

CHRISTIAN R. SHELTON

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EDUCATION

Massachusetts Institute of Technology PhD, Computer Science	1998 – 2001
Massachusetts Institute of Technology SM, Computer Science	1996 – 1998
Stanford University BS, Computer Science (with distinction)	1993 – 1996

EMPLOYMENT

University of California, Riverside , Professor Department of Computer Science and Engineering (Assistant Professor, 2003–2010, Associate Professor, 2010–2016)	2003 – present
Children’s Hospital Los Angeles , Visiting Researcher 1-year sabbatical, machine learning for ICU data	2012 – 2013
Intel , Visiting Faculty Applications of machine learning to microprocessor fabrication	2003 – 2004
Stanford University , Research Associate Reinforcement learning, game theory, stochastic processes	2001 – 2003

AWARDS

DARPA Computer Science Study Group	2009
AFOSR Young Investigator Award	2006
Member, ΦBK	1996 – present
Member, TBΠ	1996 – present

PUBLICATIONS

Journals

- [1] Benjamin D. Yetton, Elizabeth A. McDevitt, Nicola Cellini, Christian Shelton, and Sara C. Mednick. Quantifying sleep architecture dynamics and individual differences using big data and Bayesian networks. *PLoS ONE*, 13(4), April 11, 2018.
- [2] Zhen Qin and Christian R. Shelton. Event Detection in Continuous Video: An Inference in Point Process Approach. *IEEE Transaction on Image Processing*, 26(12), 5680–5691, 2017.
- [3] Zhen Qin and Christian R. Shelton. Social Grouping for Multi-target Tracking and Head Pose Estimation in Video. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 38(10), 2082–2095, 2016.
- [4] Philip Toltzis, Gerardo Soto-Campos, Christian R. Shelton, Evelyn M. Kuhn, Ryan Hohn, Robert K. Kanter, and Randall C. Wetzel. Evidence-Based Pediatric Outcome Predictors to Guide the Allocation of Critical Care Resources in a Mass Casualty Event. *Pediatric Critical Care Medicine*, 16(7), 2015.
- [5] Christian R. Shelton and Gianfranco Ciardo. Tutorial on Continuous-Time Markov Processes. *Journal of Artificial Intelligence Research*, 51, 725–778, 2014.

- [6] Robinder G. Khemani, E. Busra Celikkaya, Christian R. Shelton, Dave Kale, Patrick A. Ross, Randall C. Wetzel, and Christopher J. L. Newth. Algorithms to estimate PaCO₂ and pH using non-invasive parameters for children with Hypoxemic Respiratory Failure. *Respiratory Care*, 59(8), 1248 – 1257, 2014.
- [7] Juan I. Casse, Christian R. Shelton, and Robert A. Hanneman. A new criterion function for exploratory blockmodeling for structural and regular equivalence. *Social Networks*, 35(1), 31 – 50, 2013.
- [8] Pamela Bhattacharya, Iulian Neamtiu, and Christian R. Shelton. Automated, Highly-Accurate, Bug Assignment Using Machine Learning and Tossing Graphs. *Journal of Systems and Software*, 85(10), 2275 – 2292, 2012.
- [9] Alec C. Gerry, G. E. Higginbotham, N. Periera, A. Lam, and C. R. Shelton. Evaluation of surveillance methods for monitoring house fly abundance and activity on large commercial dairy operations. *Journal of Economic Entomology*, 104(3), 1087 – 1092, 2011.
- [10] Robert A. Hanneman and Christian R. Shelton. Applying modality and equivalence concepts to pattern-finding in social process-produced data. *Social Network Analysis and Mining*, 1, 59 – 72, 2011.
- [11] Jing Xu and Christian R. Shelton. Intrusion detection using continuous time Bayesian networks. *Journal of Artificial Intelligence Research*, 39, 745 – 774, 2010.
- [12] Yu Fan, Jing Xu, and Christian R. Shelton. Importance sampling for continuous time Bayesian networks. *Journal of Machine Learning Research*, 11(Aug), 2077 – 2102, 2010.
- [13] Kevin Horan, Christian R. Shelton, and Thomas Girke. Predicting conserved protein motifs with sub-HMMs. *BMC Bioinformatics*, 11(205), 1471 – 2105, 2010.
- [14] Christian R. Shelton, Yu Fan, William Lam, Joon Lee, and Jing Xu. Continuous time Bayesian network reasoning and learning engine. *Journal of Machine Learning Research*, 11(Mar), 1137 – 1140, 2010.
- [15] Xiaoyue Wang, Lexiang Ye, Eamonn Keogh, and Christian Shelton. Annotating historical archives of images. *International Journal of Digital Library Systems*, 1(2), 59 – 80, 2010.
- [16] Adriano Macchietto, Victor Zordan, and Christian R. Shelton. Momentum control for balance. *ACM Transactions on Graphics / SIGGRAPH*, 28(3), 2009.
- [17] Kevin Horan, Charles Jang, Julie Bailey-Serres, Ron Mittler, Christian Shelton, Jeff F Harper, Jian-Kang Zhu, John JC Cushman, Martin Gollery, and Thomas Girke. Annotating genes of known and unknown function by large-scale co-expression analysis. *Plant Physiology*, 147(1), 41 – 57, 2008.
- [18] Ben Blum, Christian R. Shelton, and Daphne Koller. A continuation method for Nash equilibria in structured games. *Journal of Artificial Intelligence Research*, 25:457 – 502, 2006.
- [19] Charles L. Isbell, Michael Kearns, Satinder Singh, Christian R. Shelton, Peter Stone, and David Kormann. Cobot in LambdaMOO: An adaptive social statistics agent. *Autonomous Agents and Multi-Agent Systems*, 13(3):327 – 354, 2006.
- [20] Christian R. Shelton. Morphable surface models. *International Journal of Computer Vision*, 38(1):75 – 91, 2000.
- [21] Tomaso Poggio and Christian R. Shelton. Learning in brains and machines. *Spatial Vision*, 13(2,3), 287 – 296, 2000.
- [22] Dan Halperin and Christian R. Shelton. A perturbation scheme for spherical arrangements with application to molecular modeling. *Computational Geometry: Theory and Applications*, 10(4):273 – 288, 1998.
- [23] P. W. Finn, L. E. Kavvaki, J.-C. Latombe, R. Motwani, C. Shelton, S. Venkatasubramanian, and A. Yao. RAPID: Randomized pharmacophore identification for drug design. *Computational Geometry: Theory and Applications*, 10(4):263 – 272, 1998.

Refereed Conferences

- [24] Jacob Fauber and Christian R. Shelton. Modeling “Presentness” of Electronic Health Record Data to Improve Patient State Estimation. In *Machine Learning for Healthcare*, 2018.
- [25] Christian R. Shelton, Zhen Qin, and Chandini Shetty. Hawkes Process Inference with Missing Data. In *Proceedings of the Thirty-Second AAAI Conference on Artificial Intelligence*, 2018.
- [26] Kazi T. Islam, Christian R. Shelton, Juan I. Casse, and Randall Wetzel. Marked Point Process for Severity of Illness Assessment In *Proceedings of Machine Learning for Healthcare*, 2017.
- [27] Mike Izbicki, Sajjad Amini, Christian R. Shelton, and Hamed Mohsenian-Rad. Identification of Destabilizing Attacks in Power Systems. In *Proceedings of the 2017 American Control Conference*, 2017.
- [28] Zhen Qin and Christian R. Shelton. Auxiliary Gibbs Sampling for Inference in Piecewise-Constant Conditional Intensity Models. In *Proceedings of the Thirty-First Conference on Uncertainty in Artificial Intelligence (UAI)*, 2015.
- [29] Mike Izbicki and Christian R. Shelton. Faster Cover Trees. In *Proceedings of the Thirty-Second International Conference on Machine Learning (ICML)*, 2015.
- [30] E. Busra Celikkaya and Christian R. Shelton. Deterministic Anytime Inference for Stochastic Continuous-Time Markov Processes. In *Proceedings of the Thirty-First International Conference on Machine Learning (ICML)*, 2014.
- [31] Zhen Qin, Christian R. Shelton, and Lunshao Chai. Social Grouping for Target Handover in Multi-View Video. In *IEEE International Conference on Multimedia and Expo*, 2013. **Best Paper Candidate**
- [32] Zhen Qin and Christian R. Shelton. Improving Multi-target Tracking via Social Grouping. In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2012.
- [33] Lunshao Chai, Zhen Qin, Honggang Zhang, Jun Guo, and Christian R. Shelton. Re-Ranking using Compression-based Distance Measure for Content-based Commercial Product Image Retrieval. In *IEEE International Conference on Image Processing (ICIP)*, 2012.
- [34] E. Busra Celikkaya, Christian R. Shelton, and William Lam. Factored Filtering of Continuous-Time Systems. In *Proceedings of the Twenty-Seventh International Conference on Uncertainty in Artificial Intelligence (UAI)*, 2011.
- [35] Teddy N. Yap, Jr., Mingyang Li, Anastasios I. Mourikis, and Christian R. Shelton. A particle filter for monocular vision-aided odometry. In *Proceedings of the 2011 IEEE International Conference on Robotics and Automation (ICRA)*. 2011.
- [36] Antony Lam, Amit K. Roy-Chowdury, and Christian R. Shelton. Interactive event search through transfer learning. In *Proceedings of the Tenth Asian Conference on Computer Vision (ACCV)*, 2010.
- [37] Yu Fan and Christian R. Shelton. Learning continuous-time social network dynamics. In *Proceedings of the Twenty-Fifth International Conference on Uncertainty in Artificial Intelligence (UAI)*, 2009.
- [38] Teddy N. Yap, Jr. and Christian R. Shelton. SLAM in large indoor environments with low-cost, noisy, and sparse sonars In *Proceedings of the 2008 IEEE International Conference on Robotics and Automation (ICRA)*. pages 1395 – 1401, 2009.
- [39] Guobiao Mei and Christian R. Shelton. Unsupervised image embedding using nonparametric statistics. In *International Conference on Pattern Recognition (ICPR)*, 2008.
- [40] Antony Lam and Christian R. Shelton. Face recognition and alignment using support vector machines. In *Automatic Face and Gesture Recognition*, 2008.

- [41] Kin Fai Kan and Christian R. Shelton. Catenary support vector machines. In *Knowledge Discovery in Databases (ECML/PKDD)* (LNAI, vol 5211), pages 597 – 610, 2008.
- [42] Jing Xu and Christian R. Shelton. Continuous time Bayesian networks for host level network intrusion detection. In *Knowledge Discovery in Databases (ECML/PKDD)* (LNAI, vol 5212), pages 613 – 627, 2008.
- [43] Xiaoyue Wang, Lexiang Ye, Eamonn Keogh, and Christian Shelton. Annotating historical archives of images. In *Joint Conference on Digital Libraries*, pages 341 – 350, 2008.
- [44] Teddy N. Yap, Jr. and Christian R. Shelton. Simultaneous learning of motion and sensor model parameters for mobile robots. In *Proceedings of the 2008 IEEE International Conference on Robotics and Automation (ICRA)*, pages 2091 – 2097, 2008.
- [45] Kin Fai Kan and Christian R. Shelton. Solving structured continuous-time Markov decision processes. In *Proceedings of the Tenth International Symposium on Artificial Intelligence and Mathematics (ISAIM)*, 2008.
- [46] Yu Fan and Christian R. Shelton. Sampling for approximate inference in continuous time Bayesian networks. In *Proceedings of the Tenth International Symposium on Artificial Intelligence and Mathematics (ISAIM)*, 2008.
- [47] Christian R. Shelton, Wesley Huie, and Kin Fai Kan. Chained boosting. In *Advances in Neural Information Processing Systems (NIPS)*, pages 1281 – 1288, 2007.
- [48] Titus Winters, Christian R. Shelton, and Tom Payne. Investigating generative factors of score matrices. In *Proceedings of the Thirteenth International Conference on Artificial Intelligence in Education*, pages 479 – 486, 2007.
- [49] Guobiao Mei and Christian R. Shelton. Visualization of Collaborative Data. In *Proceedings of the Twenty-Second International Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 341 – 348, 2006.
- [50] Xiaopeng Xi, Eamonn Keogh, Christian Shelton, Li Wei, and Chotirat Ann Ratanamahatana. Fast time series classification using numerosity reduction. In *Proceedings of the Twenty-Third International Conference on Machine Learning (ICML)*, pages 1033 – 1040, 2006.
- [51] Uri Nodelman, Christian R. Shelton, and Daphne Koller. Expectation maximization and complex duration distributions for continuous time Bayesian networks. In *Proceedings of the Twenty-First International Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 411 – 430, 2005.
- [52] Uri Nodelman, Daphne Koller, and Christian R. Shelton. Expectation propagation for continuous time Bayesian networks. In *Proceedings of the Twenty-First International Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 431 – 440, 2005.
- [53] Uri Nodelman, Christian R. Shelton, and Daphne Koller. Learning continuous time Bayesian networks. In *Proceedings of the Nineteenth International Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 451 – 458, 2003. **Best Student Paper Award** (student: Uri Nodelman).
- [54] Ben Blum, Christian R. Shelton, and Daphne Koller. A continuation method for Nash equilibria in structured games. In *Proceedings of the Eighteenth International Joint Conference on Artificial Intelligence (IJCAI)*, pages 757 – 764, 2003.
- [55] Uri Nodelman, Christian R. Shelton, and Daphne Koller. Continuous time Bayesian networks. In *Proceedings of the Eighteenth International Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 378 – 387, 2002.
- [56] Christian R. Shelton. Reinforcement learning with partially known world dynamics. In *Proceedings of the Eighteenth International Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 461 – 468, 2002.

- [57] Leonid Peshkin and Christian R. Shelton. Learning from scarce experience. In *Proceedings of the Nineteenth International Conference on Machine Learning (ICML)*, pages 498 – 505, 2002.
- [58] Charles L. Isbell, Christian R. Shelton, Michael Kearns, Satinder Singh, and Peter Stone. A social reinforcement learning agent. In *Proceedings of the Fifth International Conference on Autonomous Agents (AGENTS)*, 2001. **Best Paper Award.**
- [59] Christian R. Shelton. Policy improvement for POMDPs using normalized importance sampling. In *Proceedings of the Seventeenth International Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 496 – 503, 2001.
- [60] Christian R. Shelton. Balancing multiple sources of reward in reinforcement learning. In *Advances in Neural Information Processing Systems (NIPS)*, pages 1082 – 1088, 2000.
- [61] Dan Halperin and Christian R. Shelton. A perturbation scheme for spherical arrangements with application to molecular modeling. In *Proceedings of the Thirteenth Symposium on Computational Geometry*, pages 183 – 192, 1997.
- [62] P. W. Finn, L. E. Kavragi, J.-C. Latombe, R. Motwani, C. Shelton, S. Venkatasubramanian, and A. Yao. RAPID: Randomized pharmacophore identification for drug design. In *Proceedings of the Thirteenth Symposium on Computational Geometry*, pages 324 – 333, 1997.
- [63] Paul W. Finn, Dan Halperin, Lydia E. Kavragi, Jean-Claude Latombe, Rajeev Motwani, Christian Shelton, and Suresh Venkatasubramanian. Geometric manipulation of flexible ligands. In M. C. Lin and D. Manocha, editors, *Applied Computational Geometry: Towards Geometric Engineering*, pages 67 – 78. Springer, 1996.

FUNDED EXTERNAL GRANTS

GAANN: Fellowships in Computer Science and Engineering \$895,500, NSF, co-PI	10/2018 – 9/2021
A Comp. and Robotics Infrastr. for Learning-based Autonomous Systems \$428,331, DoD, co-PI	6/2018 – 6/2019
Prob. Ops Warranted for Energy Reliability Evaluation and Diagnostics \$170,000, DoD SBIR phase II sub-award, sole PI	7/2017 – 9/2019
NRT-DESE: NRT in Integrated Computational Entomology (NICE) \$2,721,142, NSF, co-PI	9/2016 – 8/2021
Machine Learning for Agricultural and Medical Entomology \$1,100,000, NSF, co-PI	10/2015 – 9/2019
REU Site: RE-ICE: Research Experiences in Integrated Comp. Entomology \$389,550, NSF, co-PI	4/2015 – 3/2018
DynamicData: A Hier. Appr. to Dyn. Big Data Analysis in Power Infra. Sec. \$185,000, NSF, co-PI	10/2015 – 9/2017
Inference for Continuous-Time Probabilistic Programming \$706,513, DARPA, sole PI	10/2013 – 8/2017
Estimating Models of Patient Response to Ventilation \$156,146, sub-award from Children’s Hospital Los Angeles, sole PI	10/2011 – 9/2014
Modular CS1 from the Inside Out: Comp. Thinking for STEM Students \$25,000 (UCR’s component), NSF CPATH, Senior Personnel (Harvey Mudd lead institution)	10/2010 – 9/2011
Reasoning in Dynamic Real Time Systems \$100,000, DARPA, Computer Science Study Group (CSSG), sole PI	4/2009 – 4/2010
Continuous Time Structured Stochastic Processes	12/2006 – 11/2009

\$346,729, US Air Force (AFOSR) **Young Investigator Program (YIP), sole PI**
Continuous Time Models for Malicious Net. Traffic Detection 10/2006 – 12/2007
 \$86,500 (= \$55,000 from Intel Research + \$31,500 from UC MICRO), **sole PI**
Adaptive Decision Making for Silicon Manufacturing 10/2004 – 12/2006
 \$159,646 (= \$95,000 from Intel Research + \$64,646 from UC MICRO), **sole PI**

GRADUATE STUDENTS

UC Riverside (11 PhD, 9 MS graduated) [last known location] 2003 – present
 Mike Izbicki, PhD, 2017 [post-doc at UCR]
 Busra Celikkaya, PhD, 2016 [Amazon]
 Zhen Qin, PhD, 2015 [Google]
 Juan Casse, PhD, 2014 [Beyond Limits]
 Kevin Horan, PhD, 2011 [Global Recordings Network]
 Antony Lam, PhD, 2010 [Assistant Professor, Saitama University, Japan]
 Jing Xu, PhD, 2010 [Mathworks]
 Teddy Yap, Jr., PhD, 2009 [Scotiabank]
 Yu Fan, PhD, 2009 [Google]
 Kin Fai Kan, PhD, 2008 [Salesforce]
 Guobiao Mei, PhD, 2008 [Google]
 Sanjana Sandeep, MS, 2018 [SAP]
 Anthony Williams, MS, 2017 [PhD student at Oregon State]
 Gaurav Jhaveri, MS, 2017 [HintMD]
 Chandini Shetty, MS, 2017 [VMWare]
 Matthew Zarachoff, MS, 2015 [PhD student at Leeds-Beckett]
 Louisa Kim, MS, 2015 [Eurofins Scientific]
 Suraj Narayana, MS, 2014 [Knightscope]
 Jeff Price, MS, 2011 [Osprey Data]
 Wesley Huie, MS, 2005 [DIRECTV]

PROFESSIONAL SERVICE

Conference Co-Chair 2015
 MUCMD: Meaningful Use of Complex Medical Data
Editorial Board 2009 – 2012
 Journal of Artificial Intelligence Research (JAIR)
Managing Editor 2003 – 2008
 Journal of Machine Learning Research (JMLR)
Conference Senior PC Member:

- Uncertainty in Artificial Intelligence (UAI): 2011, 2012, 2013
- Conference on Artificial Intelligence (AAAI): 2016, 2017, 2018
- International Joint Conferences on Artificial Intelligence (IJCAI): 2018
- Machine Learning for Healthcare (MLHC, formerly MUCMD): 2017, 2018, 2019

Conference PC Member:

- International Conference on Artificial Intelligence and Statistics (AISTATS): 2017, 2019
- International Joint Conferences on Artificial Intelligence (IJCAI): 2007, 2009, 2015
- International Conference on Machine Learning (ICML): 2006, 2007, 2008, 2010, 2012, 2013, 2014, 2019
- Conference on Artificial Intelligence (AAAI): 2008

- Uncertainty in Artificial Intelligence (UAI): 2003, 2005, 2006, 2007, 2018
- International Conference on Knowledge Discovery and Data Mining (KDD): 2006, 2007

UNIVERSITY SERVICE

UC System-wide Senate Committee on Planning & Budget Riverside representative	2016 – 2018
Campus Senate Committee on Planning & Budget chair, 2016 – 2018 vice chair, 2015 – 2016	2015 – 2018
Department School and Community Outreach Chair	2016 – 2019
Campus Linguistics Major Steering Committee	2016 – 2018
Department Graduate Admissions Committee	2009 – 2012, 2015 – 2016
College IT Committee	2015 – 2018
Campus Non-Senate Faculty Excellence Review Committee chair, 2013 – 2015	2011 – 2015
Department Colloquium Committee chair	2013 – 2014
College TBI faculty advisor chief advisor, 2007 – 2012, 2016 – present	2005 – present
Department Honor Society Advisor	2011 – 2018
Academic Senate Writing Across the Curriculum Advisory Council	2011 – 2012
College Undergraduate Admissions Review Committee, chair	2012
Academic Senate Preparatory Education Committee	2010 – 2012
UCR Undergraduate Research Journal Advisory Board chair, 2011 – 2012	2009 – 2012
College Executive Committee	2008 – 2011
College Breadth Requirement Review Committee chair	2011
Department Faculty Search Committee	2008 – 2010
ACM Programming Competition Coach	2009
College ABET committee	2005 – 2007

TEACHING

UC Riverside	2003 – present
CS260 (grad seminar): Deep Learning	
CS229 (grad): Machine Learning	
CS227 (grad): Probabilistic Models for Artificial Intelligence	
CS205 (grad): Artificial Intelligence	
CS181 (ugrad): Principles of Programming Languages	
CS179M (ugrad): Senior Project in Artificial Intelligence	
CS171 (ugrad): Introduction to Machine Learning and Data Mining	
CS170 (ugrad): Introduction to Artificial Intelligence	
CS14 (ugrad): Introduction to Data Structures and Algorithms	