Kevin Winner – Curriculum Vitae

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Research Interests

I am interested in using machine learning to model large scale population dynamics of endangered or difficult-to-study species. These ecological problems provide a unique motivation for novel advancements in machine learning and graphical models. My current projects include probabilistic inference for latent variables with countably infinite support (particularly time series of abundance) applied to moth, butterfly and salamander datasets and a continent-scale model of bird migration using Doppler weather radar data. Additionally, I am interested in citizen science, probabilistic graphical models, and inference in graphical models.

Education

2013 - ~**2018**	University of Massachusetts, Amherst MS/PhD in Computer Science (in progress)
2006 - **2010**	University of MD, Baltimore County BSc in Computer Science GPA: 3.7 Honors College Cum Laude

Work Experience

Sum 2016	Visiting Researcher *Smithsonian Conservation Biology Institute* Summer appointment studying statistical methods for animal movement modeling. Animals with GPS collars provided a rich dataset of animal behaviors and movement, from which we were interested in estimating range requirements and interaction dynamics between individuals, populations, and species.
Spr 2016	Visiting Lecturer *Mt Holyoke College* Taught Artificial Intelligence as a senior level undergraduate elective with a class of 15 students.
2013 - **present**	Research Assistant *UMass, MLDS Lab* My supported project with MLDS has been the Birdcast project, a collaborative project with the Cornell Lab of Ornithology that aims to model and forecast bird migration in the continental US using the NEXRAD system of Doppler weather radar. I developed a supervised learning system for distinguishing migration events from weather events in the radar datastream. I am also working on a regression technique which can forecast the quantity of nocturnal migrants using a combination of radar measurements and climatological forecasts.

2012 -
2013
Lecturer
University of MD, Baltimore County

In the 2012-2013 academic year, I became a full-time lecturer at UMBC, teaching 4 sections total of the courses described above. In general, I had a lot of freedom over my courses, with a faculty advisor to consult as needed.

2008 -
2012
Research Assistant
UMBC, MAPLE Lab

Worked on several research projects including a natural language grounding project for robotics, a generic error model for machine learning classifiers, and optimization in multi-agent systems. During my time in MAPLE, I also had an advisory role with many undergraduate students working with the lab.

2011
Intern
SRA International

Designed a Hadoop implementation of Particle Swarm Optimization and applied it to a classified data mining application.

2007 -
2010
Intern
Johns Hopkins University Applied Physics Lab

Worked on a graph based wrapper for SQL queries in intelligence analysis we called Graph Query Language (GQL). Also developed ground software for visualizing and controlling systems on board the STEREO satellite mission.

Teaching Experience

Spr. 2016
CS 334: Artificial Intelligence
Mt. Holyoke College

Senior level elective covering several topics in artificial intelligence, including search, planning, game theory, reinforcement learning and machine learning. For the second half of the semester, students worked in pairs to design and build AI agents to solve a game or puzzle of their choice. This was a small class of 15 students, taught by me with no TA and using updated material from my previous time offering this course at UMBC in 2012.

Spr. 2013
CMSC 341: Data Structures
University of Maryland, Baltimore County

Gateway computer science course transitioning students from thinking about code to designing systems and algorithms, with an introduction to asymptotic analysis and an object-oriented approach to data structures for queues, trees, heaps, and hash tables.
For this course, I taught 2 of 4 sections, with a senior professor coordinating/adminstering the 4 sections. I developed my lecture material, but the syllabus, assignments, and exams were standardized. We had 2 TAs between the 4 sections.

CMSC 203: Discrete Structures
University of Maryland, Baltimore County

Required computer science course on mathematics for computer science focusing on proof techniques, logic, graph theory, combinatorics, and probability theory.
For this course, I taught 1 of 3 independent sections, and had full control over the syllabus, lectures, assignments, and exams. I had one TA.

Fall 2012   CMSC 471: Introduction to Artificial Intelligence
University of Maryland, Baltimore County

Elective computer science course covering a wide array of topics in artificial intelligence, including search, planning, game theory, knowledge representation, logic, and machine learning. The course also served as a first introduction to functional programming with LISP. For this course, I taught the only section, building off of material from previous years' offerings.

Publications

2017	Kevin Winner, Debora Sujono, and Daniel Sheldon. Exact inference for integer latent-variable models. In *Proceedings of the 34th International Conference on Machine Learning*, volume 70 of *Proceedings of Machine Learning Research*, pages 3761–3770, Sydney, Australia, 06–11 Aug 2017. PMLR
2016	Kevin Winner and Daniel Sheldon. Probabilistic inference with generating functions for Poisson latent variable models. In *Advances in Neural Information Processing Systems 30*, 2016
2016	Andrew Farnsworth, Benjamin M. Van Doren, Wesley M. Hochachka, Daniel Sheldon, Kevin Winner, Jed Irvine, Jeffrey Geevarghese, and Steve Kelling. A characterization of autumn nocturnal migration detected by weather surveillance radars in the northeastern usa. *Ecological Applications*, 26(3):752–770, 2016
2015	Kevin Winner, Garrett Bernstein, and Daniel Sheldon. Inference in a partially observed queuing model with applications in ecology. In *Proceedings of the 32nd International Conference on Machine Learning*, volume 37 of *Proceedings of Machine Learning Research*, pages 2512–2520, Lille, France, 07–09 Jul 2015. PMLR
2015	Kevin Winner and Daniel Sheldon. Inference in a partially observed queuing model with applications in ecology. In *AAAI 2015 Workshop on Computational Sustainability*, 2015
2015	Frank A. La Sorte, Wesley M. Hochachka, Andrew Farnsworth, Daniel Sheldon, Daniel Fink, Jeffrey Geevarghese, Kevin Winner, Benjamin M. Van Doren, and Steve Kelling. Migration timing and its determinants for nocturnal migratory birds during autumn migration. *Journal of Animal Ecology*, 84(5):1202–1212, 2015
2014	Penny Rheingans, Marie desJardins, Wallace Brown, Alex Morrow, Doug Stull, and Kevin Winner. *Visualizing Uncertainty in Predictive Models*, pages 61–69. Springer London, London, 2014
2012	Monica Babeş-Vroman, James MacGlashan, Ruoyuan Gao, Kevin Winner, Richard Adjogah, Marie desJardins, Michael Littman, and Smaranda Muresan. Learning to interpret natural language instructions. In *Proceedings of the Second Workshop on Semantic Interpretation in an Actionable Context*, SIAC '12, pages 1–6, Stroudsburg, PA, USA, 2012. Association for Computational Linguistics
2012	James MacGlashan, Monica Babeş-Vroman, Kevin Winner, Ruoyuan Gao, Richard Adjogah, Marie desJardins, Michael Littman, and Smaranda Muresan. Learning to interpret natural language instructions, 2012
2009	Kevin Winner, Don Miner, and Marie desJardins. Controlling particle swarm optimization with learned parameters. In *Self-Adaptive and Self-Organizing Systems, 2009. SASO '09. Third IEEE International Conference on*, pages 288–290, Sept 2009