Aleksandr Aravkin — Curriculum Vitae

Contact Information

University of Washington
Department of Applied Mathematics
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Research Focus

My research combines continuous optimization, variational analysis, and statistical modeling. With students and collaborators, I develop new formulations and methods for data science, machine learning, and inverse problems, with applications across physical and health sciences, and disseminate solutions using open source code repositories and top journals/conferences.

Math Sciences at IHME

As director of math sciences at the Institute for Health Metrics and Evaluation, I lead a research group that develops new scientific methods used across the institute, and disseminate solutions using open source code repositories and top journals/conferences. Beginning in 2020, the math sciences team developed models used for the IHME Covid-19 forecast: `covid19.healthdata.org/`.

Publications Summary

– Over 170 publications in top peer-reviewed journals, including The Lancet, Nature Medicine, JAMA, Annals of Internal Medicine, Vaccine, Pediatrics, Mathematics of Optimization Research, Mathematical Programming, Automatica, Inverse Problems, Journal of Machine Learning Research, Informs Journal on Computing, SIAM [Optimization, Control, Applied Mathematics, Scientific Computing, Imaging Sciences, Applied Dynamical Systems], IEEE [Access, Signal Processing Letters, Transactions on: Automatic Control, Information Theory, Computational Imaging, Signal Processing], AIAA, Journal of Computational and Graphical Statistics, Journal of the American Statistical Association, Electronic Journal of Statistics, Medical Physics, Physical Review Fluids,
– 52 publications in top peer-reviewed conference proceedings, including ICML, UAI, RSS, CDC, MLSP, ICASSP, and IFAC.

Education

Ph.D., Mathematics, 2010, University of Washington. Advised by J.V. Burke.

M.S., Statistics, 2010, University of Washington.

B.S., Mathematics and Computer Science, 2004, University of Washington.

Appointments

University of Washington

2019 - Present	*Associate Professor of Applied Mathematics.* *Adjunct Associate Professor in the Departments of Mathematics.* *Adjunct Associate Professor in the Departments of Statistics.*
2020 - Present	*Director of Mathematical Sciences*, Institute for Health Metrics and Evaluation (IHME). *Adjunct Associate Professor in the Department of Health Metrics Sciences.*
2021 - Present	*Adjunct Associate Professor in the Department of Computer Science and Engineering.*
2025 - Present	*Affiliate Faculty, Center for Statistics and the Social Sciences (CSSS).*
2015 - 2019	*Assistant Professor of Applied Mathematics.* *Adjunct Assistant Professor in the Department of Mathematics.* *Adjunct Assistant Professor in the Department of Statistics.*

Columbia University, Computer Science & IEOR

2014 - 2015	*Adjunct Professor.* Taught graduate courses in machine learning and high dimensional data analysis, with focus on optimization, scientific computing, and statistical modeling.

IBM Thomas J. Watson Research Center

2013 - 2015	*Research Staff Member.*

University of British Columbia, Computer Science and Earth/Ocean Sciences.

2010 - 2012	*Postdoctoral Fellow.*

Supervision

University of Washington, 2015-2024:

- Ph.D. Students advised and co-advised(18):
  - C. Simpson (first year Ph.D.)
  - K. Golobokov (first year Ph.D, joint with Statistics Faculty Z. Harchaoui)
  - P. Howell (second year Ph.D.)
  - A. Sethi-Olowin (second year Ph.D, joint with Amath Facutly H. Wilbur)
  - A. Johnson (third year Ph.D, Joint with Amath Faculty B. Hosseini)
  - Z. Huang (third year Ph.D, joint with Amath Faculty B. Hosseini)
  - A. Hsu (fourth year Ph.D, Joint with Amath Faculty B. Hosseini)
  - J. Stevens-Haas (2025, joint with Amath Faculty N. Kutz), *Open-Source Dynamical Systems Research, with a Side of (Francis) Bacon.*
  - A. Sholokhov (2023, joint with Amath Faculty N. Kutz), *Optimization methods for parameter identifications in settings with only partial knowledge.*
  - O. Dorabiala (2023, joint with Amath Faculty N. Kutz), *Robust Approaches for Unsupervised Learning.*
  - R. Levin (2022), *Applications of Optimization and Machine Learning to Healthcare.*
  - K. Liu (2022, joint with Amath Faculty A. Greenbaum), *Dimensionality Reduction for Supervised and Unsupervised Learning: New Algorithms, Analysis and Application.*
  - K. Maass (2021), *Optimization Formulations and Algorithms for Cancer Therapy.*
  - R. Baraldi (2021), *Nonconvex and Nonsmooth Inverse Problems.*
  - J. Zhang (2020), *Nonconvex Optimization Methods with Applications to Portfolio Selection and Hybrid Systems.*
  - J. Jonker (2020), *Optimization Enabled Kalman Smoothing.*
  - D. He (2019, joint with Math Faculty J. Burke), *Iteratively re-weighted schemes for non-smooth optimization.*
  - P. Zheng (2019), *Robust Modeling and Algorithm Design for Science and Engineering.*
- IHME Math Sciences (6): P. Zheng* (Assistant Professor), K. Maass* (Research Scientist), N. Gilbert* (Postdoctoral Fellow), A. Ducellier (Postdoctoral Fellow), A. Hsu* (Research Assistant), S. Ali (Researcher). *Former members (12): J. Giles (Research Scientist), S. Carr (Researcher), N. Worku* (Research Assistant), A. Johnson* (Research Assistant), R. Sorensen (Lead Research Scientist), M. Banning (Research Scientist), J. Brennan (Research Associate), A. Sholokhov* (Research Associate), J. Zhang* (Research Associate), M. Bi (Research Assistant), J. He (Research Associate), B. Bell (Principal Mathematician).*

  * indicates current or former student of the Applied Mathematics Department.

Service

Applied Math Department and University of Washington:

- Faculty Senator for Applied Math and Statistics. 2025-2027 (Upcoming).
- Co-organizer of Center for Statistics in the Social Sciences Seminar. 2025-Present.
- Co-organizer of Distinguished Seminar in Optimization & Data. 2023-Present.
- Application Review (M.S, Ph.D.) for Applied Mathematics Department. 2015-Present.
- Application Review (M.S.) for Computational Finance and Risk Management. 2020-Present.
- Served on Applied Mathematics faculty hiring committees, 2022 and 2023.
- 2017–2020: Served on the Applied Computational and Mathematical Sciences (ACMS) committee; helped with the admissions process and program development.
- 2015–Present: Senior Data Science Fellow of eSciences Institute; promoted interdisciplinary research for data driven innovation across U. Washington; mentored ongoing Data Science Incubator research; guided curriculum development related to Data Science degree options.

Service to the Profession:

- Organized symposia/sessions at scientific conferences:
  - International Conference on Continuous Optimization (ICCOPT) 2025, 2022.
  - Applied Mathematics in Global Health (mini-workshop UW Campus, 2024),
  - West Coast Optimization Meeting (WCOM) 2025, 2019.
  - Computational Finance Session, Conference on Decision and Control, 2018.
  - Siam Optimization (SIOPT) 2023, 2021, 2017.
  - PIMS workshop on Computational Math at UBC (2019).
  - UW Data Science Summit (2019).
  - Applied Mathematics 50th Anniversary Conference (2019).
  - Session on optimization, International Symposium on Mathematical Programming (2015).
  - Session on inverse problems, SIAM Computational Science and Engineering (2015).
  - Workshop for Neural Information and Processing Systems (NeurIPS 2014).
- Grant Reviewer:
  - Department of Energy, Early Career Grants. 2023 & 2024.
  - DOE Scientific Computing. 2022.
  - NSF Computational and Data-Enabled Science and Engineering. 2020.
- Reviewer for top journals and conferences across a wide range of fields, including:
  - Automatica (top journal in automatic control)
  - SIAM Journal on Mathematics of Data Science
  - SIAM Journal on Applied Mathematics
  - SIAM Journal on Optimization
  - IEEE Transactions on Automatic Control
  - IEEE Control System Letters
  - Conference on Decision and Control (top control theory conference)
  - IEEE / RSJ International Conference on Intelligent Robots and Systems
  - Applied Mathematics and Optimization
  - Springer Nature

SUPPORT

1. RAPID: Covid-19 Forecasting Models for Removal of Social Distancing Measures, Award # 2031096, $198,048.00. 06/2020 –11/2020.
   Role: Co-PI.
2. Boeing Data Science Research grant. $ 2M. 1/2019 — 12/2019. *Role: Co-PI and Team Lead.*
3. TRIPODS+X, Foundational Training in Neuroscience and Geoscience via Hackweeks, $177,058. Summer 2019. *Role: Co-PI.*
4. NSF 1853371, (Conference) Applied Mathematics: The Next 50 Years. $37,494. *Role: Co-PI.*
5. Pacific Institute of the Mathematical Sciences (PIMS) Collaborative Research Grant, $200,000 CAD. 04/01/2018 — 03/31/2021. *Role: Co-PI.*

Software

Manage/distribute code via Github `github.com/UW-AMO` (Applied Modeling and Optimization) and `github.com/ihmeuw-msca` (Math Sciences team at IHME).

Teaching

University of Washington, Applied Mathematics, 2015-Present:

- Undergraduate Courses:
  - Applied Math 351 (differential equations), 2018
  - Applied Math 352 (applied linear algebra), 2016, 2019, 2021
  - Applied Math 383 (continuous math modeling), 2023
  - Applied Math 481 (scientific computing), 2019.
  - Applied Math 490 (co-instructor for topics course in 'Statistics and the Law')
- Graduate Courses:
  - Applied Math 515 / Math 515 / INDE 515 (fundamentals of optimization), 2016, 2017, 2019, 2020, 2021, 2022, 2023, 2024.
  - Computational Finance and Risk Management 521 (machine learning for computational finance), 2017.
  - Applied Math 581 (scientific computing), 2019.
- Curriculum Development
  - Developing an undergraduate optimization course (Amath 490). 2025-Present.
  - Developed Amath 515: *Fundamentals of Optimization*. 2016-2024.
  - Expanded Amath 383 to include an introduction optimization-based models. 2023.
  - Developed Amath 521, *Machine Learning for Computational Finance*. 2018.
  - Co-developed new topics course in Statistics and the Law (Amath 490). 2018.

Columbia University, CS & IEOR: 2014-2015: Taught three masters courses offering foundations in statistical modeling and algorithms for sparse regression, low rank recovery, and machine learning.

Selected Peer Reviewed Journal Articles

J77. A. Schumacher, P. Zheng, R. Barber, A. Aravkin, C.J. Murray et al. *Global age-sex-specific all-cause mortality and life expectancy estimates for 204 countries and territories and 660 subnational locations, 1950–2023: a demographic analysis for the Global Burden of Disease Study 2023*. The Lancet 406.10513 (2025): 1731-1810.

J76. G. Pillonetto, A. Aravkin, D. Gedon, L. Ljung, A. H. Ribeiro, T.B. Schön. *Deep networks for system identification: a Survey*. Automatica 171 (2025): 111907.

J75. J. Stevens-Haas, Y. Bhangale, A. Aravkin, N. Kutz. *Learning Nonlinear Dynamics Using Kalman Smoothing*. IEEE Access (2024).

J74. Y. Wang, P. Zheng, Y. Cheng, Z. Wang, A. Aravkin. *WENDY: Gene Regulatory Network Inference with Covariance Dynamics. WENDY: Covariance dynamics based gene regulatory network inference.* Math Biosci. 2024 Aug 20;377:109284

J73. Z. Wang, I. Gaynanova, A. Aravkin, B. Risk. *Sparse Independent Component Analysis with an Application to Cortical Surface fMRI Data in Autism.* Journal of the American Statistical Association 119.548 (2024): 2508-2520.

J72. A. Aravkin, B. Baraldi, D. Orban. *A Levenberg-Marquardt Method for Nonsmooth Regularized Least Squares.* SIAM Journal on Scientific Computing 46.4 (2024): A2557-A2581.

J71. M. Brauer, G. Roth, A. Aravkin, P. Zheng, C. Murrey, E. Gakidou et al. *Global burden and strength of evidence for 88 risk factors in 204 countries and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021*. The Lancet, 2024.

J70. O. Dorabiala, A. Aravkin, and J.N. Kutz. *Ensemble Principal Component Analysis.* IEEE Access, 2024.

J69. A. Sholokhov, J.V. Burke, D.F. Santomauro, P. Zheng, A. Aravkin. *A Relaxation Approach to Feature Selection for Linear Mixed Effects Models.* Journal of Computational and Graphical Statistics 33.1 (2024): 261-275.

J68. R. Levin, A. Aravkin, and M. Kim. *Patient-specific Quality Assurance Failure Prediction with Deep Tabular Models.* Biomedical Physics & Engineering Express. 2023 May 12;9(4).

J67. A. Sholokov, P. Zheng, A. Aravkin. *A Python Package for Sparse Relaxed Regularized Regression.* Journal of Open Source Software 8.84 (2023): 5155.

J66. A. Aravkin, S. McLaughlin, P. Zheng, H. Lescinsky, M. Brauer, S. Hay, and C. Murray. *Reply to: Concerns about the Burden of Proof studies.* Nature Medicine 29.4 (2023): 826-827.

J65. P. Zheng, A. Aravkin, C. Murray et. al. *The Burden of Proof studies: assessing the evidence of risk.* Nature Medicine 28.10 (2022): 2038-2044.

J64. J. Stanaway, P. Zheng, A. Aravkin, C. Murray et al. *Health effects associated with vegetable consumption: a Burden of Proof study.* Nature Medicine 28.10 (2022): 2066-2074.

J63. H. Leschinsky, P. Zheng, A. Aravkin, C. Murray et al. *Health effects associated with consumption of unprocessed red meat: a Burden of Proof study.* Nature Medicine 28.10 (2022): 2075-2082.

J62. X. Dai, P. Zheng, A. Aravkin, C. Murray, E. Gakidou et al. *Health effects associated with smoking: a Burden of Proof study.* Nature Medicine 28.10 (2022): 2045-2055.

J61. O. Dorabiala, J.N. Kutz, A.Y. Aravkin. *Robust Trimmed k-means.* Pattern Recognition Letters 161 (2022): 9-16.

J60. A. Aravkin, R. Baradli, D. Orban. *A Proximal Quasi-Newton Trust-Region Method for Nonsmooth Regularized Optimization.* SIAM Journal on Optimization 32.2 (2022): 900-929.

J59. K. Maass, M. Kim, A.Y. Aravkin. *A hyperparameter-tuning approach to automated inverse planning.* Medical Physics 49.5 (2022): 3405-3415.

J58. K. Maass, M. Kim, A.Y. Aravkin. *A nonconvex optimization approach to IMRT planning with dose-volume constraints.* INFORMS Journal on Computing 34.3 (2022): 1366-1386.

J57. T. Askham, P. Zheng, A. Aravkin, J. N. Kutz. *Robust and scalable methods for the dynamic mode decomposition.* SIAM Journal on Applied Dynamical Systems (SIADS), 21.1 (2022): 60-79.

J56. K. Harris, A.Y. Aravkin, R. Rao, B. Brunton. *Time-varying Autoregression with Low Rank Tensors.* SIAM Journal on Applied Dynamical Systems (SIADS), 20(4), 2335–2358.

J55. M. Vural, A.Y. Aravkin, S. Stan'czak. *l1-Norm Minimization with Regula Falsi Type Root Finding Methods.* IEEE Signal Processing Letters 28 (2021): 2132-2136.

J54. P. Zheng, K. Ramamurthy, A.Y. Aravkin. *Estimating Shape Parameters of Piecewise Linear-Quadratic Problems.* Open Journal of Mathematical Optimization 2 (2021): 1-18.

J53. A. Kaptanoglu, J. Callaham, A. Aravkin, C. Hansen, and S. Brunton. *Promoting global stability in data-driven models of quadratic nonlinear dynamics.* Physical Review Fluids 6.9 (2021): 094401.

J52. B. de Silva, J. Callaham, J. Jonker, N. Goebel, J. Klemisch, D. McDonald, N. Hicks, J.N. Kutz, S.L. Brunton, A.Y. Aravkin. *A Hybrid Learning Approach to Sensor Fault Detection with Flight Test Data.* AIAA Journal 59.9 (2021): 3490-3503.

J51. S. Brunton, J.N. Kutz, K. Manohar, A. Aravkin, K. Morgansen, J. Klemisch, N. Goebel, J. Buttrick, J. Poskin, A. Blom-Schieber, T. Hogan, D. McDonald. *Data-Driven Aerospace Engineering: Reframing the Industry with Machine Learning.* AIAA Journal 59.8 (2021): 2820-2847.

J50. G. Abrevaya, G. Dumas, A. Aravkin, P. Zheng, J-C. Gagnon-Audet, J. Kozloski, P. Polosecki, G. Lajoie, D. Cox, S.P. Dawson, G. Cecchi, I. Rish. *Learning Brain Dynamics with Coupled Low-dimensional Nonlinear Oscillators and Deep Recurrent Networks.* Neural Computation 33.8 (2021): 2087-2127.

J49. T. van Leeuwen, A. Aravkin. *Variable Projection for Nonsmooth Problems.* Siam Journal of Scientific Computing (SISC), (2021): S249-S268.

J48. A. Scampicchio, A. Aravkin, G. Pillonetto. *Stable and Robust LQR Design via Scenario Approach.* Automatica 129 (2021): 109571.

J47. A. Aravkin, J. V. Burke and D. He. *On the Global Minimizers of Real Robust Phase Retrieval With Sparse Noise,* in IEEE Transactions on Information Theory, vol. 67, no. 3, pp. 1886-1896, March 2021, doi: 10.1109/TIT.2020.3040959.

J46. P. Zheng, R. Barber, R. Sorensen, C. Murray, and A. Aravkin. *Trimmed Constrained Mixed Effects Models: Formulations and Algorithms.* Journal of Computational and Graphical Statistics (JCGS), 2021 (1-34).

J45. J. Jonker, P. Zheng and A. Aravkin, *Efficient Robust Parameter Identification in Generalized Kalman Smoothing Models.* IEEE Transactions on Automatic Control 66.10 (2020): 4852-4857. doi: 10.1109/TAC.2020.3042438.

J44. P. Zheng, A.Y. Aravkin. *Relax-and-split method for nonsmooth nonconvex problems.* Inverse Problems (2020).

J43. K. Champion, P. Zheng, A.Y. Aravkin, S.L. Brunton, J.N. Kutz. *A unified sparse optimization framework to learn parsimonious physics-informed models from data.* IEEE Access 8 (2020): 169259-169271.

J42. A. Mendible, S.L. Brunton, A.Y. Aravkin, W. Lowrie, J.N. Kutz. *Dimensionality Reduction and Reduced Order Modeling for Traveling Wave Physics.* Theoretical and Computational Fluid Dynamics (2020): 1-16.

J41. J. Zhang, A.M. Pace, S.A. Burden, A.Y. Aravkin. *Offline state estimation for hybrid systems via nonsmooth variable projection.* Automatica 115 (2020): 108871.

J40. N.B. Erichson, P. Zheng, K. Manohar, S.L. Brunton, J.N. Kutz, A. Aravkin. *Sparse Principal Component Analysis via Variable Projection.* SIAM Applied Mathematics, 80.2 (2020): 977-1002. 2020.

J39. J. Zhang, T. Leung, A.Y. Aravkin. *Sparse Mean-Reverting Portfolios via Penalized Likelihood Optimization.* Automatica 111 (2020): 108651.

J38. R. Baraldi, R. Kumar, A.Y. Aravkin. *Basis Pursuit Denoise with Nonsmooth Constraints.* IEEE Transactions on Signal Processing 67.22 (2019): 5811-5823.

J37. R. Baraldi, C. Ulberg, R. Kumar, K. Creager, A.Y. Aravkin. *Relaxation algorithms for matrix completion, with applications to seismic travel-time data interpolation.* Inverse Problems 35.10 (2019): 105009.

J36. J. Jonker, A. Aravkin, J. Burke, G. Pillonetto, S. Webster. *Fast methods for robust singular state-space models.* Automatica 105 (2019): 399-405.

J35. A. Aravkin, G. Bottegal, G. Pillonetto. Boosting as a kernel-based method. Machine Learning (2019): 1-24.

J34. A. Aravkin and D. Davis. *Trimmed Statistical Estimation via Variance Reduction.* Mathematics of Operations Research (2019).

J33. P. Zheng, T. Askham, S.L. Brunton, J.N. Kutz, A.Y. Aravkin. *A Unified Framework for Sparse Relaxed Regularized Regression: SR3.* IEEE Access, DOI 10.1109/ACCESS.2018.2886528.

J32. D. Driggs, S. Becker, A. Aravkin. *Adapting Regularized Low Rank Models for Parallel Architectures.* SIAM Journal of Scientific Computing (SISC), 41.1 (2019): A163-A189.

J31. M. Liu, R. Kumar, E. Haber, A.Y. Aravkin. *Simultaneous shot inversion for nonuniform geometries using fast data interpolation.* Inverse Problems 35 (2), 2018.

J30. A. Aravkin, J. Burke, D. Drusvyatskiy, M. Friedlander, S. Roy. *Level-set methods for convex optimization.* Math. Program. (2018). https://doi.org/10.1007/s10107-018-1351-8

J29. E. Yang, A. Lozano, A. Aravkin. *High-Dimensional Trimmed Estimators: A General Framework for Robust Structured Estimation.* Electron. J. Statist., 12(2) (2018), 3519-3553.

J28. A. Aravkin, J. Burke, G. Pillonetto. *Generalized system identification with stable spline kernels.* SIAM Journal on Scientific Computing 40.5 (2018): B1419-B1443.

J27. A. Aravkin, J. Burke, D. Drusvyatskiy, M. Friedlander, K. MacPhee. *Foundations of Gauge and Perspective Duality.* SIAM Journal on Optimization 28.3 (2018): 2406-2434.

J26. U. Diala, R. Wennberg, I. Abdulkadir Z. Farouk, C. Zabetta, E. Omoyibo A. Emokpae, A. Aravkin, B. Toma, S. Oguche, T. Slusher. *Patterns of acute bilirubin encephalopathy in Nigeria: a multicenter pre-intervention study.* Journal of Perinatology (2018):1 (D-8).

J25. M. Liu, R. Kumar, E. Haber, A. Aravkin. *Simultaneous-shot inversion for PDE-constrained optimization problems with missing data.* Inverse Problems, 35(2):025003, December 2018.

J24. E. Esser, L. Guasch, T. van Leeuwen, A.Y. Aravkin, F.J. Herrmann. *Total-variation regularization strategies in full-waveform inversion.* SIAM Journal on Imaging Sciences, 11(1), 376-406 (2018).

J23. A. Aravkin, D. Drusvyatskiy, T. van Leeuwen. *Efficient quadratic penalization through the partial minimization technique.* IEEE Transactions on Automatic Control, 2017 (D-8).

J22. A. Aravkin, J.V. Burke, L. Ljung, A. Lozano, and G. Pillonetto. *Generalized Kalman Smoothing: Modeling and Algorithms (Survey).* Automatica, Vol. 86, 2017, p. 63-86.

J21. R. Kumar, O. Lopez, D. Davis, A. Aravkin, F. Herrmann *Beating level-set methods for 3D seismic data interpolation: a primal-dual alternating approach.* IEEE Transactions on Computational Imaging 3, no. 2 (2017): 264-274.

J20. Y. Kim, A. Aravkin, H. Fei, A. Zondervan, M. Wolf. *Analytics for understanding customer behavior in the energy and utility industry.* IBM Journal of Research and Development. 60(1), 11-1, 2016 (D-13).

J19. N. Tu, A. Aravkin, T. van Leeuwen, T. Lin, F. Herrmann. *Source estimation with surface-related multiples – fast ambiguity resolved seismic imaging.* Geophysical Journal International, 205.3(2016): 1492-1511.

J18. G. Bottegal, A. Aravkin, H. Hjalmarsson and G. Pillonetto. *Robust EM kernel-based methods for linear system identification.* Automatica 67 (2016) 114-126.

J17. R. Kumar, C. Da Silva, O. Akalin, A. Aravkin, H. Mansour, B. Recht, F. Herrmann. *Efficient matrix completion for seismic data reconstruction.* Geophysics 80, no. 5 (2015): V97-V114.

J16. A. Aravkin, B. Bell, J. Burke, and G. Pillonetto. *The connection between Bayesian estimation of a Gaussian random field and RKHS.* in Neural Networks and Learning Systems, IEEE Transactions on, vol.26, no.7, pp.1518-1524, July 2015.

J15. I. Iskander, R. Gamaleldin, S. El Houchi, A. El Shenawy, I. Seoud, N. El Gharbawi, H. Abou-Youssef, A. Aravkin, and R. Wennberg, *Serum bilirubin and bilirubin/albumin ratio as predictors of bilirubin encephalopathy.* Pediatrics, DOI: 10.1542/peds.2013-1764, 2014.

J14. A. Aravkin, R. Kumar, H. Mansour, B. Recht, and F. Herrmann. *Fast methods for denoising matrix completion formulations, with applications to robust seismic data interpolation.* SIAM J. Sci. Comput., 36(5):S237-S266, 2014.

J13. A. Aravkin, J. Burke, G. Pillonetto. *Robust and trend following Student's t Kalman smoothers.* SIAM J. Control Optim., 52(5):2891-2916, 2014.

J12. A. Aravkin, J. Burke, A. Chiuso, and G. Pillonetto. *Convex vs. nonconvex approaches for sparse estimation: the mean squared properties of ARD and GLasso.* Journal of Machine Learning Research (JMLR), Volume 15, pages 217-252, 2014.

J11. A. Aravkin, J. Burke, and G. Pillonetto. *Sparse/Robust Estimation and Kalman Smoothing with Nonsmooth Log-Concave Densities: Modeling, Computation, and Theory.* Journal of Machine Learning Research (JMLR), Volume 3, pages 2689-2728, September 2013.

J10. A. Aravkin, J. Burke, M. Friedlander. *Variational Properties of Value Functions.* SIAM Journal of Optimization (SIOPT), Vol. 23, No. 3, pp. 1689-1717, August 2013.

J9. C.L. Wang, M.J. Eissa, J. Rogers, A. Aravkin, B.A. Porter, J.D. Beatty. *(18)F-FDG PET/CT-Positive Internal Mammary Lymph Nodes: Pathologic Correlation by Ultrasound-Guided Fine-Needle Aspiration and Assessment of Associated Risk Factors.* AJR Am J Roentgenol. 2013 May; 200(5): 1138-1144.

J8. A. Aravkin, T. van Leeuwen. *Estimating Nuisance Parameters in Inverse Problems*, Inverse Problems, 28(11):115016, October 2012 (S-14).

J7. A. Aravkin, M. Friedlander, F. Herrmann, and T. van Leeuwen. *Robust inversion, dimensionality reduction, and randomized sampling.* Mathematical Programming 134 (2012): 101-125.

J6. X. Li, A. Aravkin, T. van Leeuwen, and F. Herrmann, *Fast randomized full-waveform inversion with compressive sensing.* Geophysics 77.3 (2012): A13-A17.

J5. T. van Leeuwen, A. Aravkin, and F. Herrmann, *Seismic waveform inversion by stochastic optimization.* International Journal of Geophysics 2011.1 (2011): 689041.

J4. A. Aravkin, B. Bell, J. Burke, G. Pillonetto, *An ℓ_1-Laplace Robust Kalman Smoother.* IEEE Transactions on Automatic Control 56.12 (2011): 2898-2911.

J3. R. Gammeldin, I. Iskander, I. Seoud, H. Aboraya, A. Aravkin, P. Sampson, R. Wennberg, *Risk Factors of Neurotoxicity in Newborns with Severe Neonatal Hyperbilirubinemia.* Pediatrics 128(4), 2011, e925-e931.

J2. C. Wang, L. MacDonald, J. Rogers, A. Aravkin, D. Haseley, J. Beatty, *Positron emission mammography: correlation of estrogen receptor, progresterone receptor, and human epidermal growth factor receptor 2 status and 18F-FDG.* AJR Am J Roentgenol. 2011 Aug; 197(2): W247-55.

J1. R. Wennberg, C. Ahlfors and A. Aravkin, *Intervention guidelines for neonatal hyperbilirubinemia: an evidence based quagmire.* Curr. Pharm. Design 2009; 15(25):2939-45.

Additional Peer Reviewed Journal Articles in Global Health

G93. T. Vos et. al. *Global, regional, and national burden of headache disorders, 1990–2023: a systematic analysis for the Global Burden of Disease Study 2023.* The Lancet Neurology, 2025.

G92. P. Mark et. al. *Global, regional, and national burden of chronic kidney disease in adults, 1990–2023, and its attributable risk factors: a systematic analysis for the Global Burden of Disease Study 2023.* The Lancet, 2025.

G91. M. Naghavi et. al. *Global burden of 292 causes of death in 204 countries and territories and 660 subnational locations, 1990–2023: a systematic analysis for the Global Burden of Disease Study 2023.* The Lancet, 2025.

G90. L. Ong et. al. *Burden of 375 diseases and injuries, risk-attributable burden of 88 risk factors, and healthy life expectancy in 204 countries and territories, including 660 subnational locations, 1990–2023: a systematic analysis for the Global Burden of Disease Study 2023.* The Lancet, 2025.

G89. L. Force et. al. *The global, regional, and national burden of cancer, 1990–2023, with forecasts to 2050: a systematic analysis for the Global Burden of Disease Study 2023.* The Lancet, 2025.

G88. G. Gill et al. *Leveraging socioeconomic development for maternal health, breast cancer, and gynaecological cancers across 204 locations: a stochastic frontier analysis from the Global Burden of Disease Study 2023.* The Lancet Obstetrics, Gynaecology, & Women's Health Home (2025).

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C3. X. Li, A. Aravkin, T. van Leeuwen, F. Herrmann, *Full-waveform Inversion with Randomized L1 Recovery for the Model Updates.* 73rd EAGE Conference and Exhibition incorporating SPE EUROPEC 2011. European Association of Geoscientists & Engineers, 2011.

C2. A. Aravkin, B. Bell, J. Burke, G. Pillonetto, *Learning using state space kernel machines.* IFAC Proceedings Volumes 44.1 (2011): 2296-2302.

C1. G.Pillonetto, A. Aravkin, S. Carpin, *The unconstrained and inequality constrained moving horizon approach to robot localization.* 2010 IEEE/RSJ International Conference on Intelligent Robots and Systems. IEEE, 2010.

Books, Chapters, and Media

B5. A. Aravkin, C. Razo, and J. Stanaway. *How unhealthy is red meat? And how beneficial is it to eat vegetables? A new rating system could help you cut through the health guidelines.* Research brief, The Conversation, 2022.

B4. A. Aravkin, A. Choromanska, L. Deng, G. Heigold, T. Jebara, D. Kanevski, and S.J. Wright. *Log-linear models, extensions, and applications*, 2018. Edited volume, MIT Press.

B3. A. Aravkin, A. Choromanska, T. Jebara, D. Kanevsky. *Semistochastic quadratic bound methods*, in Log-Linear Models, extensions, and applications, MIT Press, 2018.

B2. A. Aravkin and S. Becker. *Dual Smoothing and Level Set Techniques for Variational Matrix Decomposition.* In Robust Low-Rank and Sparse Matrix Decomposition: Applications in Image and Video Processing, editors T. Bouwmans, N. Aybat, E. Zahzah, 2016 (S-38).

B1. A. Aravkin, J. Burke, and G. Pillonetto. *Optimization viewpoint on Kalman smoothing, with applications to robust and sparse estimation.* In Compressed Sensing and Sparse Filtering, 237-280. Springer, 2014.

Talks and Presentations

T95. Invited talk: Institute of Applied Mathematics, *Optimization Perspective on Raking.* February 24, 2025. Vancouver, BC.

T94. Invited talk: Institute of Applied Mathematics, *New Developments for Relax and Split Methods.* October 23, 2023. Vancouver, BC.

T93. Invited talk: SIAM 2023, *Modeling Risk-Outcome Relationships in Global Health Data.* June 2, 2023. Seattle, WA.

T92. Invited talk: HMS Seminar, 2022, *Variable Selection Methods for Regression Models.* April 15, 2022, Virtual.

T91. Invited talk: Mayo Clinic Covid-19 Webinar Series, 2022, *Modeling and Forecasting the COVID-19 Pandemic.* April 12, 2022, Virtual.

T90. Invited talk: East Coast Optimization Meeting, 2022, *Relax and Split Method for Nonconvex Optimization.* March 31, 2022, Virtual.

T89. Invited talk: SIAM Optimization 2021, *Relax and Split Method for Nonconvex Optimization.* Friday, July 23, 2021, Virtual.

T88. 19th IFAC Symposium on System Identification (SYSID 2021), *Kalman smoothing and block tridiagonal systems: new connections and stability results..* Friday, July 15, 2021, virtual.

T87. Invited talk: CRM Applied Math seminar, McGill University, *A Tale of Two Models for COVID-19 Scenarios.* April 12th, 2021, Virtual.

T86. Invited talk: Towards a Robust Evidence Score In Global Health. Canadian Mathematical Society, December 2020, Virtual.

T85. Invited talk: Towards a Robust Evidence Score In Global Health. Machine Learning Deep Dive, November 2020, University of Washington, Seattle, WA.

T84. Panelist on Covid-19 Panel, International Symposium on Forecasting. October 2020, Virtual.

T83. Invited talk: Towards a Robust Evidence Score In Global Health. Metrics Seminar. March 2020, Stanford University, Stanford, CA.

T82. Invited talk: Robust Mixed Effects Models for Network Analysis. GBD Science Seminar Series, Institute of Health Metrics and Evaluation. January 2020, Seattle, WA.

T81. Invited talk: Towards a Robust Evidence Score Model in Global Health. IBM TJ Watson Research Center, December 2019, NY.

T80. Invited talk: New Ideas in Quantitative Finance Workshop. Stonybrook University, November 2019, NY.

T79. Invited talk at West Coast Optimization Meeting: Meta-analysis with applications to global health. Vancouver, BC September 2019.

T78. Invited talk at ICIP (Stochastic Programming): New Methods for Nonsmooth Nonconvex Problems. Trondheim, Norway, August 2019.

T77. Invited talk at Applied Mathematics: the Next 50 Years. Seattle, WA, June 2019: Towards a Robust Evidence Score for Global Health Applications.

T76. Invited talk at Physics Informed Machine Learning Workshop, Seattle, WA, June. 2019: Nonsmooth Nonconvex Problems in Data-Driven Discovery.

T75. Invited talk at PIMS Workshop for Computational Math in Renewable Energy. UBC, Vancouver BC, May 2019: Robust Time Series Models.

T74. Invited talk at Joint Statistical Meetings, *Robust Time Series Using Exponential Smoothing Cells*, Vancouver BC, 2018.

T73. Invited talk at UBC, *Fast Methods for Nonsmooth, Nonconvex problems*, Vancouver BC, 2018.

T72. Summer School Lecture on Optimization, UBC, Vancouver BC, 2018.

T71. Invited talk at SIAM Annual Meeting. *Fast Methods for Nonsmooth, Nonconvex Problems.* Portland, 2018.

T70. Invited talk at Microsoft Research. *Fast Methods for Nonsmooth, Nonconvex Problems.* Seminar, 2018.

T69. Invited talk at TU Munchen, Mathematics Institute on the Garching Campus, *Fast Methods for Nonsmooth, Nonconvex Problems.* Munich, 2018.

T68. Invited talk at LANS Seminar (Argonne National Labs), *Fast Methods for Nonsmooth, Nonconvex Problems.* Illinois, 2018.

T67. Invited talk at SAMSI Workshop on Operator Splitting Methods in Data Analysis, *Fast methods for nonsmooth, nonconvex problems.* Raleigh, 2018.

T66. Invited talk at Amazon, *Fast Seattle, 2018. Fast Algorithms for Robust Applications in Machine Learning and Time Series.* Seattle, 2018.

T65. Banff Research Center, *Unified optimization for self-learning robust penalties.*. Banff, 2018.

T64. Invited presentation at EUROPT, Montreal, July 2017.

T63. Talk at SIAM Optimization, Vancouver BC, May 2017.

T62. Invited UW talk at Statistics Seminar, April 21st, 2017.

T61. Invited Talk at Google Seattle, April 6th, 2017.

T60. Invited Talk at Google NYC, March 24th, 2017.

T59. Invited UW talk: *Robust statistics and learning via optimization*, at Industrial and Systems Engineering, February 2017.

T58. Invited UW talk: *Robust statistics and learning via optimization*, at Computational Finance Microsoft Seminar Series, January 2017.

T57. Invited UW talk: *Robust statistics and learning via optimization*, at Applied and Computational Mathematical Sciences (ACMS) seminar, January 2017.

T56. Invited UW talk: *Robust Formulations for Learning Problems*, at eScience Community Seminar, October 2016.

T55. Invited talk: *Fast Algorithms for Robust Machine Learning*, Google NYC, July 2016.

T54. Invited talk: *Variational Projection and Applications*, Workshop on Nonlinear Optimization Algorithms and Industrial Applications FIELDS Institute, June 2016.

T53. SIAM Optimization: *Variable Projection in Nonsmooth Applications*, Boston MA, July 2016.

T52. Invited talk: *Variational Projection with Applications*, Canadian Operations Research Society (CORS), June 2016.

T51. Invited tutorial: *Modeling and Optimization in Machine Learning*, Optimization Days, Montreal, Canada, May 2016.

T50. Invited talk: *Conjugate Interior Point Methods for Large-Scale Problems*, West Coast Optimization Meeting, University of Washington, 2016.

T49. Invited talk: *Conjugate Interior point method for large-scale problems*, University of Padova, Italy, April 2016.

T48. Invited talk: *Conjugate Interior Point Method for Large-Scale Nonsmooth Problems*, Institute for Systems Biology (ISB), Seattle, April 2016.

T47. Invited talk: *Conjugate Interior Point Method for Large-Scale Nonsmooth Problems*, Institute of Mathematics and Applications, Minneapolis, MA, January 2016.

T46. Invited UW talk: *Variable projection and applications.* Applied Math Seminar, December 2015.

T45. Invited talk: *Variable projection and applications*, University of British Columbia, December 2015.

T44. Invited talk: *Variable projection and applications*, IBM T.J. Watson Research Center, November 2015.

T43. Invited talk: *Conjugate Interior Point Method for Large-Scale Nonsmooth Problems*, EPFL Lausanne, June 2015.

T42. EAGE Madrid, *A general optimization framework for 3D full waveform inversion*, Madrid, Spain, June 2015.

T41. Invited talk: *A Conjugate Interior Point Approach for Large-Scale Problems*, Pittsburg, PA, June 2015.

T40. Invited talk: *Optimization perspective on Kalman filtering and smoothing*, Utrecht University, Netherlands, June 2015.

T39. Invited tutorial: *High-dimensional data analysis*, IBM T.J. Watson Research Center, Yorktown Heights NY, May 2015.

T38. Invited talk: *Fast Flipped Algorithms for Inference on Big Data*, Columbia CS, March 2015.

T37. SIAM Comp Science & Engineering, *Matrix free interior point methods*, in Salt Lake City, Utah, March 2015.

T36. Invited talk: *A Conjugate Interior Point approach with applications to machine learning and robust inference for dynamic systems*, Columbia IEOR, February 2015.

T35. Invited talk: *Structured optimization for big data and machine learning*, Columbia Computer Science, February 2015.

T34. Invited talk: *A Conjugate Interior Point approach with applications to machine learning and robust inference for dynamic systems*, University of British Columbia, February 2015.

T33. Invited talk: *Structured optimization for big data and machine learning*, University of Washington, January 2015.

T32. NIPS 2014: *Learning sparse models using general robust losses*, Montreal, Canada, December 2014.

T31. European Utility Week: *Analytics for Renewable Energy*, poster presentation, Amsterdam, Netherlands, November 2014.

T30. Invited talk: *Fast variational methods for matrix completion and robust PCA*, at Sparse Representations, Numerical Linear Algebra, and Optimization Workshop at BIRS, October 2014.

T29. Invited talk: *Optimization perspective on Kalman filtering and smoothing*, GERAD, Montreal Canada, September 2014.

T28. Invited talk: *Optimization for Machine Learning*, ORFE, Princeton, September 2014.

T27. SIAM Optimization: *Fast variational methods for matrix completion and robust PCA*, San Diego, CA, May 2014.

T26. Invited talk: *Optimization perspective on Kalman filtering and smoothing.* Mitsubishi Electric Research Laboratory (MERL), Boston, MA, April 2014.

T25. Invited talk: *Optimization Perspective on Kalman Filtering and Smoothing.* UMass Boston, CS, Boston MA, April 2014.

T24. CISS 2014: *Conjugate Interior Point Method for Large-Scale Nonsmooth Problems*, Princeton, NJ, March 2014.

T23. ICCOPT 2013: *Sparse/robust estimation with nonsmooth log-concave densities*, Lisbon, Portugal, July 2013.

T22. Invited talk: *Piecewise linear quadratic and quadratic support functions in regularized regression, machine learning, system identification, and ESPECIALLY Kalman smoothing.* West Coast Optimization Meeting, University of Washington, May 2013.

T21. Invited talk: *Robust Methods for Large-Scale Inverse Problems*, Courant Institute, New York University, March 2013.

T20. SIAM Comp. Science & Engineering, *4D Seismic with Kalman Smoothing*, February 2013.

T19. CDC 2012, *Nonsmooth regression and state estimation using piecewise quadratic log-concave densities*, December 2012, Maui, HI.

T18. SEG 2012, *On Nonuniqueness of the Student's t formulation for linear inverse problems*, November 2012, Las Vegas.

T17. TOTAL internal conference (Mathias), invited presentation, October 2012, *Estimating nuisance parameters for inverse problems*, Paris.

T16. EAGE 2012, *Source estimation for frequency-domain FWI with robust penalties*, June 2012, Copenhagen, Denmark.

T15. ICASSP 2012, *Fast seismic imaging for marine data*, March 2012, Kyoto, Japan.

T14. ICASSP 2012, *Robust inversion via semistochastic dimensionality reduction*, March 2012, Kyoto, Japan.

T13. INFORMS Annual Meeting, November 16, 2011, *Value Functions: Variational Properties and Applications to Inversion*, Charlotte, NC.

T12. TOTAL internal conference (Mathias), invited presentation, October 2011, *Robust inversion via semistochastic dimensionality reduction*, Paris.

T11. West Coast Optimization Meeting, October 2011, *Fast Robust Seismic Imaging.* Kelowna.

T10. Society of Exploration Geophysics, September 2011, *Robust full-waveform inversion using Student's t-distribution.* San Antonio.

T9. Numerical Aspects of Waves (invited presentation), July 2011, *Robust full-waveform inversion using Student's t-distribution.* Vancouver BC.

T8. SIAM International Council for Industrial and Applied Mathematics (ICIAM), July 2011, *Robust full-waveform inversion using Student's t-distribution.* Vancouver BC.

T7. SIAM ICIAM (invited presentation), July 2011, *Exploiting block tridiagonal structure to design efficient robust Kalman smoothers.* Vancouver, BC.

T6. Applied Mathematics Perspectives 2011: Medical and Seismic Imaging (invited presentation), July 15, *Sparsity promoting formulations and algorithms for FWI.* Vancouver, BC.

T5. European Association of Geoscientists and Engineers, June 2011, *Sparsity promoting formulations and algorithms for FWI.* ViennA.

T4. SIAM Computational Science and Engineering, February 2011, *Full-waveform inversion with compressive updates.* Reno.

T3. Institute for Mathematics and Applications Workshop: Computing with Uncertainty, October 2010, *Robust estimates for discrete-time nonlinear systems.*

T2. West Coast Optimization Meeting 2009, *Robust ℓ_1-Laplace Kalman Smoother.* SFU Surrey.

T1. Lunar Science Conf. 2008, *Bundle Adjustment and Kalman Smoothing*, NASA ARC.