Peter Sadowski

Associate Professor
Information and Computer Sciences
University of Hawai'i at Mānoa
1680 East-West Road
Honolulu, HI 96822

peter.sadowski@hawaii.edu
https://peterjsadowski.github.io
+1 (808) 956-2023

Education

California Institute of Technology	Computer Science	B.S. with Honors 2009
University of California Irvine	Computer Science	M.S. 2013
University of California Irvine	Computer Science	Ph.D. 2016

Experience

2023–present:	**Associate Professor**	University of Hawai'i at Mānoa	Honolulu, HI
2018–2023:	**Assistant Professor**	University of Hawai'i at Mānoa	Honolulu, HI
2016–2018:	**Postdoc**	University of California Irvine	Irvine, CA
2010–2016:	**Graduate Student**	University of California Irvine	Irvine, CA
2009–2010:	**Research Scientist**	University of Washington	Seattle, WA

Publications

Journal articles

D. Valdez, A. Bunnell, S. Y. Lim, P. Sadowski, and J. A. Shepherd. Performance of progressive generations of GPT on an exam designed for certifying physicians as certified clinical densitometrists. *Journal of Clinical Densitometry*, 27(2):101480, 2024

L. Leong, M. C. Wong, Y. E. Liu, Y. Glaser, B. K. Quon, N. N. Kelly, D. Cataldi, P. Sadowski, S. B. Heymsfield, and J. A. Shepherd. Generative deep learning furthers the understanding of local distributions of fat and muscle on body shape and health using 3D surface scans. *Communications Medicine*, 4(13), 2024

Y. Glaser, J. Shepherd, L. Leong, T. Wolfgruber, L.-Y. Lui, P. Sadowski, and S. Cummings. Deep learning predicts all-cause mortality from longitudinal total-body DXA imaging. *Communications Medicine*, 2(102), 2022

A. Amend, S. Swift, M. Belcaid, N. Centraro, J. Darcy, K. Frank, K. Fraiola, T. McDermott, M. McFall-Ngai, C. Mora, M. Medeiros, K. Nakayama, C. Nelson, N. Nguyen, R. Rollins, P. Sadowski, W. Sparagon, M. Tefit, J. Yew, N. Hynson, J. Buchanan, D. Yogi, and K. Kajihara. A ridge-to-reef ecosystem microbial census reveals environmental reservoirs for animal and plant microbiomes. *Proceedings of the National Academy of Sciences*, 119(33):e2204146119, 2022

Z. R. Claytor, J. L. van Saders, J. Llama, P. Sadowski, B. Quach, and E. A. Avallone. Recovery of TESS stellar rotation periods using deep learning. *The Astrophysical Journal*, 927(2):219, 2022. arXiv:2104.14566 [astro-ph.SR]

L. Leong, S. Malkov, K. Drukker, B. L. Niell, P. Sadowski, T. Wolfgruber, H. Greenwood, B. Joe, K. Kerlikowske, M. E. Giger, and J. A. Shepherd. Dual-energy three-compartment breast imaging for compositional biomarkers to improve detection of malignant lesions. *Communications Medicine*, 1(29), 2021

X. Zhu, T. K. Wolfgruber, L. Leong, M. Jensen, C. Scott, S. Winham, P. Sadowski, C. Vachon, K. Kerlikowske, and J. A. Shepherd. Deep learning predicts interval and screening-detected cancer from screening mammograms: A case-case-control study in 6369 women. *Radiology*, 0(0):203758, 2021. PMID: 34491131

A. Pineci, P. Sadowski, E. Gaidos, and X. Sun. Proxy-based prediction of solar extreme ultraviolet emission using deep learning. *The Astrophysical Journal Letters*, 910(2):L25, Apr 2021. arXiv:2103.08887 [astro-ph.SR]

B. Quach, Y. Glaser, J. Stopa, A. Mouche, and P. Sadowski. Deep learning for predicting significant wave height from synthetic aperture radar. *IEEE Transactions on Geoscience and Remote Sensing*, 59(3):1859–1867, 2020

L. Hertel, J. Collado, P. Sadowski, J. Ott, and P. Baldi. Sherpa: Robust hyperparameter optimization for machine learning. *SoftwareX*, 12:100591, 2020. arXiv:2005.04048 [cs.LG]

P. Baldi and P. Sadowski. Learning in the machine: Recirculation is random backpropagation. *Neural Networks*, 108:479–494, 2018

P. Baldi, P. Sadowski, and Z. Lu. Learning in the machine: Random backpropagation and the deep learning channel. *Artificial intelligence*, 260:1–35, 2018. arXiv:1612.02734 [cs.LG]

C. Shimmin, P. Sadowski, P. Baldi, E. Weik, D. Whiteson, E. Goul, and A. Søgaard. Decorrelated jet substructure tagging using adversarial neural networks. *Phys. Rev. D*, 96:074034, Oct 2017

P. Baldi, P. Sadowski, and Z. Lu. Learning in the machine: The symmetries of the deep learning channel. *Neural Networks*, 95:110–133, 2017. arXiv:1712.08608 [cs.NE]

P. Sadowski, B. Radics, Ananya, Y. Yamazaki, and P. Baldi. Efficient antihydrogen detection in antimatter physics by deep learning. *Journal of Physics Communications*, 1(2):025001, 2017

P. Sadowski, D. Fooshee, N. Subrahmanya, and P. Baldi. Synergies between quantum mechanics and machine learning in reaction prediction. *Journal of Chemical Information and Modeling*, 56(11):2125–2128, 2016

P. Baldi and P. Sadowski. A theory of local learning, the learning channel, and the optimality of backpropagation. *Neural Networks*, 83:51–74, 2016. arXiv:1506.06472 [cs.LG]

P. Baldi, K. Bauer, C. Eng, P. Sadowski, and D. Whiteson. Jet substructure classification in high-energy physics with deep neural networks. *Phys. Rev. D*, 93:094034, May 2016

P. Baldi, K. Cranmer, T. Faucett, P. Sadowski, and D. Whiteson. Parameterized neural networks for high-energy physics. *The European Physical Journal C*, 76(5):235, 2016

P. Baldi, P. Sadowski, and D. Whiteson. Enhanced Higgs boson to $\tau^+ \tau^-$ search with deep learning. *Phys. Rev. Letters*, 114:111801, 2015

P. Baldi, P. Sadowski, and D. Whiteson. Searching for exotic particles in high-energy physics with deep learning. *Nature Communications*, 5, 2014

P. Sadowski and P. Baldi. Small-molecule 3D structure prediction using open crystallography data. *Journal of Chemical Information and Modeling*, 53(12):3127–3130, 2013

Conference publications

C. Corti, P. Sadowski, N. Nikonov, M. Potgieter, and V. Bindi. Constraining the global heliospheric transport of galactic cosmic rays in solar cycles 23 and 24. In *Proceedings of 38th International Cosmic Ray Conference PoS(ICRC2023)*, ICRC2023. Sissa Medialab, Aug. 2023

C. Dodds, S. Jaeggli, M. Rempel, P. Sadowski, T. Schadd, L. Tarr, and X. Sun. Spin4d: Spectropolarimetric inversion in four dimensions with deep learning. In *Machine Learning in Heliophysics*, 2022

J. Fletcher and P. Sadowski. Towards learned control policies for extended object imaging using distributed aperture telescopes. In *Sensors and Systems for Space Applications XV*, volume 12121, pages 75–86. SPIE, 2022

M. Ito, Y. Glaser, and P. Sadowski. Evolution informed neural networks for microbiome data analysis. In *2021 IEEE International Conference on Bioinformatics and Biomedicine (IEEE BIBM 2021)*, pages 3386–3391. IEEE, 2021

M. Ito, I. Cunnyngham, X. Sun, and P. Sadowski. Group Equivariant Neural Networks for Spectropolarimetric Inversions in Solar Astronomy. In *AGU Fall Meeting Abstracts*, volume 2021, pages SH45B–2382, Dec. 2021

Y. Glaser, J. Shepherd, L. Leong, T. Wolfgruber, L.-Y. Lui, P. Sadowski, and S. Cummings. Deep learning identifies body composition changes over time in total-body DXA imaging to predict all-cause mortality. In *The Radiological Society of North America scientific assembly and annual meeting (RSNA)*, 2021

X. Zhu, T. Wolfgruber, L. Leong, M. Jensen, C. Scott, S. Winham, P. Sadowski, C. Vachon, K. Kerlikowske, and J. Shepherd. Deep learning predicts interval and screen-detected cancer from negative screening mammograms: a case-case-control study in 6369 women. In *The Radiological Society of North America scientific assembly and annual meeting (RSNA)*, 2021

E. Racah, S. Ko, P. Sadowski, W. Bhimji, C. Tull, S.-Y. Oh, P. Baldi, et al. Revealing fundamental physics from the daya bay neutrino experiment using deep neural networks. In *2016 15th IEEE International Conference on Machine Learning and Applications*, pages 892–897. IEEE, 2016

P. Sadowski, J. Collado, D. Whiteson, and P. Baldi. Deep learning, dark knowledge, and dark matter. In *NIPS 2014 Workshop on High-energy Physics and Machine Learning*, pages 81–87, 2015

D. Chicco, P. Sadowski, and P. Baldi. Deep autoencoder neural networks for gene ontology annotation predictions. In *Proceedings of the 5th ACM conference on bioinformatics, computational biology, and health informatics*, pages 533–540, 2014

P. Sadowski, D. Whiteson, and P. Baldi. Searching for higgs boson decay modes with deep learning. In *Advances in Neural Information Processing Systems*, pages 2393–2401, 2014

P. Baldi and P. Sadowski. Understanding dropout. In *Advances in Neural Information Processing systems*, pages 2814–2822, 2013

P. Sadowski, L. Cazzanti, and M. R. Gupta. Bayesian and pairwise local similarity discriminant analysis. In *2010 2nd International Workshop on Cognitive Information Processing*, pages 287–292. IEEE, 2010

Book chapters

P. Baldi, P. Sadowski, and D. Whiteson. Deep learning from four vectors. In *Artificial Intelligence For High Energy Physics*, chapter 3, pages 59–83. World Scientific Publishing, 2022. arXiv:2203.03067 [hep-ex]

P. Sadowski and P. Baldi. Deep learning in the natural sciences: applications to physics. In *Braverman Readings in Machine Learning. Key Ideas from Inception to Current State*, pages 269–297. Springer, 2018

Other publications

Y. Hatanaka, Y. Glaser, G. Galgon, G. Torri, and P. Sadowski. Diffusion models for high-resolution solar forecasts. *arXiv preprint arXiv:2302.00170*, 2023

Y. Glaser, P. Sadowski, and J. E. Stopa. Self-supervised detection of atmospheric phenomena from remotely sensed synthetic aperture radar imagery. In *NeurIPS Workshop on Machine Learning in the Physical Sciences*, 2022

J. DeLay, J. Nicolow, P. Sadowski, W. Kuntz, G. Kalaiwaa, T. Giambelluca, and H. Tseng. Using meteorological monitoring and image recognition to inform species relocation. In *Hawaii Conservation Conference*, 2022

M. Ito, C. Karamperidou, P. Sadowski, S. Camargo, C.-Y. Lee, and C. Patricola. Explainable Artificial Intelligence for Insights into the Relationship between ENSO and Tropical Cyclone Genesis. In *AGU Fall Meeting Abstracts*, volume 2021, pages GC42A–07, Dec. 2021

E. Layton, P. Sadowski, G. Torri, and A. Nugent. Detecting Organization of Shallow Cumulus Clouds in the Central Pacific using Artificial Intelligence. In *AGU Fall Meeting Abstracts*, volume 2021, pages A25D–1698, Dec. 2021

K. Hart, P. Sadowski, and G. Torri. Nowcasting solar radiance over Oahu. In *AI for Earth Sciences Workshop at NeurIPS*, 2020

Y. Glaser, P. Sadowski, T. Wolfgruber, L. Liu, S. Cummings, and J. Shepherd. Hip fracture risk modeling using DXA and deep learning. In *Medical Imaging Meets NeurIPS Workshop*, 2020

Y. Glaser, S. Kohani, K. Nishimura, and P. Sadowski. Particle identification in the Belle II detector using deep learning. In *AAAI 2020 Fall Symposium on Physics-guided AI to Accelerate Scientific Discovery*, 2020

A. Pineci, E. Gaidos, X. Sun, and P. Sadowski. EUV-Net: Predicting solar extreme ultraviolet emission from He I line absorption using deep learning. In *AAAI 2020 Fall Symposium on Physics-guided AI to Accelerate Scientific Discovery*, 2020

B. Quach, Y. Glaser, J. Stopa, and P. Sadowski. Deep sensing of ocean wave heights with synthetic aperture radar. In *AAAI 2020 Spring Symposium on Combining Artificial Intelligence and Machine Learning with Physical Sciences*, 2020

A. Nikolaev, I. Richter, and P. Sadowski. Deep learning for climate models of the Atlantic ocean,. In *AAAI 2020 Spring Symposium on Combining Artificial Intelligence and Machine Learning with Physical Sciences*, 2020

R. Beck, P. Sadowski, Y. Glaser, and I. Szapudi. Refined redshift regression in cosmology with graph convolution networks. In *NeurIPS Machine Learning and the Physical Sciences Workshop*, 2019

C. Dodds, I. Cunnyngham, L. Tarr, S. Jaeggli, T. Schadd, P. Sadowski, and X. Sun. Inverting solar spectropolarimetric observations with deep learning. In *NeurIPS Machine Learning and the Physical Sciences Workshop*, 2019

P. Sadowski, L. Hertel, J. Collado, and P. Baldi. Sherpa: Hyperparameter optimization for machine learning models. In *NeurIPS Workshop on Machine Learning Open Source Software*, 2018

The Theano Development Team. Theano: A python framework for fast computation of mathematical expressions, 2016. arXiv:1605.02688 [cs.SC, cs.LG, cs.MS]

F. Agostinelli, M. Hoffman, P. Sadowski, and P. Baldi. Learning activation functions to improve deep neural networks, 2014. arXiv:1412.6830v3 [cs.NE]

Teaching Experience

University of hawai'i at mānoa

ICS 637 Deep Learning with Neural Networks	2018, 2023
ICS 635 Machine Learning	2019, 2022, 2024
ICS 435 Machine Learning Fundamentals	2020, 2021, 2022, 2024
ICS 235 Machine Learning Methods	2019, 2020, 2024
ICS 311 Algorithms	2020—2022

Awards

Artificial Intelligence Journal Prominent Paper Award 2019

ICML Outstanding Reviewer Award 2016

Research Grants

CAREER: Score-Based Diffusion Models for Probabilistic Forecasting of Weather and Climate, NSF 2144032, $424,293, 07/15/2023 – 06/30/2028, PI.

Enhanced Integration of Remotely Sensed Data for Improved Water Security Across Hawaii, MITRE Corporation, $125,000, 04/01/2023 – 12/31/2023, Co-I.

CC Compute: Koa - A High Performance and Flexible Research Computing Resource*, NSF 2201428, $400,000, 06/01/2022 – 05/31/2024, Co-PI.

Catch a Fading Star: Using Transient Dimming to Explore the Planet-Forming Zones of Young Stars, NSF 2106927, $697,010, 09/01/2021 – 08/31/2024, Co-PI.

MIM: Using Machine Learning and a Model Watershed to Understand how Microbes Govern Food Web Architecture and Efficiency, NSF 2124922, $2,499,432, 01/15/2022 – 12/31/2026, Co-PI.

Preliminary investigation of machine learning and advanced statistical approaches to improve projections of future climate in Hawaii, PI-CASC G21AC10381-00, $37,964, 01/01/2021 – 01/01/2022, Role: Co-I.

Forecasting of Galactic Cosmic Rays in the Heliosphere over Different Solar Cycles and Forbush Decreases, NASA 80NSSC20K1819, $916,807, 09/01/2020 – 08/31/2024, Co-I.

Critical Early DKIST Science: SPIn4D: Spectropolarimetric Inversion in Four Dimensions with Deep Learning, NSF 2008344, $693,679, 08/01/2020 – 07/31/2023, co-PI.

Nowcasting Solar Irradiance from Satellite Imagery, Hawaiian Electric Company and UH Office of Innovation and Commercialization, $10,000, 01/15/2020 – 04/31/2020, PI.

A Search for Transient Stellar Dimming in TESS FFI Lightcurves, NASA 80NSSC19K1705, $50,000, 10/01/2019 – 09/31/2020, Co-I.

Space-Feasible Body Composition and Body Shape Analysis for Long Duration Missions, Baylor College of Medicine, $332,698, 10/01/2019 – 09/31/2020, Co-I.

Professional Activities

Editing

Artificial Intelligence, Standard Editor

Conference reviewing

Neural Information Processing Systems (NeurIPS), International Conference on Learning Representations (ICLR), International Conference on Data Mining (ICDM), International Conference on Machine Learning (ICML).

Journal reviewing

Transactions in Machine Learning Research (TMLR), Journal of Machine Learning Research (JMLR), Neural Networks, Artificial Intelligence (AIJ), Physical Review Letters (PRL), Bioinformatics, IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Information Theory, Entropy, Data Mining and Knowledge Discovery, Computing and Software for Big Science, Physical Review D.

Program Committee

AAAI 2021 Spring Symposium on Combining Artificial Intelligence and Machine Learning with Physics Sciences

AAAI 2020 Spring Symposium on Combining Artificial Intelligence and Machine Learning with Physics Sciences

Invited Talks

Argonne National Lab	2023
NCAR Machine Integration and Learning for Earth Systems (MILES) Group	2023
University of South Carolina	2022
Kyung Hee University	2021
United Nations Food and Agriculture Organization	2021
University of Hawai'i Hilo	2020
International Joint Conference on Artificial Intelligence — macau, china	2019
National Taiwan University — taipei, taiwan	2019
University of California Irvine — irvine, ca	2019
APSIPA Meeting — honolulu, hi	2018
Arizona State University — tempe, az	2018
Rice University — houston, tx	2017
IDSIA Swiss AI Lab — lugano, switzerland	2015
CERN Data Science Workshop — geneva, switzerland	2015
Connecting the Dots Workshop — berkeley, ca	2015

ReWork Deep Learning Summit — san francisco, ca 2015

Systems Biology Verification Improver Symposium — lagonissi, greece 2013

Contributed talks

NeurIPS Machine Learning Open Source Software Workshop — montreal, canada 2018

MANTISSA Workshop, Lawrence Berkeley National Lab — berkeley, ca 2015

ACM Conf. on Bioinformatics, Comp. Bio., and Health Info. — newport beach, ca 2014

NeurIPS Workshop: Randomized Methods in ML — lake tahoe, nv 2013

Public outreach talks

Honolulu Science Cafe – honolulu, hi 2023

Pilina Ao Webinar – honolulu, hi 2022

Career Day: Careers in Computer Science — waipahu, hi 2021

Summer Institute for Mathematics at the Univ. of Washingon — seattle, wa 2014 — 2020

COSMOS Summer School for Math and Science — irvine, ca 2016 — 2018