

## Moshe Looks

---

4274 Wilkie Way #P  
Palo Alto, CA 94306  
phone 202-641-2157

email moshe@metacog.org  
madsience@google.com  
web metacog.org

### Employment

**Software Designer and Researcher** Nov 2007 - present  
Google Inc.  
Research in program induction and artificial general intelligence.

**Software Designer and Researcher** Jan 2002 - Oct 2007<sup>1</sup>  
Novamente LLC  
Researched probabilistic-evolutionary learning, knowledge representation, AI algorithm integration, and data clustering. Applications included bioinformatics and intelligent virtual agents.

**Software Designer and Researcher** Aug 2003 - Jun 2007<sup>2</sup>  
Integrated Intelligence Solutions Operation SAIC  
Designed and implemented a novel probabilistic-evolutionary learning system handling time-series prediction, supervised categorization, and unsupervised pattern discovery. Applied the system across numerous domains. Collaborated on various natural language processing applications.

**Research Assistant** Sep 2005 - Aug 2006  
Ron Loui and John Lockwood Washington University in St. Louis  
Created and analyzed novel machine learning algorithms for text mining and natural language processing. Regularly presented results to project sponsors.

**Research Assistant** Sep 2002 - Aug 2003  
Weixiong Zhang Washington University in St. Louis  
Designed and experimentally validated novel local search algorithms, in collaboration with adviser.

**Programmer** Aug 2000 - Mar 2001  
Wireless Mobile Advanced Push  
Collaborated on the design and implementation of a web-based SMS broadcast management system.

**Programmer** Mar 2000 - Aug 2000  
GoldNames Ltd.  
Built a web-based system handling page generation, traffic analysis, etc., for >35,000 domain names.

**Undergraduate Assistant** Jan 1999 - Mar 2000  
Haim Levanon, Physical Chemistry Hebrew University of Jerusalem  
Assisted in experiments, data collection and analysis, and preparation of results for publication.

### Degrees

**Doctorate in Computer Science**, Washington University in St. Louis, Dec 2006  
Dissertation: Competent Program Evolution

**Master's Degree in Computer Science**, Washington University in St. Louis, May 2005  
Thesis: Learning Computer Programs with the Bayesian Optimization Algorithm

**Bachelor's Degree in Computer Science**, The Hebrew University of Jerusalem, Jul 2002  
Magna Cum Laude, Dean's List, 2000-2002, Senior Project: "Optimal Stereo Mosaicing"

---

<sup>1</sup>part-time before Jun 2007

<sup>2</sup>on leave of absence Sep 2005 - Aug 2006

## Moshe Looks

---

### Research Area

Design and application of novel algorithms and integrated systems, including classification, prediction, and analytics. Methods include *evolutionary computation*, *probabilistic models*, *stochastic local search*, *statistical natural language processing*, and *data clustering*.

### Software Design Skills

Generic, functional, object-oriented, and procedural paradigms, multiparadigm design  
Languages: Awk, C, C++, Common Lisp, Java, JavaScript, Matlab, Perl, PHP, Prolog, Scheme  
*primary languages are C++ and Common Lisp*, *primary development environment is Emacs*  
Database management systems: MySQL, PostgreSQL, Oracle

### Refereed Papers

1. Cassio Pennachin, Moshe Looks, and João de Vasconcelos “Improved Time Series Prediction and Symbolic Regression with Affine Arithmetic”, *Genetic Programming Theory and Practice (GTP)*, 2011.
2. Cassio Pennachin, Moshe Looks, and João de Vasconcelos “Robust Symbolic Regression with Affine Arithmetic”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2010.
3. Moshe Looks, “Compression Progress, Pseudorandomness, & Hyperbolic Discounting”, *Conference on Artificial General Intelligence (AGI)*, 2010.
4. Moshe Looks and Ben Goertzel, “Program Representation for General Intelligence”, *Conference on Artificial General Intelligence (AGI)*, 2009.
5. Ben Goertzel, Cassio Pennachin, Nil Geissweiller, Moshe Looks, Andre Senna, Welter Silva, Ari Heljakka, and Carlos Lopes “An Integrative Methodology for Teaching Embodied Non-Linguistic Agents”, *Conference on Artificial General Intelligence (AGI)*, 2008.
6. Moshe Looks, “Scalable Estimation-of-Distribution Program Evolution”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
7. Moshe Looks, “On the Behavioral Diversity of Random Programs”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
8. Moshe Looks, “Meta-Optimizing Semantic Evolutionary Search”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
9. Moshe Looks, Ben Goertzel, Lúcio 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.
10. Moshe Looks, Ben Goertzel, Lúcio de Souza Coelho, Mauricio Mudado, and Cassio Pennachin, “Understanding Microarray Data through Applying Competent Program Evolution”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
11. Moshe Looks, Andrew Levine, Adam Covington, Ron Loui, John Lockwood, and Young Cho, “Streaming Hierarchical Clustering for Concept Mining”, *IEEE Aerospace Conference (AERO)*, 2007.
12. Moshe Looks, “Program Evolution for General Intelligence”, *Artificial General Intelligence Research Institute Workshop (AGIRI)*, 2006.
13. Moshe Looks, “Levels of Abstraction in Modeling and Sampling: The Feature-Based Bayesian Optimization Algorithm”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2006.
14. Ben Goertzel, Ari Heljakka, Stephan Vladimir Bugaj, Cassio Pennachin, and Moshe Looks, “Exploring Android Developmental Psychology in a Simulation World”, *International Cognitive Science Society, Android Science Workshop*, 2006.

15. Ben Goertzel, Moshe Looks, Ari Heljakka, and Cassio Pennachin, “Toward a Pragmatic Understanding of the Cognitive Underpinnings of Symbol Grounding”, *Semiotics and Intelligent Systems Development*, Ricardo Gudwin and João Queiroz, Eds., 2006.
16. Moshe Looks and Ben Goertzel, “Mixing Cognitive Science Concepts with Computer Science Algorithms and Data Structures: An Integrative Approach to Strong AI”, *AAAI Spring Symposium, Cognitive Science Principles Meet AI-Hard Problems*, 2006.
17. Moshe Looks, Ron Loui, and Barry Cynamon, “Dynamics of Rule Revision and Strategy Revision in Legislative Games”, *Conference on Legal Knowledge and Information Systems (JURIX)*, 2005.
18. Moshe Looks and Ron Loui, “On Game Mechanisms and Procedural Fairness: Preliminary Framework”, *Conference on Legal Knowledge and Information Systems (JURIX)*, 2005.
19. Weixiong Zhang and Moshe Looks, “A Novel Local Search Algorithm for the Traveling Salesman Problem that Exploits Backbones”, *International Joint Conference on AI (IJCAI)*, 2005.
20. Moshe Looks, Ben Goertzel, and Cassio Pennachin, “Learning Computer Programs with the Bayesian Optimization Algorithm”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2005.
21. Moshe Looks, Ben Goertzel and Cassio Pennachin, “Novamente: An Integrative Architecture for General Intelligence”, *AAAI Fall Symposium, Achieving Human-Level Intelligence*, 2004.
22. Weixiong Zhang, Ananda Rangan, and Moshe Looks, “Backbone Guided Local Search for Maximum Satisfiability”, *International Joint Conference on AI (IJCAI)*, 2003.

## Books

1. Jürgen Schmidhuber, Kristinn Thorisson, and Moshe Looks (editors), “Artificial General Intelligence. Proceedings of the 4th International Conference”, *Springer Lecture Notes in Artificial Intelligence (LNAI)*, 2011.

## Invited Talks

1. “Automated Program Learning for AGI”, *Conference on Artificial General Intelligence (AGI)*, tutorial, March 5th, 2010.
2. “Automated Program Learning for AGI”, *Conference on Artificial General Intelligence (AGI)*, tutorial, March 6th, 2009.
3. “Catalyzing the Coming AGI Renaissance”, *Conference on Artificial General Intelligence (AGI)*, panel discussion, March 3rd, 2008.
4. “The Future of Automated Program Learning”, *Washington DC Future Salon*, December 6th, 2006.
5. “Towards Competent Genetic Programming: What are the Missing Ingredients?”, *Missouri Estimation of Distribution Algorithms Laboratory (MEDAL) Gathering on Evolutionary Computation*, July 24th, 2006.
6. “Probabilistic Model-Building for Program Learning: The Challenge and Opportunity of a Complex Representation”, *Workshop on Optimization by Building and Using Probabilistic Models (OBUPM)*, July 9th, 2006.
7. “Contemporary Approaches to Symbol Grounding”, *Artificial General Intelligence Research Institute Workshop (AGIRI)*, May 21st, 2006.
8. “Frontiers of Evolutionary Computation”, *Artificial General Intelligence Research Institute Workshop (AGIRI)*, May 21st, 2006.

## Activities

### Open-source contributor

Probabilistic Learning of Programs, 2008 - present.

Treetree library, 2008.

MOSES, 2007 - 2008.

### Conference chair

*Conference on Artificial General Intelligence (AGI)*, 2011.

### Editorial board member

*Journal of Artificial General Intelligence (JAGI)*, 2008 - present.

### Reviewer

*Journal of Machine Learning Research (JMLR)*, 2011.

*IEEE Transactions on Evolutionary Computation (IEEE-TEC)*, 2008 and 2011.

### Program committee member

*International Joint Conference on AI (IJCAI)*, 2011.

*Conference on Artificial General Intelligence (AGI)*, 2008 - 2010.

*Genetic and Evolutionary Computation Conference (GECCO)*, 2007 - 2011.

*Bio-Inspired Computing: Theories and Applications (BIC-TA)*, 2007.

### Group organizer

“Probabilistic Program Induction”, reading group, 2011 - present, Google Inc. and Stanford University.

“Artificial General Intelligence”, reading group, 2008 - 2009, Google Inc.

“AI and Cognition”, graduate seminar, Fall 2006, Washington University in St. Louis.

“Clustering and Reconfigurable Hardware”, graduate seminar, Summer 2006, Washington University in St. Louis.

## Personal

Date of Birth: 10/15/1982

Citizenship: USA

Married

Native English speaker, fluent Hebrew