

Charles Lee Isbell, Jr.

John P. Imlay, Jr. Dean
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Earned Degrees

Ph.D.	1998	Massachusetts Institute of Technology	<i>Electrical Engineering and Computer Science</i>
S.M.	1993	Massachusetts Institute of Technology	<i>Electrical Engineering and Computer Science</i>
B.S.	1990	Georgia Institute of Technology	<i>Information and Computer Science</i>

Employment History

John P. Imlay, Jr. Dean	College of Computing Georgia Institute of Technology	2019-present
NCAA Faculty Athletic Representative	Georgia Institute of Technology	2017-2020
Executive Associate Dean	College of Computing Georgia Institute of Technology	2017-2019
Senior Associate Dean	College of Computing Georgia Institute of Technology	2012-2017
Professor	School of Interactive Computing College of Computing Georgia Institute of Technology	2012-present
Associate Dean	College of Computing Georgia Institute of Technology	2008-2012
Associate Professor	School of Interactive Computing College of Computing Georgia Institute of Technology	2008-2012
Assistant Professor	School of Interactive Computing College of Computing Georgia Institute of Technology	2002-2008
Visiting Scholar	Computer and Information Science University of Pennsylvania	2002
Research Scientist	AT&T Labs-Research	1998-2002

Current Fields of Interest

Academic Scholarship. My research passion is artificial intelligence with an emphasis on statistical machine learning. I think of my particular field of study as *interactive artificial intelligence* and focus on problems involving *statistical modeling of agent interactions*; that is, I care about the application of machine learning techniques to building autonomous agents and environments that must live with large numbers of other intelligent agents, some of whom may be human.

Academic Administration. I also have a strong passion for educational reform to improve access, as organizational and curricular matters, and believe that both are necessary to improve the research and academic enterprises. I split my time among my research and administrative selves because I think such administrative efforts deserve as much intellectual energy and thought as any of our other academic efforts and often can have a profound impact on those efforts.

I. Research, Scholarship, and Creative Scholarship

Ph.D. Thesis

Title: *Sparse Multi-Level Representations for Text Retrieval*

Date Completed: *May 1998*

Advisors: *Paul Viola and Rodney Brooks*

University: *Massachusetts Institute of Technology*

S.M. Thesis

Title: *Explorations of the Practical Issues of Using Temporal Difference Learning Methods for Prediction-Control Tasks*

Date Completed: *December 1992*

Advisor: *Tomaso Poggio*

University: *Massachusetts Institute of Technology*

A. Published Books, Book Chapters and Edited Volumes

A.1. Books

- [1] David A. Joyner and Charles L. Isbell. *The Distributed Classroom*. MIT Press, Cambridge, 2021.

B. Refereed Publications and Submitted Articles

B.1. Published and Accepted Journal Articles

- [1] Sam Krening, Brent Harrison, Karen Feigh, Charles L. Isbell, Mark Riedl, and Andrea Thomaz. Learning from Explanations Using Sentiment and Advice in RL. *IEEE Transactions on Cognitive and Developmental Systems*, 9(1):44–55, 2016.
- [2] Luis Carlos Cobo Rus, Kaushik Subramanian, Charles L. Isbell, Aaron Lanterman, and Andrea Thomaz. Abstraction from Demonstration for Efficient Reinforcement Learning in High-Dimensional Domains. *Artificial Intelligence*, 216(0):103–128, 2014.
- [3] David Roberts and Charles L. Isbell. Lessons on Using Computationally Generated Influence for Shaping Narrative Experiences. *Transactions on Computational Intelligence and AI in Games*, 6(2):1–15, 2014.
- [4] Michael Holmes, Alexander Gray, and Charles L. Isbell. Fast Kernel Conditional Density Estimation: A Dual Tree Monte Carlo Approach. *Computational Statistics and Data Analysis*, 54(7):1707–1718, 2010.
- [5] Charles L. Isbell, Lynn Stein, Robb Cutler, Jeffrey Forbes, Linda Fraser, John Impagliazzo, Viera Prolux, Steve Russ, Richard Thomas, and Yan Xu. (Re)Defining Computing Curricula by (Re)Defining Computing. *ACM SIGCSE Bulletin*, 41(4):195–207, 2009.
- [6] Olufisayo Omojokun, Charles L. Isbell, and Prasun Dewan. Towards Automatic Personalization of Device Controls. *IEEE Transactions on Consumer Electronics*, 55(1):269–276, 2009.
- [7] Raffay Hamid, Siddhartha Maddi, Amos Johnson, Aaron Bobick, Irfan Essa, and Charles L. Isbell. A Novel Sequence Representation for Unsupervised Analysis of Human Activities. *Artificial Intelligence*, 173(14), 2009.
- [8] David L. Roberts and Charles L. Isbell. A Survey and Qualitative Analysis of Recent Advances in Drama Management. *International Transactions on Systems Science and Applications*, 4(2):61–75, 2008.

- [9] David L. Roberts, Charles L. Isbell, and Michael L. Littman. Optimization Problems Involving Collections of Dependent Objects. *Annals of Operations Research*, 163(1):255–270, 2008.
- [10] Charles L. Isbell, Michael Kearns, Satinder Singh, Christian R. Shelton, Peter Stone, and Dave Kormann. Cobot in LambdaMOO: An Adaptive Social Statistics Agent. *Journal of Autonomous Agents and Multi-Agent Systems*, 13(3):327–354, 2006.
- [11] Mark J. Nelson, Michael Mateas, David L. Roberts, and Charles L. Isbell. Declarative Optimization-Based Drama Management in Interactive Fiction. *IEEE Computer Graphics & Applications*, 26(3):32–41, 2006.
- [12] Tucker Balch, Frank Dellaert, Adam Feldman, Andrew Guillory, Charles L. Isbell, Zia Kahn, Andrew Stein, and Hank Wilde. How AI and Multi-Robot Systems Research Will Accelerate Our Understanding of Social Animal Behavior. *Proceedings of the IEEE*, 94(7):1445–1463, 2006.
- [13] Olufisayo Omojokun, Jeffrey Pierce, Charles L. Isbell, and Prasun Dewan. Comparing End-User and Intelligent Remote Control Interface Generation. *Personal and Ubiquitous Computing*, 10(2-3):136–143, 2006.
- [14] Charles L. Isbell, Olufisayo Omojokun, and Jeffrey Pierce. From Devices to Tasks: Automatic Task Prediction for Personalized Appliance Control. *Personal and Ubiquitous Computing*, 8(3):146–153, 2004.
- [15] Brian Landry, Jeffrey Pierce, and Charles L. Isbell. Supporting Routine Decision-Making with a Next-Generation Alarm Clock. *Personal and Ubiquitous Computing*, 8(3):154–160, 2004.

B.2. Conference Presentations with Proceedings

Refereed and Archival

- [1] Shray Bansal, Rhys Newbury, Wesley Chan, Akansel Cosgun, Aimee Allen, Dana Kulić, Tom Drummond, and Charles L. Isbell. Supportive Actions for Manipulation in Human-Robot Coworker Teams. In *Proceedings of the the 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020.
- [2] Ashley Edwards, Himanshu Sahni, Rosanne Liu, Jane Hung, Ankit Jain, Rui Wang, Adrien Ecoffet, Thomas Miconi, Charles L. Isbell, and Jason Yosinski. Estimating $Q(s,s')$ with Deep Deterministic Dynamics Gradients. In *Proceedings of the 37th International Conference on Machine Learning (ICML)*, 2020.
- [3] Shray Bansal, Jin Xu, Ayanna Howard, and Charles L. Isbell. A Bayesian Framework for Nash Equilibrium Inference in Human-Robot Parallel Play. In *Proceedings of the 2020 Conference on Robotics: Science and Systems (RSS)*, 2020.
- [4] David Joyner and Charles L. Isbell. Master’s at Scale: Five Years in a Scalable Online Graduate Degree. In *The Sixth ACM Conference on Learning @ Scale*, 2019.
- [5] David Joyner, Charles L. Isbell, Thad Starner, and Ashok Goel. Five Years of Graduate CS Education Online and at Scale. In *Proceedings of the 2019 ACM Global Computing Education Conference (CompEd)*, 2019.
- [6] Christopher Simpkins and Charles L. Isbell. Composable Modular Reinforcement Learning. In *Proceedings of the Thirty-Third National Conference on Artificial Intelligence (AAAI)*, 2019.
- [7] Rahul Sawhney, Fuxin Li, Henrik Christensen, and Charles L. Isbell. Purely Geometric Scene Association and Retrieval: A case for macro-scale 3D geometry. In *Proceedings of the the 2018 IEEE International Conference on Robotics and Automation (ICRA)*, 2018.

- [8] Yannick Schroecker and Charles L. Isbell. State Aware Imitation Learning. In *Advances in Neural Information Processing Systems (NIPS) 31*, 2017.
- [9] Jonathan Scholz, Jindal Nehchal, Martin Levihn, and Charles L. Isbell. Navigation Among Movable Obstacles with Learned Dynamic Constraints. In *Proceedings of the the 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2016.
- [10] Kaushik Subramanian, Charles L. Isbell, and Andrea Thomaz. Exploration from Demonstration for Interactive Reinforcement Learning. In *Proceedings of the 15th International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2016.
- [11] Samantha Krening, Brent Harrison, Karen Feigh, Charles L. Isbell, and Andrea Thomaz. Object-Focused Advice in Reinforcement Learning. In *Proceedings of the 15th International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2016.
- [12] Himanshu Sahni, Brent Harrison, Kaushik Subramanian, Thomas Cederborg, Charles L. Isbell, and Andrea Thomaz. Policy Shaping in Domains with Multiple Optimal Policies. In *Proceedings of the 15th International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2016.
- [13] Thomas Cederborg, Ishaan Grover, Charles L. Isbell, and Andrea L Thomaz. Policy Shaping With Human Teachers. In *Proceedings of the Twenty-Fourth International Joint Conference on Artificial Intelligence (IJCAI)*, 2015.
- [14] Jesse Rosalia, Guliz Tokadli, Charles L. Isbell, Andrea Thomaz, and Karen Feigh. Discovery, Evaluation, and Exploration of Human Supplied Options and Constraints. In *Proceedings of the 14th International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2015.
- [15] Jonathan Scholz, Martin Levihn, Charles L. Isbell, Henrik Christensen, and Mike Stilman. Learning Non-Holonomic Object Models for Mobile Manipulation. In *Proceedings of the the 2015 IEEE International Conference on Robotics and Automation (ICRA)*, 2015.
- [16] Jonathan Scholz, Martin Levihn, Charles L. Isbell, and David Wingate. A Physics-Based Model Prior for Object-Oriented MDPs. In *Proceedings of the 31st International Conference on Machine Learning (ICML)*, 2014.
- [17] Joshua Jones and Charles L. Isbell. Story Similarity Measures for Drama Management with TTD-MDPs. In *Proceedings of the 13th International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2014.
- [18] Shane Griffith, Kaushik Subramanian, Jonathan Scholz, Charles L. Isbell, and Andrea Thomaz. Policy Shaping: Integrating Human Feedback with Reinforcement Learning. In *Advances in Neural Information Processing Systems (NIPS) 26*, 2013.
- [19] Liam Mac Dermed and Charles L. Isbell. Point Based Value Iteration with Optimal Belief Compression for Dec-POMDPs. In *Advances in Neural Information Processing Systems (NIPS) 26*, 2013.
- [20] Ryan Curtin, William March, Parikshit Ram, David Anderson, Alexander Gray, and Charles L. Isbell. Tree-Independent Dual-Tree Algorithms. In *Proceedings of the Thirtieth International Conference on Machine Learning (ICML)*, 2013.
- [21] Luis Carlos Cobo Rus, Charles L. Isbell, and Andrea Thomaz. Object Focused Q-learning for Autonomous Agents. In *Proceedings of the Twelfth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2013.

- [22] Joshua Letchford, Liam Mac Dermed, Vincent Conitzer, Ronald Parr, and Charles L. Isbell. Computing Optimal Strategies to Commit to in Stochastic Games. In *Proceedings of the Twenty-Sixth National Conference on Artificial Intelligence (AAAI)*, 2012.
- [23] Luis Carlos Cobo Rus, Charles L. Isbell, and Andrea Thomaz. Automatic Decomposition and State Abstraction from Demonstration. In *Proceedings of the Eleventh International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2012.
- [24] Karthik Narayan, Charles L. Isbell, and David Roberts. DEXTOR: Reduced Effort Authoring for Template-Based Natural Language Generation. In *Proceedings of the Seventh Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*, 2011.
- [25] Liam Mac Dermed, Karthik Narayan, Charles L. Isbell, and Lora Weiss. Quick Polytope Approximation of All Correlated Equilibria in Stochastic Games. In *Proceedings of the Twenty-Sixth National Conference on Artificial Intelligence (AAAI)*, 2011.
- [26] Luis Carlos Cobo Rus, Peng Zang, Charles L. Isbell, and Andrea Thomaz. Automatic State Abstraction from Demonstration. In *Proceedings of the Twenty-Second International Joint Conference on Artificial Intelligence (IJCAI)*, 2011.
- [27] Christopher Simpkins, Charles L. Isbell, and Nicholas Marquez. Deriving behavior from personality: A reinforcement learning approach. In *Proceedings of the Tenth International Conference on Cognitive Modeling (ICCM)*, 2010.
- [28] Peng Zang, Runhe Tian, Charles L. Isbell, and Andrea Thomaz. Batch versus interactive learning by demonstration. In *Proceedings of the Ninth International Conference on Development and Learning (ICDL)*, 2010.
- [29] Peng Zang, Arya Irani, Peng Zhou, Charles L. Isbell, and Andrea Thomaz. Using Training Regimens to Teach Expanding Function Approximators. In *Proceedings of the Ninth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2010.
- [30] Liam Mac Dermed and Charles L. Isbell. Solving Stochastic Games. In *Advances in Neural Information Processing Systems (NIPS) 22*, 2009.
- [31] David L. Roberts, Charles L. Isbell, and Mark Riedl. Beyond Adversarial: The Case of Game AI as Storytelling. In *Digital Games Research Association (DiGRA) 2009*, 2009.
- [32] Peng Zang, Peng Zhou, David Minnen, and Charles L. Isbell. Discovering Options from Example Trajectories. In *Proceedings of the Twenty-sixth International Conference on Machine Learning (ICML)*, 2009.
- [33] David L. Roberts, Merrick L. Furst, Charles L. Isbell, and Brian Dorn. Using Influence and Persuasion to Shape Player Experiences. In *2009 Sandbox: ACM SIGGRAPH Video Game Proceedings (SIGGRAPH Sandbox)*, 2009.
- [34] Michael Holmes, Alex Gray, and Charles L. Isbell. QUIC-SVD: Fast SVD Using Cosine Trees. In *Advances in Neural Information Processing Systems (NIPS) 21*, 2009.
- [35] David L. Roberts, Charles L. Isbell, Mark Riedl, Ian Bogost, and Merrick Furst. On the Use of Computational Models of Influence for Interactive Virtual Experience Management. In *Proceedings of the First International Conference on Interactive Digital Storytelling (ICIDS)*, 2008.
- [36] Olufisayo Omojokun, Mike Genovese, and Charles L. Isbell. Impact of User Context on Song Selection. In *Proceedings of the Sixteenth ACM SIGMM International Conference on Multimedia (ACMMM)*, 2008.

- [37] Christopher Simpkins, Sooraj Bhat, Charles L. Isbell, and Michael Mateas. Adaptive Programming: Integrating Reinforcement Learning into a Programming Language. In *Proceedings of the Twenty-Third ACM SIGPLAN International Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)*, 2008.
- [38] Rudolph Mappus, David Minnen, and Charles L. Isbell. Dimensionality Reduction for Improved Source Separation in fMRI Data. In *Proceedings of the International Conference on Bio-inspired Systems and Signal Processing (BIOSIGNALS)*, 2008.
- [39] Michael Holmes, Alex Gray, and Charles L. Isbell. Ultrafast Monte Carlo for Kernel Estimators and Generalized Statistical Summations. In *Advances in Neural Information Processing Systems (NIPS) 20*, 2008.
- [40] David Minnen, Thad Starner, Charles L. Isbell, and Irfan Essa. Detecting Subdimensional Motifs: An Efficient Algorithm for Generalized Multivariate Pattern Discovery. In *Proceedings of the Seventh IEEE International Conference on Data Mining (ICDM)*, 2007.
- [41] Michael Holmes, Alex Gray, and Charles L. Isbell. Fast Nonparametric Conditional Density Estimation. In *Proceedings of the Twenty-Third Conference on Uncertainty in Artificial Intelligence (UAI)*, 2007.
- [42] David Minnen, Charles L. Isbell, Irfan Essa, and Thad Starner. Discovering Multivariate Motifs using Subsequence Density Estimation. In *Proceedings of the Twenty-Second National Conference on Artificial Intelligence (AAAI)*, 2007.
- [43] David L. Roberts, Sooraj Bhat, Kenneth St. Clair, and Charles L. Isbell. Authorial Idioms for Target Distributions in TTD-MDPs. In *Proceedings of the Twenty-Second National Conference on Artificial Intelligence (AAAI)*, 2007.
- [44] David L. Roberts, Andrew Cantino, and Charles L. Isbell. Player Autonomy versus Designer Intent: A Case Study of Interactive Tour Guides. In *Proceedings of the Third Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*, 2007.
- [45] Sooraj Bhat, David L. Roberts, Mark Nelson, Charles L. Isbell, and Michael Mateas. A Globally Optimal Online Algorithm for TTD-MDPs. In *Proceedings of the Sixth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2007.
- [46] David L. Roberts, Andrew Cantino, and Charles L. Isbell. Improving Quality of Experience Using TTD-MDP-Based Tour Guides. In *Proceedings of the Sixth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2007.
- [47] Merrick Furst, Charles L. Isbell, and Mark Guzdial. Threads: How to Restructure a Computer Science Curriculum for a Flat World. In *Proceedings of the Thirty-Eighth ACM Technical Symposium on Computer Science Education (SIGCSE)*, 2007.
- [48] Peng Zang and Charles L. Isbell. Managing Domain Knowledge and Multiple Models with Boosting. In *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI)*, 2007.
- [49] David Minnen, Thad Starner, Irfan Essa, and Charles L. Isbell. Improving Activity Discovery with Automatic Neighborhood Estimation. In *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI)*, 2007.
- [50] Manu Sharma, Michael Holmes, Juan Santamaria, Arya Irani, Charles L. Isbell, and Ashwin Ram. Transfer Learning in Real-Time Strategy Games Using Hybrid CBR/RL. In *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI)*, 2007.

- [51] David Minnen, Thad Starner, Irfan Essa, and Charles L. Isbell. Discovering Characteristic Actions from On-Body Sensor Data. In *Proceedings of the Tenth IEEE International Symposium on Wearable Computers (ISWC)*, 2006.
- [52] Sooraj Bhat, Charles L. Isbell, and Michael Mateas. On the Difficulty of Modular Reinforcement Learning for Real-World Partial Programming. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence (AAAI)*, 2006.
- [53] David L. Roberts, Mark Nelson, Charles L. Isbell, Michael Mateas, and Michael L. Littman. Targeting Specific Distributions of Trajectories in MDPs. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence (AAAI)*, 2006.
- [54] Michael Holmes and Charles L. Isbell. Looping Suffix Tree-Based Inference of Partially Observable Hidden State. In *Proceedings of the Twenty-Third International Conference on Machine Learning (ICML)*, 2006.
- [55] Mark Nelson, David L. Roberts, Charles L. Isbell, and Michael Mateas. Reinforcement Learning in Declarative Optimization-Based Drama Management. In *Proceedings of the Fifth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2006.
- [56] Andrew Guillory, Tucker Balch, and Charles L. Isbell. Learning Executable Models of Behavior from Observations and Low Level Knowledge. In *Proceedings of the Fifth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2006.
- [57] David L. Roberts, Sooraj Bhat, Charles L. Isbell, Brian Cooper, and Jeffrey Pierce. A Decision-Theoretic Approach to File Consistency in Constrained Peer-to-Peer Device Networks. In *Proceedings of the Fifth International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2006.
- [58] Raffay Hamid, S. Maddi, Amos Johnson, S. Batta, Aaron Bobick, Irfan Essa, and Charles L. Isbell. Unsupervised Activity Discovery and Characterization from Event-Streams. In *Proceedings of the Twenty-First Conference on Uncertainty in Artificial Intelligence (UAI)*, 2005.
- [59] Raffay Hamid, Amos Johnson, S. Batta, Aaron Bobick, Charles L. Isbell, and G. Coleman. Detection and Explanation of Anomalous Activities: Representing Activities as Bags of Event n-Grams. In *Proceedings of the Twenty-Third IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 1031–1038, 2005.
- [60] Michael Holmes and Charles L. Isbell. Schema Learning: Experience-based Construction of Predictive Action Models. In *Advances in Neural Information Processing Systems (NIPS) 17*, pages 585–562, 2005.
- [61] Charles L. Isbell and Jeff Pierce. An IP Continuum for Adaptive Interface Design. In *Proceedings of the 11th International Conference on Human-Computer Interaction (HCI)*, 2005.
- [62] Lawrence Saul, Daniel Lee, Charles L. Isbell, and Yaun LeCun. Real time voice processing with audiovisual feedback: toward autonomous agents with perfect pitch. In *Advances in Neural Information Processing Systems (NIPS) 15*, pages 1205–1212, 2003.
- [63] Michael Kearns, Charles L. Isbell, Satinder Singh, Diane Litman, and Jessica Howe. CobotDS: A Spoken Dialogue System for Chat. In *Proceedings of the Nineteenth National Conference on Artificial Intelligence (AAAI)*, pages 435–440, 2002.
- [64] Charles Isbell, Christian Shelton, Michael Kearns, Satinder Singh, and Peter Stone. Cobot: A Social Reinforcement Learning Agent. In *Advances in Neural Information Processing Systems (NIPS) 14*, pages 1393–1400, 2002.

- [65] Charles L. Isbell, Christian Shelton, Michael Kearns, Satinder Singh, and Peter Stone. A Social Reinforcement Learning Agent. In *Proceedings of the Fifth International Conference on Autonomous Agents*, pages 377–384, 2001.
- [66] Charles L. Isbell, Michael Kearns, Dave Kormann, Satinder Singh, and Peter Stone. Cobot in LambdaMOO: A Social Statistics Agent. In *Proceedings of the Seventeenth National Conference on Artificial Intelligence (AAAI)*, pages 36–41, 2000.
- [67] Charles L. Isbell and Parry Husbands. The Parallel Problems Server: An Interactive Tool for Large-Scale Machine Learning. In *Advances in Neural Information Processing Systems (NIPS) 12*, pages 703–709, 2000.
- [68] Parry Husbands and Charles L. Isbell. MITMatlab: A Tool for Interactive Supercomputing. In *Proceedings of the Ninth SIAM Conference on Parallel Processing for Scientific Computing.*, 1999.
- [69] Charles L. Isbell and Paul Viola. Restructuring Sparse High Dimensional Data for Effective Information Retrieval. In *Advances in Neural Information Processing Systems (NIPS) 11*, pages 480–486, 1999.
- [70] Parry Husbands and Charles L. Isbell. Interactive Supercomputing with MITMatlab. In *The Second IMA Conference on Parallel Computation*, 1998.
- [71] Deborah McGuinness, Charles L. Isbell, M. Parker, Peter Patel-Schneider, Lori Resnick, and Chris Welty. A Description Logic-Based Configurator for the Web. In *Proceedings of the Fifteenth National Conference on Artificial Intelligence (AAAI)*, 1998.
- [72] Parry Husbands and Charles L. Isbell. The Parallel Problems Server: A Client-Server Model for Large Scale Scientific Computation. In *Proceedings of the Third International Conference on Vector and Parallel Processing (VECPAR)*, pages 156–169, 1998.
- [73] Jeremy De Bonet, Charles L. Isbell, and Paul Viola. MIMIC: Finding Optima by Estimating Probability Densities. In *Advances in Neural Information Processing Systems (NIPS) 9*, pages 424–430, 1997.
- [74] Deborah McGuinness, Lori Resnick, and Charles L. Isbell. Description Logic in Practice: A CLASSIC Application. In *Proceedings of the Fourteenth International Joint Conference on Artificial Intelligence (IJCAI)*, 1995.

Refereed

- [1] Ashley Edwards and Charles Isbell. Perceptual Values from Observation. In *Workshop on Self-Supervised Learning at ICML*, 2019.
- [2] Shray Bansal, Mustafa Mukadam, and Charles Isbell. Interaction-Aware Planning via Nash Equilibria for Manipulation in a Shared Workspace. In *Workshop on Human Movement Science for Physical Human-Robot Collaboration at ICRA*, 2019.
- [3] Yannick Schroecker and Charles Isbell. SAIL: A Temporal Difference Approach to State Aware Imitation Learning. In *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, 2017.
- [4] Ashley Edwards, Srijan Sood, and Charles Isbell. Cross-Domain Perceptual Rewards for Reinforcement Learning. In *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, 2017.

- [5] Saurabh Kumar, Himanshu Sahni, Farhan Tejani, Yannick Schroecker, and Charles Isbell. State Space Decomposition and Subgoal Creation for Transfer in Deep Reinforcement Learning. In *The 3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, 2017.
- [6] Hamid Reza Hassanzadeh, Pushkar Kolhe, Charles Isbell, and May D. Wang. MotifMark: Finding Regulatory Motifs in DNA Sequences. In *39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) 31*, 2017.
- [7] Pushkar Kolhe, Michael Littman, and Charles Isbell. Peer Reviewing Short Answers using Comparative Judgement. In *The Third ACM Conference on Learning @ Scale*, 2016.
- [8] Ashley Edwards, Charles Isbell, and Michael Littman. Expressing Tasks Robustly via Multiple Discount Factors. In *The 2nd Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, 2015.
- [9] Jonathan Scholz, Martin Levihn, and Charles Isbell. What Does Physics Bias: A Comparison of Model Priors for Robot Manipulation. In *The 1st Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, 2013.
- [10] Shane Griffith, Kaushik Subramanian, Jonathan Scholz, Charles Isbell, and Andrea Thomaz. Policy Shaping: Integrating Human Feedback with Reinforcement Learning. In *The 1st Multidisciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, 2013.
- [11] Kaushik Subramanian, Charles Isbell, and Andrea Thomaz. Learning Options through Human Interaction. In *Workshop on Agents Learning Interactively from Human Teachers at IJCAI*, 2011.
- [12] David L. Roberts, Harikrishna Narayanan, and Charles Isbell. Learning to influence emotional responses for interactive storytelling. In *Proceedings of the AAAI 2009 Spring Symposium on Intelligent Narrative Technologies II*, 2009.
- [13] Peng Zang, Charles Isbell, and Andrea Thomaz. Exploiting Training Regimens to Improve Learning. In *Multidisciplinary Symposium on Reinforcement Learning at ICML*, 2009.
- [14] David Minnen, Peng Zang, Charles Isbell, and Thad Starner. Boosting Diverse Learners for Domain Agnostic Time Series Classification. In *Workshop and Challenge on Time Series Classification at SIGKDD*, 2007.
- [15] David Roberts, Christina Strong, and Charles Isbell. Using Feature Value Distributions to Estimate Player Satisfaction Through an Author’s Eyes. In *AAAI 2007 Fall Symposium on Intelligent Narrative Technologies*, 2007.
- [16] David Roberts and Charles Isbell. Desiderata for Managers of Interactive Experiences: A Survey of Recent Advances in Drama Management. In *The Agent Based Systems for Human Learning and Entertainment Workshop (ABSHLE) at AAMAS*, 2007.
- [17] Peng Zang and Charles Isbell. Similarity in Reinforcement Learning. In *Workshop on Knowledge Discovery and Similarity in Case-Based Reasoning at ICCBR*, 2007.
- [18] David Roberts, Christina Strong, and Charles Isbell. Estimating Player Satisfaction Through the Author’s Eyes. In *Workshop on Optimizing Player Satisfaction at AIIDE*, 2007.
- [19] Olufisayo Omojokun and Charles Isbell. User Modelling for Personalized Universal Appliance Application Interaction. In *Proceedings of the Richard Tapia Celebration of Diversity in Computing Conference*, pages 65–68, 2003.
- [20] Olufisayo Omojokun and Charles Isbell. Supporting Personalized Agents in Universal Appliance Interaction. In *Proceedings of the Forty-First Annual ACM Southeast Conference*, 2003.

- [21] Olufisayo Omojokun, Charles Isbell, and Prasun Dewan. An architecture for Supporting Personalized Agents in Appliance Interaction. In *AAAI Fall Symposium on Personalized Agents*, 2002.
- [22] Charles Isbell, Gavin Bell, Brian Amento, Steve Whittaker, and Jonathan Helfman. IshMail: Designing Advanced Email Systems. In *Proceedings of the CSCW Workshop on Redesigning Email for the 21st century*, 2002.
- [23] Charles Isbell, Michael Kearns, Dave Kormann, Satinder Singh, and Peter Stone. Cobot in LambdaMOO: A Social Statistics Agent. In *Proceedings of the Workshop on Interactive Robotics and Entertainment (WIRE)*, 2000.
- [24] Parry Husbands and Charles Isbell. The Parallel Problems Server. In *Proceedings of the 1998 MIT Workshop on High Performance Computing in Science and Engineering*, 1998.
- [25] Alex Borgida, Charles Isbell, and Deborah McGuinness. Reasoning with Black Boxes: Handling Test Concepts in CLASSIC. In *Proceedings of the Workshop on Description Logics*, 1996.

Abstract Refereed

- [1] David Roberts, Mark Riedl, and Charles Isbell. Opportunities for Machine Learning to Impact Interactive Narrative. In *Workshop on Machine Learning and Games at NIPS*, 2007.
- [2] Michael Holmes, Alexander Gray, and Charles Isbell. Fast SVD for Large-Scale Matrices. In *Workshop on Efficient Machine Learning at NIPS*, 2007.
- [3] David Minnen, Thad Starner, Irfan Essa, and Charles Isbell. Pattern Discovery for Locating Motifs in Multivariate, Real-valued Time-series Data. In *The Learning Workshop (SNOWBIRD)*, 2007.
- [4] Michael Holmes, Alex Gray, and Charles Isbell. Fast Nonparametric Conditional Density Estimation. In *The Learning Workshop (SNOWBIRD)*, 2007.
- [5] Kevin Quennesson, Elias Ioup, and Charles Isbell. Wavelet statistics for human motion classification. In *National Conference on Artificial Intelligence (AAAI) Special Track*, 2006.
- [6] David Minnen, Thad Starner, Irfan Essa, and Charles Isbell. Activity Discovery: Sparse Motifs from Multivariate Time Series. In *The Learning Workshop (SNOWBIRD)*, 2006.
- [7] Michael Holmes and Charles Isbell. Looping Suffix Trees for Inference of Partially Observable Hidden State. In *The Learning Workshop (SNOWBIRD)*, 2006.
- [8] Raffay Hamid, S. Maddi, Amos Johnson, S. Batta, Aaron Bobick, Irfan Essa, and Charles Isbell. Unsupervised Activity Discovery and Characterization from Event-Streams. In *The Learning Workshop (SNOWBIRD)*, 2005.
- [9] Michael Kearns, Charles Isbell, Satinder Singh, Diane Litman, and Jessica Howe. CobotDS: A Spoken Dialogue System for Chat. In *The Learning Workshop (SNOWBIRD)*, 2001.

B.3. Other Refereed Material

Refereed Demos

- [1] Charles Isbell, Gavin Bell, Brian Amento, Steve Whittaker, and Jonathan Helfman. IshMail. In *Proceedings of the the Fifteenth Annual ACM Symposium on User Interface Software and Technology (Demo)*, 2002.

Magazines and Other Media

- [1] Ayanna Howard and Charles Isbell. Diversity in AI: The Invisible Men and Women. *MIT Sloan Management Review*, September 21, 2020.
- [2] Douglas H. Fisher, Charles L. Isbell, Michael L. Littman, Michael Wollowski, Todd Neller, and James Boerkoel. Ask Me Anything About MOOCs. *AI Magazine*, 38(2):7–12, 2017.
- [3] Eric Eaton, Tom Dietterich, Maria Gini, Barbara J. Grosz, Charles L. Isbell, Subbarao Kambhampati, Michael Littman, Francesca Rossi, Stuart Russell, Peter Stone, Tony Walsh, and Michael Wooldridge. Who Speaks for AI? *AI Matters*, 2(2):4–14, Dec 2015.
- [4] Michael Littman, Charles Isbell, and Aaron Gross. Overfitting: Machine Learning Video. In *AAAI Video Competition*, 2014.
- [5] Yukio Ohsawa, Peter McBurney, Simon Parsons, Christopher A. Miller, Alan Schultz, Jean Scholtz, Michael A. Goodrich, Eugene Santos Jr, Benjamin Bell, Charles L. Isbell, and Michael L. Littman. AAI-2002 Fall Symposium Series. *AI Magazine*, 24(1):95–98, 2003.

B.4. Software

- B.4.1 *Association Environment*, co-developed and designed with Brian Amento. A system for capturing, indexing, and retrieving a user’s document and data use.
- B.4.2 *Parallel Problems Server* and associated toolkits, co-developed and designed with Parry Husbands. A server-based computation engine for doing high-performance linear algebra with any PPS-compliant client, such as Matlab*P.
- B.4.3 *Ishmail*, java version 1.0, co-developed and designed with Gavin Bell; emacs version 2.0, co-developed and designed with Jonathan Helfman. A full-featured email client and server system for power email users. Has been used by independent researchers as an machine learning test platform.
- B.4.4 *CoAgent*, a C++ and java system for developing behavior-based virtual agents. Both the cobot and Ishmail systems use this design.

B.5. Patents

- [1] Jonathan Helfman and Charles Isbell. Electronic Message Sorting and Notification System. 6,396,513, 2002.

C. Presentations

C.1. Invited Talks

- C.1.1 Distinguished Speaker, 2021. *The Association of Computer Science Departments at Minority Institutions Symposium on Computing at Minority Institutions*, “Humans and AI, The Problems and the Promise”
- C.1.2 Invited Panelist, 2021. *2021 NSF CISE Education and Workforce PI and Community vMeeting*, “Pathways to Computing and AI Careers”
- C.1.3 Invited Colloquium, 2021. *J.P. Morgan*, “Humans and AI, The Problems and the Promise”
- C.1.4 Invited Colloquium, 2020. *Facebook*, “Humans and AI, The Problems and the Promise”

- C.1.5 Invited Keynote Plenary, 2020. *NeurIPS 2020*, “You Can’t Escape Hyperparameters and Latent Variables: Machine Learning as a Software Engineering Enterprise”
- C.1.6 Invited Colloquium, 2020. *University of Minnesota, Dr. John Carlis Memorial Lecture*, “A Whole Lot of Want to: A Conversation about Invisibility and Equity in Computing and Getting from Here to There”
- C.1.7 Convocation Address, 2020, *Toyota Technical Institute Chicago Diploma and Award Ceremony*
- C.1.8 Invited Panelist, 2020. *Seattle University School of Law 3rd Annual Innovation and Technology Law Conference: Data Justice: Legal and Policy Issues in Data Collection, Usage, and Ownership*, “It Turns Out It’s People Doing the Programming”
- C.1.9 Invited Talk, 2020. *REMOTE*, “We All Have to be At-Scale Learning Institutions Now”
- C.1.10 Invited Interview, 2019. *EmTech Next*, “Equity in Computing”
- C.1.11 Invited Interview, 2019. *TAG Data Science & Analytics Society*, “Machine Learning and AI”
- C.1.12 Invited Talk and Panel, 2019. *Hello World, Hello MIT*, “Experiences with CS+X Majors and Curricula”
- C.1.13 Invited Interview, 2018. *The 2nd Annual William G. Bowen Colloquium*, “An Interview with Charles Isbell”
- C.1.14 Invited Panelist, 2018. *National Science Board Panel on Being Smart About AI*, “Living together: What will it take for Humans and AI to be Productive Partners?”
- C.1.15 Invited Keynote, 2018. *UBTech 2018*, “Higher Education and Artificial Intelligence: A Case Study”
- C.1.16 Invited Speaker, 2018. *AAAI 2018*, “Interactive Machine Learning: How to Best Learn from Humans”
- C.1.17 Keynote Speaker, 2017. *New Faculty Workshop, UCSD*, “Teaching Matters Even More than You Think”
- C.1.18 Invited Speaker, 2017. *UPCEA Summit for Online Leadership*, “Building a Scalable, Accessible, and Community Oriented Online Degree”
- C.1.19 Invited Speaker, 2017. *Deluxe Corp*
- C.1.20 Invited Panelist, 2017. *American Academy of Arts and Sciences Commission on the Future of Undergraduate Education*
- C.1.21 Invited Panelist, 2016. *Online Education 2.0: The Future of Learning in the 21st Century Economy*
- C.1.22 Invited Speaker and Panelist, 2016. *ITHAKA: The Next Wave 2016; The Bigger Picture: How Macro Changes in Higher Education Should Shape Your Strategy*, “Trends that Matter”
- C.1.23 Invited Speaker, 2016. *AI-HRI, 2016 AAAI Fall Symposium*, “Learning from Humans by Meeting Them Where They Are”
- C.1.24 Invited Panelist, 2016. *New America*, “Most Innovative People in Higher Ed”
- C.1.25 Invited Panelist, 2015. *Rockefeller Institute of Government*, “Higher Education and Employability: New Models for Integrating Study and Work”

- C.1.26 Invited Speaker, 2015. *Second Multidisciplinary Conference on Reinforcement Learning and Decision Making*, “Reinforcement Learning as Software Engineering.”
- C.1.27 Invited Speaker, 2015. *Workshop on Mathematical sciences for understanding real world problems in Africa*, “Joint Opportunities Using a MOOC-Based Masters of Science.”
- C.1.28 Keynote Speaker, 2015. *Strategic Integration of MOOCs in Research Universities Workshop, University of Illinois*. “Some Lessons Learned while Creating a Real MOOC-based Masters of Science.”
- C.1.29 Panelist, 2015. *Harvard-MIT Online Learning Summit*.
- C.1.30 Invited Speaker, 2014. *University of Cape Town*, “Interactive Machine Learning for Interactive Experiences.”
- C.1.31 Keynote Speaker, 2014. *LearnLab’s 3rd Annual Learning Science Workshop*, “Interactive Machine Learning... for Learning.”
- C.1.32 Plenary Speaker, 2014. *36th International Conference on Software Engineering*, “Some Lessons Learned while Creating a Real MOOC-based Masters of Science.”
- C.1.33 Invited Speaker, MAC50 Anniversary Symposium, 2014. *Massachusetts Institute of Technology*, “Some Lessons Learned while Creating a Real MOOC-based Masters of Science.”
- C.1.34 Panelist, Seminar on MOOCs, 2014. *Postsecondary National Policy Institute*, “A Masters of Science in CS... Online.”
- C.1.35 Plenary Speaker, Workshop on Online Learning, 2014. *American Society for Engineering Education Engineering Deans Institute*, “A Masters of Science in CS... Online.”
- C.1.36 Panelist and Plenary Speaker, Workshop on Online Learning, 2014. *ECE Department Heads Association Meeting*, “A Masters of Science in CS... Online.”
- C.1.37 Distinctive Voices @ The Beckman Center, 2011. *National Academy of Sciences*, “Interactive Artificial Intelligence and Machine Learning.”
- C.1.38 AI Colloquium, *University of Texas at Austin*, 2011. “Adaptive Drama Management: Bringing Machine Learning to Interactive Entertainment.”
- C.1.39 CS Colloquium and CRA-W/CDC Distinguished Lecture Series, *University of Southern California*, 2010. “Adaptive Drama Management: Bringing Machine Learning to Interactive Entertainment.”
- C.1.40 Computer Science Colloquium, *Cornell University*, 2010. “Adaptive Drama Management: Bringing Machine Learning to Interactive Entertainment.” (*updated talk*)
- C.1.41 Computer Science Colloquium, *Dartmouth College*, 2010. “Implementing Threads: Practical Issues in Restructuring a Computing Curriculum.”
- C.1.42 Plenary Speaker, *Richard Tapia Celebration of Diversity in Computing*, 2009. “Adaptive Drama Management.”
- C.1.43 Panelist, *Global Information Technology Management Association (GITMA)*, 2008. “Changing Computing Curricula via Implementing Threads Model at University System of Georgia Universities Consortium.”
- C.1.44 *Massachusetts Institute of Technology*, 2007. “Creating and Assessing a Structuring Principle for Undergraduate Curricula.”

- C.1.45 Panelist, MSR Faculty Summit *Microsoft Research Labs*, 2007. “CS1: Where’s It Going and What Should We Be Thinking About.”
- C.1.46 School of Computing Colloquium *University of Utah*, 2007. “Threads: An Undergraduate Degree Curriculum for the New Face of Computing.”
- C.1.47 CS Distinguished Lecturer Series *University of Maryland*, 2007. “Threads: An Undergraduate Degree Curriculum for the New Face of Computing.”
- C.1.48 *Brooklyn College*, 2006. “Threads: An Undergraduate Degree Curriculum for the New Face of Computing.”
- C.1.49 Rutgers Computer Science Colloquium *Rutgers University*, 2006. “Threads: An Undergraduate Degree Curriculum for the New Face of Computing.”
- C.1.50 The CDC Distinguished Lecturer Series, *Florida International University*, 2004. “Building Socially-Aware Adaptive Agents.”
- C.1.51 *Workshop on Activity Recognition and Discovery at NIPS 17*, 2004. “Reinforcement Learning and Human Activity Discovery.”
- C.1.52 AI Colloquium, *Rutgers University*, 2003. “Applying Reinforcement Learning to Social Relationships”.
- C.1.53 AI Colloquium, *University of Georgia*, 2003. “Building Adaptive Social Agents”
- C.1.54 AI Colloquium, *University of Michigan*, 2002. “Building Adaptive Social Agents”
- C.1.55 Plenary Speaker, *First Annual Richard Tapia Celebration of Diversity in Computing Conference*, 2001. “Social Reinforcement Learning.”
- C.1.56 *Conference for African-American Researchers in the Mathematical Sciences*, 1998. “Finding Optima by Estimation of Probability Densities.”

C.2. Testimony

- [1] Charles Isbell. Game Changers: Artificial Intelligence Part I. *House Committee on Oversight and Government Reform, Subcommittee on Information Technology*, February 14, 2018.
- [2] Charles Isbell. Keeping college within reach: Improving access and affordability through innovative partnerships. *House Committee on Education and the Workforce, Subcommittee on Higher Education and Workforce Training*, September 18, 2013.

D. Grants and Contracts

- D.1.1 **NSF INCLUDES DDLP: Diversifying Future Leadership in the Professoriate in Computing at Research Universities**
Sponsor: NSF
Investigator(s): Jeffrey Forbes, Charles Isbell, Valerie Taylor (PIs)
- D.1.2 **Interactive Machine Learning for Machine Training**
Sponsor: ONR
Investigator(s): Andrea Thomaz (PI), Charles Isbell, Karen Feigh, Mark Reidl (co-PIs)
- D.1.3 **30th International Conference on Machine Learning (ICML 2013)**
Sponsor: NSF
Investigator(s): Charles Isbell (PI)

- D.1.4 **Advancing Interactive Machine Learning**
Sponsor: ONR
Investigator(s): Charles Isbell (co-PI) and Andrea Thomaz (co-PI)
- D.1.5 **Computer Science Study Panel Phase III**
Sponsor: DARPA
Investigator(s): Charles Isbell (PI)
- D.1.6 **Pilot Program for Computer Science Principles Course**
Sponsor: The College Board
Investigator(s): Charles Isbell (PI)
- D.1.7 **Intelligent Tutoring Agents in Adaptive Training Environments**
Sponsor: Army Research
Investigator(s): Charles Isbell (PI)
- D.1.8 **Integrated Cognitive-Neuroscience Architectures for Understanding Sensemaking (ICArUS)**
Sponsor: IARPA
Investigator(s): Charles Isbell (co-PI) with GTRI and Lockheed Martin (lead integrator)
- D.1.9 **Collaborative Research: EARly-concept Grants for Exploratory Research: Computational Thinking Olympiad**
Sponsor: NSF
Investigator(s): Charles Isbell (PI)
- D.1.10 **International Travel: Working Group on (Re)Defining Computing**
Sponsor: NSF
Investigator(s): Charles Isbell (PI)
- D.1.11 **Integrating Android into CS courses**
Sponsor: Google
Investigator(s): Russ Clark, Charles Isbell and Kristin Vadas Marsicano
- D.1.12 **HCC: Web Games to Advance Interactive Learning Agents**
Sponsor: NSF
Investigator(s): Charles Isbell (co-PI) and Andrea Thomaz (co-PI)
- D.1.13 **Learning for Home Heartbeat**
Sponsor: Eaton, Corp
Investigator(s): Charles Isbell and Olufisayo Omojokun
- D.1.14 **Persistent, Adaptive, Collaborative Agents**
Sponsor: RIM
Investigator(s): Charles Isbell and Irfan Essa
- D.1.15 **RoboCamp**
Sponsor: Microsoft
Investigator(s): Tucker Balch, Charles Isbell and Cedric Stallworth (co-PIs)
- D.1.16 **SGER: Collaborative Research: Persistent, Adaptive, Collaborative Synthespians**
Sponsor: NSF
Investigator(s): Charles Isbell (PI), Irfan Essa (co-PI), Michael Mateas (co-PI)
- D.1.17 **CPATH EAE: Extending Contextualized Computing in Multiple Institutions Using Threads**
Sponsor: NSF

Investigator(s): Charles Isbell (PI), Maureen Biggers (co-PI), Merrick Furst (co-PI), Cedric Stallworth (co-PI)

D.1.18 Computer Science Study Panel Phase II

Sponsor: DARPA

Investigator(s): Charles Isbell (PI)

D.1.19 Signals to Symbols

Sponsor: AFRL

Investigator(s): Charles Isbell (PI), subcontract with GTRI

D.1.20 CAREER: Activity Discovery for Programmable & Adaptive Personalized Environments

Sponsor: NSF

Investigator(s): Charles Isbell (PI)

D.1.21 Computer Science Study Panel

Sponsor: DARPA

Investigator(s): Charles Isbell (PI)

D.1.22 GILA: Integrated Learning

Sponsor: DARPA IPTO Integrated Learning

Investigator(s): Ashwin Ram (PI at Georgia Tech) with Charles Isbell and Michael Mateas (co-PIs at Georgia Tech) and GTRI, UMD, and Lockheed (integrator and lead institute)

D.1.23 Asynchronous Reasoning and Learning

Sponsor: DARPA IPTO seedling grant

Investigator(s): Charles Isbell (PI), Ashwin Ram (co-PI)

D.1.24 Modeling Environment for Atmospheric Discovery, Data Mining and Machine Learning Working Group

Sponsor: NSF, as part of the NCSA Expedition

Investigator(s): Bryant York (PI), Charles Isbell and Parry Husbands (co-PIs)

D.2. As Senior Personnel or Contributor

D.1.1 GroupWear

Sponsor: DARPA IPTO ASSIST

Investigator(s): Thad Starner (PI) with A. Pentland, I. Essa, G. Abowd, C. Isbell, E. Price, S. Intille, and H. Lieberman

E. Other Professional Activities

E.1. Boards of Directors

- Member, Board of Directors, Open Usage Commons (OUC), 2020 - present
- Member, Board of Trustees, Toyota Technological Institute at Chicago (TTIC), 2018 - present; Executive Committee Chair, 2020 - present
- Member, Board of Directors, Center for Minorities and People with Disabilities in IT (CMD-IT), 2017 - present

E.2. Consulting

- *Google*. Machine Learning expertise, 2021
- *Lutron*. Data Science expertise, 2021
- *Womble Carlyle Sandridge & Rice*. Software expertise, 2007-2010.
- *iAAec*. Software architecture for applying reinforcement learning to culturally-aware tutorial systems, 2003

F. Individual Student Guidance

F.1. Ph.D. Students

Ph.D. Students: Graduated

Michael P. Holmes (CoC, co-advised with Alex Gray) 2003-2008

Research Trader, RGM Advisors

Dissertation: Multi-tree Monte Carlo methods for fast, scalable machine learning

Awards: Distinguished Student Paper Award, ICML 2006

Chip Mappus (CoC) 2003-2009

Research Scientist, Georgia Tech Research Institute

Dissertation: Estimating the Discriminative Power of Time Varying Features for EEG BMI

David Roberts (CoC) 2004-2010

Assistant Professor, Department of Computer Science, NC State University

Dissertation: Computational techniques for reasoning about and shaping player experiences in interactive narratives

Awards: Georgia Tech President's Fellow; Department of Homeland Security Graduate Research Fellowship

Peng Zang (CoC) 2005-2011

Analyst, Operations Strategy Group, Goldman Sachs

Dissertation: Scaling Solutions to Markov Decision Problems

Sooraj Bhat (CoC, co-advised with Alex Gray) 2004-2013

Research Scientist, Microsoft Research

Dissertation: Syntactic Foundations for Machine Learning

Luis C. Cobo Rus (ECE) 2010-2013

Research Scientist, Google

Dissertation: Leveraging Attention Focus for Effective Reinforcement Learning in Complex Domains

Awards: la Caixa fellowship; Google Engineering Intern Scholarship; Georgia Tech Research and Innovation Conference Best Poster Prize

Liam Mac Dermed (CoC) 2007-2013

Research Scientist, Google

Dissertation: Value Methods for Efficiently Solving Stochastic Games of Complete and Incomplete Information

Awards: Shackelford Fellowship

Arya Irani (CoC, GTRI research scientist) 2006-2015

Research Scientist, GTRI

Utilizing Negative Policy Information to Accelerate Reinforcement Learning

Mark Nelson (CoC, co-advised with Michael Mateas) 2004-2015

Assistant Professor, ITU Copenhagen

Dissertation: Representing and Reasoning about Videogame Mechanics for Automated Design Support

Jon Scholz (CoC) 2010-2015

Research Scientist, Google Deep Mind

Dissertation: Physics-Based Reinforcement Learning for Autonomous Manipulation

Awards: Best paper award, Humanoid Robotics 2010 (with Mike Stilman)

Ryan Curtin (CoE, co-advised with Rich Vuduc) 2012-2015
Research Scientist
Dissertation: Improving Dual-Tree Algorithms

Chris Simpkins (CoC, GTRI research scientist) 2007-2017
Lecturer, Georgia Tech
Dissertation: Integrating Reinforcement Learning into a Programming Language

Rahul Sawhney (CoC) 2014-2017
Postdoc, Georgia Tech
Dissertation: Robust Approaches and Optimization for 3D data

Ashley Edwards (CoC) 2011-2019
Research Scientist, Google
Dissertation: Emulation and Imitation via Perceptual Goal Specifications
Awards: National Science Foundation Graduate Research Fellowship 2012-2015

Yannick Schröcker (CoC) 2015-2020
Research Scientist, Google Deep Mind
Dissertation: Manipulating State Space Distributions for Sample-Efficient Imitation Learning

Hamid Reza Hassanzadeh (CoC) 2012-2020
Postdoc, Georgia Tech
Dissertation: Advanced Machine Learning Approaches for Characterization of Transcriptional Regulatory Elements and Genome-Wide Associations

Kaushik Subramanian (CoC, co-advised with Andrea Thomaz) 2010-2020
Research Scientist, Cogitai
Dissertation: Policy-Based Exploration for Efficient Reinforcement Learning

Ph.D. Students: Current

Pushkar Kolhe (CoC) 2013-present
Machine Learning for Education

Himanshu Sahni (CoC) 2014-present
Scalable machine learning

Shray Bansal (CoC) 2019-present
Parallel Play

F.2. Mentorship of Postdoctoral Fellows or Visiting Scholars

Thomas Cederborg (CoC, co-advised with Andrea Thomaz) 2014-present
inertive machine learning

Josh Jones (CoC) 2011-2013
Neurologically consistent machine learning

Olufisayo Omojokun (CoC) 2006-2009
Adaptive task modeling

II. Honors and Awards

A. Research Honors and Awards

- **Elected Member of the American Academy of the Arts and Sciences**, 2021
- **AAAI Fellow**, “for significant contributions to the field of interactive machine learning, computing education, and for increasing access and diversity in computing”, 2019
- **Fellow of the ACM**, “for contributions to interactive machine learning; and for contributions to increasing access and diversity in computing”, 2018
- **National Academy of Sciences Kavli Fellow**, distinguished young scientists, 2010-2012
- **Outstanding Junior Faculty Research Award**, Georgia Tech College of Computing, 2007
- **NSF CAREER Award**, 2007
- **Computer Science Study Group**, A DoD Young Investigator award, 2006
- **Distinguished Student Paper Award**, Michael Holmes and Charles Isbell (2006). Looping Suffix Tree-Based Inference of Partially Observable Hidden State. Proceedings of the Twenty-Third International Conference on Machine Learning.
- **Best Paper Award**, Charles Isbell, Christian Shelton, Michael Kearns, Satinder Singh and Peter Stone (2001). A Social Reinforcement Learning Agent. Proceedings of Fifth International Conference on Autonomous Agents, pages 377-384.

B. Teaching and Curriculum Honors and Awards

- Best Distributed/Online Program at the Reimagine Education Awards, Georgia Institute of Technology and the online Master of Science in Computer Science, 2019
- University Professional and Continuing Education Association Program of Excellence [Credit] Award, Georgia Institute of Technology and the online Master of Science in Computer Science, 2016
- The Regents’ Teaching Excellence Award for an Outstanding Department, College of Computing’s Threads Program, 2013
- Georgia Tech, CETL. Thanks for Being a Great Teacher!, 2008-2014
- Georgia Tech. Parents of President’s Scholars. Recognition of Exceptional Commitment to Excellence in Teaching, 2007
- Georgia Tech. College of Computing. William A. “gus” Baird Award for Excellence in Teaching, 2006

C. Service Honors and Awards

- **AAAI Distinguished Service Award**, “For significant contributions to the field of artificial intelligence and computing education through sustained service to AAAI and other core computing organizations and tirelessly working to increase access and diversity in AI and computing”, 2021
- **Dean’s Award for Singular Service to the College of Computing**, OMSCS Pioneers, 2014
- **Dean’s Award for Singular Service to the College of Computing**, Threads Leadership Team, 2006

D. Other Honors and Awards

- Sixteen Most Innovative People in Higher Education, Washington Monthly, 2016
- Scholar, Academy for Innovative Higher Education Leadership, 2015-2016
- Scholar, University System of Georgia Executive Leadership Institute, 2010-2011
- Participant, Georgia Tech Institute for Leadership and Entrepreneurship Leadership Roundtable, 2010
- Modern Day Technology Leader Award, Black Engineer of the Year Awards, 2009
- 50 Most Important African American Technologists, "Soul of Technology" eAccess Corp, 2009
- Participant, Georgia Tech University Leadership Program, 2008-2009
- Scholar of Note, Black Issues in Higher Education, 2004
- AT&T Cooperative Research Fellowship, 1990-1998
- National Science Foundation Fellowship, 1990-1994
- Student representative (most outstanding student) of Georgia Institute of Technology, Academic Recognition Day, State of Georgia, 1990
- INROADS/Atlanta Intern of the Year, 1989, 1990

III. Service

A. Professional Contributions

A.1. Memberships and Activities in Professional Societies

- Member and Fellow, American Academy of Arts and Sciences (AmerAcad)
- Member and Fellow, Association for Computing Machinery (ACM)
- Member and Fellow, Association for The Advancement of Artificial Intelligence (AAAI)

A.2. Journal Reviewing Activities

- **Editor**, Journal of Autonomous Agents and Multi-Agent Systems
- **Reviewer**, Foundations and Trends in Robotics
- **Reviewer**, ACM Transactions on Computer-Human Interaction
- **Reviewer**, Artificial Intelligence Journal
- **Reviewer**, International Journal of Social Robotics
- **Reviewer**, Journal of Artificial Intelligence Research
- **Reviewer**, Journal of Machine Learning Research
- **Reviewer**, Journal of Autonomous Agents and Multi-Agent Systems
- **Reviewer**, Machine Learning

A.3. Conference Committee Activities

- **Diversity and Inclusion Co-Chair**, NeurIPS 2019
- **Awards and Spotlight Chair**, RLDM 2019
- **Video Competition Co-Chair**, AAAI 2016
- **General Chair**, Tapia 2015
- **Fundraising Co-Chair**, ICML 2013-2014
- **Local Co-Chair**, ICML 2013
- **Program Committee**, ICIDS 2012
- **Program Committee**, AIIDE 2012
- **Program Committee**, Doctoral Consortium, AAAI 2012
- **Program Committee**, Doctoral Consortium, FDG 2012
- **Program Committee**, ICML 2012
- **Program Co-chair and Co-organizer**, AIIDE Workshop on Taking Non-Player Characters to the Next Level, 2011
- **Program Committee**, NIPS 2012

- **Program Committee**, ICIDS 2011
- **Senior Program Committee**, AIIDE 2011
- **Program Committee**, Doctoral Consortium, AAAI 2011
- **Chair, Organizing Committee**, National Academy of Sciences Kavli Frontiers of Science Symposium, 2011-2012
- **Organizing Committee**, National Academy of Sciences Kavli Frontiers of Science Symposium, 2010-2011
- **Co-chair and co-organizer**, *(Re)defining Computing Curricula by (Re)defining Computing* Working Group, ACM-SIGCSE Annual Conference on Innovation and Technology in Computer Science Education, 2009
- **Co-chair and co-organizer**, Doctoral Consortium, TAPIA 2009
- **Program Committee**, RSS 2009
- **Program Committee**, AAMAS 2009
- **Organizing Committee**, AAAI Spring Symposium on Intelligent Narrative Technologies II, 2009.
- **Organizing Committee**, AAAI Spring Symposium on Agents that Learn from Human Teachers, 2009.
- **Program Committee**, AAAI 2008
- **Program Committee**, ICML 2008
- **Organizing Committee**, AAAI Fall Symposium on Computational Approaches to Representation Change During Learning and Development, 2007.
- **Program Committee**, AAAI 2007
- **Reviewer**, SIGGRAPH 2007
- **Senior Program Committee**, AIIDE 2007
- **Local Co-Chair**, RoboCup Junior 2007
- **Program Co-chair and Co-organizer**, AAMAS Workshop on Agent-Based Systems for Human Learning and Entertainment, 2007.
- **Program Committee**, AAMAS 2007
- **Reviewer**, CHI 2007
- **Program Committee**, AAAI 2006
- **Co-Chair**, Workshop Committee, NIPS 2007
- **Senior Co-Chair**, Workshop Committee, NIPS 2006
- **Co-Chair**, Workshop Committee, NIPS 2005
- **Program Committee**, AAMAS 2005
- **Program Committee**, CHI 2005

- **Program Committee**, AAAI 2004
- **Program Committee** IJCAI 2003
- **Program Co-chair and Co-organizer**, Ubicomp 2003 Workshop: Multi-Device Interfaces for Ubiquitous Peripheral Interaction, 2003.
- **Program Chair and Organizer**, AAAI Fall Symposium on Personalized Learning Agents, 2002.
- **Program Committee**, AAMAS 2002
- **Program Committee**, AAAI 2000

A.4. Other Reviewing Activities

- **External Reviewer**, National Research Council report: “Autonomy Research for Civil Aviation: Towards a New Era of Flight”, 2014
- **Member**, NSF Site Visit Team for Pittsburgh Science of Learning Center, 2011
- **Member**, NSF Site Visit Team for Pittsburgh Science of Learning Center, 2010
- **Member**, Committee of Visitors for the Information and Intelligent Systems Division in the Directorate for Computer and Information Science and Engineering at the National Science Foundation (NSF), 2009
- **Member**, NSF Site Visit Team for Pittsburgh Science of Learning Center, 2008

B. Public and Community Service

- Member, Computer Science and Telecommunications Board (CSTB), National Academies, 2020 - present
- Member, Board of Directors, Open Usage Commons (OUC), 2020 - present
- Member, Search Committee for the Assistant Director, CISE, 2019
- Member, AAAI representative, Board, Computing Research Association, 2018 - present
- Member, National Academies Data Science Post-Secondary Education Roundtable, 2016 - 2019
- Member, National Academies Committee on the Growth of Computer Science Undergraduate Enrollment, 2016 - 2017
- Member, Center for Minorities and People with Disabilities in IT (CMD-IT) Board of Advisors, 2016 - 2017
- Member, ABET Subcommittee on Diversity and Inclusion, 2015 - 2016
- Member, AAAI Executive Council, 2015 - 2018
- Member, National Academies NASA Technology Roadmaps Committee, 2015 - 2017
- Member, Google Online Education Advisory Board, 2015 - 2017

- Co-Chair, Executive Committee, *Coalition to Diversify Computing*, sponsored by the Computing Research Association, the Association for Computing Machinery, and The Association of Computer and Information Science and Engineering Departments at Minority Institutions, 2015 - 2016
- Member, Advisory Board for the MIT/Harvard Center for Brains, Minds and Machines, 2014 - present
- Member, Advisory Board for National Science Foundation, AC/ERE, 2014 - present
- Member, Search Committee for the Assistant Director, CISE, 2014
- Member, ABET Academic Advisory Council, 2013 - present
- Member, DARPA Information Science and Technology (ISAT) study group, 2012 - 2015
- Member, National Science Foundation Committee on Equal Opportunities in Science and Engineering (CEOSE), 2012 - present
- Member, Advisory Board, Pittsburgh Science of Learning Center, 2012-2015
- Member, Board of Visitors, School of Information Sciences, University of Pittsburgh, 2013-2017
- Co-Chair, Computing Research Association Education Committee (CRA-E), 2011 - 2013
- Member, Computing Research Association Education Committee (CRA-E), 2010 - 2014
- Member, Executive Committee, *Coalition to Diversify Computing*, sponsored by the Computing Research Association, the Association for Computing Machinery, and The Association of Computer and Information Science and Engineering Departments at Minority Institutions, 1995 - 2002, 2011 - 2017
- Member, Advisory Board for National Science Foundation, CISE, 2009 - present
- Member, Advisory Board for the Alliance for the Advancement of African American Researchers in Computing, 2008 - 2012
- Member of the Governing Board, *The Institute for African American e-Culture*, 2002 - 2007
- Panelist, *Workshop on Increasing the Participation of Minorities in the Computing Disciplines*, sponsored by the National Science Foundation, 1995

C. Institute Contributions

Georgia Tech Committees

- Member, Presidential Search Committee, 2019
- Member, Executive Committee, Creating Next in Education, 2015 - 2018
- Member, Workforce of the Future Task Force, 2015 - 2016
- Member, Search Committee for the Associate Dean of Learning Systems, Professional Education, 2015
- Chair, Search Committee for the Chair of the School of Architecture, 2015
- Member, Executive Council of the Strategic Technology Investment Committee, Georgia Tech, 2015 - 2016

- Member, Dual Degree Engineering Program Task Force, 2014 - 2015
- Member, GTNeuro Minor Committee, 2013
- Member, Strategic Technology Investment Committee, Georgia Tech, 2012 - 2016
- Member, Talks@Tech Planning Committee, Georgia Tech, 2012
- Member, President's Strategic Plan Steering Committee, Georgia Tech, 2011 - 2012
- Member, Human Resources Diversity Council Steering Committee, Georgia Tech, 2011 - 2013
- Member, Information Technology Implementation Committee, Georgia Tech, 2011 - 2012
- Member, CoC Staff Advisory Committee, 2011 - 2014
- Member, Search Committee for the Chair of the School of Architecture, 2010
- Member, Institute Honorary Degree and Commencement Speaker Committee, 2010 - 2012
- Member, President's Strategic Planning Steering Committee, 2009 - 2010
- Co-Chair, Subcommittee for the President's Strategic Planning Steering Committee, 2010
- Member, Institute Honorary Degree Committee, 2009 - 2010
- Member, College of Computing Implementation Team for CoC Staff Recommendations, 2009 - 2010
- Member, Search Committee for the Dean of the College of Computing, 2008 - 2010
- Member, GT Council on Accreditation, 2008 - 2010
- Chair, Provost's Taskforce on Modularity for the Undergraduate Curriculum, 2008
- Chair, College of Computing Undergraduate Curriculum Committee, 2007 - present
- Member, Provost's Taskforce on Undergraduate Curriculum: Broadening, 2007 - 2009
- Member, Institute Undergraduate Curriculum Committee, 2007 - 2013
- Ph.D. Review Co-ordinator, Interactive Computing, 2006 - 2007
- Member, College of Computing Undergraduate Curriculum Committee, 2003 - 2004, 2006 - 2007
- Area Co-ordinator, Intelligent Systems, 2005 - 2010
- Co-chair, College of Computing IIC Task Force for Threads Implementation, 2005
- Member, College of Computing TSO Advisory Committee, 2006 - 2009
- Member, College of Computing CNS Steering Committee, 2004 - 2005
- Chair, College of Computing ICD Task Force on reviewing the CoC undergraduate curriculum, 2004.
- Member, College of Computing CNS Task Force, 2004
- Member, College of Computing IIC Faculty Recruiting Committee, 2004 - 2006

IV. Other National and International Recognition

A. Selected Articles, Appearances, and Publications by the Popular Media

- [1] Larry Bernstein. Artificial Intelligence, Caregiving, the Penitentiary, Religion and Capitalism. *What Happens Next in 6 Minutes*, February 7, 2021.
- [2] Sam Charrington. Talk 441: Machine Learning as a Software Engineering Enterprise with Charles Isbell. *This Week in Machine Learning and AI*, December 23, 2020.
- [3] Malcolm Gladwell. Bonus: Return to the 404. *Revisionist History with Malcolm Gladwell*, December 17, 2020.
- [4] Lex Fridman. 135: Charles Isbell: Computing, Interactive AI, and Race in America. *The Lex Fridman Podcast*, November 1, 2020.
- [5] Steve LeVine. The Redlining of Black Corporate America. *Medium*, June 18, 2020.
- [6] Greg Epstein. Will the Future of Work Be Ethical? *TechCrunch*, November 28, 2019.
- [7] Greg Epstein. Teaching Ethics in Computer Science the Right Way with Georgia Tech's Charles Isbell. *TechCrunch*, September 5, 2019.
- [8] Pria Mahadevan and Virginia Prescott. Less Like HAL, More Like Help: Artificial Intelligence Applications In The Real World. *Georgia Public Broadcasting On Second Thought*, August 13, 2019.
- [9] Elisabeth O'Donnell. Charles Isbell SM '93, PhD '98: Making Computer Science Education More Accessible. *MIT Technology Review*, October 23, 2018.
- [10] Farran Powell. Computer Science Grads Can Earn More than MBAs. *US News and World Report*, March 20, 2018.
- [11] Matt Leonard. House Dives into Artificial Intelligence. *GCN*, February 15, 2018.
- [12] Dave Gershgorn. Congress is Worried about AI Bias and Diversity. *Quartz*, February 15, 2018.
- [13] Hari Sreenivasan. How Online Graduate Programs Offer Degrees at Significant Savings. *PBS NewsHour*, September 2017.
- [14] Ian Bogost. A Googler's Would-Be Manifesto Reveals Tech's Rotten Core. *The Atlantic*, August 2017.
- [15] Ian Bogost. Artificial Intelligence Has Become Meaningless. *The Atlantic*, March 2017.
- [16] Charles Isbell. Reading List for a New World Order. *Chronicle of Higher Education*, 63(12), April 2017.
- [17] Ben Mulrone and Michael Hiscock. Online or Classroom Learning: What's Better for Students? *CTV's Your Morning*, October 2016.
- [18] Evan Ackerman. You Can't Stop Robots With Furniture Barricades Anymore. *IEEE Spectrum*, October 2016.
- [19] Kevin Carey. Georgia Tech's \$7,000 Online Master's Degree Could Start a Revolution. *New York Times*, page A15, October 2016.
- [20] Tom Ashbrook. New Frontiers in Online Higher Education. *On Point with Tom Ashbrook*, October 3, 2016.

- [21] Sam Charrington. Talk 4: Charles Isbell - Interactive AI, Plus Improving ML Education. *This Week in Machine Learning and AI*, September 9, 2016.
- [22] Gilad Edelman. The Sixteen Most Innovative People in Higher Education. *Washington Monthly*, September 2016.
- [23] Emily Bazelon and John Dickerson and David Plotz. Which Candidate Is the Best Sweet Talker? *Slate Political Gabfest*, May 6, 2016.
- [24] Rose. Episode 10: Rude Bot Rises. *Flash Forward*, April 5, 2016.
- [25] Melissa Korn. Online Degree Hits Learning Curve. *Wall Street Journal*, December 13, 2015.
- [26] Peter Stokes. *Higher Education and Employability: New Models for Integrating Study and Work*. Harvard Education Press, 2015.
- [27] Jeremy Campbell. Marty McFly's next gadgets from Georgia Tech. *11 Alive News*, October 21, 2015.
- [28] Tasnim Shamma. Experts Predict Next 25 Years of Digital Life at Ga Tech. *WABE Radio*, October 23, 2015.
- [29] David Markiewicz. Hacker Schools Offer Students a Different Path to Tech Jobs. *Atlanta Journal-Constitution*, March 7, 2014.
- [30] Carl Straumsheim. The First Cohort. *Inside Higher Ed*, December 13, 2013.
- [31] Paul Fain. Helpful or Hindrance? *Inside Higher Ed*, September 19, 2013.
- [32] Ry Rivard. The Fine Print. *Inside Higher Ed*, May 28, 2013.
- [33] Chip Rogers. Secrets to Lower College Costs. *GPB Radio*, August 1, 2013.
- [34] Van Jensen. Into the Unknown. *Georgia Tech Alumni Magazine*, 88(3):48–57, 2012.
- [35] Kelsey Sheey. Computer Science Transitions From Elective to Requirement. *US News and World Report*, April 3, 2012.
Also reprinted in the Chicago Tribune, April 4, 2012.
- [36] Ryan Lytle. Learn to Code in College Without Breaking the Bank. *US News and World Report*, February 16, 2012.
Also reprinted in the Chicago Tribune, February 17, 2012.
- [37] Amar Toor. New Program Makes it Easier to Turn Your Computer into a Conversational Chat-terbox. *Engadget*, September 5, 2011.
- [38] Staff. Leaders in Computing: The Interviews from the 2009 Richard Tapia Celebration of Diversity in Computing Conference. *A4RC YouTube Channel*, July 22, 2010.
Recorded April 4, 2009.
- [39] Scott Leith. iPhone Gets Kudos, a Needs-Improvement List. *The Atlanta Journal Constitution*, July 13, 2007.
- [40] Staff. RoboCup. *WABE Radio*, June 3, 2007.
- [41] Staff. RoboCup Junior. *Good Day Atlanta, FOX 5*, June 3, 2007.
- [42] Ronald Roach. Threads Computer Science Curriculum Debuts at Georgia Tech. *Diverse Issues in Higher Education*, 23:29, November 2, 2006.

- [43] Ronald Roach. Making Things Smart, part of the Emerging Scholars of Note Series. *Black Issues in Higher Education*, page 29, 2004.
- [44] Clark Howard. Clark Howard's Advice on Home Warranties. *WSBTV Atlanta*, 2003.
- [45] Gerrit Gohlke. Cybermaps: More Beautiful than Art. *European Photography*, 2003.
- [46] Steve Carney. Database is Black History in the Making. *Los Angeles Times*, 2001.
- [47] Martin Dodge and Rob Kitchin. *Mapping Cyberspace*. Routledge Press, 2001.
- [48] Arianna Cha. Lost in Cyberspace? Try a Bot... *Washington Post*, 2000.
- [49] John Murrell. We Will Have Countless Friends. *Time Magazine / Digital*, 2000.
- [50] Anne Eisenberg. Find Me a File, Catch Me a Cache. *New York Times*, 2000.