993). *The Evolving Mind*. Plenum Press
10. Goertzel, Ben (1993). *The Structure of Intelligence*. Springer-Verlag

Edited Books

1. Samsonovich, Alexei, Kamilla Johanssdottir, Antonio Chella and Ben Goertzel (Editors). *Proceedings of the First Conference on Biologically-Inspired Cognitive Architectures*. IOS Press.
2. Goertzel, Ben, Pascal Hitzler and Marcus Hutter (2009). *Proceedings of the Second Conference on Artificial General Intelligence*. Atlantis Press.
3. Wang, Pei, Ben Goertzel and Stan Franklin (2008). *Artificial General Intelligence 2008: Proceedings of the First AGI Conference*. IOS Press: Frontiers in Artificial Intelligence and Applications
4. Goertzel, Ben and Pei Wang, Editors (2007). *Advances in Artificial General Intelligence*. IOS Press.
5. Goertzel, Ben and Cassio Pennachin, Editors (2006). *Artificial General Intelligence*. Springer-Verlag.

6.   Combs, Allan, Ben Goertzel and Mark Germine (2003). *Mind in Time.*. Plenum Press

PUBLICATIONS: JOURNAL AND CONFERENCE PAPERS

(papers submitted for publication not listed)

2011

1.   Goertzel, Ben (2011). Integrating a Compositional Spatiotemporal Deep Learning Network with Symbolic Representation/Reasoning within an Integrative Cognitive Architecture via an Intermediary Semantic Network. *Proceedings of AAAI Symposium on Cognitive Systems,* Arlington VA
2.   Goertzel, Ben, Joel Pitt, Jared Wigmore, Nil Geisweiller, Zhenhua Cai, Ruiting Lian, Deheng Huang, Gino Yu (2011). Cognitive Synergy between Procedural and Declarative Learning in the Control of Animated and Robotic Agents Using the OpenCogPrime AGI Architecture. *Proceedings of AAAI-11*
3.   Goertzel, Ben (2011). Lifelong Forgetting: A Critical Ingredient of Lifelong Learning, and its Implementation in the OpenCog Integrative AI Framework. *Proceedings of AAAI-11 Workshop on Lifelong Learning*
4.   Goertzel, Ben (2011). Imprecise Probability as a Linking Mechanism Between Deep Learning, Symbolic Cognition and Local Feature Detection in Vision Processing. *Proceedings of AGI-11*, Lecture Notes in AI, Springer Verlag
5.   Ikle, Matthew and Ben Goertzel (2011). Nonlinear-Dynamical Attention Allocation via Information Geometry, *Proceedings of AGI-11*, Lecture Notes in AI, Springer Verlag
6.   Cai, Zhenhua, Ben Goertzel and Nil Geisweiller (2011). OpenPsi: Realizing Dorner's "Psi" Cognitive Model in the OpenCog Integrative AGI Architecture, *Proceedings of AGI-11*, Lecture Notes in AI, Springer Verlag
7.   Goertzel, Ben and Matthew Ikle (2011). Three Hypotheses About the Geometry of Mind, *Proceedings of AGI-11*, Lecture Notes in AI, Springer Verlag
8.   Goertzel, Ben (2011). Self-Programming = Learning about Intelligence-Critical System Features, *Proceedings of Self-Programming Workshop at AGI-11*, Mountain View CA
9.   Goertzel, Ben, Joel Pitt, Zhenhua Cai, Jared Wigmore, Deheng Huang, Nil Geisweiller, Ruiting Lian, Gino Yu (2011). Integrative General Intelligence in a Minecraft-Type Environment. *Proceedings of BICA-2011*, Arlington VA

2010

1.   Ruiting Lian, Ben Goertzel, Rui Liu, Michael Ross,Murilo Queiroz, and Linas Vepstas. Sentence generation for artificial brains: a glocal similarity matching approach. *Neurocomputing*, Dec 2010
2.   Goertzel, Ben and Allan Combs. Water Worlds, Naive Physics, Intelligent Life, and Alien Minds. *Journal of Cosmology* 5, 897-904.
3.   Goertzel, Ben, Lucio Coelho, Mauricio Mudado and Cassio Pennachin. Classifier Ensemble Based Analysis of a Genome-Wide SNP Dataset Concerning Late-Onset Alzheimer Disease. *Journal of Cognitive Informatics,* to appear
4.   Ikle', Matthew and Ben Goertzel. Grounding Possible Worlds Semantics in Experiential Semantics. *Proceedings of the Third Conference on Artificial General Intelligence*, Atlantis Press
5.   Goertzel, Ben, Cassio Pennachin, Samir Araujo, Ruiting Lian, Fabricio Silva, Murilo Queiroz, Welter Silva, Mike Ross, Linas Vepstas, Andre Senna. A General Intelligence Oriented Architecture for Embodied Natural Language Processing. *Proceedings of the Third Conference on Artificial General Intelligence*, Atlantis Press
6.   Goertzel, Ben. Toward a Formal Characterization of Real-World General Intelligence. *Proceedings of the Third Conference on Artificial General Intelligence,* Atlantis Press
7.   Geisweiller, Nil and Ben Goertzel. Uncertain Spatiotemporal Logic for General Intelligence. *Proceedings of the Third Conference on Artificial General Intelligence,* Atlantis Press

8. De Garis, Hugo, Xiaoxi Chen and Ben Goertzel. The China Brain Project: An Evolutionary Engineering Approach to Building China's First Artificial Brain Consisting of 10,000s of Evolved Neural Net, in *Kansei Engineering and Soft Computing: Theory and Practice*, Edited by Ying Dai, IGI Global Press

9. Goertzel, Ben, Hugo de Garis, Cassio Pennachin, Nil Geisweiller, Samir Araujo ,Joel Pitt, Shuo Chen, Ruiting Lian, Min Jiang, Ye Yang, Deheng Huang (2010). OpenCogBot: Achieving Generally Intelligent Virtual Agent Control and Humanoid Robotics via Cognitive Synergy. *Proceeedings of ICAI 2010*, Beijing.

10. Goertzel, Ben, Hugo de Garis. Shuo Chen, Ruiting Lian, Min Jiang (2010). Artificial Brains: a Review of the State of the Art and a Roadmap for Future Development. *Proceeedings of ICAI 2010*, Beijing.

11. Goertzel, Ben, and Ruiting Lian (2010). A Probabilistic Characterization of Fuzzy Set Membership, with Application to Mixed Fuzzy-Probabilistic Inference. *Proceeedings of ICAI 2010*, Beijing.

12. Hugo de Garis, Chen Xiaoxi, Yang Ye, Chen Shuo, Ben Goertzel, and Ruiting Lian (2010). "Object/Gesture Recognition Software in the "China Brain Project," *Proceedings of ICCI 2010*, Beijing

13. Goertzel, Ben, Ruiting Lian, Itamar Arel, Hugo de Garis, and Chen Shuo (2010). World Survey of Artificial Brains Part 2: Biologically-Inspired Cognitive Architectures. *Neurocomputing*, Dec 2010

14. De Garis, Hugo, Chen Shuo, Ben Goertzel and Ruiting Lian. (2010). World Survey of Artificial Brains Part 1: Large-Scale Brain Simulations. *Neurocomputing,* Dec 2010

15. Goertzel, Ben, Lucio Coelho, Mauricio Mudado and Cassio Pennachin (2010). Classifier Ensemble Based Analysis of a Genome-Wide SNP Dataset Concerning Late-Onset Alzheimer Disease. *International Journal of System Science and Cognitive Informatics*.

16. Duong, Deborah, Nicholas Stone, Ben Goertzel, and Jim Venuto. "Indra: Emergent Ontologies from Text for Feeding Data to Simulations." *Spring Simulation Interoperability Workshop*, Orlando, April 12-16 2010

17. Baum, Seth D., Ben Goertzel, and Ted G. Goertzel. "How long until human-level AI? Results from an expert assessment". Technological Forecasting & Social Change, forthcoming, DOI 10.1016/j.techfore.2010.09.006.

2009

1. Goertzel, Ben and Pennachin, Cassio. The Collective Pet Unconscious: Balancing Intelligence and Individuality in Populations of Learning-Enabled Virtual Pets, *The Reign of Catz and Dogz Symposium, ACM-CHI,* Boston, 2009

2. Goertzel, Ben. OpenCogPrime: A Cognitive Synergy Based Architecture for General Intelligence. *International Conference on Cognitive Informatics*, Hong Kong, 2009

3. Goertzel, Ben. Cognitive Synergy: A Universal Principle for General Intelligence?, *International Conference on Cognitive Informatics*, Hong Kong, 2009

4. Goertzel, Ben. The Embodied Communication Prior: A Characterization of General Intelligence in the Context of Embodied Social Interaction. *International Conference on Cognitive Informatics*, Hong Kong, 2009

5. Goertzel, Ben, Lucio Coelho, Mauricio Mudado and Cassio Pennachin. *Classifier Ensemble Based Analysis of a Genome-wide SNP Dataset Concerning Late-Onset Alzheimer Disease*. International Conference on Cognitive Informatics, Hong Kong, 2009

6. Goertzel, Ben.   All Things Are Conscious, But Some Things Are More Conscious Than Others: A Panpsychist Approach to Quantifying Intensity of Consciousness in Natural and Engineered Systems. *Machine Consciousness Workshop, Toward a Science of Consciousness,* Hong Kong, 2009

7. Goertzel, Ben and Stephan Vladimir Bugaj. AGI Preschool: A Framework for Evaluating Early-Stage Human-like AGIs. *Proceedings of the Second Conference on Artificial General Intelligence*, Atlantis Press.

8. Ikle, Matthew, Joel Pitt, Ben Goertzel and George Sellman. Economic Attention Networks: Associative Memory and Resource Allocation for General Intelligence. *Proceedings of the Second Conference on Artificial General Intelligence*, Atlantis Press.
9. Looks, Moshe and Ben Goertzel. Program Representation for General Intelligence. *Proceedings of the Second Conference on Artificial General Intelligence*, Atlantis Press.
10. Goertzel, Ben. OpenCog NS: A Deeply-Connected, Hybrid Neural-Symbolic Architecture, *Proceedings of BICA-2010*, Alexandria VA
11. De Garis, Hugo and Ben Goertzel.   The First Conference on Artificial General Intelligence. *AI Magazine* 30-1, p.121
12. Goertzel, Ben, Lucio Coelho and Cassio Pennachin. Identifying Potential Biomarkers for Chronic Fatigue Syndrome via Classification Model Ensemble Mining.   in *Methods of Micorarray Data Analysis VI,* edited by McConnell, P, Lim, S., and A.J. Cuticchia. Scotts Valley, California: CreateSpace Publishing, 2009).
13. Goertzel, Ben. Mirror Man: a speculative case study of the synergetic potential of data visualization and virtual worlds. In *Working Through Synthetic Worlds*, Ed. By Cap Smith, Kenneth Kisiel and Jeffrey Morrisson, Ashgate Press
14. Wang, Yingxu, et al [incl. Ben Goertzel].   Perspectives on Cognitive Informatics and Cognitive Computing. *International Conference on Cognitive Informatics*, Hong Kong, 2009 and *Journal of Cognitive Informatics 4-1*

2008

1. Goertzel, Ben, Lucio Souza, Mauricio Mudado and Cassio Pennachin . Identifying the Genes and Genetic Interrelationships Underlying the Impact of Calorie Restriction on Maximum Lifespan: An Artificial Intelligence Based Approach.   *Rejuvenation Research*
2. Goertzel, Ben; Aam, O.; Smith, F.T.; Palmer, K. Mirror Neurons, Mirrorhouses, and the Algebraic Structure of the Self. *Cybernetics & Human Knowing*, Volume 15, Number 1, 2008 , pp. 9-28(20)
3. Goertzel, Ben and Hugo de Garis. XIA-MAN: An Integrative, Extensible Architecture for Intelligent Humanoid Robotics. *AAAI Symposium on Biologically-Inspired Cognitive Architectures,* Washington DC, November 2008
4. Goertzel, Ben . A Pragmatic Path Toward Endowing Virtually-Embodied AIs with Human-Level Linguistic Capability, *Special Session on Human-Level Intelligence, IEEE World Congress on Computational Intelligence* (WCCI) Hong Kong, 2008
5. Goertzel, Ben and Pennachin, Cassio . An Inferential Dynamics Approach to Personality and Emotion Driven Behavior Determination for Virtual Animals. *The Reign of Catz and Dogz Symposium, AI and the Simulation of Behavior* (AISB), Edinburgh, 2008
6. Goertzel, Ben, Cassio Pennachin, Nil Geissweiller, Moshe Looks, Andre Senna, Ari Heljakka, Welter Silva, Carlos Lopes . An Integrative Methodology for Teaching Embodied Non-Linguistic Agents, Applied to Virtual Animals in Second Life, in *Proceedings of the First AGI Conference*, Ed. Wang et al, IOS Press
7. Goertzel, Ben and Stephan Vladimir Bugaj. Stages of Ethical Development in Artificial General Intelligence Systems, in *Proceedings of the First AGI Conference*, Ed. Wang et al, IOS Press
8. Ikle', Matthew and Ben Goertzel . Probabilistic Quantifier Logic for General Intelligence: An Indefinite Probabilities Approach, in *Proceedings of the First AGI Conference*, Ed. Wang et al, IOS Press
9. Hart, David and Ben Goertzel. OpenCog: A Software Framework for Integrative Artificial General Intelligence, in *Proceedings of the First AGI Conference*, Ed. Wang et al, IOS Press
10. Pennachin, Cassio and Ben Goertzel. How Might Probabilistic Reasoning Emerge from the Brain?, in *Proceedings of the First AGI Conference*, Ed. Wang et al, IOS Press

2007

1. Goertzel, Ben. Human-level artificial general intelligence and the possibility of a technological singularity. *Artificial Intelligence* 171-18
2. Goertzel, Ben, Cassio Pennachin, Lucio Coelho, Leonardo Shikida, Murilo Queiroz. Biomind

ArrayGenius and GeneGenius: Web Services Offering Microarray and SNP Data Analysis via Novel Machine Learning Methods. In *Proceedings of IAAI 2007*, Vancouver CA, July 2007

3. Goertzel, Ted and Benjamin Goertzel, "Sociologische Wirklichkeit und ire Ökonometrische Verzerrung – Sociological Realities and Econometri Distortions." Pages 417-452 in Wolfgang Koschnick, editor. Focus-Jahrbuch 2007 – *Schwerpunkt: Neuroökonomie, Neuromarketing und Neuromarktforschung. Mit weiteren Beiträgen uber Messen und Befragen, Treiberanalysen, okonometrisches Modeling under Verkehrsmittelwerbung.* Munich, Germany: Focus Magazin Verlag GmbH, 2007.

4. Looks, Moshe, Ben Goertzel, Lucio de Souza Coelho, Mauricio Mudado, and Cassio Pennachin, "Clustering Gene Expression Data via Mining Ensembles of Classification Rules Evolved Using MOSES", *Genetic and Evolutionary Computation COnference (GECCO),* 2007.

5. Looks, Moshe, Ben Goertzel, Lucio de Souza Coelho, Mauricio Mudado, and Cassio Pennachin, "Understanding Microarray Data through Applying Competent Program Evolution", *Genetic and Evolutionary Computation COnference (GECCO)*, 2007

6. Ikle', Matt and Ben Goertzel. Indefinite Probabilities for General Intelligence, in *Advances in Artificial General Intelligence*, IOS Press.

7. Goertzel, Ben. Virtual Easter Egg Hunting: A Thought-Experiment in Embodied Social Learning, Cognitive Process Integration, and the Dynamic Emergence of the Self, in *Advances in Artificial General Intelligence*, IOS Press.

8. Heljakka, Ari, Ben Goertzel, Welter Silva, Izabela Goertzel and Cassio Pennachin. Reinforcement Learning of Simple Behaviors in a Simulation World Using Probabilistic Logic, in *Advances in Artificial General Intelligence*, IOS Press.

9. Goertzel, Ben and Stephan Bugaj (2006). Stages of Cognitive Development in Uncertain-Logic-Based AI Systems.iin *Advances in Artificial General Intelligence*, IOS Press.

10. Goertzel, Ben, Cassio Pennachin, Lucio Coelho and Mauricio Mudado. Application of MUTIC to the Exploration of Gene Expression Data on Prostate Cancer. *Genet. Mol. Res. 6* (4): 890-900 (2007)

11. Goertzel, Ben, Ari Heljakka, CassProbabilistic Logic Based Reinforcement Learning of Simple Embodied Behaviors in a 3D Simulation World, Welter Silva, Cassio Pennachin, Andre Senna, Izabela Goertzel, Teemu Keinonen, Matthew Ikle', Sanjay Padmane, *Proceedings of International Symposium on Intelligence Computation and Applications* (ISICA) 2007

12. Goertzel, Ben, and Matthew Ikle'. Assessing the Weight of Evidence Implicit in an Indefinite Probability. *Proceedings of International Symposium on Intelligence Computation and Applications (ISICA) 2007*

2006

1. Goertzel, Ben, Cassio Pennachin, Lucio Coelho, Brian Gurbaxani, Elizabeth B. Maloney, James F. Jones (2006). *Combinations of single nucleotide polymorphisms in neuroendocrine effector and receptor genes are predictive of chronic fatigue syndrome*, Pharmacogenomics

2. Pennachin, Cassio, Ben Goertzel Lucio Coelho, Izabela Freire Goertzel, Murilo Queiroz, Francisco Prosdocimi, Francisco Lobo (2006). *Learning Comprehensible Classification Rules from Gene Expression Data Using Genetic Programming and Biological Ontologie*s, Proceedings of CIBB 2006, Genova, Italy

3. Maloney, Elizabeth M. Maloney, Brian M. Gurbaxani, James F. Jones, Lucio de Souza Coelho, Cassio Pennachin, Benjamin N. Goertzel (2006). *Chronic Fatigue Syndrome is Associated with High Allostatic Load*, Pharmacogenomics

4. Goertzel, Ben, Cassio Pennachin, Lucio de Souza Coelho, Elizabeth B. Maloney, James F. Jones, Brian Gurbaxani (2006). *Allostatic Load is Associated with Symptoms in CFS Patients*, Pharmacogenomics

5. Gurbaxani, Brian, James F. Jones, Benjamin N. Goertzel, Elizabeth M. Maloney (2006). *Linear Data Mining the Wichita Clinical Matrix Suggests Sleep and Allostatic Load Involvement in Chronic Fatigue Syndrome*, Pharmacogenomics

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JOURNALISTIC ARTICLES

During the period 1999-2002 I published roughly two dozen articles in the newspaper Frankfurter Allgemaine Zeitung. Most dealt with topics or individuals in computer science or science in general, or with "visionary futuristic" themes. English-language versions of most of the articles can be found at http://www.goertzel.org/benzine/

More recently, since 2006 I have published numerous articles in various online futurist magazines including Kurzweilai.net and others. Also, since 2008 I have written a column for the quarterly futurist magazine H+.