Curriculum Vitae

James V. Burke

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Education

Ph.D., Mathematics, University of Illinois at Urbana-Champaign, October, 1983.
B.S., Mathematics, Knox College, Galesburg, Illinois, May 1977.

Recent Visiting Appointments

02/16 - 03/16	Visiting Distinguished Researcher Department of Applied Mathematics, The Polytechnic University of Hong Kong.
04/15 - 07/15	Giovani Prodi Chair, University of Würzburg, Würzburg, Germany.
Spring - 2013	Vietnam National University, Hanoi, Vietnam

Editorial Positions

20 - :	Associate Editor	*SIAM Journal on Optimization*
20 - :	Associate Editor	*Journal of Nonsmooth Analysis and Optimization*
20 - :	Associate Editor	*Open Journal of Mathematical Optimization*
07 - 16:	Editorial Board	*Set Valued and Variational Analysis*
05 - 15:	Editorial Board	*Pacific J. of Optimization*
99 - 03:	Associate Editor	*Mathematics of Operations Research*
94 - 00:	Corresponding Editor	*SIAM J. Control and Optimization*
92 - 94:	Associate Editor	*SIAM J. Control and Optimization*

Awards

Research:	2021	SIAM Fellow For pioneering contributions to continuous optimization and variational analysis.
	2018	INFORMS Computing Society Prize Awarded jointly to James Burke, Frank Curtis, Adrian Lewis and Michael Overton for pioneering work on gradient sampling methods for nonsmooth optimization.
	2015	Giovani Prodi Chair in Nonlinear Analysis, University of Würzburg
Teaching	2013	Excellence in Teaching Award University of Washington Tolo Chapter of the Mortar Board National College Senior Honor Society

PUBLICATIONS

2020
- "On the Global Minimizers of Real Robust Phase Retrieval with Sparse Noise." with A.Aravkin and D.He. To appear in IEEE Transactions on Information Theory (2020).
- "An Algorithm for Nonparametric Estimation of A Multivariate Mixing Distribution with Applications to Population Pharmacokinetics." with W.M.Yamada, M.N.Neely, J. Bartroff, D.S.Bayard, M. van Guilder, R.W.Jelliffe, A.Kryshchenko, R.Leary, T.Tatarinova, A.Schumitzky. To appear in Pharmaceutics, 2020.
- "A study of convex convex-composite functions via infimal convolution with applications." with Tim Hoheisel and Quang V. Nguyen. To appear in Mathematics of Operations Research (2020).
- "Inexact Sequential Quadratic Optimization with Penalty Parameter Updates Within the QP Solver." with Frank Curtis, Hao Wang, and Jiashan Wang. SIAM J. on Optimization, **30**(2020) 1822-1849.
- "The Subdifferential of Measurable Composite Max Integrands and Smoothing Approximation." with X. Chen and H. Sun. Math. Prog., **181**(2020) 229–264. (https://doi.org/10.1007/s10107-019-01441-9)

- "Strong Metric (Sub)regularity of KKT Mappings for Piecewise Linear- Quadratic Convex-Composite Optimization and the Quadratic Convergence of Newton's Method."
with A. Engle. Math of Oper. Res., **45**(2020) 797-1192. (https://doi.org/10.1287/moor.2019.1027)
- "Gradient Sampling Methods for Nonsmooth Optimization."
with Frank E. Curtis, Adrian S. Lewis, Michael L. Overton, and Lucas E. A. Simões.
Numerical Nonsmooth Optimization: State of the Art Algorithms,
Eds. A.M. Bagirov, M. Gaudioso, N. Karmitsa, M.M. Mäkella and S. Taheri,
Springer, New York (2020), Ch.6, 201–225.

2019
- "Robust Singular Smoothers For Tracking Using Low-Fidelity Data."
with J. Jonker, A.Y. Aravkin, G. Pillonetto, and S. Webster.
Proceedings of Robotics: Science and Systems XV, 2019, FreiburgimBreisgau, Germany.
(https://doi.org/10.15607/RSS.2019.XV.037)
- "The Gradient Sampling Methodology."
with Frank E. Curtis, Adrian S. Lewis, and Michael L. Overton.
INFORMS Computing Society Newsletter, 2019 Spring Issue, pp. 4-9.
- "Variational Properties of Matrix Functions via the Generalized Matrix-Fractional Function,"
with Y. Gao, and T. Hoheisel. SIAM J. Optim., **29**(2019)1958–1987.
- "Level-set methods for convex optimization,"
with A. Aravkin, D. Drusvyatskyi, M. Friedlander, and S. Roy.
Math. Prog. Series B, , **174**(2019)359–390.

2018
- "Foundations of gauge and perspective duality"
with A. Aravkin, D. Drusvyatskyi, M. Friedlander, and K. MacPhee.
SIAM J. on Optim. 28(2018): 2406 - 2434.
- "Generalized System Identification with Stable Spline Kernels."
with A. Aravkin and G. Pillonetto. SIAM J. Sci. Comput., 40(2018)1419-1443.
- "Convex Geometry of the Generalized matrix-fractional Function."
with Yuan Gao and Tim Hoheisel. SIAM J. on Optimization **28**(2018): 2189 - 2200.
- "Variational Analysis of Convexly Generated Spectral Max Functions."
with Julie Eaton. Mathematical Programming **168**(2018): 63 - 92.
Published online, DOI 10.1007/s10107-016-1088-1, January, 2016.

2017
- "Generalized Kalman Smoothing: Modeling and Algorithms."
with Aleksandr Aravkin, Lennart Ljung, Aurelie Lozano, and Gianluigi Pillonetto.
Automatica **86**(2017): 63 - 86.
- "Epi-convergence Properties of Smoothing by Infimal Convolution."
with T. Hoheisel. Set-Valued and Variational Analysis, **25**(2017): 1 - 23.

2015
- "Matrix support functionals for inverse problems, regularization, and learning."
with T. Hoheisel. SIAM J. Optim. **25**(2015): 1135 - 1159.
- "Iteratively Reweighted Linear Least Squares for Exact Penalty Subproblems on Product Sets."
with F. Curtis, H. Wang and J. Wang. SIAM J. Optim. **25**(2015): 261 - 294.
- "The connection between Bayesian estimation of a Gaussian random field and RKHS."
with A.Y. Aravkin, B.M. Bell and G. Pillonetto.
IEEE Transactions on Neural Networks and Learning Systems. **26**(2015): 1518 - 1524.
E-Preprint: ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=6871416

2014
- "Smoothing dynamical systems with state-dependent covariance matrices." with A.Y. Aravkin.
IEEE 53rd Annual Conference on Decision and Control (CDC), 2014, pages 3382 - 3387.
- "Robust and Trend-following Student's t-Kalman Smoothers."
with A.Y. Aravkin and G. Pillonetto.
SIAM J. Control Optim. **52**(2014): 2891-2916.
- "Convex vs. nonconvex approaches for sparse estimation: GLasso, multiple kernel learning, and HGLasso."
with A.Y. Aravkin, A. Chiuso, and G. Pillonetto.
Journal of Machine Learning Research, **15**(2014) 217-252.
- "A sequential quadratic programming optimization algorithm with rapid infeasibility detection."
with F. Curtis and H. Wang.
SIAM J. Optimization, **24**(2014):839–872.

- "Optimization viewpoint on Kalman smoothing, with applications to robust and sparse estimation." with A.Y. Aravkin and G. Pillonetto.
  In Compressed Sensing & Sparse Filtering, eds., A. Carmi, L. Mihaylova, and S. Godsill.
  Springer. pp. 237-281, 2014.

2013
- "Linear system identification using stable spline kernels and PLQ penalties." with A.Y. Aravkin and G. Pillonetto.
  Proceedings of the 52nd IEEE Conf. Decision and Control (CDC), December 2013, pp. 5168-5173.
- "Sparse/Robust Estimation and Kalman Smoothing with Nonsmooth Log-Concave Densities: Modeling, Computation, and Theory." with A.Y. Aravkin and G. Pillonetto.
  Journal of Machine Learning Research, **14**(2013) 2689-2728.
- "Epi-convergent smoothing with applications to convex composite functions." with T. Hoheisel. *Siam J. Optimization*, **23**(2013) 1457 - 1479.
- "Variational Properties of Value Functions." with A.Y. Aravkin and M.P. Friedlander.
  SIAM Journal of Optimization, **23**(2013) 1689 - 1717.
- "Gradient consistency for integral-convolution smoothing functions." with T. Hoheisel and Christian Kanzow.
  Set-Valued and Variational Analysis, **21**(2013) 359 – 376.

2012
- "On the MSE properties of empirical Bayes methods for sparse estimation", IFAC Systems Identification, Volume 16, Part 1, Pages 965-970, 2012, with A.Y. Aravkin, A. Chiuso, and G. Pillonetto.
- "Robust and trend following Kalman smoothers using Student's t", IFAC Systems Identification, Volume 16, Part 1, Pages 1215-1220, 2012, with A.Y. Aravkin and G. Pillonetto.
- "A statistical and computational theory for robust and sparse Kalman smoothing", IFAC Systems Identification, Volume 16, Part 1, Pages 894-899, 2012, with A.Y. Aravkin and G. Pillonetto.
- "On the estimation of hyper parameters for empirical Bayes estimators: maximum marginal likelihood vs. minimum MSE", IFAC Systems Identification, Volume 16, Part 1, Pages 125-130, 2012, with A.Y. Aravkin, A. Chiuso, and G. Pillonetto.
- "On the subdifferential regularity of max root functions for polynomials", with Julia Eaton, *Journal of Nonlinear Analysis Series A: Theory, Methods & Applications*, **75**(2012) 1168–1187.
- "Nonsmooth regression and state estimation using piecewise quadratic log-concave densities." with A.Y. Aravkin and G. Pillonetto.
  Proceedings of the 51st IEEE Conf. Decision and Control (CDC), 2012, pp. 4101-4106.

2011:
- "Convex vs. non-convex approaches to sparse estimation: LASSO, multiple kernel learning, and hyperparameter LASSO", Proceedings of the IEEE Conference on Decision and Control (CDC), 2011, pp. 156–161, with A.Y. Aravkin, A. Chiuso, and G. Pillonetto.
- "Learning using state space kernel machines", IFAC World Congress, Volume 18, Part 1, pages 2296-2302, 2011, with A.Y. Aravkin, B. Bell, and G. Pillonetto.
- "A nonlinear sparsity promoting formulation and algorithm for full-waveform inversion", EAGE Expanded Abstracts (2011), with A.Y. Aravkin, T. van Leeuwen, and F.J. Herrmann.
- "An ℓ_1-Laplace Robust Kalman Smoother", *IEEE Transactions on Automatic Control*, **56**(2011) 2898–2911, with Aleksandr Aravkin, Bradley Bell and Gianluigi Pillonetto.

2009:
- "An Inequality Constrained Kalman-Bucy Smoother by Interior Point Likelihood Maximization", with Bradley Bell and Gianluigi Pillonetto, *Automatica*, **45**(2009) 25-33.
- "Weak sharp minima revisited, part III: error bounds for differentiable convex inclusions", with Sien Deng, *Mathematical Programming*, **116**(2009) 37-56.

2008:
- "Algorithmic differentiation of implicit functions and optimal values", with Bradley Bell, in *Advances in Automatic Differentiation*, Eds. C. Bischof, H. Bücker, P. Hovland, U. Naumann, and J. Utke, Springer, 2008, pp. 67-77.

2007:
- "The Speed of Shor's R-Algorithm",

with Adrian S. Lewis and Michael L. Overton, *IMA Journal of Numerical Analysis*, **28**(2008) 711-720.

- "Convexity and Lipschitz behavior for small pseudospectra",
with Adrian S. Lewis and Michael L. Overton, *SIAM J. Matrix Analysis*, **29**(2007) 586-595.
- "Spectral conditioning and pseudospectral growth",
with Adrian S. Lewis, and Michael L. Overton, *Numerische Mathematik*, **107**(2007) 27-37.

2006:
- "Characterizations of the Polynomial Numerical Hull of Degree k",
with Anne Greenbaum, *Lin. Alg. Appl.*, **419**(2006) 37-47.
- "HIFOO - A MATLAB package for fixed-order controller design and H_∞ optimization",
IFAC Robust Control Design Volume 5, Part 1, 2006,
with Didier Henrion, Adrian S. Lewis, and Michael L. Overton.
- "Stabilization via nonsmooth, nonconvex optimization",
with Didier Henrion, Adrian S. Lewis, and Michael L. Overton, *IEEE Transactions on Automatic Control*, **51**(2006) 1760-1769.

2005:
- "Weak sharp minima revisited, Part II: Applications to Linear Regularity and Error Bounds",
with Sien Deng, *Mathematical Programming*, **104**(2005) 236-261.
- "Variational Analysis of Functions of the Roots of Polynomials",
with Adrian Lewis and Michael Overton, *Mathematical Programming*, **104**(2005) 263-292.
- "A robust gradient sampling algorithm for nonsmooth, nonconvex optimization",
with Michael Overton and Adrian Lewis, *SIAM J. Optimization*, **15**(2005) 751-779.
- "A new proximal point iteration that converges weakly but not in norm",
with H. H. Bauschke, F. R. Deutsch, H. S. Hundal, and J. D. Vanderwerff, *Proc. Amer. Math. Soc.*, **133**(2005), 1829-1835.

2004:
- "Pseudospectral components and distance to controllability",
with Michael Overton and Adrian Lewis, *SIAM J. Matrix Anal. Appl.*, **26**(2004) 350-361.
- "Variational analysis of the abscissa mapping for polynomials via the Gauss-Lukas theorem",
with Adrian Lewis and Michael Overton, *J. Global Optimization*, **28**(2004), 259–268.
- "Differentiability of cone-monotone functions on separable Banach space",
with Jonathan Borwein and Adrian Lewis, *Proc. of the American Math. Soc.*, **132**(2004), 1067–1076.

2003:
- "Robust stability and a criss-cross algorithm for pseudospectra",
with Adrian Lewis and Michael Overton, *IMA J Num Anal*, **23**(2003), 1–17.
- "Variational analysis applied to the problem of optical phase retrieval",
with Russell Luke, *SIAM J. Control and Optimization*, **42**(2003), 576–575.
- "Optimization and Pseudospectra, with applications to robust stability",
with Adrian Lewis and Michael Overton, *SIAM Journal on Matrix Analysis and Applications*, **25**(2003), 80–104.
- "A Nonsmooth, Nonconvex Optimization Approach to Robust Stabilization by Static Output Feedback and Low-Order Controllers", with Michael Overton and Adrian Lewis, IFAC Proceedings Volumes, **36**(2003), 175–181.

2002:
- "Optical wavefront reconstruction: theory and numerical methods",
with Russell Luke and Richard Lyon, *SIAM Review*, **44**(2002), 169–224.
- "Weak sharp minima revisited, Part I: basic theory",
with Sien Deng, *Control & Cybernetics*, **31**(2002), 439–469.
- "Two numerical methods for optimizing matrix stability",
with Adrian Lewis and Michael Overton, *Linear Algebra and its Applications*, **351-352**(2002), 117–145.
- "Approximating subdifferentials by random sampling of gradients",
with Adrian Lewis and Michael Overton, *Mathematics of Operations Research*, **27**(2002), 567–584.
- "The complexity of a non-interior path following method for the linear complementarity problem",
with Song Xu, *J. Optimization Theory and Applications*, **112**(2002), 53–76.

2001:
- "Variational analysis of non–Lipschitz spectral functions",
with Michael Overton, *Math. Programming*, **90**(2001), 317–351.
- "Optimal stability and eigenvalue multiplicity",
with Adrian Lewis and Michael Overton, *Foundations of Computational Mathematics*, **1**(2001), 205–225.

2000:
- "Variational analysis of the abscissa mapping for polynomials",
with Michael Overton, *SIAM Journal on Control and Optimization*, **39**(2000), 1651–1676.
- "Optimizing matrix stability",
with Adrian Lewis and Michael Overton, *Proc. of the American Math. Soc.*, **129**(2000), 1635–1642.

- "A non–interior predictor–corrector path following algorithm for the monotone linear complementarity problem", with Song Xu, *Mathematical Programming*, **87**(2000), 113–130.
- "On the super–linear convergence of the variable metric proximal point algorithm using Broyden and BFGS matrix secant updating", with M. Qian, *Mathematical Programming*, **88**(2000), 157–181.
- "Fast algorithms for phase diversity and phase retrieval", with Russell Luke and Richard Lyon, *Proceedings for the Workshop on Computational Optics and Imaging for Space Applications: May 2000*, Editor: Richard Lyon, NASA/Goddard Space Fight Center.

1999: - "The global linear convergence of a non–interior path–following algorithm for linear complementarity problems", with S. Xu, *Mathematics of Operations Research*, **23**(1999), 719–734.
- "A polynomial time interior–point path–following algorithm for LCP based on Chen–Harker–Kanzow smoothing techniques", with S. Xu, *Mathematical Programming*, **86** (1999), 91–103.
- "The variable metric proximal point algorithm for monotone operators", with M. Qian, *SIAM J. Control and Optimization*, **37** (1999), 353–375.

1998 - "A non–interior predictor–corrector path following method for LCP", with S. Xu, *Reformulation– Nonsmooth, Piecewise Smooth, Semi–smooth, and Smoothing Methods*, Editors: Liqun Qi and Masao Fukushima, Kluwer Academic Publishers, 1998, pp. 45–64.
- "On the local super-linear convergence of a matrix secant implementation of the variable metric proximal point algorithm for monotone operators", with M. Qian, *Reformulation– Nonsmooth, Piecewise Smooth, Semi–smooth, and Smoothing Methods*, Editors: Liqun Qi and Masao Fukushima, Kluwer Academic Publishers, 1998, pp. 317–334.

1997 - "On the Lidskii–Vishik–Lyusternik perturbation theory for eigenvalues of matrices with arbitrary Jordan structure", with J. Moro and M. L. Overton, *SIAM J. Matrix Anal. Appl.*, **18** (1997), 793–817.

1996 - "A unified analysis of Hoffman's bound via Fenchel duality", with P. Tseng, *SIAM J. Optimization*, **6** (1996), 265–282.
- "A Gauss–Newton method for convex composite optimization", with M. C. Ferris, *Mathematical Programming*, **71** (1996), 179–194.
- "A relative weighting method for estimating parameters and variances in multiple data sets", with B. Bell and A. Schumitzky, *Computational Statistics and Data Analysis*, **22** (1996), 119–135.

1994 - "Exposing constraints", *SIAM J. Control and Optimization*, with J. J. Moré, **4**(1994), 573–595.
- "Differential properties of the spectral abscissa and the spectral radius for analytic matrix-valued mappings", with M. L. Overton, *Journal of Nonlinear Analysis, Theory, Methods, and Applications*, *23*(1994), 467–488.

1993 - "Weak sharp minima in Mathematical programming," with M. C. Ferris, *SIAM J. Control and Optimization*, **31**(1993), 1340–1359.
- "Translational cuts for minimization," with A. A. Goldstein, P. Tseng, and Yinyu Ye, *Complexity in Numerical Optimization*, Ed. P. Pardalos, (1993) pp. 57–72.

1992 - "Optimality conditions for non-finite valued convex composite functions", with R. Poliquin, *Mathematical Programming*, **57** (1992), 103–120.
- "A robust trust region method for constrained optimization", *SIAM J. Optimization*, **2**(1992), 325–347.
- "On the Clarke subdifferential of the distance function to a closed set", with M. C. Ferris and M. Qian, *J. Math. Analysis and Applications*, **166** (1992), 199–213.
- "Stable perturbations of nonsymmetric matrices", with M. L. Overton, *Linear Algebra and Its Applications*, **171**(1992), 249–273.
- "On the subdifferentiability of functions of a matrix spectrum, I: Mathematical foundations", with M. L. Overton, *Nonsmooth Optimization: Methods and Applications*, Ed. F. Giannessi, (1992) pp. 11–18.
- "On the subdifferentiability of functions of a matrix spectrum, II: Subdifferential formulas", with M. L. Overton, *Nonsmooth Optimization: Methods and Applications*, Ed. F. Giannessi, (1992) pp. 19–29.

1991 - "Weak directionally closed generalized subdifferentials", with L. Qi, *J. Math. Analysis and Applications*, **159**(1991), 485–499.
- "Calmness and exact penalization", *SIAM J. Control and Optimization*, **29** (1991), 493–497.
- "An exact penalization viewpoint of constrained optimization", *SIAM J. Control & Opt.*, **29** (1991), 968–998.

1990 - "Characterization of solution sets to convex programs", with M. C. Ferris, *Operations Research Letters*, **10** (1990), 57–60.
- "Convergence properties of trust region methods for linear and convex constraints",

with J. J. Moré and G. Toraldo, *Mathematical Programming*, **47** (1990), 305-336.
- "On the identification of active constraints II: the nonconvex case", *SIAM J. Numer. Anal.*, **27** (1990), 1081-1102.

1989 - "A robust sequential quadratic programming method",
with S.-P. Han, *Mathematical Programming*, **43** (1989), 277–303.
- "A sequential quadratic programming method for potentially infeasible mathematical programs",
J. Math. Analysis and Applications, **139** (1989), 319–351.

1988 - "On the identification of active constraints",
with J. J. Moré, *SIAM J. Numer. Anal.*, **25** (1988), 1197–1211.

1987 - "Second order necessary and sufficient conditions for convex composite NDO",
Mathematical Programming, **38** (1987), 287–302.

1986 - "A Gauss-Newton approach to solving generalized inequalities",
with S.-P. Han, *Mathematics of Operations Research*, **11** (1986), 632–643.

1985 - "Descent methods for composite nondifferentiable optimization problems",
Mathematical Programming, **33** (1985), 260–279.

SOFTWARE

CKBS: Robust State Constrained Kalman-Bucy Smoothing (2010)
A MATLAB package for robust Kalman-Bucy smoothing subject to equality and/or inequality state constraints.

SPK: System for Population Kinetics (2006)
A C++ package with Java web interface for modeling and parameter estimation in population kinetics.
A laboratory-wide effort at the Resource for Population Kinetics (PI Dr. Paolo Vicini).

SAAM II: Simulation, Analysis, and Modeling Software (2000)
A graphical programming environment for compartmental kinetic modeling, simulations, and data analysis.
A laboratory-wide effort at the Resource for Kinetic Analysis (PI Dr. David Foster).

ASTRAL: Active Set Trust-Region Algorithm (2007)
MATLAB, C++, and FORTRAN packages for large-scale optimization problems with bound constraints.
James Burke and Liang Xu.

INVITED TALKS 2015 - 2019

2019: - "Quadratic convergence of SQP-like methods for convex-composite optimization,"
Advances in Nonsmooth Analysis and Applications 2019, Shenzhen, China (December 7-9).
- "Quadratic convergence of SQP-like methods for convex-composite optimization,"
Sixth International Conference on Continuous Optimization, Berlin, Germany (August 3-8, 2019).
- "Quadratic convergence of SQP-like methods for convex-composite optimization,"
Vietnam-USA Joint Mathematical Meeting (June 10-13, 2019), Quy Nhon, Vietnam.

2018: - "Strong Metric Subregularity and Regularity for Piecewise Linear-Quadratic Convex-Composite Optimization."
International Symposium on Mathematical Programming, Bordeaux, July 2018.
- "Foundations of Gauge and Perspective Duality."
2018 SIAM Annual Meeting, July, Portland.
- "Foundations of Gauge and Perspective Duality."
Spring Western Sectional Meeting, April 2018, Portland.

2017: - "Iteratively Re-weighted Least Squares for Sums of Convex Functions."
BIRS Workshop on Splitting Algorithms, Modern Operator Theory, and Applications.
Casa Matematica Oaxaca, September 2017.
- "Perspectives on Convex Duality Theory."
Applied Math/Discrete Mathematics and Optimization Seminar,
McGill University, February 20, 2017.
- "Variational Analysis of Spectral Functions for Nonsymmetric Matrices."
Hausdorff Center for Mathematics Workshop on Nonsmooth Optimization and its Applications,
Bonn, May 2017.
- "Estimating Clarke Subgradients of Non-Regular Integrands by Smoothing."
SIAM Conference on Optimization, Vancouver May 22-25.
Minisymposium on Smoothing and Regularization Techniques in Optimization.

2016 - "Optimal Value Function Methods in Numerical Optimization."
Workshop on Nonlinear Optimization Algorithms and Industrial Applications,
Fields Institute, Toronto, June 3, 2016.
- "The affine matrix fractional function and applications."
58th Canadian Operational Research Society Annual Conference, Banff, May 30, 2016.
- "Optimal Value Function Methods in Numerical Optimization."
Colloquium of the Courant Institute, New York University, April 15, 2016.
- "Optimal Value Function Methods in Numerical Optimization."
2016 Joint Mathematics Meeting, SIAM Mini-symposium on Optimization, January 2016.
- "Optimization and Kalman Smoothing."
Colloquium of the Department of Systems Engineering and Engineering Management,
The Chinese University of Hong Kong, March 4, 2016.
- "Optimal Value Function Methods in Numerical Optimization."
Applied Mathematics Colloquium, The Hong Kong Polytechnic University, February 4, 2016.

2015 - "Weak Sharp Minima in Convex Optimization."
Opening Lecture for the Workshop on Weak Sharp Minima in Optimization, December 2015,
King Fahd University of Petroleum and Minerals, Dhahran, Kingdom of Saudi Arabia.
- "Level Set Methods in Convex Optimization."
International Symposium on Mathematical Programming, Pittsburgh, August 2015.
- "Optimization and Kalman-Bucy Smoothing."
Colloquium, Institut für Numerische Mathematik, Technische Universität Dresden, July 2015.
- "Optimization and Kalman-Bucy Smoothing."
Colloquium, Institut für Numerische und Angewandte Mathematik, Universität Göttingen, June 2015.
- "Optimization and Kalman-Bucy Smoothing."
Colloquium, Karlsruhe Institute for Technology, Institute of Operations Research, June 2015.
- "Level Set Methods in Convex Optimization."
International Conference on Variational Analysis, Optimization, and Quantitative Finance,
University of Limoges, May 2015.
- "Optimization and Kalman-Bucy Smoothing."
Colloquium, Institut fuŕ Mathematik, Universität Würzburg, April 2015.
- "Matrix Free Solvers for Systems of Inclusions."
SIAM Conference on Computational Science and Engineering, Salt Lake, March 2015.
- "Optimization and Kalman-Bucy Smoothing."
Colloquium, Statistics Department, University of Washington, March 2015.

STUDENTS

Ph.D. Students (5 women, 10 men)

2020	Yuan Gao:	"Generalized Matrix Fractional Functions and Their Applications" Applied Mathematics, University of Washington, December.
2019	Daiwei He:	"Iteratively Re-weighted Schemes for Non-smooth Optimization" Mathematics, University of Washington, December.
2018	Abraham Engle:	"Local and Global Convergence for Convex-Composite Optimization" Mathematics, University of Washington, December.
2015	Jiashan Wang:	"Matrix Free Methods for Large Scale Optimization" Mathematics, University of Washington, August.
	Christopher Jordan-Squire:	"Convex Optimization over Probability Measures" Mathematics, University of Washington, March.
2012	Yun Zhang:	"ETG-ETL Portfolio Optimization", Applied Mathematics, University of Washington, June.
2010	Aleksandr Aravkin:	"Robust Methods for Kalman Filtering/Smoothing and Bundle Adjustment," Mathematics, University of Washington, July.
	Julia Eaton:	"Variational Properties of Polynomial Root Functions and Spectral Functions," Mathematics, University of Washington, May.
	Liang Xu:	"Merging Trust-Region and Limited Memory Technologies for Large-Scale Optimization,"

		Mathematics, University of Washington, March.
	Jonathan Cross:	"Spectral Abscissa Optimization using Polynomial Stability Conditions," Mathematics, University of Washington, March.
2009	Qiuying Lin:	"Sparsity and Non-Convex, Non-Smooth Optimization," Mathematics, University of Washington, December.
2006	Yeongcheon Baek:	"An Interior Point Approach to Nonparametric Mixture Models," Mathematics, University of Washington, December.
2001	Russell Luke:	"Analysis of Optical Wavefront Reconstruction and Deconvolution in Adaptive Optics," Applied Mathematics, University of Washington, June.
1998	Song Xu:	"Non-Interior Path Following Methods for Complementarity Problems," Mathematics, University of Washington, June.
1992	Maijian Qian:	"The Variable Metric Proximal Point Algorithm: Convergence Theorey and Applications," Mathematics, University of Washington, July.

Masters Students (8 women, 15 men)

2013	Airlie Chapman:	"Dynamical Systems on Graphs", Mathematics, University of Washington, August.
	Jing Hong:	" Low Rank Estimation for Matrices with Missing Diagonal", Mathematics, University of Washington, May.
	Yang Song:	"Stochastic Programming in Finance", Mathematics, University of Washington, May.
2012	Fabiana Ferracina:	"Machine Learning", Mathematics, University of Washington, May.
	Brian Donhauser:	"Optimal Estimation of Jump Variation in a Bayesian Model of High-Frequency Asset Returns", Mathematics, University of Washington, May.
2009	George Bouvier:	"The Mathematics of Gamma Knife Technology," Mathematics, University of Washington, March.
2007	Piotr Jagiello:	"Maching Learning and Optimization," Mathematics, University of Washington, June.
2003	Joel Hindorff:	"Bridge Sampling for Hierarchical Density Estimation," Applied Mathematics, University of Washington, August.
	Shenyu Zhang:	"Expected Value at Risk," Mathematics, University of Washington, June.
2002	Le Sun:	"Risk Models in Finance," Mathematics, University of Washington, June.
2000	Brett Berger:	"Economic Models of Technology," Mathematics, University of Washington, December.
1999	Greg Burd:	"The Capital Asset Pricing Model," Mathematics, University of Washington, August.
1998	Michael Kremer:	"Influence Functions in Portfolio Optimization," Mathematics, University of Washington, June.
1997	Chee Sim:	"Quadratic Programming with Ball Constraints," Mathematics, University of Washington, June.
1994	Pamela Shaw:	"Trust-Region Methods," Mathematics, University of Washington, June.
1991	Jeffery Lim:	"Mulicommodity Flow Problems and the Dantzig-Wolfe Decomposition Principal," Mathematics, University of Washington, June.
1989	Jiseong Park:	"On the Infimal Convolution Operator for Convex Matrix Functions," Mathematics, University of Washington, August.
	Greg Langkamp:	"Interior Point Methods," Mathematics, University of Washington, March.
	Lillian Tjajhadi:	"Trust-Region Methods for Nonlinear Equations," Mathematics, University of Washington, December.

1988	Thomas Leonard:	"On the Second-Order Subdifferential for Convex Functions," Mathematics, University of Washington, November.
	Thanh Hoang:	"Convex Analysis and Optimal Experimental Design," Mathematics, University of Washington, December.
	Donna Calhoun:	"Decomposition Methods for Linear Programs," Mathematics, University of Washington, June.
1987	Ray Blackburn:	"Algorithms for Solving Nonlinear Equations and Inequalities," Mathematics, University of Washington, March.

Undergraduate Honors (1)

1990	Mary Culic:	"The Affine Rescaling Algorithm for Linear Programming," Mathematics, University of Washington, June.