Assistant Professor
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Jason Pacheco

Machine Learning: Graphical Models, Approximate Inference, Information Planning
Signal Processing: Nonlinear Dynamical Systems, Image/Video Analysis, Motion/Tracking
Applications: Protein Structure, Gene Interaction Discovery, Articulated Object Tracking

Education

Doctor of Philosophy, Brown University   Spring 2016
  Computer Science
  Thesis: *Variational Approximations with Diverse Applications*
  Supervisor: Erik Sudderth

Master of Science, Brown University   Spring 2007
  Computer Science
  Thesis: *Temporal Decomposition for Online Multisensor Multitarget Tracking*
  Supervisor: Meinolf Sellmann

Bachelor of Science, University of Massachusetts Dartmouth   Spring 2003
  Computer Science

Publications

Refereed Publications

[1] E. Mohammadreza, J. Pacheco, W. Li, J. Lee Hu, H. Chen. "Binary Black-Box Attacks Against Static Malware Detectors with Reinforcement Learning in Discrete Action Space." *IEEE S&P Deep Learning and Security Workshop.* May 2021.

[2] S. J. Lee, D. Suri, P. Somani, C. L. Dean, J. Pacheco, R. Stoner, I. Perez-Arriaga, J. W. Fisher III, J. Taneja. "How Probabilistic Electricity Demand Forecasts can Expedite Universal Access to Clean and Reliable Electricity." *J. Energy for Economic Growth.* 2021

[3] S. Zheng, D. S. Hayden, J. Pacheco, J. Fisher III. "Sequential Bayesian Experimental Design with Variable Cost Structure." *Advances in Neural Information Processing Systems.* 2020.

[4] D. S. Hayden, J. Pacheco, J. Fisher III. "Nonparametric Object and Parts Modeling with Lie Group Dynamics." *Conference on Computer Vision and Pattern Recognition.* 2020.

[5] J. Belden, M. M. Mansoor, A. Hellum, S. R. Rahman, A. Meyer, C. Pease, J. Pacheco, S. Koziol and T. T. Truscott. "How vision governs the collective behaviour of dense cycling pelotons." *Journal of the Royal Society Interface.* 2019.

[6] J. Pacheco and J. Fisher III. "Variational Information Planning for Sequential Decision Making." *International Conference on Artificial Intelligence and Statistics.* 2019.

[7] S. Zheng, J. Pacheco, J. Fisher III. "A Robust Approach to Sequential Information Theoretic Planning." *International Conference on Machine Learning.* 2018.

[8] D. Milstein, J. Pacheco, L. Hochberg, J. Simeral, B. Jarosiewicz, E. Sudderth. "Multiscale Semi-Markov Dynamics for Intracortical Brain-Computer Interfaces." *Advances in Neural Information Processing Systems.* 2017.

[9] J. Pacheco and E. B. Sudderth. "Proteins, Particles, and Pseudo-Max-Marginals: A Submodular Approach." *International Conference on Machine Learning.* 2015.

[10] J. Pacheco, S. Zuffi, M. J. Black and E. B. Sudderth. "Preserving Modes and Messages

via Diverse Particle Selection." *International Conference on Machine Learning.* 2014.

[11] J. Pacheco and E. B. Sudderth. "Minimization of continuous Bethe approximations: A positive variation." *Advances in Neural Information Processing Systems.* 2012.

[12] J. Pacheco and E. Sudderth. "Improved variational inference for tracking in clutter." *IEEE Statistical Signal Processing.* 2012.

Technical Reports and Working Papers

[13] C. L. Dean, S. J. Lee, J. Pacheco, J. W. Fisher III. "Lightweight Data Fusion with Conjugate Mappings." *arXiv.* 2020

[14] R. Kothapa, J. Pacheco and E. B. Sudderth. "Max-product particle Belief Propagation." *Brown University Technical Report.* 2011.

Work Experience

University of Arizona, Computer Science	Tucson, AZ	Aug. 2019 - Present
Assistant Professor		
Massachusetts Institute of Technology	Cambridge, MA	Dec. 2016 - Aug. 2019
Postdoctoral Associate		
Naval Undersea Warfare Center	Newport, RI	Sep. 2012 - Dec. 2016
Research Scientist		
Brown University, Computer Science	Providence, RI	Sep. 2010 - May 2016
Graduate Research Assistant		
Naval Undersea Warfare Center	Newport, RI	Jun. 2003 - Sep. 2012
Software Engineer		

Research Grants and Funding

Defending Malware Detectors against Adversarial Malware Variants: A Sequential Decision Making Wargame Framework
National Science Foundation (NSF) Secure and Trustworthy Cyberspace (SaTC)
Co-PI (Submitted)

Robust Maximum Entropy Planning, Learning, and Control in Uncertain Environments
Air Force Office of Scientific Research (AFOSR) Young Investigator Program (YIP)
$422,374, Principal Investigator, Apr. 2022 to Sep. 2024

Robust Planning, Learning, and Control with Diverse Particle Approximations
TRIF Eighteenth Mile Seed Grant
$41,135, Principal Investigator, Jan. 2022 to Jun. 2022

Estimation of Stochastic Surface and Region Growth from Temporally Sparse and Spatially Dense Geophysical Data
Mission Support and Test Services (MSTS)
$60,000, Principal Investigator, Oct. 2021 to Sep. 2022

IAM: Advanced Video Analytics for Metric-Base4d Network Safety Performance Prediction (Phase 2)
Arizona Commerce Authority
$83,904, Co-PI, Sep. 2019 to Dec. 2021

Awards

Diversity, Equity and Inclusion Award, UA Dept. of Computer Science	2022
Brown University Dept. of Computer Science Dissertation Fellowship	2015
Naval Undersea Warfare Center Fellowship	2014
Naval Undersea Warfare Center Fellowship	2007

Teaching and Advising

University of Arizona

CSC 380: Principals of Data Science	Fall 2021
CSC 535: Introduction to Probabilistic Graphical Models	(Fall 2020, Spring 2022)
CSC 665-1: Advanced Topics in Probabilistic Graphical Models	(Fall 2019, Fall 2022)

Brown University

CSCI 2950-P: Probabilistic Graphical Models (Graduate TA)	Spring 2013
CSCI 2950-P: Applied Bayesian Nonparametrics (Graduate TA)	Fall 2011
CSCI 1950-F: Introduction to Machine Learning (Graduate TA)	Spring 2011

Graduate Supervision

Caleb Dahlke, *UA, Applied Mathematics, PhD*	Current
Job Placement : (Internship) Nevada Nuclear Security Site	
Jianwei "James" Shen, *UA, Computer Science, PhD*	Current
Alonso Granados Baca, *UA, Computer Science, PhD*	Current
Marium Yousuf, *UA, Computer Science, PhD*	2019-2022
Job Placement : (Internship) Argonne National Laboratory	

Undergraduate Supervision

Chu Chen, *UA, Computer Science and Mathematics*	2021-2022
Job Placement : (2022 Summer Research Fellowship) Stanford University	

Invited Lectures

Variational Information Control

University of Arizona, Dept. of Mathematics	Fall 2019
University of Arizona, TRIPODS Seminar	Fall 2019

Probabilistic Reasoning in Complex Systems: Algorithms and Applications

UA, Data Science Institute	Oct. 2022
MIT, Computer Science and Artificial Intelligence Lab	Feb. 2019
Dartmouth College, School of Engineering	Feb. 2019
Purdue University, Dept. of Computer Science	Mar. 2019
University of Arizona, Dept. of Computer Science	Mar. 2019
University of Pittsburgh, School of Information Science	Apr. 2019

Robust Information Theoretic Planning

MIT, Consortium for Verification Technology Project Review	Sep. 2017
ExxonMobil Headquarters, Houston TX	Jun. 2017

Diverse Particle Max-Product

UA, Dept. of Management Information Systems	Fall 2021
MIT CSAIL, John Fisher III Laboratory	Jun. 2016
McGill University, Kaleem Sidiqqi Laboratory	May. 2016

Naval Undersea Warfare Center, Division Newport RI		Apr. 2016
Brown University, Guest Lecture: Probabilistic Graphical Models		Mar. 2016
Virginia Tech, Dhruv Batra Laboratory		Feb. 2016
Naval Undersea Warfare Center, Division Newport RI		Apr. 2015
International Conf. on Machine Learning		Jul. 2015
International Conf. on Machine Learning		Jul. 2014
Brown University, Division of Applied Mathematics		Apr. 2014

Tutorial: Graphical Models, Variational Inference, and Message Passing

Naval Undersea Warfare Center, Division Newport RI	Feb. 2012

Professional Service

Departmental Service

Diversity, Equity and Inclusion Chair	UACS	Fall 2022
Department Head Search	UACS	Fall 2022
Graduate Admissions Committee Member	UACS	Spring 2022
Diversity, Equity and Inclusion Committee Member	UACS	Fall 2021 - Spring 2022
Graduate Admissions Committee Member	UACS	Spring, 2021
Faculty Recruiting Committee Member	UACS	Spring, 2020

Conference Program Committee Member

Co-Organizer : International Conference on Data Mining (ICDM) Workshop on Machine Learning for Cybersecurity (MLC)

Co-Organizer : Women in Data Science (WiDS) Tucson

Advances in Neural Information Processing Systems (NeurIPS)

International Conf. on Machine Learning (ICML)

International Conf. on Artificial Intelligence and Statistics (AISTATS)

Association of Advances in Artificial Intelligence (AAAI)

IEEE International Conf. on Computer Vision (ICCV)

IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)

Journal Reviewer

Journal of Machine Learning Research (JMLR)

IEEE Transactions on Signal Processing

IEEE Transactions on Aerospace Engineering