DANIEL LOWD

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INTERESTS

Machine learning, data mining, and artificial intelligence.

EDUCATION

2003–2010: **University of Washington**, Seattle, WA
    Ph.D. in Computer Science and Engineering, March 2010
    M.S. in Computer Science and Engineering, June 2005
    Advisor: Pedro Domingos.
    Committee members: Jeff Bilmes, Marina Meila, and Mark S. Handcock.
    Dissertation title: *Efficient Algorithms for Learning and Inference in Rich, Statistical Models.*

1999–2003: **Harvey Mudd College**, Claremont, CA.
    B.S. in Mathematics/Computer Science with "High Honors."

SCHOLARSHIPS, HONORS, AND AWARDS

Google Faculty Research Award (2013)
Microsoft Research Fellow, sponsored by Live Labs (2007–2008)
National Science Foundation Graduate Research Fellowship (2003–2006)

PROFESSIONAL EXPERIENCE

June 2010 – Present: Assistant Professor, Department of Computer and Information Science, University of Oregon

September 2009 – June 2010: Acting Assistant Professor, Department of Computer and Information Science, University of Oregon

September 2003 – August 2009: Research assistant for Pedro Domingos at the University of Washington.
Developed faster machine learning algorithms, more flexible probabilistic models, and methods for learning models with efficient inference.

Summer 2008: Intern at SmartDesktop division of Pi Corporation, Seattle, WA.
Developed and evaluated automatic methods for desktop activity recognition.

Summer 2004: Intern at Microsoft Research with Christopher Meek in Redmond, WA.
Developed simple yet effective attacks against linear spam filters, testing filter robustness and promoting the development of more secure spam filters.

June 2002 – September 2003: Research assistant for Jon Herlocker at Oregon State University.
Conducted a third-party evaluation of prominent collaborative filtering algorithms. Funded by the NSF through the REU program.

Summer 2001: Intern at Green Hills Software in Santa Barbara, CA.
  Invented and implemented a binary diff algorithm, reducing code update time by 90-97% for embedded targets. Ported a linker from Solaris to vxWorks and reduced code size by 80% for use on JPL's Mars Expedition Rover. Ran automated compiler validations for R6K architecture and implemented appropriate fixes in library code.

Summer 2000: Intern at Adobe Systems in San Jose, CA.
  Added XML support to Adobe Acrobat's Webcapture plug-in.

Summer 1999: Intern at Spyglass in Los Gatos, CA.
  Assisted in the development of a Windows CE application for physical therapists.

PROFESSIONAL SERVICE

Proceedings Chair:
  Conference on Uncertainty in Artificial Intelligence (UAI) 2014

Workshop Co-Chair:
  ICML 2014 Workshop on Learning, Security and Privacy
  ICML 2014 Workshop on Learning Tractable Probabilistic Models

Reviewer:
  Journal of Machine Learning Research (JMLR)
  Journal of Artificial Intelligence Research (JAIR)
  Data Mining and Knowledge Discovery (DMKD) journal
  Machine Learning Journal (MLJ)
  Transactions on Dependable and Secure Computing (TDSC)
  IEEE Security & Privacy
  ACM SIGKDD Explorations
  Neural Information Processing Systems (NIPS) conference 2006, 2012, 2013
  International Conference on Machine Learning (ICML) 2008
  ACM Conference on Electronic Commerce (EC) 2006
  Research proposals for National Science Foundation (NSF) and Israel Science Foundation
  Journal of Systems and Software
  International Journal of Pattern Recognition and Artificial Intelligence

Program Committees:
  International Joint Conference on Artificial Intelligence (IJCAI) 2011, 2013
  AAAI Conference on Artificial Intelligence (AAAI) 2006, 2010-2013
  Uncertainty in Artificial Intelligence (UAI) 2010-2014
  International Conference on Machine Learning (ICML) 2010-2014
  International Conference on Artificial Intelligence and Statistics (AISTATS) 2012, 2013
  ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2011
  ECML-PKDD 2012
  ICML Workshop on Structured Learning (SLG) 2013
  AAAI Workshop on Statistical Relational AI 2013
  ICML Workshop on Statistical Relational Learning 2012
  AAAI Nectar 2011
  ECML/PKDD Workshop on Privacy and Security issues in Data Mining and Machine Learning, 2010

GRANTS AND OTHER FUNDING

2013: *Learning Tractable Graphical Models with Latent Variables*, Google Faculty Research Award, $56,856

2013: *Understanding the Mechanism of Social Network Influence in Health Outcomes through Multidimensional and Semantic Data Mining Approaches*, National Institutes of Health, $1,500,000 (co-PI, with Dejing Dou and 6 others)

2011: *Statistical Knowledge Translation and Knowledge Integration Using Markov Logic*, National Science Foundation, $495,000 (co-PI, with Dejing Dou)

2011: *A Unified Approach to Abductive Inference*, Multidisciplinary University Research Initiative, Army Research Office, $232,998 (subcontract from UW)

STUDENTS

Ph.D. advisor (current)
Shangpu Jiang (with Dejing Dou)
Brent Lessley
Amirmohammad Rooshenas
Mohamad Ali Torkamani
Xiao Xiao (with Dejing Dou)

M.S. thesis advisor (current)
Igor Burago
Mino De Raj

M.S. thesis advisor (graduated)
Arash Shamaei (Oregon State University)

INVITED TALKS

"Using Dependency Networks To Learn Markov Networks"
University of Wisconsin-Madison. October, 2013.

"Learning Relational Classifiers for Adversarial Domains"
University of Indiana-Bloomington. October, 2013.

"Learning Relational Classifiers for Adversarial Domains"
SRI International. October, 2013.

"Better Learning and Inference with Dependency Networks"
University of Maryland, College Park. January, 2013.

"Learning Relational Classifiers for Adversarial Domains"
LinkedIn. January, 2013.

"Convex Adversarial Collective Classification"
SRI International. January, 2013.

"Convex Adversarial Collective Classification"
Dagstuhl Perspectives Workshop on Machine Learning Methods for Computer Security. October, 2012.

"Convex Adversarial Collective Classification"
University of Washington. September, 2012.

"Toward Adversarial Collective Classification"
2nd ARO Workshop on Moving Target Defense, George Mason University. October, 2011.

"Better Learning and Inference with Dependency Networks"
University of Washington. September, 2011.

"Mean Field Inference in Dependency Networks: An Empirical Study"
Oregon State University. July, 2011.

"Inference Complexity As Learning Bias"
Oregon State University. January, 2010.

"Adversarial Machine Learning"
Portland State University. November, 2009.

"Markov Logic: Representation, Inference and Learning"
University of Michigan. March, 2009.

"Markov Logic: Representation, Inference and Learning"
University of Oregon. April, 2009.

"Foundations of Adversarial Machine Learning"
University of Cagliari. July, 2008.

"Adversarial Learning"
Oregon State University. June, 2006.

SOFTWARE RELEASED

Libra: Machine learning toolkit for Bayesian networks, Markov networks, and arithmetic circuits
`http://libra.cs.uoregon.edu`

Alchemy: Algorithms for statistical relational AI
`http://alchemy.cs.washington.edu`
(Along with various other contributors.)

NBE: A Bayesian learner with very fast inference
`http://www.cs.washington.edu/ai/nbe`

CoFE: COllaborative Filtering Engine
`http://eecs.oregonstate.edu/iis/CoFE/`
(Along with various other contributors. No longer supported.)

BOOKS

1. P. Domingos and D. Lowd, *Markov Logic: An Interface Layer for AI*, Morgan & Claypool. 2009.

BOOK CHAPTERS

1. P. Domingos, D. Lowd, S. Kok, H. Poon, M. Richardson and P. Singla, "Markov Logic: A Language and Algorithms for Link Mining," in *Link Mining: Models, Algorithms, and Applications*, edited by P. S. Yu, J. Han, and C. Faloutsos, Springer, 2010.

2. P. Domingos, D. Lowd, S. Kok, H. Poon, M. Richardson and P. Singla, "Just Add Weights: Markov Logic for the Semantic Web," in *Uncertainty Reasoning for the Semantic Web I*, edited by P. Costa, C. d'Amato, N. Fanizzi, K. B. Laskey, K. J. Laskey, T. Lukasiewicz, M. Nickles and M. Pool, Springer, 2008.

3. P. Domingos, S. Kok, D. Lowd, H. Poon, M. Richardson and P. Singla, "Markov Logic," in *Probabilistic Inductive Logic Programming* (pp. 92-117), edited by L. De Raedt, P. Frasconi, K. Kersting and S. Muggleton, Springer, 2008.

JOURNAL ARTICLES

1. D. Lowd and J. Davis, "Improving Markov Network Structure Learning Using Decision Trees," in the *Journal of Machine Learning Research*, vol.15, 2014.

REFEREED CONFERENCE PUBLICATIONS

1. A. Rooshenas and D. Lowd, "Learning Sum-Product Networks with Direct and Indirect Interactions," in *Proceedings of the 31st International Conference on Machine Learning (ICML)*, Beijing, China, 2014.

2. D. Lowd and A. Rooshenas, "Learning Markov Networks with Arithmetic Circuits," in *Sixteenth International Conference on Artificial Intelligence and Statistics (AISTATS 2013)*, Scottsdale, AZ, USA, 2013. (Acceptance rate: 34%.)

3. M. Torkamani and D. Lowd, "Convex Adversarial Collective Classification," in *Proceedings of the 30th International Conference on Machine Learning (ICML)*, Atlanta, GA, USA, 2013. (Oral. Acceptance rate: Not published.)

4. S. Jiang, D. Lowd, and D. Dou, "Learning to Refine an Automatically Extracted Knowledge Base using Markov Logic," in *Proceedings of the IEEE International Conference on Data Mining (ICDM)*, Brussels, Belgium, 2012. (Acceptance rate: 20%.)

5. D. Lowd, "Closed-Form Learning of Markov Networks from Dependency Networks," in *Proceedings of the 28th Conference on Uncertainty in Artificial Intelligence (UAI-12)*, Catalina Island, CA, 2012. (Spotlight. Acceptance rate: 32% overall; 14% with a talk or spotlight.)

6. D. Lowd and A. Shamaei, "Mean Field Inference in Dependency Networks: An Empirical Study," in *Proceedings of the 25th Conference on Artificial Intelligence (AAAI-11)*, San Francisco, CA, 2011. (Acceptance rate: 25%.)

7. D. Lowd and P. Domingos, "Approximate Inference by Compilation to Arithmetic Circuits," in *Advances in Neural Information Processing Systems (NIPS) 24*, Vancouver, BC, 2010. (Acceptance rate: 24%.)

8. D. Lowd and J. Davis, "Learning Markov Network Structure with Decision Trees," in *Proceedings of the 10th IEEE International Conference on Data Mining (ICDM)*, Sydney, Australia, 2010. (Full paper. Acceptance rate: 19% overall; 9% for full papers.)

9. S. Natarajan, T. Khot, D. Lowd, K. Kersting, P. Tadepalli and J. Shavlik, "Exploiting Causal Independence in Markov Logic Networks: Combining Undirected and Directed Models," in *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)*, Barcelona, Spain, 2010. (Acceptance rate: 16%.)

10. D. Lowd and N. Kushmerick, "Using Salience to Segment Desktop Activity into Projects," in *Proceedings of the Thirteenth International Conference on Intelligent User Interfaces*, Sanibel Island, Florida, 2009.

11. D. Lowd and P. Domingos, "Learning Arithmetic Circuits," in *Proceedings of the Twenty-Fourth Conference on Uncertainty in Artificial Intelligence* (pp. 383-392), Helsinki, Finland, 2008.

12. D. Lowd and P. Domingos, "Efficient Weight Learning for Markov Logic Networks," in *Proceedings of the Eleventh European Conference on Principles and Practice of Knowledge Discovery in Databases* (pp. 200-211), Warsaw, Poland, 2007.

13. D. Lowd and P. Domingos, "Recursive Random Fields," in *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence* (pp. 950-955), Hyderabad, India, 2007.

14. D. Lowd and P. Domingos, "Naive Bayes Models for Probability Estimation," in *Proceedings of the Twenty-Second International Conference on Machine Learning* (pp. 529-536), Bonn, Germany, 2005.

15. D. Lowd and C. Meek, "Good Word Attacks on Statistical Spam Filters," in *Proceedings of the Second Conference on Email and Anti-Spam*, Palo Alto, CA, 2005.

16. D. Lowd and C. Meek, "Adversarial Learning," in *Proceeedings of the Eleventh ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, Chicago, IL, 2005.

REFEREED WORKSHOP PUBLICATIONS

1. M. Torkamani and D. Lowd, "On Robustness and Regularization of Structural Support Vector Machines," in *NIPS 2013 Workshop on Perturbation, Optimization, and Statistics*, Stateline, NV, USA, 2013.

2. A. Rooshenas and D. Lowd, "Learning Sum-Product Networks with Direct and Indirect Interations," in *NIPS 2013 Workshop on Deep Learning*, Stateline, NV, USA, 2013.

3. D. Stevens and D. Lowd, "On the Hardness of Evading Combinations of Linear Classifiers," in *Proceedings of the 2013 ACM Workshop on Artificial Intelligence and Security (AISec)*, Berlin, Germany, 2013.

4. A. Rooshenas and D. Lowd, "Learning Tractable Graphical Models Using Mixtures of Arithmetic Circuits," in *Late-Breaking Developments in the Field of Artificial Intelligence: Papers Presented at the Twenty-Seventh AAAI Conference on Artificial Intelligence*, Bellevue, WA, USA, 2013.

5. D. Lowd and A. Rooshenas, "Learning Markov Networks with Arithmetic Circuits," in *ICML-13 Workshop on Inferning*, Atlanta, GA, USA, 2013.

6. M. Torkamani and D. Lowd, "Convex Adversarial Collective Classification," in *UAI-12 Workshop on Statistical Relational AI*, Catalina Island, CA, 2012.

7. S. Jiang, D. Lowd, and D. Dou, "Using Markov Logic to Refine an Automatically Extracted Knowledge Base," in *UAI-12 Workshop on Statistical Relational AI*, Catalina Island, CA, 2012.

8. S. Natarajan, T. Khot, D. Lowd, P. Tadepalli, K. Kersting, and J. Shavlik, "Exploiting Causal Independence in Markov Logic Networks: Combining Undirected and Directed Models," in *AAAI-10 Workshop on Statistical Relational AI*, Atlanta, Georgia, 2010.

9. D. Lowd, C. Meek and P. Domingos, "Foundations of Adversarial Machine Learning," in *NIPS-2007 Workshop on Machine Learning in Adversarial Environments for Computer Security*, Vancouver, Canada, 2007.

10. D. Lowd and P. Domingos, "Recursive Random Fields," in *Proceedings of the ICML-2006 Workshop on Open Problems in Statistical Relational Learning*, Pittsburgh, PA, 2006.