

Physics-Informed Learning Machines Literature

Citations from *Physics of Data* Obsidian vault

Alfonso R. Reyes

2025-08-01

Table of Contents

Citation Bibliography - PhysicsOfData Vault	2
Categorization Summary	2
DataFrame Analysis	2
Citation Bibliography	2
1. Physics-Informed Learning Machines, SciML, PINNs	3
2. Supporting Papers	50
Processing Summary	56

Citation Bibliography - PhysicsOfData Vault

Total Citations Found: 455

Categorization Summary

Scientific Machine Learning (Core): 404 papers

Supporting Papers: 51 papers

DataFrame Analysis

Year range: 1915 - 2024

Citations with Git repositories: 148

Citation types: - Paper : 398 - Book : 19 - Software : 10 - Slides : 6 - Chapter : 4

Citation Bibliography

Format: lastname, lastname. year. *title*. journal. N pages. DOI: DOI url. Relevance: score. [Git Repo].

1. Physics-Informed Learning Machines, SciML, PINNs

1. Wang, Wang, Perdikaris. 2021. *Learning the solution operator of parametric partial differential equations with physics-informed DeepONets*. Science Advances. 29 Sep 2021. Vol 7, Issue 40. 9 pages. DOI: <https://doi.org/10.1126/sciadv.abi8605>. Relevance: 111.44. [Git Repo](#).
2. Yuan, Ni, Deng, Hao. 2022. *A-PINN: Auxiliary physics informed neural networks for forward and inverse problems of nonlinear integro-differential equations*. Journal of Computational Physics. 21 pages. DOI: <https://doi.org/10.1016/j.jcp.2022.111260>. Relevance: 87.43. [Git Repo](#).
3. Liu, Zhu, Lu, Sun, Wang. 2023. *Multi-resolution partial differential equations preserved learning framework for spatiotemporal dynamics*. Communication Physics. 19 pages. DOI: <https://doi.org/10.1038/s42005-024-01521-z>. Relevance: 82.47. [Git Repo](#).
4. Anumasa, Srijith. 2021. *Improving Robustness and Uncertainty Modelling in Neural Ordinary Differential Equations*. IEEE Explore. 9 pages. DOI: <https://doi.org/10.48550/arXiv.2112.12707>. Relevance: 69.67. [Git Repo](#).
5. Kong, Yamashita, Foggo, Yu. 2022. *Dynamic Parameter Estimation with Physics-based Neural Ordinary Differential Equations*. 5 pages. DOI: <https://doi.org/10.1109/pesgm48719.2022.9916840>. Relevance: 66.4.
6. Jagtap, Karniadakis. 2020. *Extended Physics-Informed Neural Networks (XPINNs): A Generalized Space-Time Domain Decomposition Based Deep Learning Framework for Nonlinear Partial Differential Equations*. Communications in Computational Physics. Volume 28, Issue 5pp. 2002–2041. 6 pages. DOI: <https://doi.org/10.4208/cicp.OA-2020-0164>. Relevance: 63.33. [Git Repo](#).
7. Karniadakis, Kevrekidis, Lu, Perdikaris, Wang, Yang. 2021. *Physics-informed machine learning*. Nature Reviews Physics. 20 pages. DOI: <https://doi.org/10.1038/s42254-021-00314-5>. Relevance: 63.16. [Git Repo](#).
8. Champion, Lusch, Kutz, Brunton. 2019. *Data-driven discovery of coordinates and governing*

- equations*. Proc. Natl. Acad. Sci. U.S.A.116 (45) 22445-22451,. 7 pages. DOI: <https://doi.org/10.1073/pnas.1906995116>. Relevance: 62.29. [Git Repo](#).
9. Zhao, Ding, Prakash. 2023. *PINNsFormer: A Transformer-Based Framework For Physics-Informed Neural Networks*. cs> arXiv:2307.11833. 17 pages. DOI: <https://arxiv.org/abs/2307.11833v3>. Relevance: 54.35.
 10. Yan, Du, Tan, Feng. 2020. *On Robustness of Neural Ordinary Differential Equations*. 15 pages. DOI: <https://doi.org/10.48550/arXiv.1910.05513>. Relevance: 53.33. [Git Repo](#).
 11. Wang, Yang, Liu, Zhao, Liu, Wu, Banu, Chen. 2022. *Data-driven modeling of process, structure and property in additive manufacturing: A review and future directions*. Journal of Manufacturing Processes 77 (2022) 13–31. 19 pages. DOI: <https://doi.org/10.1016/j.jmapro.2022.02.053>. Relevance: 52.68. [Git Repo](#).
 12. Finlay, Jacobsen, Oberman. 2020. *How to train your neural ODE: the world of Jacobian and kinetic regularization*. Accepted to ICML 2020. 11 pages. DOI: <https://doi.org/10.48550/arXiv.2002.02798>. Relevance: 52.45.
 13. Cai, Mao, Wang, Yin, Karniadakis. 2021. *Physics-informed neural networks (PINNs) for fluid mechanics: A review*. . *ODE-Net*. The Chinese Society of Theoretical and Applied Mechanics (CSTAM) 2020. 12 pages. DOI: <https://doi.org/10.48550/arXiv.2105.09506>. Relevance: 51.58.
 14. Cai, Wang, Wang, Perdikaris, Karniadakis. 2021. *Physics-Informed Neural Networks for Heat Transfer Problems*. Journal of Heat Transfer 143(6).. 12 pages. DOI: <https://doi.org/10.1115/1.4050542>. Relevance: 51.58.
 15. Liu, Xiao, Si, Cao, Kumar, Hsieh. 2019. *Neural SDE: Stabilizing Neural ODE Networks with Stochastic Noise*. 15 pages. DOI: <https://doi.org/10.48550/arXiv.1906.02355>. Relevance: 50.67. [Git Repo](#).
 16. Lu, Meng, Mao, Karniadakis. 2019. *DeepXDE: A Deep Learning Library for Solving Differential Equations*. SIAM Review 63(1):208-228. 2 pages. DOI: <https://doi.org/10.1137/19M1274067>. Relevance: 50.5. [Git Repo](#).

17. Psychogios, Ungar. 1992. *A hybrid neural network—first principles approach to process modeling*. AIChE J., 38: 1499-1511. 13 pages. DOI: <https://doi.org/10.1002/aic.690381003>. Relevance: 48.46.
18. Arzani, Wang, D’Souza. 2021. *Uncovering near-wall blood flow from sparse data with physics-informed neural networks*. Physics of Fluids. 10 pages. DOI: <https://doi.org/10.1063/5.0055600>. Relevance: 47.8. [Git Repo](#).
19. Kim, Kim, Lee, Lee. 2021. *Knowledge Integration into deep learning in dynamical systems: an overview and taxonomy*. J Mech Sci Technol. 13 pages. DOI: <https://doi.org/10.1007/s12206-021-0342-5>. Relevance: 47.42.
20. Fang. 2021. *A High-Efficient Hybrid Physics-Informed Neural Networks Based on Convolutional Neural Network*. IEEE Trans Neural Netw Learn Syst. 2022 Oct;33(10):5514-5526. 13 pages. DOI: <https://doi.org/10.1109/tnnls.2021.3070878>. Relevance: 46.08. [Git Repo](#).
21. Rudy, Brunton, Proctor, Kutz. 2017. *Data-driven discovery of partial differential equations*. Science Advances. 26 Apr 2017. Vol 3, Issue 4.. 6 pages. DOI: <https://doi.org/10.1126/sciadv.1602614>. Relevance: 43.67. [Git Repo](#).
22. Laboratory. 2020. *PhILMs: Collaboratory on Mathematics and Physics-Informed Learning Machines for Multiscale and Multiphysics Problems*. 40 pages. DOI: NA. Relevance: 43.12. [Git Repo](#).
23. Chen, Sondak, Protopapas, Mattheakis, Liu, Agarwal, Giovanni. 2020. *NeuroDiffEq: A Python package for solving differential equations with neural networks*. Journal of Open Source Software, 5(46), 1931,. 3 pages. DOI: <https://doi.org/10.21105/joss.01931>. Relevance: 43. [Git Repo](#).
24. Bongard, Lipson. 2007. *Automated reverse engineering of nonlinear dynamical systems*. Proc Natl Acad Sci U S A. 2007 Jun 12;104(24):9943-8. 6 pages. DOI: <https://doi.org/10.1073/pnas.0609476104>. Relevance: 42.17.
25. Falas, Konstantinou, Michael. 2020. *Physics-Informed Neural Networks for Securing Water Distribution Systems*. 4 pages. DOI: <https://doi.org/10.48550/arXiv.2009.08842>. Relevance:

- 41.5.
26. Jagtap, Mao, Adams, Karniadakis. 2022. *Physics-informed neural networks for inverse problems in supersonic flows*. math>arXiv:2202.11821. 19 pages. DOI: <https://doi.org/10.1016/j.jcp.2022.111402>. Relevance: 41.32.
27. Guo, You, Li, Tang, Li. 2016. *Physics-Inspired Neural Networks for Efficient Device Compact Modeling*. IEEE Journal on Exploratory Solid-State Computational Devices and Circuits. 6 pages. DOI: <https://doi.org/10.1109/JXCDC.2016.2636161>. Relevance: 40.67. [Git Repo](#).
28. Heiden, Millard, Coumans, Sheng, Sukhatme. 2021. *Neuralsim: Augmenting differentiable simulators with neural networks*. 2021 IEEE International Conference on Robotics and Automation (ICRA), IEEE, 2021, pp. 9474–9481.. 8 pages. DOI: <https://doi.org/10.48550/arXiv.2011.04217>. Relevance: 40.25. [Git Repo](#).
29. Xujiao, Andy, Albert, Shahed. 2020. *Physics-Informed Graph Neural Network for Circuit Compact Model Development*. Conference: Physics-Informed Graph Neural Network for Circuit Compact Model Development.. 4 pages. DOI: <http://dx.doi.org/10.23919/SISPAD49475.2020.9241634>. Relevance: 40.
30. Yu, Swaminathan, Ji, White. 2017. *A method for creating behavioral models of oscillators using augmented neural networks*. 2017 IEEE 26th Conference on Electrical Performance of Electronic Packaging and Systems (EPEPS). 3 pages. DOI: <https://doi.org/10.1109/EPEPS.2017.8329714>. Relevance: 40.
31. Adeli. 2001. *Neural Networks in Civil Engineering: 1989–2000*. Comput. Aided Civ. Inf. Eng.. 17 pages. DOI: <https://doi.org/10.1111/0885-9507.00219>. Relevance: 39.59.
32. Zhang, Yao, Gholami, Keutzer, Gonzalez, Biros, Mahoney. 2019. *ANODEV2: A Coupled Neural ODE Evolution Framework*. NeurIPS 2019 Workshop. 14 pages. DOI: <https://doi.org/10.48550/arXiv.1906.04596>. Relevance: 39.29.
33. Meng, Li, Zhang, Karniadakis. 2019. *PPINN: Parareal Physics-Informed Neural Network for time-dependent PDEs*. Computer Methods in Applied Mechanics and Engineering. Volume. 17 pages. DOI: <https://doi.org/10.1016/j.cma.2020.113250>. Relevance: 39.06.

34. Kidger, Morrill, Foster, Lyons. 2020. *Neural Controlled Differential Equations for Irregular Time Series*. Advances in Neural Information Processing Systems 33 (NeurIPS 2020). 12 pages. DOI: <https://doi.org/10.48550/arXiv.2005.08926>. Relevance: 38.67. [Git Repo](#).
35. Sun, Gao, Pan, Wang. 2019. *Surrogate Modeling for Fluid Flows Based on Physics-Constrained Deep Learning Without Simulation Data*. Computer Methods in Applied Mechanics and Engineering. 56 pages. DOI: <https://doi.org/10.1016/j.cma.2019.112732>. Relevance: 37.76. [Git Repo](#).
36. Lettermann, Jurado, Betz, Wörgötter, Herzog. 2024. *Tutorial: a beginner's guide to building a representative model of dynamical systems using the adjoint method*. Communications Physics volume 7, Article number: 128 (2024). 14 pages. DOI: <https://doi.org/10.1038/s42005-024-01606-9>. Relevance: 37.21. [Git Repo](#).
37. Laboratory. 2021. *PhILMS: Collaboratory on Mathematics and Physics-Informed Learning Machines for Multiscale and Multiphysics Problems*. October 2021. 47 pages. DOI: NA. Relevance: 37.11. [Git Repo](#).
38. Rubanova, Chen, Duvenaud. 2019. *Latent ODEs for Irregularly-Sampled Time Series*. 21 pages. DOI: <https://doi.org/10.48550/arXiv.1907.03907>. Relevance: 37.05. [Git Repo](#).
39. Butler, Davies, Cartwright, Isayev, Walsh. 2018. *Machine learning for molecular and materials science*. Nature. 10 pages. DOI: <http://dx.doi.org/10.1038/s41586-018-0337-2>. Relevance: 37. [Git Repo](#).
40. Matsubara, Yaguchi. 2023. *Number Theoretic Accelerated Learning of Physics-Informed Neural Networks*. cs> arXiv:2307.13869. 14 pages. DOI: <https://arxiv.org/abs/2307.13869v2>. Relevance: 36.86.
41. Waheed, Haghighat, Alkhalifah, Song, Hao. 2021. *PINNeik: Eikonal solution using physics-informed neural networks*. Computers & Geosciences. Volume 155, October. 14 pages. DOI: <https://doi.org/10.1016/j.cageo.2021.104833>. Relevance: 36.86. [Git Repo](#).
42. Wang, Teng, Perdikaris. 2020. *Understanding and mitigating gradient pathologies in physics-informed neural networks*. NA. 28 pages. DOI: <https://arxiv.org/abs/2001.04536v1>. Relevance: 36.86.

- vance: 36.75. [Git Repo](#).
43. N, KT, FX, S, O, A, A. 2021. *Best practices in machine learning for chemistry*. (2021) .Nat Chem 13:505–508. 4 pages. DOI: <https://doi.org/10.1038/s41557-021-00716-z>. Relevance: 36.5.
 44. Li, Zheng, Kovachki, Jin, Chen, Liu, Azizzadenesheli, Anandkumar. 2021. *Physics-Informed Neural Operator for Learning Partial Differential Equations*. 27 pages. DOI: <https://doi.org/10.48550/arXiv.2111.03794>. Relevance: 36.26.
 45. Ren, Rao, Liu, Wang, Sun. 2020. *PhyCRNet: Physics-informed Convolutional-Recurrent Network for Solving Spatio-temporal PDEs*. Computer Methods in Applied Mechanics and Engineering. Volume. 21 pages. DOI: <https://doi.org/10.1016/j.cma.2021.114399>. Relevance: 36.19. [Git Repo](#).
 46. Lu, Jin, Pang, Zhang, Karniadakis. 2021. *Learning nonlinear operators via DeepONet based on the universal approximation theorem of operators*. 15 pages. DOI: <https://doi.org/10.1038/s42256-021-00302-5>. Relevance: 36. [Git Repo](#).
 47. Moseley, Markham, Nissen-Meyer. 2023. *Finite basis physics-informed neural networks (FBPINNs): a scalable domain decomposition approach for solving differential equations*. Adv Comput Math. 39 pages. DOI: <https://doi.org/10.1007/s10444-023-10065-9>. Relevance: 35.87.
 48. Penwarden, Zhe, Narayan, Kirby. 2021. *Multifidelity Modeling for Physics-Informed Neural Networks (PINNs)*. physics> arXiv:2106.13361. 17 pages. DOI: <https://arxiv.org/abs/2106.13361v2>. Relevance: 35.35.
 49. Wang. 2024. *Scientific Machine Learning for Computational Physics*. SHTC Short Course, Anaheim, CA, July. 103 pages. DOI: NA. Relevance: 35.02.
 50. Zhu, Liu, Yan. 2021. *Machine learning for metal additive manufacturing: predicting temperature and melt pool fluid dynamics using physics-informed neural networks*. Computational Mechanics. Volume 67. Issue number 2. State Published - Feb 2021. 17 pages. DOI: <https://doi.org/10.1007/s00466-020-01952-9>. Relevance: 34.94.

51. Chang, Meng, Haber, Ruthotto, Begert, Holtham. 2017. *Reversible Architectures for Arbitrarily Deep Residual Neural Networks*. The Thirty-Second AAAI Conference on Artificial Intelligence (AAAI-18). 8 pages. DOI: <http://10.1609/aaai.v32i1.11668>. Relevance: 34.88.
52. Kochkov, Smith, Alieva, Wang, Brenner, Hoyer. 2021. *Machine learning accelerated computational fluid dynamics*. Proceedings of the National Academy of Sciences 118 (21) (2021).. 8 pages. DOI: <https://doi.org/10.1073/pnas.2101784118>. Relevance: 34.88. [Git Repo](#).
53. Shukla, Jagtap, Karniadakis. 2021. *Parallel Physics-Informed Neural Networks via Domain Decomposition*. arXiv [Submitted on 20 Apr 2021 (v1), last revised 8 Sep 2021 (this version, v3)]. 23 pages. DOI: <https://arxiv.org/abs/2104.10013v3>. Relevance: 34.83.
54. Fan, Xu, Darve. 2020. *Solving Inverse Problems in Steady State Navier-Stokes Equations using Deep Neural Networks*. 7 pages. DOI: <https://doi.org/10.48550/arXiv.2008.13074>. Relevance: 34.43. [Git Repo](#).
55. Zhang, Dao, Karniadakis, Suresh. 2022. *Analyses of internal structures and defects in materials using physics-informed neural networks*. Science Advances. 2022 Feb 18;8(7):eabk0644.doi: 10.1126/sciadv.abk0644. Epub 2022 Feb 16.. 13 pages. DOI: <https://doi.org/10.1126/sciadv.abk0644>. Relevance: 34.38.
56. Han, Jentzen, E. 2018. *Solving high-dimensional partial differential equations using deep learning*. Han J, Jentzen A, Weinan E. . Proc Natl Acad Sci 2018;115:8505–10.. 6 pages. DOI: <https://doi.org/10.1073/pnas.1718942115>. Relevance: 33.5.
57. Jia, Benson. 2019. *Neural Jump Stochastic Differential Equations*. Advances in Neural Information Processing Systems 32 (NeurIPS 2019). 12 pages. DOI: NA. Relevance: 33.5. [Git Repo](#).
58. Yıldız, Heinonen, Lähdesmäki. 2019. *ODE2VAE: Deep generative second order ODEs with Bayesian neural networks*. 14 pages. DOI: <https://doi.org/10.48550/arXiv.1905.10994>. Relevance: 33.5. [Git Repo](#).
59. Rasht-Behesht, Huber, Shukla, Karniadakis. 2021. *Physics-Informed Neural Networks (PINNs) for Wave Propagation and Full Waveform Inversions*. Journal of Geophysical

- Research: Solid Earth, 127. 21 pages. DOI: <https://doi.org/10.1029/2021JB023120>.
Relevance: 33.48.
60. Mkaem, Boumaiza. 2011. *Physically Inspired Neural Network Model for RF Power Amplifier Behavioral Modeling and Digital Predistortion*. IEEE Transactions on Microwave Theory and Techniques, vol. 59, no. 4, pp. 913-923, April 2011. 13 pages. DOI: <https://doi.org/10.1109/TMTT.2010.2098041>. Relevance: 32.73.
61. Trask, G.Patel, Gross, Atzberger. 2020. *GMLS-Nets: A machine learning framework for unstructured data*. AAAI-MLPS Proceedings, (2020). 9 pages. DOI: <https://doi.org/10.48550/arXiv.1909.05371>. Relevance: 31.56. [Git Repo](#).
62. Lusch, Kutz, Brunton. 2018. *Deep learning for universal linear embeddings of nonlinear dynamics*. Nature Communications volume 9, Article number: 4950 (2018). 10 pages. DOI: <https://doi.org/10.1038/s41467-018-07210-0>. Relevance: 31.5. [Git Repo](#).
63. Sun, Wang. 2020. *Physics-constrained bayesian neural network for fluid flow reconstruction with sparse and noisy data*. 9 pages. DOI: <https://doi.org/10.1016/j.taml.2020.01.031>. Relevance: 31.44. [Git Repo](#).
64. Cuomo, Cola, Giampaolo, Rozza, Raissi, Piccialli. 2022. *Scientific Machine Learning Through Physics-Informed Neural Networks: Where we are and What's Next*. 85 pages. DOI: <https://doi.org/10.1007/s10915-022-01939-z>. Relevance: 31.36. [Git Repo](#).
65. Wong, Ooi, Gupta, Chiu, Low, Dao, Ong. 2023. *Generalizable Neural Physics Solvers by Baldwinian Evolution*. Neural and Evolutionary Computing. 26 pages. DOI: <https://doi.org/10.48550/arXiv.2312.03243>. Relevance: 31.31. [Git Repo](#).
66. Kashinath, Mustafa, Albert, Wu, Jiang, Esmailzadeh, Azizzadenesheli, Wang, Chattopadhyay, Singh, Manepalli, Chirila, Yu, Walters, White, Xiao, Tchelepi, Marcus, Anandkumar, Hassanzadeh. 2021. *Physics-informed machine learning: case studies for weather and climate modelling*. Royal Society Volume 379 Issue 2194. 36 pages. DOI: <https://doi.org/10.1098/rsta.2020.0093>. Relevance: 31.28. [Git Repo](#).
67. Detorakis. 2024. *Practical Aspects on Solving Differential Equations Using Deep Learning: A*

- Primer*. 32 pages. DOI: <https://arxiv.org/abs/2408.11266v2>. Relevance: 31.19. [Git Repo](#).
68. Jeong, Batuwatta-Gamage, Bai, Xie, Rathnayaka, Zhou, Gu. 2023. *A complete Physics-Informed Neural Network-based framework for structural topology optimization*. Computer Methods in Applied Mechanics and Engineering. Volume 417, Part A, 1 December. 22 pages. DOI: <https://doi.org/10.1016/j.cma.2023.116401>. Relevance: 31.14.
69. Ruthotto, Haber. 2018. *Deep Neural Networks Motivated by Partial Differential Equations*. Journal of Mathematical Imaging and Vision. 8 pages. DOI: <https://doi.org/10.1007/s10851-019-00903-1>. Relevance: 30.86. [Git Repo](#).
70. Reyes, Howard, Perdikaris, Tartakovsky. 2020. *Learning unknown physics of non-Newtonian fluids*. Phys. Rev. Fluids. 6 pages. DOI: <https://doi.org/10.1103/PhysRevFluids.6.073301>. Relevance: 30.67.
71. Kanaa, Voleti, Kahou, Pal. 2019. *Simple Video Generation using Neural ODEs*. NeurIPS 2019 Workshop. 10 pages. DOI: <https://doi.org/10.48550/arXiv.2109.03292>. Relevance: 30.2. [Git Repo](#).
72. Brunton, Hemati, Tair. 2020. *Special issue on machine learning and data-driven methods in fluid dynamics*. Theoretical and Computational Fluid Dynamics.. 5 pages. DOI: <https://doi.org/10.1007/s00162-020-00542-y>. Relevance: 29.6.
73. Jagtap, Kharazmi, Karniadaki. 2020. *Conservative physics-informed neural networks on discrete domains for conservation laws: Applications to forward and inverse problems*. Computer Methods in Applied Mechanics and Engineering. Volume. 27 pages. DOI: <https://doi.org/10.1016/j.cma.2020.113028>. Relevance: 29.15.
74. Brunton, Proctor, Kutz. 2016. *Sparse Identification of Nonlinear Dynamics with Control (SINDYc)*. Accepted for NOLCOS conference. 6 pages. DOI: <https://doi.org/10.48550/arXiv.1605.06682>. Relevance: 28.83.
75. Li, Kovachki, Azizzadenesheli, Liu, Bhattacharya, Stuart, Anandkumar. 2021. *Fourier Neural Operator for Parametric Partial Differential Equations*. Published as a conference paper at ICLR 2021. 16 pages. DOI: <https://doi.org/10.48550/arXiv.2010.08895>. Relevance: 28.69.

76. Jagtap, Kawaguchi, Karniadakis. 2019. *Locally adaptive activation functions with slope recovery term for deep and physics-informed neural networks*. Proc Math Phys Eng Sci. 2020 Jul 15; 476(2239):20200334.. 20 pages. DOI: <https://doi.org/10.1098/rspa.2020.0334>. Relevance: 28.6. [Git Repo](#).
77. LeCun, Bengio, Hinton. 2015. *Deep Learning*. Nature 521 (2015)436–444.. 10 pages. DOI: <http://dx.doi.org/10.1038/nature14539>. Relevance: 28.5. [Git Repo](#).
78. L, B, A, J, A, R, JE, B. 2019. *Models and machines: how deep learning will take clinical pharmacology to the next level*. (2019) . CPTPharmacometrics Syst Pharmacol. <https://doi.org/10.1002/psp4.12377>. 4 pages. DOI: <https://doi.org/10.1002/psp4.12377>. Relevance: 28.25.
79. McClenny, Haile, Braga-Neto. 2021. *TensorDiffEq: Scalable Multi-GPU Forward and Inverse Solvers for Physics Informed Neural Networks*. arxiv [Submitted on 30 Mar 2021]. 8 pages. DOI: <https://arxiv.org/abs/2103.16034v1>. Relevance: 28.25.
80. Darbon, Meng. 2020. *On some neural network architectures that can represent viscosity solutions of certain high dimensional Hamilton–Jacobi partial differential equations*. Journal of Computational Physics. Volume. 18 pages. DOI: <https://doi.org/10.1016/j.jcp.2020.109907>. Relevance: 28.11. [Git Repo](#).
81. Dupont, Doucet, Teh. 2019. *Augmented Neural ODEs*. 20 pages. DOI: <https://doi.org/10.48550/arXiv.1904.01681>. Relevance: 28.1. [Git Repo](#).
82. Um, Brand, Fei, Holl, Thuerey. 2020. *Solver-in-the-loop: Learning from differentiable physics to interact with iterative PDE-solvers*. Advances in Neural Information Processing Systems 33 (2020) 6111–6122.. 12 pages. DOI: <https://doi.org/10.48550/arXiv.2007.00016>. Relevance: 27.67. [Git Repo](#).
83. Cheng, Fu, Wang, Dong, Jin, Jiang, Maa, Qin, Liu. 2022. *Data-driven, multi-moment fluid modeling of Landau damping*. 10 pages. DOI: <https://doi.org/10.48550/arXiv.2209.04726>. Relevance: 27.5.
84. Bram, Nahum, Schropp, Pfister, Koch. 2023. *Low-dimensional neural ODEs and their appli-*

- cation in pharmacokinetics*. Journal of Pharmacokinetics and Pharmacodynamics. 18 pages. DOI: <https://doi.org/10.1007/s10928-023-09886-4>. Relevance: 27.39.
85. Chen, Shi, He, Fang. 2024. *Data-driven solutions and parameter estimations of a family of higher-order KdV equations based on physics informed neural networks*. Scientific Reports. 27 pages. DOI: <https://doi.org/10.1038/s41598-024-74600-4>. Relevance: 27.22.
86. Wang, Sankaran, Wang, Perdikaris. 2023. *An Expert's Guide to Training Physics-informed Neural Networks*. cs>arXiv:2308.08468. 36 pages. DOI: <https://arxiv.org/abs/2308.08468v1>. Relevance: 27.17.
87. Rackauckas, Nie. 2017. *DifferentialEquations.jl – A Performant and Feature-Rich Ecosystem for Solving Differential Equations in Julia*. Journal of Open Research Software 5(1). 10 pages. DOI: <https://doi.org/10.5334/jors.151>. Relevance: 27.1.
88. Kissas, Yang, Hwuang, Witschey, Detre, Perdikaris. 2020. *Machine learning in cardiovascular flows modeling: Predicting arterial blood pressure from non-invasive 4D flow MRI data using physics-informed neural networks*. Computer Methods in Applied Mechanics and Engineering. Volume. 30 pages. DOI: <https://doi.org/10.1016/j.cma.2019.112623>. Relevance: 27.07.
89. Yu, Lu, Meng, Karniadakis. 2021. *Gradient-enhanced physics-informed neural networks for forward and inverse PDE problems*. Computer Methods in Applied Mechanics and Engineering. Volume. 22 pages. DOI: <https://doi.org/10.1016/j.cma.2022.114823>. Relevance: 27.05.
90. Hodas, Stinis. 2018. *Doing the Impossible: Why Neural Networks Can Be Trained at All*. Front. Psychol., 11 July 2018 Sec. Cognitive Science. Volume 9 - 2018. 7 pages. DOI: <https://doi.org/10.3389/fpsyg.2018.01185>. Relevance: 27. [Git Repo](#).
91. Lu, Zhong, Li, Dong. 2018. *Beyond Finite Layer Neural Networks: Bridging Deep Architectures and Numerical Differential Equations*. Proceedings of the 35th International Conference on Machine Learning, PMLR 80:3276-3285, 2018.. 15 pages. DOI: <https://doi.org/10.48550/arXiv.1710.10121>. Relevance: 26.87. [Git Repo](#).

92. Blechschmidt, Ernst. 2021. *Three ways to solve partial differential equations with neural networks - A review*. Volume 44, Issue 2 Special Issue:Scientific Machine Learning - Part II June 2021 e202100006. 29 pages. DOI: <https://doi.org/10.1002/gamm.202100006>. Relevance: 26.83. [Git Repo](#).
93. Kosma, Nikolentzos, Panagopoulos, Steyaert, Vazirgiannis. 2023. *Neural Ordinary Differential Equations for Modeling Epidemic Spreading*. Published in Trans. Mach. Learn. Res. 2023. 18 pages. DOI: NA. Relevance: 26.78. [Git Repo](#).
94. Akbarian, Raissi. 2023. *PINNs-TF2: Fast and User-Friendly Physics-Informed Neural Networks in TensorFlow V2*. Machine Learning and the Physical Sciences Workshop, NeurIPS 2023. 13 pages. DOI: <https://arxiv.org/abs/2311.03626v1>. Relevance: 26.62. [Git Repo](#).
95. Akbarian, Raissi. 2023. *PINNs-Torch: Enhancing Speed and Usability of Physics-Informed Neural Networks with PyTorch*. NeurIPS 2023 Workshop. 14 pages. DOI: <https://openreview.net/forum?id=nl1ZzdHpab>. Relevance: 26.57. [Git Repo](#).
96. Pascanu, Gulcehre, Cho, Bengio. 2014. *How to Construct Deep Recurrent Neural Networks*. Accepted at ICLR 2014 (Conference Track).. 13 pages. DOI: <https://doi.org/10.48550/arXiv.1312.6026>. Relevance: 26.54.
97. Qin, Wu, Xiu. 2019. *Data Driven Governing Equations Approximation Using Deep Neural Networks*. Journal of Computational Physics. Volume. 19 pages. DOI: <https://doi.org/10.1016/j.jcp.2019.06.042>. Relevance: 26.
98. Stiller, Bethke, Böhme, Pausch, Torge, Debus, Vorberger, Bussmann, Hoffmann. 2020. *Large-Scale Neural Solvers for Partial Differential Equations*. Driving Scientific and Engineering Discoveries Through the Convergence of HPC, Big Data and AI. SMC 2020. Communications in Computer and Information Science, vol 1315. Springer,. 15 pages. DOI: https://doi.org/10.1007/978-3-030-63393-6_2. Relevance: 26. [Git Repo](#).
99. Wang, Yu, Perdikaris. 2020. *When and why PINNs fail to train: A neural tangent kernel perspective*. Journal of Computational Physic. 29 pages. DOI: <https://doi.org/10.1016/j.jcp.2021.110768>. Relevance: 26. [Git Repo](#).

100. Koryagin, Khudorozkov, Tsimfer. 2019. *PyDEns: a Python Framework for Solving Differential Equations with Neural Networks*. 8 pages. DOI: <https://arxiv.org/abs/1909.11544>. Relevance: 25.88. [Git Repo](#).
101. Wang, Wang, Perdikaris. 2021. *On the eigenvector bias of Fourier feature networks: From regression to solving multi-scale PDEs with physics-informed neural networks*. Computer Methods in Applied Mechanics and Engineering. Volume. 27 pages. DOI: <https://doi.org/10.1016/j.cma.2021.113938>. Relevance: 25.85. [Git Repo](#).
102. Gal, Ghahramani. 2016. *Dropout as a Bayesian Approximation: Representing Model Uncertainty in Deep Learning*. Proceedings of The 33rd International Conference on Machine Learning, PMLR 48:1050-1059, 2016.. 10 pages. DOI: NA. Relevance: 25.8.
103. Zhang, Gao, Unterman, Arodz. 2020. *Approximation Capabilities of Neural ODEs and Invertible Residual Networks*. Proceedings of the 37th International Conference on Machine Learning, PMLR 119:11086-11095. 14 pages. DOI: <https://doi.org/10.48550/arXiv.1907.12998>. Relevance: 25.57.
104. Liu, Sun, Wang. 2022. *Predicting parametric spatio-temporal dynamics by multi-resolution PDE structure-preserved deep learning*. Commun Phys. 41 pages. DOI: <http://dx.doi.org/10.48550/arXiv.2205.03990>. Relevance: 25.54.
105. Alkin, Fürst, Schmid, Gruber, Holzleitner, Brandstetter. 2024. *Universal Physics Transformers: A Framework For Efficiently Scaling Neural Operators*. NeurIPS 2024. 37 pages. DOI: <https://doi.org/10.48550/arXiv.2402.12365>. Relevance: 25.38. [Git Repo](#).
106. Raissi, Perdikaris, Karniadakis. 2017. *Physics Informed Deep Learning (Part I): Data-driven Solutions of Nonlinear Partial Differential Equations*. 22 pages. DOI: <https://doi.org/10.48550/arXiv.1711.10561>. Relevance: 25.32. [Git Repo](#).
107. Chen, Lu, Karniadakis, Negro. 2020. *Physics-informed neural networks for inverse problems in nano-optics and metamaterials*. April 2020 Optics Express 28(8). 16 pages. DOI: <https://doi.org/10.48550/arXiv.1912.01085>. Relevance: 24.69.
108. Huang, Wang, Lan. 2011. *Extreme learning machines: a survey*. International Journal of

- Machine Learning and Cybernetics 2(2):107–122. 16 pages. DOI: <https://doi.org/10.1007/s13042-011-0019-y>. Relevance: 24.56.
109. Pearlmutter. 1995. *Gradient calculations for dynamic recurrent neural networks: a survey*. IEEE Transactions on Neural Networks, vol. 6, no. 5, pp. 1212–1228, Sept. 1995. 21 pages. DOI: <https://doi.org/10.1109/72.410363>. Relevance: 24.5.
110. Long, Lu, Ma, Dong. 2017. *PDE-Net: Learning PDEs from Data*. 17 pages. DOI: <https://doi.org/10.48550/arXiv.1710.09668>. Relevance: 24.47.
111. Erichson, Muehlebach, Mahoney. 2019. *Physics-informed Autoencoders for Lyapunov-stable Fluid Flow Prediction*. 14 pages. DOI: <https://doi.org/10.48550/arXiv.1905.10866>. Relevance: 24.36.
112. Chen, Rubanova, Bettencourt, Duvenaud. 2018. *Neural Ordinary Differential Equations*. 32nd Conference on Neural Information Processing Systems (NeurIPS 2018), Montréal, Canada.. 18 pages. DOI: <https://doi.org/10.48550/arXiv.1806.07366>. Relevance: 24.33. [Git Repo](#).
113. Wang, Zeng, Wang, Shang, Zhang, Luo, Dowling. 2022. *When physics-informed data analytics outperforms black-box machine learning: A case study in thickness control for additive manufacturing*. Digital Chemical Engineering. 17 pages. DOI: <https://doi.org/10.1016/j.dche.2022.100076>. Relevance: 24.06.
114. Rao, Sun, Liu. 2021. *Physics informed deep learning for computational elastodynamics without labeled data*. Journal of Engineering Mechanics 147 (8) (2021) 04021043.. 26 pages. DOI: <https://arxiv.org/abs/2006.08472v1>. Relevance: 24. [Git Repo](#).
115. Ren, Rao, Chen, Wang, Sun, Liu. 2022. *SeismicNet: Physics-informed neural networks for seismic wave modeling in semi-infinite domain*. 22 pages. DOI: <https://doi.org/10.48550/arXiv.2210.14044>. Relevance: 24. [Git Repo](#).
116. Raissi, Perdikaris, Karniadakis. 2019. *Physics-informed neural networks: A deep learning framework for solving forward and inverse problems involving nonlinear partial differential equations*. Journal of Computational Physics, vol. 378, pp. 686–707, 2019.. 45 pages. DOI:

- <https://doi.org/10.1016/j.jcp.2018.10.045>. Relevance: 23.91. [Git Repo](#).
117. Haghighat, Raissi, Moure, Gomez, Juanes. 2021. *A physics-informed deep learning framework for inversion and surrogate modeling in solid mechanics*. Computer Methods in Applied Mechanics and Engineering. Volume. 22 pages. DOI: <https://doi.org/10.1016/j.cma.2021.113741>. Relevance: 23.82. [Git Repo](#).
118. Ruthotto, Osher, Li, Nurbekyan, Fung. 2019. *A Machine Learning Framework for Solving High-Dimensional Mean Field Game and Mean Field Control Problems*. Proc. Natl. Acad. Sci. U.S.A.117 (17) 9183-9193,. 11 pages. DOI: <https://doi.org/10.1073/pnas.1922204117>. Relevance: 23.82. [Git Repo](#).
119. Mishra, Molinaro. 2021. *Estimates on the generalization error of physics-informed neural networks for approximating a class of inverse problems for PDEs* Get access Arrow. IMA Journal of Numerical Analysis, Volume 42, Issue 2, April 2022, Pages 981–1022. 35 pages. DOI: <https://doi.org/10.1093/imanum/drab032>. Relevance: 23.8. [Git Repo](#).
120. McClenny, Braga-Neto. 2020. *Self-Adaptive Physics-Informed Neural Networks using a Soft Attention Mechanism*. cs> arXiv:2009.04544. 24 pages. DOI: <https://arxiv.org/abs/2009.04544v5>. Relevance: 23.75. [Git Repo](#).
121. Michoski, Milosavljevic, Oliver, Hatch. 2019. *Solving Irregular and Data-enriched Differential Equations using Deep Neural Networks*. 22 pages. DOI: <https://doi.org/10.48550/arXiv.1905.04351>. Relevance: 23.73.
122. Perkins, Jaeger, Reinitz, Glass. 2006. *Reverse Engineering the Gap Gene Network of Drosophila melanogaster*. PLoS Comput Biol 2(5): e51.. 12 pages. DOI: <https://doi.org/10.1371/journal.pcbi.0020051>. Relevance: 23.42.
123. Cranmer, Greydanus, Hoyer, Battaglia, Spergel, Ho. 2020. *Lagrangian Neural Networks*. Published in ICLR 2020 Deep Differential Equations Workshop.. 9 pages. DOI: <https://doi.org/10.48550/arXiv.2003.04630>. Relevance: 23.33. [Git Repo](#).
124. Chung, Mai. 2020. *Neural Ordinary Differential Equations Network and its Extensions*. Hoa Lac campus - FPT University. 40 pages. DOI: NA. Relevance: 23.32.

125. Shi, Chen, Wang, Yeung, Wong, Woo. 2015. *Convolutional LSTM Network: A Machine Learning Approach for Precipitation Nowcasting*. 9 pages. DOI: <https://doi.org/10.48550/arXiv.1506.04214>. Relevance: 23.22. [Git Repo](#).
126. Ryck, Jagtap, Mishra. 2022. *Error estimates for physics informed neural networks approximating the Navier-Stokes equations*. NA. 34 pages. DOI: <https://doi.org/10.48550/arXiv.2203.09346>. Relevance: 23.18.
127. Innes, Edelman, Fischer, Rackauckas, Saba, Shah, Tebbutt. 2019. *A Differentiable Programming System to Bridge Machine Learning and Scientific Computing*. Submitted to NeurIPS 2019. 14 pages. DOI: <https://arxiv.org/abs/1907.07587v2>. Relevance: 23.07. [Git Repo](#).
128. Berman, Buczak, Chavis, Corbett. 2019. *A Survey of Deep Learning Methods for Cyber Security*. Machine Learning for Cyber-Security. 35 pages. DOI: <https://doi.org/10.3390/info10040122>. Relevance: 23.06.
129. Han, Gao, Pfaff, Wang, Liu. 2022. *Predicting Physics in Mesh-reduced Space with Temporal Attention*. ICLR 2022. 22 pages. DOI: <https://doi.org/10.48550/arXiv.2201.09113>. Relevance: 22.95.
130. Cheng, Zhang. 2021. *Deep Learning Method Based on Physics Informed Neural Network with Resnet Block for Solving Fluid Flow Problems*. Water 13, no. 4: 423. 17 pages. DOI: <https://doi.org/10.3390/w13040423>. Relevance: 22.88.
131. Paszke, Gross, Massa, Lerer, Bradbury, Chanan, Killeen, Lin, Gimelshein, Antiga, Desmaison, Kopf, Yang, DeVito, Raison, Tejani, Chilamkurthy, Steiner, Fang, Bai, Chintala. 2019. *PyTorch: An Imperative Style, High-Performance Deep Learning Library*. Advances in Neural Information Processing Systems 32 (NeurIPS 2019). 12 pages. DOI: <https://arxiv.org/abs/1912.01703v1>. Relevance: 22.83.
132. Hao, Wang, Su, Ying, Dong, Liu, Cheng, Song, Zhu. 2023. *GNOT: A general neural operator transformer for operator learning*. Proceedings of the 40th International Conference on Machine Learning, pp.12556–12569. PMLR, 2023.. 14 pages. DOI: <https://doi.org/10.48550/arXiv.2302.14376>. Relevance: 22.57. [Git Repo](#).

133. Sun, Zhang, Schaeffer. 2020. *NeuPDE: Neural network based ordinary and partial differential equations for modeling time-dependent data*. Mathematical and Scientific Machine Learning, PMLR, 2020, pp. 352–372.. 21 pages. DOI: <https://doi.org/10.48550/arXiv.1908.03190>. Relevance: 22.57.
134. Hochlehnert, Terenin, Sæmundsson, Deisenroth. 2021. *Learning contact dynamics using physically structured neural networks*. International Conference on Artificial Intelligence and Statistics, PMLR, 2021, pp. 2152–2160.. 10 pages. DOI: <https://doi.org/10.48550/arXiv.2102.11206>. Relevance: 22.4. [Git Repo](#).
135. He, Zhao, Chu. 2019. *AutoML: A Survey of the State-of-the-Art*. Elsevier Knowledge-Based Systems. Volume. 37 pages. DOI: <https://doi.org/10.1016/j.knosys.2020.106622>. Relevance: 22.38.
136. Jia, Willard, Karpatne, Read, Zwart, Steinbach, Kumar. 2020. *Physics-Guided Machine Learning for Scientific Discovery: An Application in Simulating Lake Temperature Profiles*. ACM/IMS Transactions on Data Science, Volume 2, Issue 3. Article No.: 20, Pages 1 - 26. 26 pages. DOI: <https://doi.org/10.1145/3447814>. Relevance: 22.31.
137. Pang, Lu, Karniadakis. 2019. *fPINNs: Fractional Physics-Informed Neural Networks*. Methods and Algorithms for Scientific Computing. 29 pages. DOI: <https://doi.org/10.1137/18M1229845>. Relevance: 22.24.
138. Kurth, Treichler, Romero, Mudigonda, Luehr, Phillips. 2018. *Exascale Deep Learning for Climate Analytics*. International Conference for High Performance Computing, Networking, Storage and Analysis. 12 pages. DOI: <https://doi.org/10.1109/SC.2018.00054>. Relevance: 22.17.
139. Nwankpa, Ijomah, Gachagan, Marshall. 2018. *Activation Functions: Comparison of trends in Practice and Research for Deep Learning*. 20 pages. DOI: <https://doi.org/10.48550/arXiv.1811.03378>. Relevance: 21.95.
140. Du, Dai, Trivedi, Upadhyay, Gomez-Rodriguez, Song. 2016. *Recurrent marked temporal point processes: Embedding event history to vector*. Association for Computing Machinery. 10 pages. DOI: <https://doi.org/10.1145/2939672.2939875>. Relevance: 21.9.

141. Rudy, Alla, Brunton, Kutz. 2018. *Data-driven identification of parametric partial differential equations*. arxiv math arXiv:1806.00732. 17 pages. DOI: <https://arxiv.org/abs/1806.00732v1>. Relevance: 21.88.
142. Jagtap, Kawaguchi, Karniadakis. 2020. *Adaptive activation functions accelerate convergence in deep and physics-informed neural networks*. Journal of Computational Physics. Volume. 28 pages. DOI: <https://doi.org/10.1016/j.jcp.2019.109136>. Relevance: 21.75.
143. Mathews, Francisquez, Hughes, Hatch, Zhu, Rogers. 2021. *Uncovering turbulent plasma dynamics via deep learning from partial observations*. Phys. Rev. E. 11 pages. DOI: https://doi.org/10.1103/PhysRevE.104.025205?_gl=11wtofrg_gcl_aumTQzNjk1OTA4Ni4xNzI5ODI5ODUy_g. Relevance: 21.73. [Git Repo](#).
144. Rackauckas, Innes, Ma, Bettencourt, White, Dixit. 2019. *DiffEqFlux.jl - A Julia Library for Neural Differential Equations*. 17 pages. DOI: <https://arxiv.org/abs/1902.02376v1>. Relevance: 21.65.
145. Greydanus, Dzamba, Yosinski. 2019. *Hamiltonian Neural Networks*. Conference paper at NeurIPS 2019. 11 pages. DOI: <https://doi.org/10.48550/arXiv.1906.01563>. Relevance: 21.55. [Git Repo](#).
146. Raissi, Perdikaris, Karniadakis. 2017. *Physics Informed Deep Learning (Part II): Data-driven Discovery of Nonlinear Partial Differential Equations*. 19 pages. DOI: <https://doi.org/10.48550/arXiv.1711.10566>. Relevance: 21.53. [Git Repo](#).
147. Sirignano, Spiliopoulos. 2018. *DGM: A deep learning algorithm for solving partial differential equations*. Journal of Computational Physics. Volume. 31 pages. DOI: <https://doi.org/10.1016/j.jcp.2018.08.029>. Relevance: 21.52.
148. Brunton, Noack, Koumoutsakos. 2020. *Machine Learning for Fluid Mechanics*. Annual Review of Fluid Mechanics Volume. 32 pages. DOI: <https://doi.org/10.1146/annurev-fluid-010719-060214>. Relevance: 21.44.
149. Lu, Pestourie, Yao, Wang, Verdugo, Johnson. 2020. *Physics-Informed Neural Networks with Hard Constraints for Inverse Design*. SIAM Journal on Scientific Computing. Volume 43 •

- Issue 6 • January 2021. Pages: B1105 - B1132. 29 pages. DOI: <https://doi.org/10.1137/21M1397908>. Relevance: 21.14.
150. Pfaff, Fortunato, Sanchez-Gonzalez, Battaglia. 2020. *Learning Mesh-Based Simulation with Graph Networks*. International Conference on Learning Representations (ICLR), 2021. 18 pages. DOI: <https://arxiv.org/abs/2010.03409v4>. Relevance: 21.11. [Git Repo](#).
151. Fan, Wang. 2023. *Differentiable hybrid neural modeling for fluid-structure interaction*. Journal of Computational Physics. 42 pages. DOI: <https://doi.org/10.1016/j.jcp.2023.112584>. Relevance: 21.
152. Pathak, Wikner, Fussell, Chandra, Hunt, Girvan, Ott. 2018. *Hybrid Forecasting of Chaotic Processes: Using Machine Learning in Conjunction with a Knowledge-Based Model*. Chaos. 10 pages. DOI: <https://doi.org/10.1063/1.5028373>. Relevance: 20.89.
153. Wiewel, Becher, Thuerey. 2018. *Latent-space Physics: Towards Learning the Temporal Evolution of Fluid Flow*. 16 pages. DOI: <https://doi.org/10.48550/arXiv.1802.10123>. Relevance: 20.88.
154. Brunton, Kutz, Manohar, Aravkin, Morgansen, Klemisch, Goebel, Buttrick, Poskin, Blom-Schieber, Hogan, McDonald. 2020. *Data-driven aerospace engineering: Reframing the industry with machine learning*. American Institute of Aeronautics and Astronautics Journal. 35 pages. DOI: <https://doi.org/10.48550/arXiv.2008.10740>. Relevance: 20.74.
155. Kharazmi, Zhang, Karniadakis. 2021. *hp-VPINNs: Variational physics-informed neural networks with domain decomposition*. Computer Methods in Applied Mechanics and Engineering. Volume. 21 pages. DOI: <https://doi.org/10.1016/j.cma.2020.113547>. Relevance: 20.43.
156. Li, Du, Zhou, Jing, Zhou, Zeng, Xiao, Zhu, Liu, Zhang. 2022. *ODE Transformer: An Ordinary Differential Equation-Inspired Model for Sequence Generation*. Annual Meeting of the Association for Computational Linguistics. 17 pages. DOI: <https://doi.org/10.18653/v1/2022.acl-long.571>. Relevance: 20.29. [Git Repo](#).
157. Rahim, Al-Ramadhan. 2002. *Dynamic equivalent of external power system and its parameter*

- estimation through artificial neural networks*. International Journal of Electrical Power & Energy Systems. Volume 24, Issue 2, February 2002, Pages 113-120. 7 pages. DOI: [https://doi.org/10.1016/S0142-0615\(01\)00016-3](https://doi.org/10.1016/S0142-0615(01)00016-3). Relevance: 20.29.
158. Pun, Batra, Ramprasad, Mishin. 2019. *Physically informed artificial neural networks for atomistic modeling of materials*. Nature Communications volume 10, Article number: 2339 (2019). 10 pages. DOI: <https://doi.org/10.1038/s41467-019-10343-5>. Relevance: 20.1.
159. Florio, Schiassi, Furfaro. 2022. *Physics-Informed Neural Networks and Functional Interpolation for Initial Value Problems with Applications to Integro-Differential and Stiff Differential Equations*. AIP Chaos. 18 pages. DOI: <https://doi.org/10.1063/5.0086649>. Relevance: 19.94. [Git Repo](#).
160. Shin, Darbon, Karniadakis. 2020. *On the convergence of physics informed neural networks for linear second-order elliptic and parabolic type PDEs*. Communications in Computational Physics, Vol. 28 (2020), Iss. 5 : pp. 2042–2074. 31 pages. DOI: <https://doi.org/10.48550/arXiv.2004.01806>. Relevance: 19.9.
161. Kharazmi, Zhang, Karniadakis. 2019. *Variational Physics-Informed Neural Networks For Solving Partial Differential Equations*. arXiv e-prints. 24 pages. DOI: <https://doi.org/10.48550/arXiv.1912.00873>. Relevance: 19.79.
162. Grathwohl, Chen, Bettencourt, Sutskever, Duvenaud. 2019. *FFJORD: Free-form Continuous Dynamics for Scalable Reversible Generative Models*. 13 pages. DOI: <https://doi.org/10.48550/arXiv.1810.01367>. Relevance: 19.77.
163. Shukla, Leoni, Blackshire, Sparkman, Karniadakis. 2020. *Physics-informed neural network for ultrasound nondestructive quantification of surface breaking cracks*. arXiv. [Submitted on 7 May 2020]. 19 pages. DOI: <https://arxiv.org/abs/2005.03596v1>. Relevance: 19.47.
164. Zhang, Yin, Karniadakis. 2020. *Physics-Informed Neural Networks for Nonhomogeneous Material Identification in Elasticity Imaging*. arXiv. [Submitted on 2 Sep 2020]. 10 pages. DOI: <https://arxiv.org/abs/2009.04525v1>. Relevance: 19.4.
165. Sompolinsky. 1988. *Statistical Mechanics of Neural Networks*. Physics Today 41 (12), 70–80

- (1988). 11 pages. DOI: <https://doi.org/10.1063/1.881142>. Relevance: 19.27.
166. Raissi, Perdikaris, Karniadakis. 2018. *Multistep Neural Networks for Data-driven Discovery of Nonlinear Dynamical Systems*. 19 pages. DOI: <https://doi.org/10.48550/arXiv.1801.01236>. Relevance: 19.26. [Git Repo](#).
167. Akhare, Luo, Wang. 2022. *Physics-integrated Neural Differentiable (PiNDiff) Model for Composites Manufacturing*. Computer Methods in Applied Mechanics and Engineering.. 44 pages. DOI: <https://doi.org/10.1016/j.cma.2023.115902>. Relevance: 19.
168. He, Zhang, Ren, Sun. 2015. *Deep Residual Learning for Image Recognition*. Proceedings of the IEEE conference on computer vision and pattern recognition, 2016, pp. 770–778.. 12 pages. DOI: <https://doi.org/10.48550/arXiv.1512.03385>. Relevance: 18.92.
169. Laubscher. 2021. *Simulation of multi-species flow and heat transfer using physics-informed neural networks*. Physics of Fluids - POF21-AR-02440.. 25 pages. DOI: <https://doi.org/10.1063/5.0058529>. Relevance: 18.88.
170. Lukosevicius, Jaeger. 2009. *Reservoir computing approaches to recurrent neural network training*. Computer Science Review. Volume 3, Issue 3, August 2009, Pages 127-149. 23 pages. DOI: <https://doi.org/10.1016/j.cosrev.2009.03.005>. Relevance: 18.61.
171. Milano, Koumoutsakos. 2002. *Neural Network Modeling for Near Wall Turbulent Flow*. Journal of Computational Physics. Volume 182, Issue. 26 pages. DOI: <https://doi.org/10.1006/jcph.2002.7146>. Relevance: 18.58.
172. Ramabathiran, Ramachandran. 2021. *SPINN: Sparse, Physics-based, and partially Interpretable Neural Networks for PDEs*. Journal of Computational Physics, Volume. 58 pages. DOI: <https://doi.org/10.48550/arXiv.2102.13037>. Relevance: 18.55. [Git Repo](#).
173. Lai, Mylonas, Nagarajaiah, Chatzi. 2021. *Structural identification with physics-informed neural ordinary differential equations*. Journal of Sound and Vibration. Volume. 36 pages. DOI: <https://doi.org/10.1016/j.jsv.2021.116196>. Relevance: 18.34.
174. Hackenberg, Grodd, Kreutz, Fischer, Esins, Grabenhenrich, Karagiannidis, Binder. 2021. *Using differentiable programming for flexible statistical modeling*. The American Statistician

- (2021) 1–10. 25 pages. DOI: <https://doi.org/10.1080/00031305.2021.2002189>. Relevance: 18.32. [Git Repo](#).
175. Wight, Zhao. 2020. *Solving Allen-Cahn and Cahn-Hilliard Equations using the Adaptive Physics Informed Neural Networks*. math> arXiv:2007.04542. 25 pages. DOI: <https://arxiv.org/abs/2007.04542v1>. Relevance: 18.32.
176. Mattheakis, Protopapas, Sondak, Giovanni, Kaxiras. 2019. *Physical Symmetries Embedded in Neural Networks*. 16 pages. DOI: <https://arxiv.org/abs/1904.08991v3>. Relevance: 18.31.
177. Gao, Wang. 2021. *A Bi-fidelity ensemble kalman method for PDE-constrained inverse problems in computational mechanics*. Comput Mech. 17 pages. DOI: <https://doi.org/10.1007/s00466-021-01979-6>. Relevance: 18.29.
178. Jordan, Mitchell. 2015. *Machine learning: Trends, perspectives, and prospects*. Science, 349(6245):255–260, 2015. 7 pages. DOI: <https://doi.org/10.1126/science.aaa8415>. Relevance: 18.29.
179. Lagaris, Likas, Fotiadis. 1997. *Artificial Neural Networks for Solving Ordinary and Partial Differential Equations*. IEEE Transactions on Neural Networks (Volume: 9, Issue: 5, September 1998). 14 pages. DOI: <https://doi.org/10.48550/arXiv.physics/9705023>. Relevance: 18.29.
180. Lew, Shah, Pati, Cattell, Zhang, Sandhupatla, Ng, Goli, Sinclair, Rogers, Aamodt. 2018. *Analyzing Machine Learning Workloads Using a Detailed GPU Simulator*. 2019 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS). 11 pages. DOI: <http://dx.doi.org/10.48550/arXiv.1811.08933>. Relevance: 18.27. [Git Repo](#).
181. Wang, Perdikaris. 2021. *Deep learning of free boundary and Stefan problems*. Journal of Computational Physics. Volume. 27 pages. DOI: <https://doi.org/10.1016/j.jcp.2020.109914>. Relevance: 18.26. [Git Repo](#).
182. Xie, Franz, Chu, Thuerey. 2018. *tempoGAN: A Temporally Coherent, Volumetric GAN for Super-resolution Fluid Flow*. ACM Transactions on Graphics (SIGGRAPH). 2018; 37(4): 1–15.; arXiv pre-print 1801.09710.. 15 pages. DOI: <https://doi.org/10.1145/3072959.3073643>. Relevance: 18. [Git Repo](#).

183. Yang, Meng, Karniadakis. 2021. *B-PINNs: Bayesian physics-informed neural networks for forward and inverse PDE problems with noisy data*. Journal of Computational Physics. Volume. 32 pages. DOI: <https://doi.org/10.1016/j.jcp.2020.109913>. Relevance: 18.
184. He, Barajas-Solano, Tartakovsky, Tartakovsky, al. 2020. *Physics-informed neural networks for multiphysics data assimilation with application to subsurface transport*. Advances in Water Resources. Volume 141, July. 38 pages. DOI: <https://doi.org/10.1016/j.advwatres.2020.103610>. Relevance: 17.95.
185. Lee, Bahri, Novak, Schoenholz, Pennington, Sohl-Dickstein. 2017. *Deep Neural Networks as Gaussian Processes*. NA. 17 pages. DOI: <https://arxiv.org/abs/1711.00165v3>. Relevance: 17.94.
186. Gardner, Pleiss, Weinberger, Bindel, Wilson. 2018. *GPyTorch: Blackbox Matrix-Matrix Gaussian Process Inference with GPU Acceleration*. Advances in Neural Information Processing Systems 31 (NeurIPS 2018). 11 pages. DOI: <https://arxiv.org/abs/1809.11165v6>. Relevance: 17.91.
187. Yang, Perdikaris. 2019. *Adversarial Uncertainty Quantification in Physics-Informed Neural Networks*. Journal of Computational Physics. 33 pages, 7 figures. 33 pages. DOI: <https://doi.org/10.1016/j.jcp.2019.05.027>. Relevance: 17.88. [Git Repo](#).
188. Kakka. 2022. *Sequence to sequence AE-ConvLSTM network for modelling the dynamics of PDE systems*. 27 pages. DOI: <https://doi.org/10.48550/arXiv.2208.07315>. Relevance: 17.85. [Git Repo](#).
189. Goswami, Yin, Yu, Karniadakis. 2021. *A physics-informed variational DeepONet for predicting the crack path in brittle materials*. Computer Methods in Applied Mechanics and Engineering. Volume. 39 pages. DOI: <https://doi.org/10.1016/j.cma.2022.114587>. Relevance: 17.74.
190. Sun, Han, Gao, Wang, Liu. 2023. *Unifying Predictions of Deterministic and Stochastic Physics in Mesh-reduced Space with Sequential Flow Generative Model*. 32nd Conference on Neural Information Processing Systems (NeurIPS 2018), Montréal, Canada.. 25 pages. DOI: NA. Relevance: 17.72.

191. Hennigh, Narasimhan, Nabian, Subramaniam, Tangsali, Fang, Rietmann, Byeon, Choudhry. 2021. *NVIDIA SimNet: An AI-Accelerated Multi-Physics Simulation Framework*. ICCS 2021. ICCS 2021. Lecture Notes in Computer Science(), vol 12746.. 15 pages. DOI: https://doi.org/10.1007/978-3-030-77977-1_36. Relevance: 17.71.
192. Zhang, Liu, Sun. 2020. *Physics-informed multi-LSTM networks for metamodeling of non-linear structures*. Computer Methods in Applied Mechanics and Engineering. Volume. 21 pages. DOI: <https://doi.org/10.1016/j.cma.2020.113226>. Relevance: 17.71. [Git Repo](#).
193. Ramachandran, Zoph, Le. 2017. *Searching for Activation Functions*. 13 pages. DOI: <https://doi.org/10.48550/arXiv.1710.05941>. Relevance: 17.62.
194. Pakravan, Mistani, Aragon-Calvo, Gibou. 2020. *Solving inverse-PDE problems with physics-aware neural networks*. 39 pages. DOI: <https://arxiv.org/abs/2001.03608v3>. Relevance: 17.54.
195. Patra, Panda, Parida, Arya, Jacobs, Bondar, Sen. 2024. *Physics Informed Kolmogorov-Arnold Neural Networks for Dynamical Analysis via Efficient-KAN and WAV-KAN*. cs>arXiv:2407.18373. 18 pages. DOI: <https://arxiv.org/abs/2407.18373v2>. Relevance: 17.5.
196. Kollmannsberger, D'Angella, Jokeit, Herrmann. 2021. *Physics-informed neural networks for high-speed flows*. Computational Mechanics. Studies in Computational Intelligence, Springer International Publishing, Cham, p 55–84. 108 pages. DOI: https://doi.org/10.1007/978-3-030-76587-3_5. Relevance: 17.44. [Git Repo](#).
197. Belbute-Peres, Economou, Kolter. 2020. *Combining differentiable PDE solvers and graph neural networks for fluid flow prediction*. International Conference on Machine Learning, PMLR, 2020, pp. 2402–2411.. 16 pages. DOI: <https://doi.org/10.48550/arXiv.2007.04439>. Relevance: 17.38. [Git Repo](#).
198. Subramani, Vadivelu, Kamath. 2020. *Enabling Fast Differentially Private SGD via Just-in-Time Compilation and Vectorization*. arxiv [Submitted on 18 Oct 2020 (v1), last revised 26 Oct 2021 (this version, v2)]. 30 pages. DOI: <https://arxiv.org/abs/2010.09063v2>. Relevance: 17.37.

199. Darbon, Langlois, Meng. 2019. *Overcoming the curse of dimensionality for some Hamilton-Jacobi partial differential equations via neural network architectures*. 44 pages. DOI: <https://doi.org/10.48550/arXiv.1910.09045>. Relevance: 17.34.
200. Raissi. 2017. *Parametric Gaussian Process Regression for Big Data*. arxiv [Submitted on 11 Apr 2017 (v1), last revised 4 May 2017 (this version, v2)]. 6 pages. DOI: <https://arxiv.org/abs/1704.03144v2>. Relevance: 17.33. [Git Repo](#).
201. Beidokhti, Malek. 2009. *Solving initial-boundary value problems for systems of partial differential equations using neural networks and optimization techniques*. Journal of the Franklin Institute. Volume 346, Issue 9, November 2009, Pages 898-913. 16 pages. DOI: <https://doi.org/10.1016/j.jfranklin.2009.05.003>. Relevance: 17.31.
202. Weinan. 2017. *A Proposal on Machine Learning via Dynamical Systems*. Commun. Math. Stat.. 13 pages. DOI: <https://doi.org/10.1007/s40304-017-0103-z>. Relevance: 17.23.
203. Choi, Bahadori, Schuetz, Stewart, Sun. 2016. *Doctor AI: Predicting Clinical Events via Recurrent Neural Networks*. Proceedings of the 1st Machine Learning for Healthcare Conference, PMLR 56:301-318, 2016.. 18 pages. DOI: <https://doi.org/10.48550/arXiv.1511.05942>. Relevance: 17.22. [Git Repo](#).
204. Guo, Agarwal, Cooper, Tian, Gao, Guo, Guo. 2022. *Machine Learning for Metal Additive Manufacturing: Towards a Physics-Informed Data-Driven Paradigm*. Journal of Manufacturing Systems. Volume 62, January 2022, Pages 145-163. 40 pages. DOI: <https://doi.org/10.1016/j.jmsy.2021.11.003>. Relevance: 17.15.
205. Gomez, Ren, Urtasun, Grosse. 2017. *The Reversible Residual Network: Backpropagation Without Storing Activations*. Computer Vision and Pattern Recognition. 11 pages. DOI: <https://doi.org/10.48550/arXiv.1707.04585>. Relevance: 17. [Git Repo](#).
206. Liao, Poggio. 2016. *Bridging the Gaps Between Residual Learning, Recurrent Neural Networks and Visual Cortex*. 14 pages. DOI: <https://doi.org/10.48550/arXiv.1604.03640>. Relevance: 17.
207. Loiseau, Brunton. 2018. *Constrained sparse Galerkin regression*. J. Fluid Mech.. 27 pages.

- DOI: <https://doi.org/10.1017/jfm.2017.823>. Relevance: 17. [Git Repo](#).
208. Morrill, Salvi, Kidger, Foster, Lyons. 2021. *Neural Rough Differential Equations for Long Time Series*. Proceedings of the Thirty-Second AAAI Conference on Artificial Intelligence, (AAAI-18), the 30th innovative Applications of Artificial Intelligence (IAAI-18), and the 8th AAAI Symposium on Educational Advances in Artificial Intelligence (EAAI-18), New Orleans, Louisiana, USA, February 2-7, 2018, pages 2811–2818. AAAI Press.. 22 pages. DOI: <https://doi.org/10.48550/arXiv.2009.08295>. Relevance: 16.95. [Git Repo](#).
209. Pang, D’Elia, Parks, Karniadakis1. 2020. *nPINNs: nonlocal Physics-Informed Neural Networks for a parametrized nonlocal universal Laplacian operator*. *Algorithms and Applications*. Journal of Computational Physics. 31 pages. DOI: <https://doi.org/10.1016/j.jcp.2020.109760>. Relevance: 16.84.
210. Berg, Nyström. 2019. *Data-driven discovery of PDEs in complex datasets*. Journal of Computational Physics. Volume. 22 pages. DOI: <https://doi.org/10.1016/j.jcp.2019.01.036>. Relevance: 16.73.
211. Özbay, Hamzehloo, Laizet, Tzirakis, Rizos, Schuller. 2021. *Poisson CNN: Convolutional neural networks for the solution of the Poisson equation on a Cartesian mesh*. *Data-Centric Engineering*. 2021;2:e6.. 31 pages. DOI: <https://doi.org/10.1017/dce.2021.7>. Relevance: 16.65. [Git Repo](#).
212. Raissi, Wang, Triantafyllou, Karniadakis. 2019. *Deep learning of vortex-induced vibrations*. Journal of Fluid Mechanics. 29 pages. DOI: <https://doi.org/10.1017/jfm.2018.872>. Relevance: 16.5. [Git Repo](#).
213. B, H. 1997. *Basic concepts of pharmacokinetic/pharmacodynamic (PK/PD) modelling*. *Int J Clin Pharmacol Ther*. 1997 Oct;35(10):401-13.. 13 pages. DOI: NA. Relevance: 16.46.
214. Iten, Metger, Wilming, Rio, Renner. 2020. *Discovering Physical Concepts with Neural Networks*. *Phys. Rev. Lett.*. 18 pages. DOI: https://doi.org/10.1103/PhysRevLett.124.010508?_gl=11m475v2_gcl. Relevance: 16.44. [Git Repo](#).
215. Jin, Lu, Tang, Karniadakis. 2019. *Quantifying the generalization error in deep learning in*

- terms of data distribution and neural network smoothness*. Neural Networks. Volume 130, October 2020, Pages 85-99. 17 pages. DOI: <https://doi.org/10.1016/j.neunet.2020.06.024>. Relevance: 16.41.
216. Sun, Gao, Pan, Wang. 2020. *Surrogate modeling for fluid flows based on physics-constrained deep learning without simulation data*. Computer Methods in Applied Mechanics and Engineering. Volume. 43 pages. DOI: <https://doi.org/10.1016/j.cma.2019.112732>. Relevance: 16.4. [Git Repo](#).
217. Lake, Salakhutdinov, Tenenbaum. 2015. *Human-level concept learning through probabilistic program induction*. Science 350 (2015)1332–1338.. 8 pages. DOI: <https://doi.org/10.1126/science.aab3050>. Relevance: 16.38. [Git Repo](#).
218. Sutskever, Vinyals, Le. 2014. *Sequence to Sequence Learning with Neural Networks*. NIPS'14: Proceedings of the 27th International Conference on Neural Information Processing Systems - Volume 2. Pages 3104 - 3112. 9 pages. DOI: <https://doi.org/10.48550/arXiv.1409.3215>. Relevance: 16.33.
219. O'Leary, Paulson, Mesbah. 2022. *Stochastic Physics-Informed Neural Ordinary Differential Equations*. Journal of Computational Physics. Vol. 468, No. C. 35 pages. DOI: <https://doi.org/10.1016/j.jcp.2022.111466>. Relevance: 16.17. [Git Repo](#).
220. Patel, Manickam, Trask, Wood, Lee, Tomas, Cyr. 2020. *Thermodynamically consistent physics-informed neural networks for hyperbolic systems*. eprint arXiv:2012.05343. 36 pages. DOI: https://ui.adsabs.harvard.edu/link_gateway/2020arXiv201205343P/doi:10.48550/arXiv.2012.05343. Relevance: 16.06.
221. Schiassi, Furfaro, Leake, Florio, Johnston, Mortari. 2021. *Extreme theory of functional connections: A fast physics-informed neural network method for solving ordinary and partial differential equations*. Neurocomputing. Volume. 29 pages. DOI: <https://doi.org/10.1016/j.neucom.2021.06.015>. Relevance: 15.96.
222. Kovachki, Li, Liu, Azizzadenesheli, Bhattacharya, Stuart, Anandkumar. 2021. *Neural Operator: Learning Maps Between Function Spaces*. Kovachki, N., Li, Z., Liu, B., Azizzadenesheli, K., Bhattacharya, K., Stuart, A., and Anandkumar, A. Neural operator: Learning

- maps between function spaces. arXiv preprint arXiv:2108.08481, 2021.. 97 pages. DOI: <https://doi.org/10.48550/arXiv.2108.08481>. Relevance: 15.88. [Git Repo](#).
223. Alipanahi, Delong, Weirauch, Frey. 2015. *Predicting the sequence specificities of DNA-and RNA-binding proteins by deep learning*. Nature biotechnology 33 (2015) 831–838.. 10 pages. DOI: <https://doi.org/10.1038/nbt.3300>. Relevance: 15.78. [Git Repo](#).
224. Yin, Zheng, Humphrey, Karniadakis. 2021. *Non-invasive inference of thrombus material properties with physics-informed neural networks*. Computer Methods in Applied Mechanics and Engineering. 38 pages. DOI: <https://doi.org/10.1016/j.cma.2020.113603>. Relevance: 15.63.
225. Lu, Jin, Karniadakis. 2020. *DeepONet: Learning nonlinear operators for identifying differential equations based on the universal approximation theorem of operators*. 22 pages. DOI: <https://doi.org/10.48550/arXiv.1910.03193>. Relevance: 15.59. [Git Repo](#).
226. Raissi. 2018. *Deep Hidden Physics Models: Deep Learning of Nonlinear Partial Differential Equations*. 26 pages. DOI: <https://doi.org/10.48550/arXiv.1801.06637>. Relevance: 15.46. [Git Repo](#).
227. Huang, Xu, Farhat, Darve. 2020. *Learning Constitutive Relations from Indirect Observations Using Deep Neural Networks*. Journal of Computational Physics. Volume. 40 pages. DOI: <https://www.sciencedirect.com/science/article/abs/pii/S0021999120302655?via%3Dihub>. Relevance: 15.45. [Git Repo](#).
228. Lu, Dao, Kumar, Ramamurty, Karniadakis, Suresh. 2020. *Extraction of mechanical properties of materials through deep learning from instrumented indentation*. Proc. Natl. Acad. Sci. U.S.A.. 11 pages. DOI: <https://doi.org/10.1073/pnas.1922210117>. Relevance: 15.45. [Git Repo](#).
229. Baty. 2024. *A hands-on introduction to Physics-Informed Neural Networks for solving partial differential equations with benchmark tests taken from astrophysics and plasma physics*. 38 pages. DOI: <https://doi.org/10.48550/arXiv.2403.00599>. Relevance: 15.42. [Git Repo](#).
230. Baymani, Kerayechian, Effati. 2010. *Artificial neural networks approach for solving stokes*

- problem*. Applied Mathematics, Vol.1 No.4, 2010. 5 pages. DOI: <http://dx.doi.org/10.4236/am.2010.14037>. Relevance: 15.4.
231. DS, N, L, B. 2022. *Introduction of an artificial neural network-based method for concentration-time predictions*. (2022) CPT Pharmacometrics Syst Pharmacol11:745–754. <https://doi.org/10.1002/psp4.12786>. 10 pages. DOI: <https://doi.org/10.1002/psp4.12786>. Relevance: 15.4.
232. Hagge, Stinis, Yeung, Tartakovsky. 2017. *Solving differential equations with unknown constitutive relations as recurrent neural networks*. arxiv [Submitted on 6 Oct 2017]. 16 pages. DOI: <https://arxiv.org/abs/1710.02242v1>. Relevance: 15.38.
233. Errico. 1997. *What Is an Adjoint Model?*. Bulletin of the American Meteorological Society. Volume 78. Issue 11. 15 pages. DOI: [https://doi.org/10.1175/1520-0477\(1997\)078%3C2577:WIAAM%3E2.0.CO;2](https://doi.org/10.1175/1520-0477(1997)078%3C2577:WIAAM%3E2.0.CO;2). Relevance: 15.27.
234. Gopalani, Karmakar, Kumar, Mukherjee. 2024. *Towards Size-Independent Generalization Bounds for Deep Operator Nets*. Transactions on Machine Learning Research. 33 pages. DOI: NA. Relevance: 15.15. [Git Repo](#).
235. Li, Kovachki, Azizzadenesheli, Liu, Bhattacharya, Stuart, Anandkumar. 2020. *Neural Operator: Graph Kernel Network for Partial Differential Equations*. 21 pages. DOI: <https://doi.org/10.48550/arXiv.2003.03485>. Relevance: 15.1. [Git Repo](#).
236. Lutter, Ritter, Peters. 2019. *Deep Lagrangian Networks: Using Physics as Model Prior for Deep Learning*. Published at ICLR 2019. 17 pages. DOI: <https://doi.org/10.48550/arXiv.1907.04490>. Relevance: 15. [Git Repo](#).
237. Lipton, Kale, Elkan, Wetzl. 2017. *Learning to Diagnose with LSTM Recurrent Neural Networks*. International Conference on Learning Representations. 18 pages. DOI: <https://doi.org/10.48550/arXiv.1511.03677>. Relevance: 14.94.
238. Jin, Zhang, Zhu, Tang, Karniadakis. 2020. *SympNets: Intrinsic structure-preserving symplectic networks for identifying Hamiltonian systems*. cs> arXiv:2001.03750. 18 pages. DOI: <https://arxiv.org/abs/2001.03750v3>. Relevance: 14.89.

239. Gao, Sun, Wang. 2021. *PhyGeoNet: Physics-informed geometry-adaptive convolutional neural networks for solving parameterized steady-state PDEs on irregular domain*. Journal of Computational Physics. Volume. 57 pages. DOI: <https://doi.org/10.1016/j.jcp.2020.110079>. Relevance: 14.72. [Git Repo](#).
240. Zhang, Lu, Guo, Karniadakis. 2019. *Quantifying total uncertainty in physics-informed neural networks for solving forward and inverse stochastic problems*. Journal of Computational Physics. Volume. 34 pages. DOI: <https://doi.org/10.1016/j.jcp.2019.07.048>. Relevance: 14.68.
241. Geneva, Zabaras. 2020. *Transformers for Modeling Physical Systems*. Neural Networks; Volume 146, February 2022, Pages 272-289. 39 pages. DOI: https://ui.adsabs.harvard.edu/link_gateway/2020arXiv201003957G/doi:10.48550/arXiv.2010.03957. Relevance: 14.49.
242. FALSE, Petra, Zhang, Constantinescu, Anitescu. 2016. *A Bayesian Approach for Parameter Estimation With Uncertainty for Dynamic Power Systems*. IEEE Transactions on Power Systems (Volume: 32, Issue: 4, July 2017). 10 pages. DOI: <https://doi.org/10.1109/TPWRS.2016.2625277>. Relevance: 14.4. [Git Repo](#).
243. Schaeffer, Cañisch, Hauck, Osher. 2013. *Sparse dynamics for partial differential equations*. Applied Mathematics 110 (17) 6634-6639. 6 pages. DOI: <https://doi.org/10.1073/pnas.1302752110>. Relevance: 14.33.
244. Karalias, Loukas. 2020. *Erdos Goes Neural: an Unsupervised Learning Framework for Combinatorial Optimization on Graphs*. Advances on Neural Information Processing Systems, pp. 6659–6672. 21 pages. DOI: <https://doi.org/10.48550/arXiv.2006.10643>. Relevance: 14.14. [Git Repo](#).
245. Klooster. 2021. *Approximating differential equations using neural ODEs*. U of Twente. Department of Applied Mathematics. Faculty of Electrical Engineering. 22 pages. DOI: NA. Relevance: 14.
246. Graves. 2011. *Practical Variational Inference for Neural Networks*. Advances in Neural Information Processing Systems 24 (NIPS 2011). 9 pages. DOI: NA. Relevance: 13.89.

247. Shahriari, Swersky, Wang, Adams, Freitas. 2016. *Taking the Human Out of the Loop: A Review of Bayesian Optimization*. 28 pages. DOI: <https://doi.org/10.1109/JPROC.2015.2494218>. Relevance: 13.82.
248. Perdikaris, Raissi, Damianou, Lawrence, Karniadakis. 2017. *Nonlinear information fusion algorithms for data-efficient multi-fidelity modelling*. Proc. R. Soc. A.47320160751. 16 pages. DOI: <https://doi.org/10.1098/rspa.2016.0751>. Relevance: 13.81.
249. Gao, Han, Fan, Sun, Liu, Duan, Wang. 2024. *Bayesian conditional diffusion models for versatile spatiotemporal turbulence generation*. Computer Methods in Applied Mechanics and Engineering. 37 pages. DOI: <https://doi.org/10.1016/j.cma.2024.117023>. Relevance: 13.78.
250. Dai, Khalil, Zhang, Dilkina, Song. 2017. *Learning Combinatorial Optimization Algorithms over Graphs*. Advances on Neural Information Processing Systems, pp. 6351–6361, 2017. 24 pages. DOI: <https://doi.org/10.48550/arXiv.1704.01665>. Relevance: 13.75. [Git Repo](#).
251. Cheridito, Jentzen, Rossmannek. 2019. *Efficient approximation of high-dimensional functions with neural networks*. IEEE Trans. Neural Netw. Learn. Syst. (2021). 15 pages. DOI: <https://arxiv.org/abs/1912.04310v3>. Relevance: 13.33.
252. Siegelmann, Sontag. 1992. *On the computational power of neural nets*. COLT '92: Proceedings of the fifth annual workshop on Computational learning theory. Pages 440 - 449. 10 pages. DOI: <https://doi.org/10.1145/130385.130432>. Relevance: 13.3.
253. Hensman, Lawrence. 2013. *Gaussian Processes for Big Data*. arxiv [Submitted on 26 Sep 2013]. 9 pages. DOI: <https://arxiv.org/abs/1309.6835v1>. Relevance: 13.22.
254. Cao. 2021. *Choose a Transformer: Fourier or Galerkin*. Part of Advances in Neural Information Processing Systems 34 (NeurIPS 2021). 36 pages. DOI: NA. Relevance: 13.11. [Git Repo](#).
255. Yang, Daskalakis, Karniadakis. 2020. *Generative Ensemble Regression: Learning Particle Dynamics from Observations of Ensembles with Physics-Informed Deep Generative Models*. cs> arXiv:2008.01915. 35 pages. DOI: <https://arxiv.org/abs/2008.01915v2>. Relevance: 13.03.
256. Hornik, Stinchcombe, White. 1989. *Multilayer feedforward networks are universal approx-*

- imators*. Neural Networks. Volume 2, Issue. 8 pages. DOI: [https://doi.org/10.1016/0893-6080\(89\)90020-8](https://doi.org/10.1016/0893-6080(89)90020-8). Relevance: 13.
257. Baty, Baty. 2023. *Solving differential equations using physics informed deep learning: a hand-on tutorial with benchmark tests*. 23 pages. DOI: <https://doi.org/10.48550/arXiv.2302.12260>. Relevance: 12.96. [Git Repo](#).
258. Samaniego, Anitescu, Goswami, Nguyen-Thanh, Guo, Hamdia, Zhuang, Rabczuk. 2020. *An energy approach to the solution of partial differential equations in computational mechanics via machine learning: Concepts, Implementation and Applications*. Computer Methods in Applied Mechanics and Engineering. Volume. 37 pages. DOI: <http://dx.doi.org/10.1016/j.cma.2019.112790>. Relevance: 12.81. [Git Repo](#).
259. Schmidt, Lipson. 2009. *Distilling Free-Form Natural Laws from Experimental Data*. Science Vol. 324, No. 5923. 6 pages. DOI: <https://doi.org/10.1126/science.1165893>. Relevance: 12.8.
260. Babuška, Suri. 1990. *The p - and h - p versions of the finite element method, an overview*. Computer Methods in Applied Mechanics and Engineering. Volume 80, Issues 1–3, June 1990, Pages 5–26. 22 pages. DOI: [https://doi.org/10.1016/0045-7825\(90\)90011-A](https://doi.org/10.1016/0045-7825(90)90011-A). Relevance: 12.77.
261. Xu, Darve. 2019. *The Neural Network Approach to Inverse Problems in Differential Equations*. NA. 32 pages. DOI: <https://doi.org/10.48550/arXiv.1901.07758>. Relevance: 12.75.
262. Meng, Karniadakis. 2020. *A composite neural network that learns from multi-fidelity data: Application to function approximation and inverse PDE problems*. Journal of Computational Physics. Volume. 29 pages. DOI: <https://doi.org/10.1016/j.jcp.2019.109020>. Relevance: 12.72.
263. Haber, Ruthotto. 2017. *Stable Architectures for Deep Neural Networks Inverse Problems*. Volume 34, Number 1 Inverse Problems, Volume 34, Number. 23 pages. DOI: <https://doi.org/10.48550/arXiv.1705.03341>. Relevance: 12.7.
264. Berg, Hasenclever, Tomczak, Welling. 2018. *Sylvester Normalizing Flows for Variational Inference*. arxiv [Submitted on 15 Mar 2018 (v1), last revised 20 Feb 2019 (this version, v2)].

- 12 pages. DOI: <https://arxiv.org/abs/1803.05649v2>. Relevance: 12.67.
265. Graepel. 2003. *Solving Noisy Linear Operator Equations by Gaussian Processes: Application to Ordinary and Partial Differential Equations*. Proceedings of the Twentieth International Conference on Machine Learning. 8 pages. DOI: NA. Relevance: 12.62.
266. Lagaris, Likas, Papageorgiou. 2000. *Neural-network methods for boundary value problems with irregular boundaries*. IEEE Trans Neural Netw. 2000;11(5):1041-9.. 9 pages. DOI: <https://doi.org/10.1109/72.870037>. Relevance: 12.44.
267. Rowley, Mezic, Bagheri, Schlatter, Henningson. 2009. *Spectral analysis of nonlinear flows*. J. Fluid Mech., 645:115–127, 2009.. 13 pages. DOI: <https://doi.org/10.1017/S0022112009992059>. Relevance: 12.38.
268. Zhou. 2024. *Nonlocal Turbulence Models with neural networks*. Virginia Tech. 47 pages. DOI: NA. Relevance: 12.38.
269. Cai, Kang, Wang. 2017. *A stochastic SIRS epidemic model with nonlinear incidence rate*. Applied Mathematics and Computation. Volume. 20 pages. DOI: <https://doi.org/10.1016/j.amc.2017.02.003>. Relevance: 12.35.
270. Majda, Harlim. 2012. *Physics constrained nonlinear regression models for time series*. Non-linearity 26 201. 21 pages. DOI: <http://10.1088/0951-7715/26/1/201>. Relevance: 12.33.
271. Qiao, Liang, Koltun, Lin. 2020. *Scalable Differentiable Physics for Learning and Control*. ICML 20 Proceedings of the 37th International Conference on Machine Learning. Article No.: 727, Pages 7847 - 7856. 12 pages. DOI: <https://doi.org/10.48550/arXiv.2007.02168>. Relevance: 12.33. [Git Repo](#).
272. Tartakovsky, Marrero, Perdikaris, Tartakovsky, Barajas-Solano. 2018. *Learning Parameters and Constitutive Relationships with Physics Informed Deep Neural Networks*. math> arXiv:1808.03398. 22 pages. DOI: <https://arxiv.org/abs/1808.03398v2>. Relevance: 12.32.
273. Rackauckas, Ma, Martensen, Warner, Zubov, Supekar, Skinner, Ramadhan, Edelman. 2021. *Universal differential equations for scientific machine learning*. (2021) arXiv:200104385v4 [csLG]. <https://doi.org/10.48550/arXiv.2001.04385>. 55 pages. DOI: <https://doi.org/10.48550>

- [/arXiv.2001.04385](#). Relevance: 12.27. [Git Repo](#).
274. Mezic. 2013. *Analysis of fluid flows via spectral properties of the koopman operator*. Annual Review of FluidMechanics, 45:357–378, 2013.. 24 pages. DOI: <https://doi.org/10.1146/annu-rev-fluid-011212-140652>. Relevance: 12.25.
275. Zobeiry, Humfeld. 2021. *A physics-informed machine learning approach for solving heat transfer equation in advanced manufacturing and engineering applications*. Engineering Applications of Artificial Intelligence. Volume 101, May. 27 pages. DOI: <https://doi.org/10.1016/j.engappai.2021.104232>. Relevance: 12.22.
276. Hui, Chris, Carlos, Claes, Peter, S.. 2018. *Spectral/hp element methods: Recent developments, applications, and perspectives*. Volume 30, pages 1–22, (2018). 22 pages. DOI: <https://doi.org/10.1007/s42241-018-0001-1>. Relevance: 12.18.
277. Brunton, Proctor, Kutz. 2016. *Discovering governing equations from data by sparse identification of nonlinear dynamical systems*. Proc. Natl. Acad. Sci. U.S.A.113 (15) 3932-3937,. 20 pages. DOI: <https://doi.org/10.1073/pnas.1517384113>. Relevance: 12.08.
278. Lee, You. 2019. *Data-driven prediction of unsteady flow over a circular cylinder using deep learning*. Journal of Fluid Mechanics , Volume 879 , 25 November 2019 , pp. 217 - 254. 38 pages. DOI: <https://doi.org/10.1017/jfm.2019.700>. Relevance: 12.05.
279. Pestourie, Mroueh, Rackauckas, Johnson. 2023. *Physics-enhanced deep surrogates for partial differential equations*. Nature Machine Intelligence volume 5, pages 1458–1465 (2023). 40 pages. DOI: <https://doi.org/10.1038/s42256-023-00761-y>. Relevance: 12.05. [Git Repo](#).
280. Perdikaris, Venturi, Karniadakis. 2016. *Multifidelity Information Fusion Algorithms for High-Dimensional Systems and Massive Data sets*. SIAM Journal on Scientific Computing. Vol. 38, Iss. 4 (2016)10.1137/15M1055164. 19 pages. DOI: <https://doi.org/10.1137/15M1055164>. Relevance: 12.
281. Raissi, Yazdani, Karniadakis. 2020. *Hidden fluid mechanics: Learning velocity and pressure fields from flow visualizations*. Science 367(6481), 1026–1030 (2020). 9 pages. DOI: <https://doi.org/10.1126/science.aaw4741>. Relevance: 12. [Git Repo](#).

282. Kidger. 2022. *On Neural Differential Equations*. University of Oxford. Mathematical Institute. 231 pages. DOI: <https://doi.org/10.48550/arXiv.2202.02435>. Relevance: 11.91. [Git Repo](#).
283. Sun, Tao, Du. 2018. *Stochastic Training of Residual Networks: a Differential Equation Viewpoint*. 20 pages. DOI: <https://arxiv.org/abs/1812.00174v1>. Relevance: 11.9.
284. Jin, Cai, Li, Karniadakis. 2021. *NSFnets (Navier-Stokes flow nets): Physics-informed neural networks for the incompressible Navier-Stokes equations*. Journal of Computational Physics. 26 pages. DOI: <https://doi.org/10.1016/j.jcp.2020.109951>. Relevance: 11.88.
285. Lawrence. 2004. *Gaussian Process Latent Variable Models for Visualisation of High Dimensional Data*. Advances in Neural Information Processing Systems 16 (NIPS 2003). 8 pages. DOI: NA. Relevance: 11.88.
286. Raissi, Babaee, Givi. 2019. *Deep Learning of Turbulent Scalar Mixing*. Phys. Rev. Fluids. 19 pages. DOI: https://doi.org/10.1103/PhysRevFluids.4.124501?_gl=112e55k7_gaMTg3MzMwMjYzMi4xNzIzN. Relevance: 11.84.
287. Saxe, McClelland, Ganguli. 2013. *Exact solutions to the nonlinear dynamics of learning in deep linear neural networks*. International Conference on Learning Representations 2014. 22 pages. DOI: <https://doi.org/10.48550/arXiv.1312.6120>. Relevance: 11.59.
288. Zhang, Guo, Karniadakis. 2020. *Learning in Modal Space: Solving Time-Dependent Stochastic PDEs Using Physics-Informed Neural Networks*. SIAM Journal on Scientific Computing. Vol. 42, Iss. 2 (2020)10.1137/19M1260141. 31 pages. DOI: <https://doi.org/10.1137/19M1260141>. Relevance: 11.58.
289. Zhu, Zabaras, Koutsourelakis, Perdikaris. 2019. *Physics-Constrained Deep Learning for High-dimensional Surrogate Modeling and Uncertainty Quantification without Labeled Data*. Journal of Computational Physics. Volume. 51 pages. DOI: <https://doi.org/10.1016/j.jcp.2019.05.024>. Relevance: 11.51. [Git Repo](#).
290. Hethcote. 2000. *The Mathematics of Infectious Diseases*. SIAM Review. Vol. 42, Iss. 4 (2000). 55 pages. DOI: <https://doi.org/10.1137/S0036144500371907>. Relevance: 11.49.

291. Chang, Zhang, Han, Yu, Guo, Tan, Cui, Witbrock, Hasegawa-Johnson, Huang. 2017. *Dilated Recurrent Neural Networks*. Event 31st Annual Conference on Neural Information Processing Systems, NIPS 2017 - Long Beach, United States Duration: Dec 4 2017 → Dec 9 2017. 13 pages. DOI: <https://doi.org/10.48550/arXiv.1710.02224>. Relevance: 11.46. [Git Repo](#).
292. Patel, Trask, Wood, Cyr. 2020. *A physics-informed operator regression framework for extracting data-driven continuum models*. Computer Methods in Applied Mechanics and Engineering. Volume. 38 pages. DOI: <https://doi.org/10.1016/j.cma.2020.113500>. Relevance: 11.42. [Git Repo](#).
293. Li, Wong, Chen, Duvenaud. 2020. *Scalable Gradients for Stochastic Differential Equations*. AISTATS 2020. 25 pages. DOI: <https://doi.org/10.48550/arXiv.2001.01328>. Relevance: 11.32. [Git Repo](#).
294. Zhang, Sandu. 2014. *FATODE: a library for forward, adjoint, and tangent linear integration of ODEs*. SIAM Journal on Scientific Computing Vol. 36, Iss. 5 (2014). 30 pages. DOI: <https://doi.org/10.1137/130912335>. Relevance: 11.3.
295. Voleti. 2020. *A brief tutorial on Neural ODEs*. 51 pages. DOI: NA. Relevance: 11.29. [Git Repo](#).
296. Shwartz-Ziv, Tishby. 2017. *Opening the Black Box of Deep Neural Networks via Information*. 19 pages. DOI: <https://doi.org/10.48550/arXiv.1703.00810>. Relevance: 11.21.
297. Yang, Zhang, Karniadakis. 2020. *Physics-Informed Generative Adversarial Networks for Stochastic Differential Equations*. 35 pages. DOI: <https://doi.org/10.1137/18M1225409>. Relevance: 11.03.
298. Luo, Kareem. 2020. *Bayesian deep learning with hierarchical prior: Predictions from limited and noisy data*. Structural Safety. Volume 84, May. 34 pages. DOI: <https://doi.org/10.1016/j.strusafe.2019.101918>. Relevance: 10.82.
299. Chen, Duan, Karniadakis. 2019. *Learning and meta-learning of stochastic advection-diffusion-reaction systems from sparse measurements*. European Journal of Applied

- Mathematics. 31 pages. DOI: <https://doi.org/10.48550/arXiv.1910.09098>. Relevance: 10.81.
300. Manohar, Brunton, Kutz, Brunton. 2018. *Data-driven sparse sensor placement for reconstruction: Demonstrating the benefits of exploiting known patterns*. IEEE Control Systems Magazine. Volume 38, Issue 3. 34 pages. DOI: <https://doi.org/10.1109/MCS.2018.2810460>. Relevance: 10.68. [Git Repo](#).
301. Baldillou. 2024. *An introduction to neural ordinary differential equations*. U of Barcelona. 73 pages. DOI: NA. Relevance: 10.66. [Git Repo](#).
302. Schmid. 2010. *Dynamic mode decomposition of numerical and experimental data*. Journal of Fluid Mechanics, 656:5–28, August 2010.. 25 pages. DOI: <https://doi.org/10.1017/S0022112010001217>. Relevance: 10.6.
303. Hopfield. 1982. *Neural Networks and Physical Systems with Emergent Collective Computational Abilities*. Proceedings of the National Academy of Sciences. 5 pages. DOI: <https://doi.org/10.1073/pnas.79.8.2554>. Relevance: 10.4.
304. Zubov, McCarthy, Ma, Calisto, Pagliarino, Azeglio, Bottero, Luján, Sulzer, Bharambe, Vinchhi, Balakrishnan, Upadhyay, Rackauckas. 2021. *NeuralPDE: Automating Physics-Informed Neural Networks (PINNs) with Error Approximations*. cs> arXiv:2107.09443. 77 pages. DOI: <https://arxiv.org/abs/2107.09443v1>. Relevance: 10.31. [Git Repo](#).
305. Jin, McCann, Froustey, Unser. 2017. *Deep Convolutional Neural Network for Inverse Problems in Imaging*. IEEE Transactions on Image Processing, vol. 26, no. 9, pp. 4509-4522, Sept. 2017. 14 pages. DOI: <https://doi.org/10.1109/TIP.2017.2713099>. Relevance: 10.29.
306. Tang, Liu, Durlofsky. 2020. *A deep-learning-based surrogate model for data assimilation in dynamic subsurface flow problems*. 47 pages. DOI: <https://doi.org/10.1016/j.jcp.2020.109456>. Relevance: 10.23.
307. Raissi, Perdikaris, Karniadakis. 2017. *Inferring solutions of differential equations using noisy multi-fidelity data*. Journal of Computational Physics. Volume. 11 pages. DOI: <https://doi.org/10.1016/j.jcp.2017.01.060>. Relevance: 10.18.
308. Xu, Li, Darve, Harris. 2019. *Learning Hidden Dynamics using Intelligent Automatic Differ-*

- entiation. 25 pages. DOI: <https://doi.org/10.48550/arXiv.1912.07547>. Relevance: 10.04. [Git Repo](#).
309. Luo, Yang. 2020. *Two-Layer Neural Networks for Partial Differential Equations: Optimization and Generalization Theory*. math> arXiv:2006.15733. 31 pages. DOI: <https://arxiv.org/abs/2006.15733v2>. Relevance: 9.74.
310. Rosofsky. 2021. *Physics Informed Deep Learning*. UIUC Department of Physics. NCSA Gravity group. HAL Training Series. 19 pages. DOI: NA. Relevance: 9.74. [Git Repo](#).
311. Tartakovsky, Marrero, Perdikaris, Tartakovsky, Barajas-Solano. 2020. *Physics-Informed Deep Neural Networks for Learning Parameters and Constitutive Relationships in Subsurface Flow Problems*. Water Resources Research. Volume 56. Issue number 5. 47 pages. DOI: <https://doi.org/10.1029/2019WR026731>. Relevance: 9.6.
312. Raissi. 2018. *Forward-Backward Stochastic Neural Networks: Deep Learning of High-dimensional Partial Differential Equations*. arxiv [Submitted on 19 Apr 2018]. 17 pages. DOI: <https://arxiv.org/abs/1804.07010v1>. Relevance: 9.59.
313. Basdevant, Deville, Haldenwang, Lacroix, Ouazzani, Peyret, Orlandi, Patera. 1986. *Spectral and finite difference solutions of the Burgers equation*. Computers & Fluids 14 (1986) 23–41.. 19 pages. DOI: [https://doi.org/10.1016/0045-7930\(86\)90036-8](https://doi.org/10.1016/0045-7930(86)90036-8). Relevance: 9.58.
314. Gulian, Raissi, Perdikaris, Karniadakis. 2018. *Machine Learning of Space-Fractional Differential Equations*. Computer Science > Machine Learning. arXiv:1808.00931. 26 pages. DOI: <https://arxiv.org/abs/1808.00931v3>. Relevance: 9.54.
315. McFall, Mahan. 2009. *Artificial Neural Network Method for Solution of Boundary Value Problems With Exact Satisfaction of Arbitrary Boundary Conditions*. IEEE Transactions on Neural Networks (Volume: 20, Issue: 8, August 2009). 13 pages. DOI: <https://doi.org/10.1109/TNN.2009.2020735>. Relevance: 9.54.
316. Shi, Tsymbalov, Dao, Suresh, Shapeev, Li. 2019. *Deep elastic strain engineering of bandgap through machine learning*. Proc. Natl. Acad. Sci. U.S.A.. 6 pages. DOI: <https://doi.org/10.1073/pnas.1818555116>. Relevance: 9.5.

317. Raissi, Karniadakis. 2018. *Hidden physics models: Machine learning of nonlinear partial differential equations*. Journal of Computational Physics 357(4). 31 pages. DOI: <https://www.sciencedirect.com/science/article/abs/pii/S0021999117309014?via%3Dihub>. Relevance: 9.43. [Git Repo](#).
318. Raissi, Yazdani, Karniadakis. 2018. *Hidden Fluid Mechanics: A Navier-Stokes Informed Deep Learning Framework for Assimilating Flow Visualization Data*. arxiv [Submitted on 13 Aug 2018]. 33 pages. DOI: <https://arxiv.org/abs/1808.04327v1>. Relevance: 9.33.
319. Xu, Darve. 2019. *Adversarial Numerical Analysis for Inverse Problems*. 29 pages. DOI: <https://doi.org/10.48550/arXiv.1910.06936>. Relevance: 9.28. [Git Repo](#).
320. Mhaskar, Poggio. 2019. *Function approximation by deep networks*. Communications in pure and applied mathematics. 9 pages. DOI: <https://arxiv.org/abs/1905.12882v2>. Relevance: 9.22.
321. Caterini, Chang. 2018. *Generic Representation of Neural Networks*. n: Deep Neural Networks in a Mathematical Framework. SpringerBriefs in Computer Science. Springer, Cham.. 91 pages. DOI: https://doi.org/10.1007/978-3-319-75304-1_3. Relevance: 9.03.
322. Bradbury, Frostig, Hawkins, Johnson, Leary, Maclaurin, Necula, Paszke, VanderPlas, Milne, Zhang. 2018. *JAX: composable transformations of Python+NumPy programs*. 1 pages. DOI: NA. Relevance: 9. [Git Repo](#).
323. Raissi, Perdikaris, Karniadakis. 2021. *Physics informed learning machines*. US Patent. 54 pages. DOI: NA. Relevance: 8.96.
324. Wu, Zhang. 2017. *Learning physics by data for the motion of a sphere falling in a non-Newtonian fluid*. Communications in Nonlinear Science and Numerical Simulation. Volume 67, February 2019, Pages 577-593. 27 pages. DOI: <https://doi.org/10.1016/j.cnsns.2018.05.007>. Relevance: 8.93.
325. Wang, Wu, Ling, Iaccarino, Xiao. 2017. *A Comprehensive Physics-Informed Machine Learning Framework for Predictive Turbulence Modeling*. Physical Review Fluids.. 34 pages. DOI: <https://arxiv.org/abs/1701.07102v2>. Relevance: 8.88.

326. Dissanayake, Phan-Thien. 1994. *Neural-network-based approximations for solving partial differential equations*. Commun. Numer. Meth. Engng., 10: 195-201. 7 pages. DOI: <https://doi.org/10.1002/cnm.1640100303>. Relevance: 8.86.
327. Mao, Jagtap, Karniadakis. 2020. *Physics-informed neural networks for high-speed flows*. Computer Methods in Applied Mechanics and Engineering. 38 pages. DOI: <https://doi.org/10.1016/j.cma.2019.112789>. Relevance: 8.74.
328. Brunton, Kutz. 2019. *Data-Driven Science and Engineering: Machine Learning, Dynamical Systems, and Control*. Cambridge University Press. 495 pages. DOI: <https://doi.org/10.1017/9781108380690>. Relevance: 8.72. [Git Repo](#).
329. Thuerey, Holl, Mueller, Schnell, Trost, Um. 2021. *Physics-based deep learning*. arXiv pre-print arXiv:2109.05237, 2021. 287 pages. DOI: <https://doi.org/10.48550/arXiv.2109.05237>. Relevance: 8.72. [Git Repo](#).
330. Ruder. 2017. *An overview of gradient descent optimization algorithms*. 14 pages. DOI: <https://doi.org/10.48550/arXiv.1609.04747>. Relevance: 8.5. [Git Repo](#).
331. Wang, Wu, Xiao. 2017. *Physics-informed machine learning approach for reconstructing Reynolds stress modeling discrepancies based on DNS data*. Phys. Rev. Fluids. 36 pages. DOI: https://doi.org/10.1103/PhysRevFluids.2.034603?_gl=119helgd_gcl_auMTQzNjk1OTA4Ni4xNzI5ODI5ODUy. Relevance: 8.31.
332. Jasak1, Jemcov, Tukovi. 2007. *OpenFOAM: A C++ library for complex physics simulations*. In: International Workshop on Coupled Methods in Numerical Dynamics, vol. 1000, pp. 1–20. IUC Dubrovnik Croatia (2007). 20 pages. DOI: NA. Relevance: 8.3.
333. Kutz, Brunton, Brunton, Proctor. 2016. *Dynamic Mode Decomposition: Data-Driven Modeling of Complex Systems*. 241 pages. DOI: NA. Relevance: 8.25. [Git Repo](#).
334. Yin, Ban, Rego, Zhang, Cavinato, Humphrey, Karniadakis. 2021. *Simulating progressive intramural damage leading to aortic dissection using an operator-regression neural network*. arXiv:2108.11985 [cs.CE] (25 August 2021).. 47 pages. DOI: <https://doi.org/10.48550/arXiv.2108.11985>. Relevance: 8.11.

335. Bec, Khanin. 2007. *Burgers Turbulence*. Physics Reports. Volume 447, Issues 1–2, August 2007, Pages 1–66. 49 pages. DOI: <https://doi.org/10.1016/j.physrep.2007.04.002>. Relevance: 7.9.
336. Raissi, Perdikaris, Karniadakis. 2017. *Machine learning of linear differential equations using Gaussian processes*. Journal of Computational Physics. 18 pages. DOI: <https://doi.org/10.1016/j.jcp.2017.07.050>. Relevance: 7.83.
337. Schober, Duvenaud, Hennig. 2014. *Probabilistic ODE Solvers with Runge-Kutta Means*. 18 pages. DOI: <https://doi.org/10.48550/arXiv.1406.2582>. Relevance: 7.72.
338. Rasmussen, Williams. 2006. *Gaussian Processes for Machine Learning*. The MIT Press. ISBN electronic:9780262256834. 266 pages. DOI: <https://doi.org/10.7551/mitpress/3206.001.0001>. Relevance: 7.65.
339. Li, Wang, Lee, Luo. 2022. *Physics-informed neural networks for solving multiscale mode-resolved phonon Boltzmann transport equation*. Materials Today Physics. 31 pages. DOI: <https://doi.org/10.1016/j.mtphys.2021.100429>. Relevance: 7.58. [Git Repo](#).
340. Raissi, Karniadakis. 2016. *Deep Multi-fidelity Gaussian Processes*. Computer Science > Machine Learning arXiv:1604.07484. 14 pages. DOI: <https://arxiv.org/abs/1604.07484v1>. Relevance: 7.57.
341. Shen, Yang, Zhang. 2019. *Nonlinear Approximation via Compositions*. Neural Networks, Volume 119, November 2019, Pages 74–84. 19 pages. DOI: <https://doi.org/10.1016/j.neunet.2019.07.011>. Relevance: 7.47.
342. Kirchdoerfer, Ortiz. 2016. *Data-driven computational mechanics*. Computer Methods in Applied Mechanics and Engineering. Volume. 32 pages. DOI: <https://doi.org/10.1016/j.cma.2016.02.001>. Relevance: 7.19.
343. Ha, Dai, Le. 2017. *Hypernetworks*. arxiv [Submitted on 27 Sep 2016 (v1), last revised 1 Dec 2016 (this version, v4)]. 29 pages. DOI: <https://arxiv.org/abs/1609.09106v4>. Relevance: 7.17.
344. Martin, Joachim, Lieven. 2013. *CVXOPT: Convex Optimization*. Astrophysics Source Code

- Library, record ascl:2008.017. 1 pages. DOI: NA. Relevance: 7. [Git Repo](#).
345. Pang, Yang, Karniadakis. 2018. *Neural-net-induced Gaussian process regression for function approximation and PDE solution*. Journal of Computational Physics. Volume. 24 pages. DOI: <https://doi.org/10.1016/j.jcp.2019.01.045>. Relevance: 6.92. [Git Repo](#).
346. Chen, Fox, Guestrin. 2014. *Stochastic Gradient Hamiltonian Monte Carlo*. ICML 2014 version. 14 pages. DOI: <https://arxiv.org/abs/1402.4102v2>. Relevance: 6.64.
347. Hopfield, Tank. 1985. “Neural” computation of decisions in optimization problems. 13 pages. DOI: <http://dx.doi.org/10.1007/BF00339943>. Relevance: 6.5.
348. Logg, Mardal, Wells. 2012. *Automated solution of differential equations by the finite element method: The FEniCS book*. 722 pages. DOI: <https://doi.org/10.1007/978-3-642-23099-8>. Relevance: 6.48.
349. Gardner. 1988. *The space of interactions in neural network models*. Journal of Physics A: Mathematical and General, Volume 21, Number 1. 10 pages. DOI: <http://10.1088/0305-4470/21/1/030>. Relevance: 6.3.
350. BergKaj, Nyström. 2018. *A unified deep artificial neural network approach to partial differential equations in complex geometries*. Neurocomputing. Volume. 36 pages. DOI: <https://doi.org/10.1016/j.neucom.2018.06.056>. Relevance: 6.29.
351. Chiaramonte, Kiener. 2018. *Solving differential equations using neural networks*. Stanford. 5 pages. DOI: NA. Relevance: 6.2.
352. Owhadi. 2015. *Bayesian Numerical Homogenization*. Multiscale Modeling & Simulation. Vol. 13, Iss. 3 (2015)10.1137/140974596. 17 pages. DOI: <https://doi.org/10.1137/140974596>. Relevance: 5.94.
353. Zhu, Yin. 2009. *On competitive Lotka-Volterra model in random environments*. Journal of Mathematical Analysis and Applications 357 (1)(2009) 154–170.. 17 pages. DOI: <https://doi.org/10.1016/j.jmaa.2009.03.066>. Relevance: 5.71.
354. E.Weinan, Yu. 2018. *The Deep Ritz method: A deep learning-based numerical algorithm for solving variational problems*. Springer Nature Volume 6, pages 1–12, (2018). 14 pages. DOI:

- <https://doi.org/10.1007/s40304-018-0127-z>. Relevance: 5.5.
355. Protter, Qiu, Martin. 1998. *Asymptotic error distribution for the Euler scheme with locally Lipschitz coefficients*. Stochastic Processes and their Applications. Volume 130, Issue 4, April 2020, Pages 2296-2311. 16 pages. DOI: <https://doi.org/10.1016/j.spa.2019.07.003>. Relevance: 5.5.
356. Kirkpatrick, Jr, Vecchi. 1983. *Optimization by simulated annealing*. Science. 13 May 1983. Vol 220, Issue 4598pp. 671-680. 12 pages. DOI: <http://dx.doi.org/10.1126/science.220.4598.671>. Relevance: 5.45.
357. Raissi, Perdikaris, Karniadakis. 2017. *Numerical Gaussian Processes for Time-dependent and Non-linear Partial Differential Equations*. Methods and Algorithms for Scientific Computing. 51 pages. DOI: <https://doi.org/10.1137/17M1120762>. Relevance: 5.3.
358. Raissi, Perdikaris, Karniadakis. 2018. *Numerical Gaussian processes for time-dependent and nonlinear partial differential equations*. SIAM Journal on Scientific Computing 40(1), A172–A198 (2018). 51 pages. DOI: <https://doi.org/10.1137/17M1120762>. Relevance: 5.3.
359. Kevrekidis, Gear, Hyman, Kevrekidis, Runborg, Theodoropoulos. 2003. *Equation-free, coarse-grained multiscale computation: Enabling microscopic simulators to perform system-level analysis..* Communications in Mathematical Science, 1(4):715–762, 2003.. 74 pages. DOI: <http://dx.doi.org/10.4310/CMS.2003.v1.n4.a5>. Relevance: 5.29.
360. Bettencourt, Johnson, Duvenaud. 2019. *Taylor-Mode Automatic Differentiation for Higher-Order Derivatives in JAX*. Program Transformations @NeurIPS2019 Oral. 14 pages. DOI: NA. Relevance: 5.14.
361. Gabrielsson, Weiner. 2016. *Pharmacokinetic and pharma-codynamic data analysis: concepts and applications*. (2016) .Lakemedelsakademin i Stockholm AB. 1 pages. DOI: NA. Relevance: 5.
362. Graves. 2016. *Adaptive Computation Time for Recurrent Neural Networks*. arxiv [Submitted on 29 Mar 2016 (v1), last revised 21 Feb 2017 (this version, v6)]. 19 pages. DOI: <https://arxiv.org/abs/1603.08983v6>. Relevance: 4.95.

363. Friedrich, Siebert, Peinke, Lück, Siefert, Lindemann, Raethjen, Deuschl, Pfister. 2000. *Extracting model equations from experimental data*. Physics Letters A. Volume 271, Issue. 6 pages. DOI: [https://doi.org/10.1016/S0375-9601\(00\)00334-0](https://doi.org/10.1016/S0375-9601(00)00334-0). Relevance: 4.83.
364. Eldan, Shamir. 2016. *The Power of Depth for Feedforward Neural Networks*. 29th Annual Conference on Learning Theory, PMLR 49:907-940, 2016.. 34 pages. DOI: <https://arxiv.org/abs/1512.03965>. Relevance: 4.79.
365. Stuart. 2010. *Inverse problems: A Bayesian perspective*. Published online by Cambridge University Press: 10 May 2010. 110 pages. DOI: <https://doi.org/10.1017/S0962492910000061>. Relevance: 4.79.
366. Daubechies, DeVore, Foucart, Hanin, Petrova. 2019. *Nonlinear Approximation and (Deep) ReLU Networks*. Constructive Approximation, 55(1), 127-172.. 42 pages. DOI: <https://doi.org/10.1007/s00365-021-09548-z>. Relevance: 4.69.
367. Cha, Choi, Büyüköztürk. 2017. *Deep learning-based crack damage detection using convolutional neural networks*. Comput. Aided Civ. Inf. Eng.. 19 pages. DOI: <http://dx.doi.org/10.1111/mice.12263>. Relevance: 4.67.
368. Owhadi, Scovel, Sullivan. 2015. *Brittleness of Bayesian inference under finite information in a continuous world*. Electron. J. Statist. 9 (1) 1 -. 79 pages. DOI: <https://doi.org/10.1214/15-EJS989>. Relevance: 4.33.
369. Brunton. 2023. *Neural ODEs (NODEs) Physics Informed Machine Learning*. [[YouTube]]. 23 pages. DOI: NA. Relevance: 4.22.
370. Maziar, Perdikaris, Karniadakis. 2018. *Physics Informed Neural Networks*. 1 pages. DOI: NA. Relevance: 4. [Git Repo](#).
371. O’Leary. 2022. *Stochastic Physics-Informed Neural Ordinary Differential Equations (SPIN-ODE)*. NA. 1 pages. DOI: NA. Relevance: 4. [Git Repo](#).
372. Bottou, Bousquet. 2008. *The Tradeoffs of Large Scale Learning*. Advances in Neural Information Processing Systems} Volume 40. 17 pages. DOI: NA. Relevance: 3.94.

373. Jin. 2021. *Big-Data-Driven Multi-Scale Experimental Study of Nanostructured Block Copolymer's Dynamic Toughness*. 24 pages. DOI: NA. Relevance: 3.92.
374. Niyogi, Girosi. 1999. *Generalization bounds for function approximation from scattered noisy data*. Advances in Computational Mathematics. 30 pages. DOI: <https://doi.org/10.1023/A:1018966213079>. Relevance: 3.9.
375. Chartrand. 2011. *Numerical Differentiation of Noisy, Nonsmooth Data*. ISRN Applied Mathematics. 11 pages. DOI: <https://doi.org/10.5402/2011/164564>. Relevance: 3.64.
376. Franke, Schaback. 1998. *Solving partial differential equations by collocation using radial basis functions*. Applied Mathematics and Computation. Volume 93, Issue. 12 pages. DOI: [https://doi.org/10.1016/S0096-3003\(97\)10104-7](https://doi.org/10.1016/S0096-3003(97)10104-7). Relevance: 3.5.
377. Siegert, Friedrich, b. 1998. *Analysis of data sets of stochastic systems*. Physics Letters A. Volume 243, Issues 5–6, 6 July 1998, Pages 275-280. 7 pages. DOI: [https://doi.org/10.1016/S0375-9601\(98\)00283-7](https://doi.org/10.1016/S0375-9601(98)00283-7). Relevance: 3.14.
378. Lu, Mao, Dong. 2017. *Comment on “An Efficient and Stable Hydrodynamic Model With Novel Source Term Discretization Schemes for Overland Flow and Flood Simulations” ’ by Xilin Xia et al.*. Water Resources Research. 7 pages. DOI: <https://doi.org/10.1002/2017WR021563>. Relevance: 3.
379. Manohar, Brunton, Kutz, Brunton. 2017. *Code supplement to “Data-driven sparse sensor placement*. K. Manohar, B. W. Brunton, J. N. Kutz, and S. L. Brunton, “Code supplement to”Datadriven sparse sensor placement.” https://github.com/kmanohar/SSPOR_pub, January 2017.. 1 pages. DOI: NA. Relevance: 3. [Git Repo](#).
380. Duvenaud. 2018. *Neural Ordinary Differential Equations*. [[YouTube]]. 32 pages. DOI: NA. Relevance: 2.94. [Git Repo](#).
381. Griffiths, Higham. 2010. *Numerical methods for ordinary differential equations: initial value problems*. 274 pages. DOI: <http://dx.doi.org/10.1007/978-0-85729-148-6>. Relevance: 2.8.
382. Karniadakis, Sherwin. 2013. *Spectral/HP Element Methods for Computational Fluid Dynamics*. Oxford University Press, Oxford. 7 pages. DOI: <http://dx.doi.org/10.1093/acprof:>

- [oso/9780198528692.001.0001](#). Relevance: 2.57.
383. Neal. 2011. *MCMC using Hamiltonian dynamics*. NA. 51 pages. DOI: <https://doi.org/10.48550/arXiv.1206.1901>. Relevance: 2.53.
384. Dagan, Daskalakis, Dikkala, Kandiros. 2020. *Learning Ising models from one or multiple samples*. 64 pages. DOI: <https://doi.org/10.48550/arXiv.2004.09370>. Relevance: 2.48.
385. Koza, III, Stiffelman. 1999. *Genetic Programming as a Darwinian Invention Machine*. Part of the book series: Lecture Notes in Computer Science ((LNCS, volume 1598)). 18 pages. DOI: https://doi.org/10.1007/3-540-48885-5_8. Relevance: 2.44.
386. Butcher. 1987. *The numerical analysis of ordinary differential equations: Runge-Kutta and general linear methods*. 484 pages. DOI: ISBN: 978-0-471-91046-6. Relevance: 2.4. [Git Repo](#).
387. Iserles. 2008. *A first course in the numerical analysis of differential equations*. 481 pages. DOI: <https://doi.org/10.1017/CBO9780511995569>. Relevance: 2.4. [Git Repo](#).
388. E., J.. 1986. *Learning and relearning in Boltzmann machines*. Parallel Distributed Processing: Explorations in the Microstructure of Cognition. Volume 1: Foundations, MIT Press, Cambridge, MA. pp 282-317. 37 pages. DOI: NA. Relevance: 2.35.
389. Grohs, Hornung, Jentzen, Wurstemberger. 2018. *A proof that artificial neural networks overcome the curse of dimensionality in the numerical approximation of Black-Scholes partial differential equations*. Mem. Amer. Math. Soc.284(2023), no.1410, v+93 pp. 126 pages. DOI: <https://arxiv.org/abs/1809.02362v3>. Relevance: 2.29.
390. McFall, Albert. 2006. *Artificial neural network method for solving boundary value problems with arbitrary irregular boundaries*. Georgia Institute of Technology. 167 pages. DOI: NA. Relevance: 1.96.
391. Mhaskar, Micchelli. 1992. *Approximation by superposition of sigmoidal and radial basis functions*. Advances in Applied Mathematics. Volume 13, Issue 3, September 1992, Pages 350-373. 24 pages. DOI: [https://doi.org/10.1016/0196-8858\(92\)90016-P](https://doi.org/10.1016/0196-8858(92)90016-P). Relevance: 1.96.
392. Carpenter, Hoffman, Brubaker, Lee, Li, Betancourt. 2015. *The Stan Math Library: Reverse-Mode Automatic Differentiation in C++*. arxiv [Submitted on 23 Sep 2015]. 96 pages. DOI:

- <https://arxiv.org/abs/1509.07164v1>. Relevance: 1.92.
393. DeVore, Ron. 2010. *Approximation using scattered shifts of a multivariate function*. Transactions of the American Mathematical Society. Vol. 362, No. 12 (DECEMBER 2010), pp. 6205-6229 (25 pages). 25 pages. DOI: <https://arxiv.org/abs/0802.2517v1>. Relevance: 1.68.
394. Betancourt. 2017. *A Conceptual Introduction to Hamiltonian Monte Carlo*. NA. 60 pages. DOI: <https://arxiv.org/abs/1701.02434>. Relevance: 1.58.
395. Rumelhart, Hinton, Williams. 1986. *Learning internal representations by error propagation*. 45 pages. DOI: <https://doi.org/10.1016/B978-1-4832-1446-7.50035-2>. Relevance: 1.04.
396. Neal. 2012. *Bayesian Learning for Neural Networks*. Springer New York, NY. 195 pages. DOI: <https://doi.org/10.1007/978-1-4612-0745-0>. Relevance: 0.99.
397. Chandrasekhar. 1943. *Stochastic problems in Physics and Astronomy*. Reviews of Modern Physics. 89 pages. DOI: <https://doi.org/10.1103/REVMODPHYS.15.1>. Relevance: 0.79.
398. NPTEL, Srinivasan. 2019. *Application 4 - Solution of PDE/ODE using Neural Networks*. [[YouTube]]. 30 pages. DOI: NA. Relevance: 0.7.
399. Pontryagin. 1962. *Mathematical Theory of Optimal Processes*. Routledge. 385 pages. DOI: <https://doi.org/10.1201/9780203749319>. Relevance: 0.43.
400. Mao, Lu, Marxen, Zaki, Karniadakis. 2020. *DeepM&Mnet for hypersonics: Predicting the coupled flow and finite-rate chemistry behind a normal shock using neural-network approximation of operators*. Journal of Computational Physics. Volume. 37 pages. DOI: <https://doi.org/10.1016/j.jcp.2021.110698>. Relevance: 0.19.
401. Goswami, Anitescu, Chakraborty, Rabczuk. 2020. *Transfer learning enhanced physics informed neural network for phase-field modeling of fracture*. Theoretical and Applied Fracture Mechanics. Volume 106, April. 21 pages. DOI: <https://doi.org/10.1016/j.tafmec.2019.102447>. Relevance: 0.1.
402. Lanthaler, Mishra, Karniadakis. 2021. *Error estimates for DeepOnets: A deep learning framework in infinite dimensions*. math> arXiv:2102.09618. 123 pages. DOI: <https://arxiv.org/abs/2102.09618v3>. Relevance: 0.02.

403. PL. 2011. *Pharmacokinetic-pharmacodynamic modeling and simulation*. Bonate PL (2011) . Springer New York, NY. 0 pages. DOI: NA. Relevance: 0.
404. Sabne. 2020. *XLA : Compiling Machine Learning for Peak Performance*. Google Research. 1 pages. DOI: NA. Relevance: 0.

2. Supporting Papers

405. Schmidhuber. 2015. *Deep learning in neural networks: An overview*. Neural Networks. Volume 61, January 2015, Pages 85-117. 33 pages. DOI: <https://doi.org/10.1016/j.neunet.2014.09.003>. Relevance: 32.82.
406. Paszke, Gross, Chintala, Chanan, Yang, DeVito, Lin, Desmaison, Antiga, Lerer. 2017. *Automatic differentiation in PyTorch*. NIPS 2017 Workshop Autodiff Decision Program Chairs. 4 pages. DOI: NA. Relevance: 19.75.
407. Rasmussen, Ghahramani. 2001. *Occam's Razor*. Part of Advances in Neural Information Processing Systems 13 (NIPS 2000). 7 pages. DOI: NA. Relevance: 18.43.
408. Glorot, Bengio. 2010. *Understanding the difficulty of training deep feedforward neural networks*. International Conference on Artificial Intelligence and Statistics 2010. 8 pages. DOI: NA. Relevance: 16.75.
409. Blundell, Cornebise, Kavukcuoglu, Wierstra. 2015. *Weight Uncertainty in Neural Networks*. In Proceedings of the 32nd International Conference on Machine Learning (ICML 2015). 10 pages. DOI: <https://arxiv.org/abs/1505.05424v2>. Relevance: 16.
410. Lin, Tegmark, Rolnick. 2017. *Why Does Deep and Cheap Learning Work So Well?*. J Stat Phys. 16 pages. DOI: <https://doi.org/10.1007/s10955-017-1836-5>. Relevance: 15.38.
411. Lin, Chen, Yan. 2013. *Network In Network*. 10 pages. DOI: <https://doi.org/10.48550/arXiv.1312.4400>. Relevance: 14.1.
412. Tariyal, Majumdar, Singh, Vatsa. 2016. *Greedy Deep Dictionary Learning*. 9 pages. DOI: <https://arxiv.org/abs/1602.00203v1>. Relevance: 13.44.

413. Krizhevsky, Sutskever, Hinton. 2012. *ImageNet Classification with Deep Convolutional Neural Networks*. Advances in Neural Information Processing Systems. 9 pages. DOI: <http://dx.doi.org/10.1145/3065386>. Relevance: 10.67.
414. Stein. 1987. *Large Sample Properties of Simulations Using Latin Hypercube Sampling*. Technometrics Volume. 10 pages. DOI: <https://doi.org/10.2307/1269769>. Relevance: 10.
415. Qiao, Özkan, Teich, Hannig. 2020. *The best of both worlds: Combining CUDA graph with an image processing DSL*. 2020 57th ACM/IEEE Design Automation Conference (DAC). 6 pages. DOI: <https://doi.org/10.1109/DAC18072.2020.9218531>. Relevance: 9.33.
416. Seefeldt, Sondak, Hensinger, Phipps, Foucar, P., C., N., M., D., Sibusiso, M., M., J., J., G., T., Sean, Paul, M., E., Sidafa. 2017. *Drekar v.2.0*. Sandia National Laboratories (SNL-NM), Albuquerque, NM (United States). 1 pages. DOI: <https://doi.org/10.11578/dc.20220414.50>. Relevance: 9.
417. Mallat. 2016. *Understanding deep convolutional networks*. Adaptive data analysis: theory and applications' compiled and edited by Norden E. Huang, Ingrid Daubechies and Thomas Y. Hou. 16 pages. DOI: <https://doi.org/10.1098/rsta.2015.0203>. Relevance: 8.56.
418. LeCun, Touresky, Hinton, Sejnowski. 1988. *A theoretical framework for back-propagation*. In Proceedings of the 1988 connectionist models summer school, volume 1, pages 21–28. CMU,Pittsburgh, Pa: Morgan Kaufmann, 1988.. 9 pages. DOI: NA. Relevance: 7.
419. Sutton, Barto. 2018. *Reinforcement Learning: An Introduction, second edition*. NA. 548 pages. DOI: NA. Relevance: 6.93.
420. Shi, Dao, Tsymbalov, Shapeev, Li, Suresh. 2020. *Metallization of diamond*. 6 pages. DOI: <https://doi.org/10.1073/pnas.2013565117>. Relevance: 6.67.
421. Kingma, Ba. 2014. *Adam: A Method for Stochastic Optimization*. NA. 15 pages. DOI: <https://doi.org/10.48550/arXiv.1412.6980>. Relevance: 6.4.
422. Rajan. 2005. *Materials informatics*. Material Today. Volume 8, Issue 10, October 2005, Pages 38-45. 8 pages. DOI: [https://doi.org/10.1016/S1369-7021\(05\)71123-8](https://doi.org/10.1016/S1369-7021(05)71123-8). Relevance: 6.12.
423. Haenlein, Kaplan. 2019. *A Brief History of Artificial Intelligence: On the Past, Present, and*

- Future of Artificial Intelligence*. California Management Review 61(4):000812561986492. 11 pages. DOI: <https://doi.org/10.1177/0008125619864925>. Relevance: 6.1.
424. Yarotsky. 2017. *Error bounds for approximations with deep ReLU networks*. Neural Networks. Volume 94, October 2017, Pages 103-114. 31 pages. DOI: <https://doi.org/10.1016/j.neunet.2017.07.002>. Relevance: 5.84.
425. Mhaskar, Poggio. 2016. *Deep vs. shallow networks: An approximation theory perspective*. Analysis and Applications. Vol. 14, No. 06, pp. 829-848 (2016). 16 pages. DOI: <https://doi.org/10.1142/S0219530516400042>. Relevance: 5.81.
426. Agarwal, Dhar. 2014. *Big Data, Data Science, and Analytics: The Opportunity and Challenge for IS Research*. Information Systems Research 25(3):443-448.. 6 pages. DOI: <https://doi.org/10.1287/isre.2014.0546>. Relevance: 5.5.
427. Zingg, Chisholm. 1999. *Runge-Kutta methods for linear ordinary differential equations*. Applied Numerical Mathematics 31 (1999) 227-238. 12 pages. DOI: [https://doi.org/10.1016/S0168-9274\(98\)00129-9](https://doi.org/10.1016/S0168-9274(98)00129-9). Relevance: 5.42.
428. Draper, Smith. 2014. *Applied regression analysis*. John Wiley & Sons, 2014. 738 pages. DOI: ISBN: 978-0-471-17082-2. Relevance: 5.15.
429. Zhou. 2021. *Machine Learning*. Springer Nature Link. 460 pages. DOI: <https://doi.org/10.1007/978-981-15-1967-3>. Relevance: 4.82.
430. Dormand, Prince. 1980. *A family of embedded Runge-Kutta formulae*. Journal of Computational and Applied Mathematics. Volume 6, Issue 1, March 1980, Pages 19-26. 8 pages. DOI: [https://doi.org/10.1016/0771-050X\(80\)90013-3](https://doi.org/10.1016/0771-050X(80)90013-3). Relevance: 4.75.
431. Liu, Nocedal. 1989. *On the limited memory BFGS method for large scale optimization*. Mathematical Programming. 27 pages. DOI: <https://doi.org/10.1007/BF01589116>. Relevance: 4.67.
432. Griewank. 2012. *Who Invented the Reverse Mode of Differentiation?*. 12 pages. DOI: NA. Relevance: 4.58.
433. Hochreiter, Schmidhuber. 1997. *Long Short-Term Memory*. Neural Computation (1997) 9

- (8): 1735–1780.. 32 pages. DOI: <https://doi.org/10.1162/neco.1997.9.8.1735>. Relevance: 4.28.
434. Khoury, Ioannidis. 2014. *Medicine. Big data meets public health*. Science, 346(6213):1054–1055, 2014.. 4 pages. DOI: <https://doi.org/10.1126/science.aaa2709>. Relevance: 4.
435. Marx. 2013. *The big challenges of big data*. Nature, 498(7453):255–260, 2013.. 5 pages. DOI: <https://doi.org/10.1038/498255a>. Relevance: 3.8.
436. Bodaghi, Wang, Xue, Zheng. 2023. *Effects of antagonistic muscle actuation on the bilaminar structure of ray-finned fish in propulsion*. Journal of Fluid Mechanics. 22 pages. DOI: <https://doi.org/10.1017/jfm.2023.839>. Relevance: 3.64.
437. Burgers. 1948. *A Mathematical Model Illustrating the Theory of Turbulence*. Advances in Applied Mechanics. Volume. 29 pages. DOI: [https://doi.org/10.1016/S0065-2156\(08\)70100-5](https://doi.org/10.1016/S0065-2156(08)70100-5). Relevance: 3.55.
438. Archibald, Fraser, Grattan-Guinness. 2005. *The history of differential equations, 1670–1950*. 66 pages. DOI: <https://doi.org/10.14760/OWR-2004-51>. Relevance: 2.48.
439. Mohri, Rostamizadeh, Talwalkar. 2018. *Foundations of Machine Learning, second edition*. The MIT Press. 496 pages. DOI: NA. Relevance: 2.15.
440. Hall. 2005. *Generalized Method of Moments*. In book A Companion to Theoretical Econometrics. 16 pages. DOI: <https://doi.org/10.1002/9780470996249.ch12>. Relevance: 2.07.
441. Calvo, Montijano, Randez. 1990. *A fifth-order interpolant for the Dormand and Prince Runge-Kutta method*. Journal of Computational and Applied Mathematics. Volume 29, Issue. 10 pages. DOI: [https://doi.org/10.1016/0377-0427\(90\)90198-9](https://doi.org/10.1016/0377-0427(90)90198-9). Relevance: 2.
442. Falcon. 2019. *PyTorch Lightning*. GitHub. 1 pages. DOI: NA. Relevance: 2.
443. Nguyen, Carilli, Eryilmaz, Singh, Lin, Gimelshein, Desmaison, Yang. 2021. *Accelerating PyTorch with CUDA Graphs*. PyTorch. 1 pages. DOI: NA. Relevance: 2.
444. Golub, Loan. 2012. *Matrix Computations*. 780 pages. DOI: NA. Relevance: 1.9.
445. Plaut, Nowlan, Hinton. 1986. *Experiments on Learning by Back Propagation*. 45 pages. DOI:

NA. Relevance: 1.69.

446. Garey, Johnson. 1979. *Computers and Intractability: A Guide to the Theory of NP-Completeness*. Journal of Symbolic Logic 48 (2):498-500 (1983). 175 pages. DOI: NA. Relevance: 1.52.
447. Pinkus. 1999. *Approximation theory of the MLP model in neural networks*. 30 pages. DOI: <https://doi.org/10.1017/S0962492900002919>. Relevance: 1.2.
448. Driscoll, Hale, Trefethen. 2014. *Chebfun Guide*. 212 pages. DOI: NA. Relevance: 1.1. [Git Repo](#).
449. Whitham. 2011. *Linear and Nonlinear Waves*. Wiley. Applied Mathematics in Science. 660 pages. DOI: ISBN: 978-0-471-35942-5. Relevance: 1.1.
450. Harry. 1915. *Some Recent Researches on the Motion of Fluids*. Monthly Weather Review, vol. 43, issue 4, p. 163. 8 pages. DOI: [https://doi.org/10.1175/1520-0493\(1915\)43%3C163:SRROTM%3E2.0.CO;2](https://doi.org/10.1175/1520-0493(1915)43%3C163:SRROTM%3E2.0.CO;2). Relevance: 0.5.
451. Hinton, Srivastava, Swersky. 2012. *Neural Networks for Machine Learning. Lecture 6a. Overview of mini-batch gradient descent*. Open Journal of Applied Sciences, Vol.14 No.6, June. 31 pages. DOI: NA. Relevance: 0.39.
452. Sakurai. 1995. *Modern quantum mechanics, revised edition*. Sakurai, J. J. and Commins, E. D. Modern quantum mechanics, revised edition. AAPT, 1995.. 635 pages. DOI: <https://doi.org/10.1119/1.17781>. Relevance: 0.34.
453. Daubechies. 1992. *Ten Lectures on Wavelets*. CBMS-NSF Regional Conference Series in Applied Mathematics. 344 pages. DOI: <https://doi.org/10.1137/1.9781611970104>. Relevance: 0.27.
454. Abadi, Agarwal, Barham, Brevdo, Chen, Citro, Corrado, Davis, Dean, Devin, Ghemawat, Goodfellow, Harp, Irving, Isard, Jia, Jozefowicz, Kaiser, Kudlur, Levenberg, Mane, Monga, Moore, Murray, Olah, Schuster, Shlens, Steiner, Sutskever, Talwar, Tucker, Vanhoucke, Vasudevan, Viegas, Vinyals, Warden, Wattenberg, Wicke, Yu, Zheng. 2016. *TensorFlow: Large-Scale Machine Learning on Heterogeneous Distributed Systems*. 19 pages. DOI: https://doi.org/10.1162/9781611682834_0001.

[//arxiv.org/abs/1603.04467v2](https://arxiv.org/abs/1603.04467v2). Relevance: 0.05.

455. Yadan. 2019. *Hydra - a framework for elegantly configuring complex applications*. GitHub. 1 pages. DOI: NA. Relevance: 0.
-

Processing Summary

Files generated:

- citations.bib - BibTeX bibliography file
- citations_dataframe.csv - Structured dataset for analysis
- piml-citations-455.html - HTML web report
- piml-citations-455.pdf - PDF report

Vault citations folder statistics:

- Referenced folder: 404 papers
- Supporting folder: 51 papers
- Unreferenced folder: 0 papers
- Scientific ML core papers: 404 papers
- Supporting papers: 51 papers
- No rated papers: 0 papers