Lyle H. Ungar

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Education

1979-84 *Massachusetts Institute of Technology*
PhD in Chemical Engineering

1975-79 *Stanford University*
BS in Chemical Engineering (with distinction)

Experience

2013-16 *University of Pennsylvania*
Professor of
- Computer and Information Science
- Bioengineering
- Genomics and Computational Biology, SOM
- Operations, Information and Decisions (formerly OPIM), Wharton
- Psychology, SAS

1990-2013 *University of Pennsylvania*
Associate Professor of
- Computer and Information Science
- Bioengineering (2010-13)
- Chemical and Biomolecular Engineering (1990-2005)
- Electrical and Systems Engineering (1996-99)
- Genomics and Computational Biology, SOM (2002-13)
- Operations and Information Management, Wharton (2000-13)
- Psychology, SAS (2012-13)

1984-90 *University of Pennsylvania*
Assistant Professor of
- Chemical Engineering
- Computer and Information Science (1987–90)

2007 *Google*, New York Office (on leave)
1999 *Carnegie Mellon University* (sabbatical)

1982 (summer)	*Boston Consulting Group* Associate: Strategic business analysis.
1979 (summer)	*Shell Oil,* Westhollow Research Center Engineer: Developed computer model for catalytic cracking plant.
1976-78 (summers)	*Chevron USA,* Richmond Refinery Design Engineer (three summer co-op program).

Awards

- National Science Foundation (NSF) Graduate Fellow (1979-83)
- Presidential Young Investigator (1984-89)

Research interests

- *Machine learning:* feature selection, dimensionality reduction, spectral estimation, reinforcement learning, clustering
- *NLP and text mining:* information extraction, parsing, analysis of user-generated content, language modeling, language visualization
- *Psychology:* personality, well-being, group decision making
- *Computer Science/Economics:* bibliometrics, forecasting, auction mechanism design, applied economics
- *Computational Biology:* genomics, proteomics, brain image analysis
- *Chemical Engineering:* fluid dynamics, molecular dynamics, process modeling and control, supply chain optimization

Administration at Penn (since 2000)

- Graduate Chair, *Computer and Information Science (CIS)* (2015-6)
- Associate Director, *Penn Center for Bioinformatics (PCBI)* (2004-13)
- Executive Committee, *Genomics and Computational Biology (GCB)* (2002-8)
- Admissions Committee, *Genomics and Computational Biology (GCB)* (2002-4)
- Director, *Executive Masters in Technology Management (EMTM)*, SEAS and Wharton (1996-2004)
- Director, *CIS Graduate Admissions* (2000-2)

Public Service

Conferences Chaired

- IEEE International Conference on Bioinformatics and Biomedicine (BIBM), (co-chair) 2012
- ACM International Conference on Knowledge Discovery and Data Mining (SIG-KDD), 2006
- Gordon Research Conference on Statistics in Chemistry and Chemical Engineering, 1997

Associate Editor

- Journal of Machine Learning Research

Program committees served on (last five years)

- American Association for Artificial Intelligence (AAAI)
- ACM Knowledge Discovery and Data Mining (KDD)
- World Wide Web (WWW)
- IEEE International Conference on Data Mining (ICDM)
- International Conference on Machine Learning (ICML)
- Neural Information Processing Systems (NIPS)

Tutorials given (last five years)

- Crowdsourcing for Natural Language Processing (with Chris Callison-Burch)
  - North American Chapter of the Association for Computational Linguistics (NAACL) 2015
- Textmining, including information extraction and sentiment analysis, (with Ronen Feldman)
  - SIGIR 2008, KDD 2008, KDD 2009, CIKM 2010, ICWSM 2011, ICWSM 2012, AAAI 2012, AAAI 2013
- Crowdsourcing for Statisticians (with Adam Kapelner)
  - American Statistical Association (ASA) 2013
- Spectral Learning Algorithms for Natural Language Processing (with Michael Collins, Shay Cohen and Dean Foster)
  - North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT), 2013

Courses taught

Undergraduate

ChE 231	Thermodynamics
ChE 350	Fluid Mechanics
CIS 140/COGS 1	Cognitive Science
CSE 120	Programming Languages and Techniques
CSE/ChE 270	Expert Systems
CSE 391	Artificial Intelligence
EAS 410	Model Building with Modern Statistics

Graduate

ChE 500	Applied Mathematics I
ChE 501	Applied Mathematics II
ChE 640	Fluid Dynamics
ChE 641	Heat and Mass Transfer
ChE 700	Bifurcation Theory
CIS 520	Machine Learning
CIS 521	Artificial Intelligence
CIS/GCB 535	Introduction to BioInformatics
CIS 620	Machine Learning (Advanced)
CIS 700	Machine Learning in Bioinformatics
EMTM 554	Data Mining
EMTM 605	Advances in Artificial Intelligence
MGMT 560	Management of Technology
MGMT 732	Technology for Managers

Masters Students

2009	Paramveer Dhillon	”Transfer Learning using Feature Selection.”
2003	Alex Vasserman	“Identifying Chemical Names in Biomedical Text: An Investigation of the Substring Co-occurrence Based Approaches”
1988	Michael R. Weinstein Kodak	“Process scheduling using artificial intelligence”

Doctoral Students

2016	Joao Sedoc (CIS)	“TBA”
2016	Ville Satopää (Stat)	“Partial Information Framework: Basic Theory and Applications”
2014	Paramveer Dhillon (CIS)	“Advances in Spectral Learning with Applications to Text Analysis and Brain Imaging. ”
2010	Perry Evans (GCB) Childrens’ Hosptial of Pennsylvania	“Modeling virus-host networks”
2010	Ted Sandler (CIS) amazon	“Regularization and Model Selection with Networks of Features”
2009	Bill Kandylas (CIS) Microsoft	“Online clustering and citation analysis using Streemer”
2008	Gary Morris (CIS)	“Active relational learning for kinship analysis”
2006	Jing Zhou (ESE) Microsoft	“Streaming Feature Selection”
2005	Andrew Schein	“Active learning using A-optimality”

	Amaranth LLC	
2004	Sasha Popescul Yahoo	"Statistical Learning from Relational Databases"
2004	Panos Markopoulos University of Cyprus	"The Information Gap: Understanding Product Information Dissemination"
2003	Eugene Buehler NIH	"Statistical Models for the analysis of heterogeneous biological data sets"
2002	Roy Kwon University of Toronto	"Approximate Mechanisms and Algorithms for Combinatorial Auctions" (with G. Anandalingam)
2000	David Parkes Harvard University	"Iterative Combinatorial Auctions: Achieving Economic and Computational Efficiency"
1999	Rinaldo Jose private practice	"On the optimal coordination of profit maximizing divisions using auctions and price theory"
1995	Evi Gazi Chem. Ind. Inst. Toxicology	"Verification of controllers for incompletely-known chemical plants" (with W.D. Seider)
1995	Jack Vinson Pharmacia	"Automated first principles reasoning using qualitative and quantitative models"
1993	Bill Foster BMS	"The significance of neuronal ionic conductances in the cardiorespiratory nucleus of the solitary tract of the rat and in Hodgkin-Huxley models"
1993	Catherine Catino Air Products	"Automated modeling of chemical plants with application to hazard and operability studies"
1993	Dimitris Psichogios JP Morgan	"Process control using structured neural networks"
1990	Stephen Grantham Merck	"Automated reasoning from first principles using qualitative physics"
1989	Charles X. Ling U. Western Ontario	"Inductive learning and invention in domains with primitive recursive structures"
1989	Paul P. Durand Exxon-Mobil	"Percolation and transport in random media with application to high temperature superconductors"
1989	Thomas J. Balsano Amoco	"Unidirectional solidification of an anisotropic binary alloy"
1989	Ralph Gonzales U. Rutgers, Camden	"Learning by progressive subdivision of state space"

1988	Steven J. Weinstein Kodak	"The low flow rate limit for immiscible fluid systems in narrow gaps"
1988	Francis X. Kelly Exxon-Mobil	"Growth morphologies in rapid solidification"

Publications - Refereed Conference Proceedings

1. New Subsampling Algorithms for Fast Least Squares Regression.
Paramveer Dhillon, Yichao Lu, Dean Foster and Lyle Ungar, *Neural Information Processing Systems (NIPS)* 2013.

2. Faster Ridge Regression via the Subsampled Randomized Hadamard Transform.
Yichao Lu, Paramveer Dhillon, Dean Foster and Lyle Ungar, *Neural Information Processing Systems (NIPS)* 2013.

3. Using Regression for Spectral Estimation of HMMs.
Jordan Rodu, Dean Foster, Lyle Ungar and Weichen Wu *First International Conference on Statistical Language and Speech Processing (SLSP)* 2013.

4. Experiments with Spectral Learning of Latent-Variable PCFGs.
Shay B. Cohen, Karl Stratos, Michael Collins, Dean P. Foster and Lyle Ungar *Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL-HLT)* 2013

5. Choosing the Right Words: Characterizing and Reducing Error of the Word Count Approach.
H. Andrew Schwartz, Johannes Eichstaedt, Eduardo Blanco, Lukasz Dziurzyski, Margaret L. Kern, Stephanie Ramones, Martin Seligman, and Lyle Ungar. *Second Joint Conference on Lexical and Computational Semantics (*SEM-2013)*, 2013

6. Characterizing Geographic Variation in Well-Being using Tweets.
H. Andrew Schwartz, Johannes Eichstaedt, Richard Lucas, Lukasz Dziurzynski, Margaret L Kern, Gregory Park, Megha Agrawal, Shrinidhi K Lakshmikanth, Shneha Jha, Martin Seligman and Lyle Ungar *International AAAI Conference on Weblogs and Social Media (ICWSM)* 2013.

7. Toward Personality Insights from Language Exploration in Social Media.
H. Andrew Schwartz, Johannes Eichstaedt, Lukasz Dziurzynski, Margaret Kern, Eduardo Blanco, Michal Kosinski, David Stillwell, Martin Seligman, Lyle H. Ungar. *AAAI-2013 Spring Symposium: Analyzing Microtext* 2013.

8. The Marketcast Method for Aggregating Prediction Market Forecasts.
Pavel Atanasov, Barbara Mellers, Lyle Ungar, Philip Tetlock, Phillip Rescober and Emile Servan-Schreiber *International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction (SBP13)*, 2013.

9. How do Infomediaries affect firms information strategies, and how do they impact buyer and social welfare?
P Markopoulos, R Aron, L Ungar, *ICIS* 2013.

10. Improving Supervised Sense Disambiguation with Web-scale Selectors.
H. Andrew Schwartz, Fernando Gomez, Lyle H. Ungar. *COLing-2012: the 24th International Conference on Computational Linguistics* 2012.

11. New Insights from Coarse Word Sense Disambiguation in the Crowd.
Adam Kapelner, Krishna Kaliannan, H. Andrew Schwartz, Lyle Ungar and Dean Foster *COLing-2012: the 24th International Conference on Computational Linguistics* 2012.

12. Spectral Dependency Parsing with Latent Variables.
Paramveer Dhillon, Jordan Rodu, Michael Collins, Dean Foster and Lyle Ungar *EMNLP* 2012.

13. Spectral Learning of Latent-Variable PCFGs.
Shay Cohen, Karl Stratos, Michael Collins, Dean Foster, and Lyle Ungar *ACL* 2012.

14. Using CCA to improve CCA: A new spectral method for estimating vector models of words.
Paramveer Dhillon, Dean Foster and Lyle Ungar, *ICML* 2012.

15. Using Word Similarities to better Estimate Sentence Similarity.
Sneha Jha, H. Andrew Schwartz and Lyle H. Ungar, *Semeval* 2012.

16. Characterizing Emergence Using a Detailed Micro-model of Science: Investigating Two Hot Topics in Nanotechnology.
Kevin W. Boyack, Richard Klavans, Henry Small and Lyle Ungar, *Technology Management for Emerging Technologies (PICMET)* 2012.

17. Partial Sparse Canonical Correlation Analysis (PSCCA) for population studies in medical imaging.
Paramveer Dhillon, Brian Avants, Lyle Ungar, James Gee, *ISBI 2012 Paper 1074*, 2012.

18. Spectral methods for estimating probabilistic language models.
Lyle Ungar, Paramveer Dhillon, Jordan Rodu, Michael Collins, and Dean Foster *Snowbird Learning Workshop*, 2012.

19. Online discussion of drug side effects and adherence behaviors by breast cancer survivors.
Mao JJ, Chung A, Benton A, Hill S, Ungar L, Leonard C, Hennessy S, Holmes J. *Sixth Biennial Cancer Survivorship Research Conference: Translating Science to Care,* Arlington, VA, June 2012.

20. Multi-View Learning of Word Embeddings via CCA.
Paramveer Dhillon, Dean Foster, Lyle Ungar, *Neural Information Processing Systems (NIPS)* 2011.

21. Discovery of Significant Emerging Trends.
Saurabh Goorha and Lyle Ungar *ACM Knowledge Discovery and Data mining (KDD)* 57–64, 2010.

22. A System for De-identifying Medical Message Board Text.
Benton, A. and Hill, S. and Ungar, L. and Chung, A. and Leonard, C. and Freeman, C. and Holmes, J.H. *IEEE Ninth International Conference on Machine Learning and Applications*. 485490, 2010. also published in *BMC Bioinformatics*,Jun 9;12 Suppl 3:S2, 2011.

23. Mining Internet Conversations for Evidence of Supplement-Associated Adverse Events.
J.H. Holmes, A. Benton, A. Chung, C. Freeman, S. Hennessy, S. Hill, C. Leonard, J. Mao and L. Ungar *AMIA 2010 Symposium Proceedings (AMIA-1851-A2009)* 1082. 2010.

24. A new approach to lexical disambiguation of Arabic text.
R. Shah, P. Dhillon, M. Liberman, D. Foster, M. Maamouri and L. Ungar, *Proceedings of the 2010 Conference on Empirical Methods in Natural Language Processing*, 725–735, 2010.

25. Feature Selection using Multiple Streams.
Paramveer Dhillon, Dean Foster and Lyle Ungar. *Proceedings of The Thirteenth International Conference on Artificial Intelligence and Statistics (AISTATS): Journal of Machine Learning Research - Proceedings Track 9* 153-160, 2010.

26. Multi-Task Feature Selection using the Multiple Inclusion Criterion (MIC).
Paramveer Dhillon, Brian Tomasik, Dean Foster and Lyle Ungar, *ECML-PKDD (European Conference on Machine Learning)*, Bled, Slovenia, Sept. 2009.

27. Transfer Learning, Feature Selection and Word Sense Disambiguation.
Paramveer Dhillon, and Lyle Ungar. *ACL-IJCNLP (Annual Meeting of the Association of Computational Linguistics)*,257-260, 2009.

28. Transfer Learning Using Feature Selection.
Paramveer S. Dhillon, Dean P. Foster, Lyle H. Ungar, *CoRR* abs/0905.4022, 2009.

29. Gamma-band ECoG correlates of human cognitive representations.
Jacobs, J., Ungar, L.H. and Kahana, M.J. Program No. 279.2. Chicago, IL: *Society for Neuroscience*, 2009.

30. Efficient Clustering of Web-Derived Data Sets.
Luis Sarmento, Alexander Kehelenbeck, Eugenio Oliveira, and Lyle Ungar, *International Conference on Machine Learning and Data Mining (MLDM)* 2009.

31. An Approach to Web-scale Named-Entity Disambiguation.
Luis Sarmento, Alexander Kehelenbeck, Eugenio Oliveira, and Lyle Ungar, *International Conference on Machine Learning and Data Mining (MLDM)* 2009.

32. Resolving Identity Uncertainty with Learned Random Walks.
Ted Sandler, Lyle H. Ungar and Koby Crammer, *International Conference on Data Mining (ICDM)*, 457-465, 2009.b

33. Regularized Learning with Networks of Features.
Ted Sandler, John Blitzer, Partha Pratim Talukdar, Lyle H. Ungar, *Neural Information Processing Systems (NIPS)*, 1401-1408, 2008.

34. Protein-Protein Interaction Network Alignment by Quantitative Simulation.
Perry Evans, Ted Sandler and Lyle Ungar *Proceedings of the 2008 IEEE International Conference on Bioinformatics and Biomedicine (BIBM '08)*, 325-328, 2008.

35. Multiway Clustering for Creating Biomedical Term Sets.
V Kandylas, L Ungar, T Sandler, S Jensen *Proceedings of the 2008 IEEE International Conference on Bioinformatics and Biomedicine (BIBM '08)*, 449-452, 2008.

36. Using Text Mining to Analyze User Forums.
R. Feldman, M. Fresko, J. Goldenberg, O. Netzer, L. Ungar *5th IEEE ICSSSM'08, Melbourne*, 2008.

37. Web-Scale Named Entity Recognition. Casey Whitelaw, Alex Kehlenbeck, Nemanja Petrovic and Lyle Ungar *ACM 17th Conference on Information and Knowledge Management (CIKM)*, 123-132, 2008.

38. Using sequence classification for filtering web pages.
Binyamin Rosenfeld, Ronen Feldman and Lyle H. Ungar *ACM 17th Conference on Information and Knowledge Management (CIKM)*, 1355-1356, 2008.

39. Efficient Feature Selection in the Presence of Multiple Feature Classes.
Paramveer S. Dhillon, Dean Foster and Lyle H. Ungar *IEEE International Conference on Data Mining (ICDM)*, 2008.

40. Scalable Methods for Extracting Named Entities from the Web.
Casey Whitelaw, Alex Kehlenbeck, Luis Sarmento, Lyle Ungar *INFORMS* 2008 (abstract only)

41. In defense of L_0.
Dongyu Lin, Dean Foster and Lyle Ungar *ICML-2008 Workshop on Sparse Optimization and Variable Selection*, 2008.

42. Information Theory-Based Feature Selection.
Dean P. Foster and Lyle H. Ungar *Fourteenth Yale Workshop on Adaptive and Learning Systems*, 2008

43. Learning with Locally Linear Feature Regularization.
Ted Sandler, John Blitzer, Lyle Ungar *Snowbird Learning Workshop*, 2008

44. Maximal Subset Feature Selection for BioInformatics.
Dean P. Foster, Anna Goldenberg and Lyle H. Ungar *Snowbird Learning Workshop*, 2008

45. Finding cohesive clusters for analyzing knowledge communities.
Vasileios Kandylas, S. Phineas Upham, and Lyle H. Ungar, *Seventh IEEE International Conference on Data Mining (ICDM)*, Oct 2007.

46. Extracting Product Comparisons from Discussion Boards.
Feldman, R., M. Fresko, J. Goldenberg, O. Netzer and L. Ungar *Seventh IEEE International Conference on Data Mining (ICDM)*, Oct 2007.

47. Innovating Knowledge Communities.
Phin Upham, Lori Rosenkopf, and Lyle Ungar 2007 Academy of Management Meeting, Philadelphia, PA (selected for the "Best Paper Proceedings of the 2007 Academy of Management Meeting.")

48. An Empirical Study of the Behavior of Active Learning for Word Sense Disambiguation.
J. Chen, A. Schein, L. Ungar and M. Palmer *HLT-NAACL 06*, 2006.

49. Is Online Product Information Driven by Quality or Differentiation?
P.M. Markopoulos and R. Aron and L.H. Ungar. *proceedings of the International Conference of Information Systems (ICIS-2005)*, 2005.

50. Cluster-based Concept Invention for Statistical Relational Learning.
A. Popescul and L. Ungar, *KDD-2004*, 2004.

51. Genomic Characterization of Synaptic Proteins, SynapseDB.
M. Bucan et al. *The Biology of Genomes (Cold Spring Harbor May, 2004)*. (abstract only)

52. Integrated Annotation for Biomedical Information Extraction.
S. Kulick, A. Bies, M. Liberman, M. Mandel, R. McDonald, M. Palmer, A. Schein and L. Ungar, *HLT/NAACL, Boston*, May, 2004.

53. Statistical Relational Learning for Document Mining.
A. Popescul, L. H. Ungar, S.Lawrence and K.M. Pennock. *International Conference on Data Mining (ICDM-2003)*, 2003.

54. Using Reinforcement Learning to Refine Autonomous Robot Controllers
G. Grudic, V. Kumar and L. Ungar, *International Conference on Intelligent Robots and Systems (IROS)*, 2003.

55. Mixtures of Conditional Maximum Entropy Models.
D. Pavlov, A. Popescul, D.M. Pennock and L.H. Ungar, *International Conference on Machine Learning (ICML)*, 2003.

56. Structural Logistic Regression for Link Prediction.
A. Popescul and L. H. Ungar, *KDD Workshop on Multi-Relational Data Mining* and a similar paper, Statistical Relational Learning for Link Prediction. A. Popescul and L. H. Ungar, *IJCAI-03 Workshop on Relational Learning*, 2003.

57. A Combinatorial Auction-Based Method for Supply Chain Management.
R. Kwon and L. Ungar, *Institute for Operations Research and the Management Sciences (INFORMS)*, 2003.

58. Static and Dynamic Analysis of the Internet's Susceptibility to Faults and Attacks.
S-T. Park, A. Khrabrov, D.M. Pennock, S. Lawrence, C.L. Giles and L.H. Ungar, *Infocom*, 2003.

59. A Generalized Linear Model for Principal Component Analysis of Binary Data.
A. I. Schein, L. K. Saul and L. H. Ungar, *Proc. 9th International Workshop of AI and Statistics*, Jan 3-6, 2003.

60. Rates of Convergence of Performance Gradient Estimates Using Function Approximation and Bias in Reinforcement Learning.
G. Grudic, and L. Ungar, *NIPS 14*, 2002.

61. Dual Pricing and Information Deficit in Electronic Markets.
P. Markopoulos, R. Aron and L. H. Ungar, *International Conference on Information Systems (ICIS) 2003*; earlier version appeared in *Workshop on Information Systems and Economics (WISE)*, 2002.

62. Towards Structural Logistic Regression: Combining Relational and Statistical Learning.
A. Popescul, L. H. Ungar, S. Lawrence and D. M. Pennock, *Workshop on Multi-Relational Data Mining, at the Eighth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2002)*, 2002.

63. Methods and Metrics for Cold-Start Recommendations.
A. I. Schein, A. Popescul, L. H. Ungar and D. M. Pennock, *ACM Special Interest Group on Information Retrieval SIGIR-2002*, August 2002.

64. Pricing Price Information in E-commerce.
P.M. Markopoulos and L.H. Ungar, *Proceedings of the ACM Conference on Electronic Commerce (EC01)*, Tampa, Florida, October 2001.

65. Towards Learning by Ontological Leaps.
L. Ungar and D. Foster, *Snowbird Learning Workshop*. 2001.

66. A Primal-Dual Algorithm for Winner Determination in Combinatorial Auctions.
R. Kwon, G. Anandalingam and L.H. Ungar, *INFORMS*, 2001.

67. Maximum Entropy Methods for Biological Sequence Modeling.
Buehler, E. and L.H. Ungar, *BIOKDD 2001 workshop*, 2001.

68. Generative Models for Cold-Start Recommendations.
A. Schein, A. Popescul, L. H. Ungar and D. M. Pennock, *Workshop on Recommender Systems, SIGIR-2001*, 2001

69. Exploiting Multiple Secondary Reinforcers in Policy Gradient Reinforcement Learning.
G. Z. Grudic and L. H. Ungar, *IJCAI 2001*, 2001.

70. Probabilistic Models for Unified Collaborative and Content-Based Recommendation in Sparse-Data Environments.
A. Popescul, L. H. Ungar, D. M. Pennock and S. Lawrence, *Uncertainty in AI (UAI 2001) Conference*, August 2001

71. Efficient Reinforcement Learning for Robots.
G. Z. Grudic and L. H. Ungar, *Yale Workshop on Adaptive and Learning Systems*, June, 2001.

72. Iterative Combinatorial Auctions: Theory and Practice.
D. C. Parkes and L.H. Ungar, *Proc. 18th National Conference on Artificial Intelligence, (AAAI-00)*, 74-81. 2000.

73. Preventing Strategic Manipulation in Iterative Auctions: Proxy-Agents and Price-Adjustment.
D. C. Parkes and L.H. Ungar, *Proc. 18th National Conference on Artificial Intelligence, (AAAI-00)*, 82-89. 2000.

74. Localizing Search in Reinforcement Learning.
G. Z. Grudic and L. H. Ungar, *Proc. 18th National Conference on Artificial Intelligence, (AAAI-00)*, 590-595. 2000.

75. Localizing Policy Gradient Estimates to Action Transitions.
G. Z. Grudic and L. H. Ungar, *International Conference on Machine Learning (ICML2000)*, 343-350. 2000.

76. Efficient Clustering of High-Dimensional Data Sets with Application to Reference Matching.
A. McCallum, K. Nigam and L. Ungar, *KDD-2000*, 2000.

77. Clustering and Identifying Temporal Trends in Document Databases.
A. Popescul, G. W. Flake, S. Lawrence, L.H. Ungar and C. L. Giles, *Proc. IEEE Advances in Digital Libraries 2000 Conference*, 2000.

78. String Edit Analysis for Merging Databases.
J.J. Zhu and L.H. Ungar, *Proc. KDD-2000 Workshop on Text Mining*, 2000.

79. Accounting for Cognitive Costs in On-line Auction Design.
D. C. Parkes, L. H. Ungar and D. P. Foster, *LNAI 1571 Agent mediated Electronic Commerce (AMEC-98)*, pp 25–40, Springer Verlag, 1999.

80. Clustering methods for collaborative filtering.
L.H. Ungar and D.P. Foster *AAAI Workshop on Recommendation Systems*, 1998

81. A formal statistical approach to collaborative filtering.
L.H. Ungar, D.P. Foster *CONALD98*, 1998

82. Auction-driven coordination for plantwide optimization.
R.A. Jose and L.H. Ungar, *Foundations of Computer-Aided Process Operation FOCAPO*, 1998.

83. Learning and Adaption in Multiagent Systems.
D.C. Parkes and L. H. Ungar, *AAAI97 Workshop on MultiAgent Learning*, 1997.

84. Characterizing the generalization performance of model selection strategies.
D. Schuurmans, D.P. Foster and L.H. Ungar, *Proceedings of 1997 ML/COLT*, 1997.

85. Learning and Adaption in Multiagent Systems.
D.C. Parkes and L. H. Ungar, *AAAI97 Workshop on MultiAgent Learning*, 1997.

86. Automatic Analysis of Monte-Carlo Simulations of Dynamic Chemical Plants.
E. Gazi, L. H. Ungar, W. D. Seider and B. J. Kuipers, *Proceedings of the ESCAPE 6 Symposium, Rhodes, Greece*, May, Pergamon Press, 1996.

87. Controller verification for polymerization reactors.
E. Gazi, W.D. Seider and L.H. Ungar, *Proc. Intelligent Systems in Process Engineering (ISPE '95)*, 1995.

88. Neural Networks for Process Control.
L.H. Ungar, E. Hartman and J. Keeler, *Proc. Intelligent Systems in Process Engineering (ISPE '95)*, 1995.

89. A Statistical Basis for Using Radial Basis Functions for Process Control.
L.H. Ungar and R.D. DeVeaux, *Proceedings of the ACC*, 1995.

90. Active Exploration and Learning in Real-Valued Spaces using Multi-Armed Bandit Allocation Indices.
Salganicoff, M. and L.H. Ungar, *Proc. 12th Intl. Conf. on Machine Learning*, July, 1995.

91. Statistical Approaches to Fault Analysis in Multivariate Process Control.
R.D. DeVeaux, L.H. Ungar and J.M. Vinson, *Proceedings of the ACC*, 1994.

92. Active Exploration-Based ID-3 Learning for Robot Grasping.
M. Salganicoff, L.G. Kunin and L.H. Ungar, *Proceedings of the Workshop on Robot Learning, 11th Intl. Conf. on Machine Learning*, July, 1994.

93. Control of Nonlinear Processes Using Qualitative Reasoning.
E. Gazi, W.D. Seider and L.H. Ungar, *Proceedings of ESCAPE 3*, 1994.

94. Controller Verification Using Qualitative Reasoning.
E. Gazi, L.H. Ungar and W.D. Seider, *ADCHEM Proceedings*, 1994.

95. Stability of Neural Net Based Model Predictive Control.
J.W. Eaton, J.B. Rawlings and L.H. Ungar, *Proceedings of the ACC*, 2481-85, 1994.

96. The Role of Baroreceptor Resetting in Habituating Control of Blood Pressure.
S.R. Carden, L.H. Ungar, W.C. Rose and J.S. Schwaber, *Proceedings of the ACC*, 87-91, 1994.

97. Dynamic Fault Detection with the Automatic Process Evaluator.
J.M. Vinson and L.H. Ungar, *CIMPRO Proceedings*, 295-301, 1994.

98. Radial Basis Function Neural Networks for Process Control.
L.H. Ungar, T. Johnson and R.D. DeVeaux, *Computer-Integrated Manufacturing in the PROcess industries (CIMPRO) Proceedings*, 357-364, 1994.

99. Controller verification using qualitative reasoning.
E. Gazi, W.D. Seider and L.H. Ungar, *Proceedings of 2nd IFAC workshop on computer software structure integ. AI/KBS Sys. In Proc. Cont.* Lund, Sweden, 1994.

100. Control of Nonlinear Processes using Qualitative Reasoning.
E. Gazi, W.D. Seider and L.H. Ungar, *Proceedings of 1993 ESCAPE* in *Computers and Chem. Engr.*, 18, S189–S193, 1994.

101. The Automatic Process Evaluator.
J.M.Vinson and L.H. Ungar, *Proceedings of the Second Intl. Conf. on FOCAPO*, ed. Rippin et al., CACHE, 443-449, 1993.

102. QMIMIC: Model-based Monitoring and Diagnosis.
J.M. Vinson and L.H. Ungar, *Proceedings of the ACC* 1880–1884, 1993.

103. A Tale of Two Nonparametric Estimation Schemes: MARS and Neural Networks.
R.D. DeVeaux, D.C. Psichogios and L.H. Ungar, *4th Intl. Conf. on Artificial Intelligence and Statistics*, Jan. 1993.

104. Neural Control and Adaptation in Blood Pressure Control.
L.H. Ungar, J.S. Schwaber and W.R. Foster, *Proceedings of the Yale Workshop on Adaptive and Learning Systems,* 111-115, 1992.

105. Matching Neural Models to Experiment.
W.R. Foster, J.F.R. Paton, J.J. Hopfield, L.H. Ungar and J.S. Schwaber, *Proceedings of Computation and Neural Systems Meeting*, San Francisco, 1992.

106. Fault Detection and Diagnosis using Qualitative Modelling and Interpretation.
J.M. Vinson and L.H. Ungar, in *On-line Fault Detection and Supervision in the Chemical Process Industries* Preprints of the IFAC Symposium, Newark, Delaware, USA April 22-24, 1992, Ed. P.S. Dhurjati, pp. 81-86, 1992.

107. Process Modeling Using Structured Neural Networks.
D.C. Psichogios and L.H. Ungar, *Proceedings of the ACC* 1917-1921 (1992).

108. Nonparametric System Identification: A Comparison of MARS and Neural Networks.
D.C. Psichogios, R.D. DeVeaux and L.H. Ungar, *Proceedings of the ACC* 1436-1440, 1992.

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2. US 5,951,623 Lempel-Ziv data compression technique utilizing a dictionary prefilled with frequent letter combinations, words and/or phrases
   J.C Reynar, F. Herz, J. Eisner and L. Ungar

3. US 5,835,087 System for general of object profiles for a system for customized elecronic identification of desirable objects
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4. US 5,758,257 System and method of scheduling broadcast of and access to video program and other data using customer profiles
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