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Jan Mandel

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Education

Candidate of Sciences (CSc., Ph.D. equivalent), Numerical and Approximate Methods, Charles University, Prague, Czechoslovakia, 1983. Advisor B. Sekerka. Thesis title: *On Some Two-Level Iterative Methods*.
Doctor of Natural Sciences (RNDr., M.S. equivalent), Numerical Mathematics, Charles University, Prague, Czechoslovakia, 1978. Thesis title: *Application of Convex Analysis in Timetable Problems.*
Graduated (B.S. with honors equivalent), Faculty of Mathematics and Physics, Charles University, Prague, Czechoslovakia, 1978. Informatics. Specialization: Mathematical methods in economics.

Fields of Interest

Scientific computing, data assimilation, wildland fire modeling, applied probability, statistics, numerical differential equations, iterative methods, machine learning

Awards

2025 Olof B. Widlund prize
2019 CU Denver Graduate School Dean's Master's students mentoring award
2010 University of Colorado Denver Campus Research Award
2007 ISI "Fast Breaking Highly Cited" paper (Mathematics & Statistics, June 2007): Mandel, Dohrmann, Tezaur (2005)
2002 College of Liberal Arts and Sciences Research Award
1992 University of Colorado at Denver Campus Research Award
1991 Honorable Mention, Technical paper, 1991 MacNeal-Schwendler Corporation World Users'Conference (selected by conference attendees)

Professional Experience

Employment History

1986-present University of Colorado Denver, Department of Mathematical and Statistical Sciences. Assistant Professor (1986), Associate Professor (1989), Professor (1992), Research Professor and Professor Emeritus (2024)

1978-1986 Faculty of Mathematics and Physics, Charles University, Prague, Czechoslovakia. Graduate Research Assistant (1978), Research Staff (1982), Scientist (1983), Independent Research Scientist (1985).
1976-1978 Mototechna, Prague, Czechoslovakia, Software Developer.

Other Positions

2017-2018 Graduate Director, Department of Mathematical and Statistical Sciences, University of Colorado at Denver
2012-2016 Chair, Department of Mathematical and Statistical Sciences, University of Colorado Denver
2013-2021 Graduate research advisor, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic
2013-2016 Senior Researcher, Institute for Computer Science, Academy of Sciences of the Czech Republic, Prague, Czech Republic
2012-2014 Lecturer, Ecole Nationale de la Météorologie, Météo France, Toulouse, France
2012 Senior Researcher, CERFACS and INP-ENSEEIHT, Toulouse, France
2011 Visiting Researcher, Institute for Computer Science, Czech Academy of Sciences
2006-2009 Visiting Scientist, Mesoscale and Microscale Meteorology Division, National Center for Atmospheric Research, Boulder, CO
1996-2004 Visitor, Department of Aerospace Engineering Science, University of Colorado at Boulder
1995-1999 Director, Graduate Program in Applied Mathematics, University of Colorado at Denver
1993-1994, 2000-2012, 2017-2024 Director, Center for Computational Mathematics, University of Colorado Denver
1993 Visiting, Courant Institute, NY
1992-present President and founder of Solvers International, Inc., Boulder, CO
1990, 1989, 1988 IBM T. J. Watson Research Center, N.Y., Visiting Scientist.
1987 Visiting, Oxford University Computing Laboratory, Oxford, England.
1986-1987 Colorado Research Development Corporation, Scientist, part time.
1985 Visiting Research Associate, University of Colorado at Denver.

Bibliography

106 refereed journal papers, 48 refereed conference proceedings, 55 others.
Google Scholar: 13,681 citations, h-index 61, since 2020 31
Web of Science Researcher ID: Core 127 publications, 5,497 citations, h-index 40
Math Reviews: 94 publications, 2,692 citations
Listed *2021 Top Mathematics Scientists* Mathematics world ranking 880, USA ranking 417, *Top Engineering and Technology* world ranking 1685, USA ranking 708

Refereed Journal Publications

1. Derek V Mallia, Cambria White, Angel Farguell, Jan Mandel, Adam K Kochanski, Simulating the impacts of regional wildfire smoke on ozone using a coupled fire-atmosphere-chemistry model, Atmospheric Environment 121404, 2025
2. Kathleen Clough, Angel Farguell, Jan Mandel, Kyle Hilburn, and Adam Kochanski, Enhancing Wildfire and Smoke Forecasting by Integrating Fire Observations: A Comparative Analysis of Methods for Integrating Infrared and Satellite Data Into a Coupled Fire-Atmosphere Model, Journal of Geophysical Research: Atmospheres, 130, e2024JD042561, **2025**
3. Bryan Shaddy, Deep Ray, Angel Farguell, Valentina Calaza, Jan Mandel, James Haley, Kyle Hilburn, Derek V. Mallia, Adam Kochanski, and Assad Oberai, Generative algorithms for fusion of physics-based wildfire spread models with satellite data for initializing wildfire forecasts. *Artificial Intelligence for the Earth Systems*, 3(3):e230087, **2024**
4. Adam K. Kochanski, Kathleen Clough, Angel Farguell, Derek V. Mallia, Jan Mandel, Kyle Hilburn, Analysis of methods for assimilating fire perimeters into a coupled fire-atmosphere model, *Frontiers in Forests and Global Change*, 6:1203578, **2023.**
5. Adam K. Kochanski, Farren Herron-Thorpe, Derek V. Mallia, Jan Mandel, Joseph K. Vaughan, Integration of a coupled fire-atmosphere model into a regional air quality forecasting system for wildfire events, *Frontiers in Forests and Global Change*, 10, Article 728726, **2021**.
6. Marie Turčičová, Jan Mandel, Kryštof Eben, Score matching filters for Gaussian Markov random fields with a linear model of the precision matrix, *Foundations of Data Science*, 3(4), 793–824, **2021**.
7. Farguell, Angel; Mandel, Jan; Haley, James; Mallia, Derek V.; Kochanski, Adam; Hilburn, Kyle, Machine Learning Estimation of Fire Arrival Time from Level-2 Active Fires Satellite Data, *Remote Sensing,* 13(11), 2203, **2021**
8. Mallia, D. V., A. Kochanski, K. E. Kelly, R. Whitaker, W. Xing, L. Mitchell, A. Jacques, A. Farguell, J. Mandel, P.-E. Gaillardon, T. Becnel, and S. Krueger: Evaluating wildfire smoke transport within a coupled fire-atmosphere model using a high-density observation network for an episodic smoke event along Utah's Wasatch Front. *J. Geophys. Res.*, 125, e2020JD032712, **2020**
9. Mallia, D. V., A. Kochanski, S. Urbanski, J. Mandel, A. Farguell, and S. Krueger: Incorporating a canopy parameterization within a coupled fire-atmosphere model to improve a smoke simulation for a prescribed burn. *Atmosphere*, 11(8), 832, **2020**
10. Vincent Herr, Adam Kochanski, Van Miller, Rich McCrea, Dan O'Brien, and Jan Mandel. A method for estimating the socioeconomic impact of Earth observations in wildland fire suppression decisions *International Journal of Wildland Fire*, 29(3), 282-293, **2020**
11. Jan Mandel, Martin Vejmelka, Adam K. Kochanski, Angel Farguell, James D. Haley, Derek V. Mallia, and Kyle Hilburn. An interactive data-driven HPC system for forecasting weather, wildland fire, and smoke. In *2019 IEEE/ACM HPC for Urgent Decision Making (UrgentHPC)*, Supercomputing 2019. Denver, CO, USA, pages 35–44. IEEE, **2019**

12. Yongqiang Liu, Adam Kochanski, Kirk Baker, William Mell, Rodman Linn, Ronan Paugam, Jan Mandel, Aime Fournier, Mary Ann Jenkins, Scott Goodrick, Gary Achtemeier, Fengjun Zhao, Roger Ottmar, Nancy French, Narasimhan Sim Larkin, Tim Brown, Andrew Hudak, Matthew Dickinson, Brian Potter, Craig Clements, Shawn Urbanski, Susan Prichard, Adam Watts, Derek McNamara, Fire behavior and smoke modeling: Model improvement and measurement needs for next-generation operational smoke prediction systems, *International Journal of Wildland Fire* 28, 570-588, **2019**
13. Adam Kochanski, Derek Mallia, Matthew Fearon, Jan Mandel, Amir Souri, Timothy Brown, Modeling wildfire smoke feedback mechanisms using a coupled fire-atmosphere model with a radiatively active aerosol scheme *J. Geophys. Res. Atmospheres,* 124(16), 9099-9116, **2019**
14. E. Bergou, J. Mandel, and S. Gratton, On the convergence of a nonlinear ensemble Kalman smoother, *Applied Numerical Mathematics*, 137, 151-168, **2019**
15. C. B. Clements, A. K. Kochanski, D. Seto, B. Davis, C. Camacho, N. P. Lareau, J. Contezac, J. Restaino, W. E. Heilman, S. K. Krueger, B. Butler, R. D. Ottmar, R. Vihnanek, J. Flynn, J.-B. Filippi, T. Barboni, D. E. Hall, J. Mandel, M. A. Jenkins, J. O'Brien, B. Hornsby, and C. Teske, The FireFlux II experiment: a model-guided field experiment to improve understanding of fire-atmosphere interactions and fire spread. *International Journal of Wildland Fire*, 28, 308–326, **2019**
16. M. Turčičová, J. Mandel, and K. Eben, Multilevel maximum likelihood estimation with application to covariance matrices, *Communication in Statistics – Theory and Methods*, 48, 909-925, **2019**
17. A. K. Kochanski, A. Fournier, and J. Mandel, Experimental Design of a Prescribed Burn Instrumentation*, Atmosphere*, 9, 296, **2018**
18. A. H. Souri, Y. Choi, W. Jeon, A. K. Kochanski, L. Diao, J. Mandel, P. V. Bhave, and S. Pan, Quantifying the impact of biomass burning emissions on major inorganic aerosols and their precursors in the US. *Journal of Geophysical Research: Atmospheres*, **122**, 21, 12,020–12,041, **2017**
19. J. Mandel, E. Bergou, S. Gürol, S. Gratton, and I. Kasanický, Hybrid Levenberg-Marquardt and weak-constraint ensemble Kalman smoother method, *Nonlinear Processes in Geophysics* 23, 59-73, **2016**
20. M. Vejmelka, A. K. Kochanski, and J. Mandel, Data assimilation of dead fuel moisture observations from remote automated weather stations, *International Journal of Wildland Fire* 25, 558-568, **2016**
21. A. K. Kochanski, M. A. Jenkins, K. Yedinak, J. Mandel, J. D. Beezley, and B. Lamb, Toward an integrated system for fire, smoke, and air quality simulations. *International Journal of Wildland Fire* 25, 534-546, **2016**
22. I. Kasanický, J. Mandel, and M. Vejmelka, Spectral Diagonal Ensemble Kalman Filters, *Nonlinear Processes in Geophysics*, 22, 485–497, **2015**
23. P. Franková, J. Mandel, P. Vaněk, Model analysis of BPX preconditioner based on smoothed aggregation, *Applications of Mathematics*, 60, 219-250, **2015**
24. E. Kwiatkowski and J. Mandel, Convergence of the Square Root Ensemble Kalman Filter in the Large Ensemble Limit, *SIAM/ASA Journal on Uncertainty Quantification* 3, 1-17, **2015**.

25. J. Mandel, S. Amram, J. D. Beezley, G. Kelman, A. K. Kochanski, V. Y. Kondratenko, B. H. Lynn, B. Regev, M. Vejmelka, Recent advances and applications of WRF-SFIRE. *Natural Hazards and Earth System Science* 14, 2829–2845, **2014**
26. L. Cobb, A. Krishnamurthy, J. Mandel, and J. D. Beezley: Bayesian Tracking of Emerging Epidemics Using Data Assimilation Methods, *Spatial and Spatio-temporal Epidemiology* 10, 39–48, **2014**
27. A. K. Kochanski, M. A. Jenkins, J Mandel, J. D. Beezley, C. B. Clements, Evaluation of WRF-Sfire Performance with Field Observations from the FireFlux experiment, *Geoscientific Model Development* 6, 1109–1126, **2013**
28. B. Sousedík. J. Šístek, and J. Mandel, Adaptive-Multilevel BDDC and its parallel implementation, *Computing* 95, 1087–1119, **2013**
29. A. K. Kochanski, M. A. Jenkins, S. K. Krueger, J. Mandel, and J. D. Beezley, Real-time simulation of 2007 Santa Ana fires, *Forest Ecology and Management* 15, 136–149, **2013**
30. J. Mandel, B. Sousedík and J. Šístek, Adaptive BDDC in Three Dimensions, *Mathematics and Computers in Simulation,* 82, 1812-1831, **2012**
31. J. Mandel, L. Cobb, and J. D. Beezley, On the Convergence of the ensemble Kalman filter, *Applications of Mathematics,* 56, 533-541, **2011**
32. J. Šístek, B. Sousedík, P. Burda, J. Mandel, and J. Novotny, Application of the parallel BDDC preconditioner to the Stokes flow, *Computers and Fluids*, 46, 429-435, **2011**
33. J. Mandel, J. D. Beezley, and Adam K. Kochanski, Coupled atmosphere-wildland fire modeling with WRF 3.3 and SFIRE 2011, *Geoscientific Model Development*, 4, 591-610, **2011**
34. D. H. Glueck, A. Karimpour-Fard, J. Mandel, and K. E. Muller, On probabilities for separating sets of order statistics, *Statistics*, 44, 145-153, **2010**
35. J. Šístek, J. Novotný, J. Mandel, M. Čertíková, and P. Burda, BDDC by a frontal solver and stress computation in a hip joint replacement, *Mathematics and Computers in Simulation*, 80, 1310-1323, **2010**
36. J. Mandel, J. D. Beezley, J. L. Coen, M. Kim, Data assimilation for wildland fires: Ensemble Kalman filters in coupled atmosphere-surface models, *IEEE Control Systems Magazine* 29, Issue 3, 47-65, June **2009**
37. B. Sousedík and J. Mandel, On the equivalence of primal and dual substructuring preconditioners, *Electronic Transactions in Numerical Analysis,* 31, 384-402, **2008**
38. J. Mandel, B. Sousedík, and C. R. Dohrmann, Multispace and multilevel BDDC, *Computing* 83, 55-85, **2008**
39. D. H. Glueck, J. Mandel, A. Karimpour-Fard, L. Hunter, and K. E. Muller, Exact Calculations of Expected Power for the Benjamini-Hochberg Procedure. *The International Journal of Biostatistics,* Vol. 4, Iss. 1, Art. 11, **2008**
40. J. Mandel, L. S. Bennethum, J. D. Beezley, J. L. Coen, C. C. Douglas, M. Kim, and A. Vodacek, A wildland fire model with data assimilation. *Mathematics and Computers in Simulation* 79, 584-606, **2008**
41. D. H. Glueck, A. Karimpour-Fard, J. Mandel, L. Hunter, and K. E. Muller, Fast computation by block permanents of cumulative distribution functions of order statistics from several populations, *Communications in Statistics - Theory and Methods*, 37(18), 2815-2824, **2008**

42. Jonathan D. Beezley and Jan Mandel, Morphing Ensemble Kalman Filters, *Tellus* 60A, 131-140, **2008**
43. C. J. Johns and J. Mandel, A Two-Stage Ensemble Kalman Filter for Smooth Data Assimilation, *Environmental and Ecological Statistics* 15, 101-110, **2008**
44. J. Mandel and B. Sousedík, BDDC and FETI-DP under Minimalist Assumptions, *Computing* 81, 269-280, **2007**
45. J. Mandel and B. Sousedík, Adaptive Selection of Face Coarse Degrees of Freedom in the BDDC and the FETI-DP Iterative Substructuring Methods, *Computer Methods in Applied Mechanics and Engineering* 196, 1389–1399, **2007**
46. J. Mandel, C. R. Dohrmann, and R. Tezaur, An Algebraic Theory for Primal and Dual Substructuring Methods by Constraints, *Applied Numerical Mathematics* 54, 167–193, **2005**
47. J. Mandel and M. Popa, Iterative solvers for coupled fluid-solid scattering, *Applied Numerical Mathematics* 54, 194–207, **2005**
48. J. Mandel and C. R. Dohrmann, Convergence of a Balancing Domain Decomposition by Constraints and Energy Minimization, *Numerical Lineal Algebra and Applications* 10, 639–659, **2003**
49. J. Mandel, Local Approximation Estimators for Algebraic Multigrid, *Electronic Transactions on Numerical Analysis* 15, 56–65, **2003**
50. G. Poole, Y-C. Liu, and J. Mandel, Advancing Analysis Capabilities in ANSYS through Solver Technology, *Electronic Transactions on Numerical Analysis* 15, 106-121, **2003**
51. J. Mandel, An Iterative Substructuring Method for Coupled Fluid-Solid Acoustic Problems, *Journal of Computational Physics* 177, 95-116, **2002**
52. J. Mandel and R. Tezaur, On the Convergence of a Dual-Primal Substructuring Method, *Numerische Mathematik* 88, 543-558, **2001**
53. P. Vaněk, M. Brezina, and J. Mandel, Convergence of Algebraic Multigrid Based on Smoothed Aggregation, *Numerische Mathematik* 88, 559-579, **2001**
54. D. J. Rixen, C. Farhat, R. Tezaur, and J. Mandel, Theoretical Comparison of the FETI and Algebraically Partitioned FETI Methods, and Performance Comparisons with Direct Sparse Solver, *International Journal for Numerical Methods in Engineering* 46, 501–534, **1999**
55. J. Mandel, M. Brezina, and P. Vaněk, Energy Optimization of Algebraic Multigrid Bases, *Computing* 62, 205–228, **1999**
56. J. Mandel, R. Tezaur, and C. Farhat, A Scalable Substructuring Method by Lagrange Multipliers for Plate Bending Problems, *SIAM J. Numer. Anal.* 36, 1370–1391, **1999**
57. R. Djellouli, C. Farhat, J. Mandel, and P. Vaněk, Continuous Fréchet Differentiability with respect to Lipschitz Domain and a Stability Estimate for Direct Acoustic Scattering Problems, *IMA J. Appl. Math.* 63, 51–69, **1998**
58. C. Farhat and J. Mandel, The Two-Level FETI Method for Static and Dynamic Plate Problems - Part I: An Optimal Iterative Solver for Biharmonic Systems, *Comp. Meth. Appl. Mech. Engrg.* 155, 129–152, **1998**
59. C. Farhat, P.-S. Chen, J. Mandel, and F.-X. Roux, The Two-Level FETI Method - Part II: Extension to Shell Problems, Parallel Implementation and Performance Results, *Comp. Meth. Appl. Mech. Engrg.* 155, 153–180, **1998**

60. P. Le Tallec, J. Mandel, and M. Vidrascu, A Neumann-Neumann Domain Decomposition Algorithm for Solving Plate and Shell Problems, *SIAM J. Numer. Anal.* 35, 836–867, **1998**
61. Z. Cai, J. Mandel, and S. McCormick, Multigrid Methods for Nearly Singular Linear Equations and Eigenvalue Problems, *SIAM J. Numer. Anal.* 34, 178–200, **1997**
62. J. Mandel and R. Tezaur, On the Convergence of a Substructuring Method with Lagrange Multipliers, *Numerische Mathematik* 73, 473–487, **1996**
63. P. Vaněk, J. Mandel, and M. Brezina, Algebraic Multigrid by Smoothed Aggregation for Second and Fourth Order Elliptic Problems, *Computing* 56, 179–196, **1996**
64. J. Mandel and M. Brezina, Balancing Domain Decomposition for Problems with Large Jumps in Coefficients, *Mathematics of Computation* 65, 1387–1401, **1996**
65. J. Mandel, Iterative Methods for *p*-Version Finite Elements: Preconditioning Thin Solids, *Comput. Meth. Appl. Mech. Engrg.* 133, 247–257, **1996**
66. C. Farhat, P. S. Chen, and J. Mandel, A Scalable Lagrange Multiplier Based Domain Decomposition Method for Time-Dependent Problems, *Int. J. Numer. Meth. Engrg.*, 38, 3831–3853, **1995**
67. L. C. Cowsar, J. Mandel, and M. F. Wheeler, Balancing Domain Decomposition for Mixed Finite Elements, *Mathematics of Computation* 64, 989–1015, **1995**
68. C. Farhat, J. Mandel, and F.-X. Roux, Optimal Convergence Properties of the FETI Domain Decomposition Method, *Comput. Methods Appl. Mech. Engrg.* 115, 365–3858, **1994**
69. J. Mandel, Hybrid Domain Decomposition with Unstructured Subdomains, Proceedings 6th International Symposium on Domain Decomposition Methods, *Contemporary Math.* 157 103–112, **1994**
70. J. Mandel, Iterative Solver for *p*-Version Finite Elements in Three Dimensions, Proceedings ICOSAHOM 1992; *Comp. Meth. Appl. Mech. Engrg.* 116, 175-183, **1994**
71. J. Mandel, Balancing domain decomposition, *Communications in Applied Numerical Methods* 9, 233–241, **1993**
72. C. C. Douglas and J. Mandel, Abstract theory for the domain reduction method, *Computing* 48, 73–96, **1992**
73. J. Mandel and G. S. Lett, Domain decomposition preconditioning for *p*-version finite elements with high aspect ratios, *Applied Numer. Math.* 8, 411–425, **1991**
74. Z. Cai, J. Mandel, and S. F. McCormick, The finite volume element method for diffusion equations on general triangulations, *SIAM J. on Numer. Anal.* 28, 392–402, **1991**
75. P. Bjørstad and J. Mandel, Spectra of sums of orthogonal projections and applications to parallel computing, *BIT* 31, 76-88, **1991**
76. J. Mandel, Some recent advances in multigrid methods, *Advances in Electronics and Electron Physics* 82, 327–377, **1991**
77. Babuška, A. W. Craig, J. Mandel, and J. Pitkäranta, Efficient preconditioning for the *p*-version finite element method in two dimensions, *SIAM J. on Numer. Anal* 28, 624–662, **1991**
78. Mandel, Iterative solvers by substructuring for the *p*-version finite element method, *Comput. Meth. Appl. Mech. Engrg.* 80, 117-128, **1990**

79. Mandel, On block diagonal and Schur complement preconditioning, *Numerische Mathematik* 58, 79–93, **1990**
80. J. Mandel, Two-level domain decomposition preconditioning for the *p*-version finite element method in three dimensions, *Int. J. Num. Meth. Engrg.*, 29, 5, 1095-1108, **1990**
81. E. Gelman and J. Mandel, Multilevel algorithms for optimization problems, *Mathematical Programming* 48, 1, 1-18, **1990**
82. J. Mandel and W. L. Miranker, New techniques for fast hybrid solution of systems of equations, *Int. J. Num. Meth. Engrg.* 27, 3, 455-468, **1990**
83. C. C. Douglas, J. Mandel, and W. L. Miranker, Fast Hybrid Solution of Systems of Linear Equations, *SIAM J. Sci. Stat. Computing* 11, 6, 1073-1086, **1990**
84. J. Mandel and S. V. Parter, On the multigrid F-cycle, *Applied Math. Computation* 37, 19–36, **1990**
85. J. Mandel and S. F. McCormick, A multilevel variational method for Au = λBu on composite grids, *J. of Computational Physics* 80, 2, 442-452, **1989**
86. J. Mandel, Algebraic study of multigrid methods for symmetric, definite problems, *Applied Mathematics and Computation* 25, 39-56, **1988**
87. J. Mandel, S. F. McCormick, and J. Ruge, An algebraic theory for multigrid methods for variational problems, *SIAM J. Numer. Anal.* 25, 91-110, **1988**
88. M. Kočvara and J. Mandel, A multigrid method for three-dimensional elasticity and algebraic convergence estimates, *Applied Mathematics and Computation* 23, 121-135, **1987**
89. J. Mandel and J. Nečas, Convergence of finite elements for transonic potential flows, *SIAM J. Numer. Anal.* 24, 985-997, **1987**
90. J. Mandel, On an iterative method for nonlinear variational inequalities, *Numerical Functional Analysis and Optimization* 8, 473-483, **1986**
91. J. Mandel, Multigrid convergence for nonsymmetric, indefinite variational problems and one smoothing step, *Applied Mathematics and Computation* 19, 201-216, **1986**
92. J. Mandel, On multilevel iterative methods for integral equations of the second kind and related problems, *Numerische Mathematik* 46, 147-157, **1985**
93. J. Mandel, A multilevel iterative method for symmetric, positive definite linear complementarity problems, *Applied Mathematics and Optimization* 11, 77-95, **1984**
94. J. Mandel, Convergence of the cyclical relaxation method for linear inequalities, *Mathematical Programming* 30, 218-228, **1984**
95. J. Mandel, On some two-level iterative methods, In: Defect Correction Methods, K. Böhmer and H. J. Stetter, editors, *Computing Supplementum* 5, pp. 75-88, **1984**. Springer-Verlag, Wien-New York.
96. J. Mandel, A convergent nonlinear splitting via orthogonal projection, *Aplikace Matematiky* 29, 250-257, **1984**.
97. J. Mandel, A convergence analysis of the iterative aggregation method with one parameter, *Linear Algebra and its Applications* 59, 159-169, **1984**
98. J. Mandel, Étude algébrique d'une méthode multigrille pour quelques problèmes de frontière libre, *Comptes Rendus Acad. Sci. Paris, Sér. I,* 298, 469-472, **1984**
99. M. Feistauer, J. Mandel, and J. Nečas, Entropy regularization of the transonic potential flow problem, *Comment. Math. Univ. Carolinae* 25, 431-443, **1984**

100. J. Mandel and B. Sekerka, A local convergence proof for the iterative aggregation method, *Linear Algebra and its Applications* 51, 163-172, **1983**
101. J. Mandel and B. Sekerka, Iterative method enabling solution of material balances (in Czech), *Ekonomicko-Matematický Obzor* 19, 52-63, **1983**
102. J. Mandel and B. Sekerka, Iterative aggregation and residue minimization in solution of input-output relations (in Czech), *Ekonomicko-Matematický Obzor* 18, 428-441, **1982**
103. J. Mandel, A least exchange theorem for the generalized timetable problem, *Elektronische Informationverabeitung und Kybernetik* 17, 633-636, **1981**
104. J. Mandel, Convergence of an iterative method for the system $Ax+y = x$ using aggregation, *Ekonomicko-Matematický Obzor* 17, 287-291, **1981**
105. J. Mandel and F. Turnovec, A quick matrix multiplication in the simplex algorithm, *Ekonomicko-Matematický Obzor* 17, 180-182, **1981**
106. J. Mandel, The duration of fluid outflow (in Czech), *Rozhledy Matematicko-Fyzikalni* 51, 26-28, **1972-73**

Refereed Conference Proceedings

1. Shelley Knuth, Craig Earley, Brandon Reyes, Kyle Reinholt, Jan Mandel, Mitchell McGlaughlin, Jarrod Schiffbauer, Joel Sharbrough. Building the HPC Workforce: RMACC's Cohort Program for System Administrators, *PEARC'25,* Association for Computing Machinery, Article 80,1-4, **2025**
2. Sreeja Nag, Vinay Ravindra, Richard Levinson, Mahta Moghaddam, Kurtis Nelson, Jan Mandel, Adam Kochanski, Angel Farguell Caus, Amer Melebari, Archana Kannan, Ryan Ketzner. Distributed Spacecraft with Heuristic Intelligence to Monitor Wildfire Spread for Responsive Control, *IGARSS 2024 IEEE International Geoscience and Remote Sensing Symposium*, 699-703**, 2024**
3. James Haley, Angel Farguell Caus, Jan Mandel, Adam K. Kochanski, and Sher Schranz. Data likelihood of active fires satellite detection and applications to ignition estimation and data assimilation. In D. X. Viegas, editor, *Advances in Forest Fire Research 2018*, University of Coimbra Press, 959-968, **2018**.
4. A. Kochanski, D. V. Mallia, M. Fearon, T. Brown, J. Mandel, and J. K. Vaughan, Do we need weather prediction models to account for local weather modifications by wildland fires? In *Advances in Forest Fire Research*, D. X. Viegas (Ed.), University of Coimbra Press, 987-994, **2018**.
5. Adam K. Kochanski, Jan Mandel, Martin Vejmelka, Dalton Burke, Lauren Hearn, James Haley, Angel Farguell Caus, and Sher Schranz. Coupled fire-atmosphere-smoke forecasting: current capabilities and plans for the future. In D. X. Viegas, editor, *Advances in Forest Fire Research*. University of Coimbra Press, 950-958, **2018**.
6. Angel Farguell Caus, James Haley, Adam K. Kochanski, Ana Cortés Fité, and Jan Mandel. Assimilation of fire perimeters and satellite detections by minimization of the residual in a fire spread model. *Lecture Notes in Computer Science*, 10861:711–723, **2018**. Proceedings ICCS 2018, Part II
7. J. Mandel, A. K. Kochanski, M. Vejmelka, J. D. Beezley, Data Assimilation of Satellite Fire Detection in Coupled Atmosphere-Fire Simulations by WRF-SFIRE,

Advances in Forest Fire Research, D. X. Viegas (ed), Coimbra University Press, 716–724, **2014**

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111. Angel Farguell, James Haley, Kyle Hilburn, Adam Kochanski, Derek V. Mallia, Jan Mandel, Fire arrival time estimation from satellite observations using machine learning, *AGU Fall Meeting*, December 15, 2020
112. Adam Kochanski, Craig Clements, Matthew Brewer, Jan Mandel, Angel Farguell Caus, Kyle Hilburn, Roger Ottmar, Modeling support for FASMEE western campaign, *3rd International Smoke Symposium*, April 22nd 2020
113. Adam Kochanski, Derek Mallia, Jan Mandel, Angel Farguell, James Haley, Matt Fearon, Amir Hossain, Tim Brown, The role of the fire-atmosphere coupling in high smoke concentration episodes in complex terrain, *3rd International Smoke Symposium*, April 21st 2020
114. Derek Vincent Mallia, Adam Kochanski, Shawn P Urbanski, Jan Mandel, Steven K. Krueger, The importance of resolving small-scale processes and their impacts on large-scale smoke plume dynamics*, AGU Fall Meeting*, San Francisco, CA, December 10, 2019
115. Troy D Thornberry, Ru-Shan Gao, Laurel A Watts, Steven J Ciciora, Richard J McLaughlin, Karen Hepler Rosenlof, Brian M. Argrow, Daniel Hesselius, Jack Steward Elston, Adam Kochanski, Jan Mandel, The NightFOX project: a small UAS system for wildfire observations, *AGU Fall Meeting,* San Francisco, CA, December 10, 2019
116. Kyle A Hilburn, Adam Kochanski, Jan Mandel, Ned Nikolov, Martin Vejmelka and Angel Farguell**,** Integrating Satellite Fire Detections with Coupled Fire-Weather-Smoke Forecasting System WRFx for Improved Wildland Fire Decision Making, *AGU Fall Meeting*, San Francisco, CA, December 13, 2019
117. Jan Mandel, Angel Farguell, James Haley, Kirana Bergstrom, Adam Kochanski, Kyle A Hilburn and Lauren Hearn, Assimilation of satellite fire detections in coupled atmosphere-fire model WRF-SFIRE by machine learning, *AGU Fall Mee*ting, San Francisco, CA, December 10, 2019
118. Adam K. Kochanski, Jan Mandel, Derek V. Mallia, Kyle Hilburn, Steve Krueger, Roger Ottmar, Tim Brown, Fire-atmosphere coupling: implications for wildfire and air quality modeling, *National Academy of Sciences Workshop Modeling and Simulation of Wildfires*, UC Berkeley, Oct 7th 2019.
119. Jan Mandel, Martin Vejmelka, Adam K. Kochanski, Angel Farguell, James Haley, Derek V. Mallia, Kirana Bergstrom, Kyle Hilburn, Coupled fire-atmosphere-fuel

moisture modeling driven by satellite data, *National Academy of Sciences Workshop Modeling and Simulation of Wildfires*, UC Berkeley, Oct 7th 2019.

120. Jan Mandel, Angel Farguell, James Haley, Lauren Hearn, and Adam Kochanski, Challenges and opportunities in Bayesian and support vector machine estimation of fire arrival time in a coupled atmosphere-wildland fire model, *Machine Learning and Uncertainty Quantification (MLUQ) Workshop*, University of Southern California, Los Angeles, CA, July 25. 2019
121. Adam Kochanski, Mallia, D. V., Jan Mandel, Angel Farguell Caus, James Haley, and Steve Krueger. WRFXPY: Numerical modeling framework for operational coupled fire-atmosphere-fuel moisture forecasting. Joint WRF and MPAS User's Workshop, Boulder, CO, June 10th – 14th, 2019.
122. Jan Mandel, Adam Kochanski, and Martin Vejmelka, Fuel moisture model in WRF-Fire and assimilation of RAWS data, Joint WRF and MPAS User's Workshop, Boulder, CO, June 10th – 14th, 2019.
123. Mallia, D. V., Adam Kochanski, Jan Mandel, and Tim Brown. Can coupled fire-atmosphere models predict smoke-induced inversions from wildfires? Joint WRF and MPAS User's Workshop, Boulder, CO, June 10th – 14th, 2019.
124. Angel Farguell, James Haley, Lauren Hearn, Jan Mandel, and Adam Kochanski, Recovering fire arrival time from satellite data by machine learning, Joint WRF and MPAS User's Workshop, Boulder, CO, June 10th – 14th, 2019.
125. Lauren Hearn, Angel Farguell, James Haley, Jan Mandel, Adam Kochanski, L^1 estimation of fire arrival time using satellite data, Joint WRF and MPAS User's Workshop, Boulder, CO, June 10th – 14th, 2019.
126. Haley, James, Angel Farguell, Jan Mandel, Lauren Hern, and Adam Kochanski, Data assimilation cycling in a coupled fire-atmosphere model, Joint WRF and MPAS User's Workshop, Boulder, CO, June 10th – 14th, 2019.
127. Adam Kochanski, Derek Mallia, Jan Mandel, Angel Farguell, Tim Brown, Rodger Ottmar, Updates and recent applications of WRFXPY coupled modeling system, *Fire Weather Research Workshop*, San Jose State University, San Jose, CA, April 26th 2019.
128. Adam Kochanski, Derek Mallia, Jan Mandel, Roger Ottmar, WRF-SFIRE modeling activities for FASMEE and WE-CAN, *WE-CAN project workshop*, NCAR, Boulder CO, April 24th 2019.
129. Adam Kochanski, Tim Brown, Jan Mandel, On Demand Operational Coupled Weather and Fire Modeling, *Fire Technology Summit*, Sacramento, CA, March 20th, 2019
130. Adam K. Kochanski, Derek V. Mallia, Jan Mandel, Farren Herron-Thorpe, Joseph Vaughan. Coupled fire-atmosphere modeling – new capabilities, challenges and opportunities in the context of air quality forecasting. *Science for Solutions*. Logan, UT, March 28th, 2019.
131. RuShan Gao, Troy D Thornberry, Karen Hepler Rosenlof, Brian M. Argrow, Cory Dixon, Jack Steward Elston, Jan Mandel, Adam Kochanski, A43J-06: The Nighttime Fire Observations eXperiment (NightFOX) - UAS wildfire measurements for air quality, fire weather forecasting, and satellite validations, *AGU Fall Meeting, Washington DC, December 10-14, 2018*

132. Steven K Krueger, Brian Bailey, Mary Ann Jenkins, Adam Kochanski, Derek V. Mallia, Jan Mandel, Eric Pardyjak, Rob Stoll, Natalie S Wagenbrenner, Peter Willemsen, NH31C-1005: A fast-response wildland fire modeling framework for prediction and risk assessment, *AGU Fall Meeting, Washington DC, December 10-14, 2018*
133. J. Mandel, A. Kochanski, J. Haley, A. Farguell, M. Vejmelka, S. Schranz, EP33E-2482: WRFx: An Online Data-Driven Coupled Atmosphere-Fire Modeling System with Automated Acquisition and Assimilation of Satellite Active Fires Detection and RAWS Fuel Moisture Data, Poster, *AGU Fall Meeting, Washington DC, December 10-14, 2018*
134. J. Mandel, A. K. Kochanski, E. A. Ellicot, J. Haley, L. Hearn, A. Farguell, K. Hilburn, NH23C-0859: Retrieving Fire Perimeters and Ignition Points of Large Wildfires from Satellite Observations, Poster, *AGU Fall Meeting, Washington DC, December 10-14, 2018*
135. Kochanski, S. Krueger, J. Mandel, M. Vejmelka, D. Burke, J. Haley (presenting), Angel Farguell Caus, Sher Schranz, Coupled fire-atmosphere-smoke forecasting: current capabilities and plans for the future, *VIII International Conference on Forest Fire Research, Coimbra, Portugal 9 to 16 Nov, 2018*
136. James Haley, Angel Farguell Caus, Jan Mandel, Adam K. Kochanski, and Sher Schranz. Data likelihood of active fires satellite detection and applications to ignition estimation and data assimilation, *VIII International Conference on Forest Fire Research, Coimbra, Portugal 9 to 16 Nov, 2018*
137. Kochanski, D. V. Mallia, M. Fearon, T. Brown (presenting), J. Mandel, J. K. Vaughan, Do we need weather prediction models to account for local weather modifications by wildland fires? *VIII International Conference on Forest Fire Research, Coimbra, Portugal 9 to 16 Nov, 2018*
138. Krystof Eben, Marie Turcicova, Jan Mandel, Pavel Krc, On the estimation of the background covariance in wavelet space, *6th International Symposium on Data Assimilation (ISDA)*, Poster, Munich, Germany, March 3-9, 2018
139. Adam Kochanski (presenting), Derek Mallia, Jan Mandel, Angel Farguell, James Haley, Dalton Burke, Tim Brown, Simulating Plume Rise, Dispersion and Radiative Smoke Impacts in a Coupled Fire-Atmosphere Framework, *Fire Continuum Conference, Missoula MT, May 22, 2018*
140. M. Vejmelka, J. Mandel (presenting), A. Kochanski, D. Burke, S. Schranz, WRFX - Numerical framework for operational coupled fire-atmosphere-fuel moisture forecasting, *12th Fire and Forest Meteorology Symposium, Boise, ID, May 14-17, 2018*
141. Farguell, J. Haley, A. Kochanski, J. Mandel, S. Schranz, Assimilation of Fire Perimeters and Satellite Observations into a Coupled Fire-Atmosphere Model, *12th Fire and Forest Meteorology Symposium, Boise, ID, May 14-17, 2018*
142. J. Haley, A. Farguell Caus, A. Kochanski, J. Mandel, Data Likelihood of Active Fires Satellite Detection and Applications to Ignition Estimation and Data Assimilation, *12th Fire and Forest Meteorology Symposium, Boise, ID, May 14-17, 2018*
143. Van V. Miller, Vince Herr, Adam Kochanski, Jan Mandel, *Modeling Wildland Fire Suppression Decisions Using GIS and Remote Sensing Data*, 7th International

Fire Ecology and Management Congress 2017, Orlando, FL, November 28-December 2, **2017**

144. Jan Mandel, Adam Kochanski, Sher Schranz, and Martin Vejmelka. *Coupled Fire-Atmosphere-Fuel Moisture Online Modeling System WRF-SFIRE*. Poster, Fire Prediction Across Scales, Columbia University, New York, NY, October 23 — October 25, **2017**
145. Adam Kochanski, Vincent Herr, Jan Mandel, Van Miller, Richard McCrea, Dan O'Brien, *An analysis of socio-economic impact of fire modeling and fire detection data*, Poster, Fire Prediction Across Scales, Columbia University, New York, NY, October 23 — October 25, **2017**
146. Aimé Fournier, Jan Mandel, and Adam Kochanski, *Statistical Analysis of Initial-condition Constraints and Parametric Sensitivity*, The 3rd Annual Meeting of SIAM Central States Section, Colorado State University, Fort Collins, CO, September 29 — October 1, **2017**
147. September 2017 Jan Mandel, Adam K. Kochanski, Sher Schranz, Martin Vejmelka. *Coupled fire-atmosphere-fuel moisture-smoke online modeling with WRF-SFIRE*. The 3rd Annual Meeting of SIAM Central States Section. Colorado State University, Fort Collins, CO, September 29 — October 1, **2017**
148. September 2017 Jan Mandel, James Haley, Ivan Kasanicky, Adam K. Kochanski, Martin Vejmelka (2017). *Functional Data Assimilation with White-Noise Data Error and Applications to Assimilation of Active Fires Satellite Detection Data*. The 3rd Annual Meeting of SIAM Central States Section. Colorado State University, Fort Collins, September 29 — October 1, **2017**
149. July 2016 Assimilation of MODIS and VIIRS satellite active fires detection in coupled atmosphere-fire spread model. Poster, *The 5th Annual International Symposium on Data Assimilation*, Reading, UK., **2016**
150. February 2016 *Data assimilation on random smooth functions with applications to ensemble Kalman filter and satellite fire detection*, Invited lecture (with Loren Cobb, Adam Kochanski, Martin Vejmelka, Sher Schranz), Symposium on Data Assimilation and Inverse Problems, University of Warwick
151. December 2015 *Kalman filtering and inverse problems with infinite dimensional data*, invited minisyposium presentation, SIAM Conference on Analysis of Partial Differential Equations Scottsdale, AZ, December 10, 2015
152. June 2015 *Multiscale fire modeling with WRF-Sfire*, A.K. Kochanski (presenting), M.A. Jenkins, J. Mandel, J.D. Beezley, K. Yedinak, and B.K. Lamb, Workshop on Modelling of Wildfires and their Environmental Impact, International Center for Theoretical Physics, Trieste, Italy, invited lecture.
153. June 2015 *Coupled Atmosphere-Fire Modeling with Data Assimilation*, Invited lecture, with A.K. Kochanski, M. Vejmelka, and S. Schranz, Workshop on Modelling of Wildfires and their Environmental Impact, International Center for Theoretical Physics, Trieste, Italy, invited lecture.
154. May 2015 *Data Assimilation of Satellite Active Fire Detection in Coupled Atmosphere-Fire Simulations,* Invited plenary lecture (with Adam K. Kochanski, Martin Vejmelka, and Sher Schranz) HPCSE 2015 High Performace Computing in Science and Engineering, Karolinka, Czech Republic.

155. May 2015 Data assimilation in high and infinite dimension, Prague Computer Science Seminar, public lecture.
156. May 2015 *Integrated fire-atmosphere prediction system with data assimilation.* A.K. Kochanski (presenting), M. Vejmelka, J. Mandel, M.A. Jenkins, and S. Schranz, 11th Symposium on Fire and Forest Meteorology, Minneapolis, MN
157. May 2015 *Smoke modeling in a coupled fire-atmosphere framework,* A.K. Kochanski (presenting), M.A. Jenkins, J. Mandel, K. Yedinak, and B.K. Lamb, 11th Symposium on Fire and Forest Meteorology, Minneapolis, MN
158. January 2015 *Towards data assimilation and coupled physics wildland fire modeling***,** Invited plenary lecture, NSF sponsored WIFIRE workshop, University of California San Diego
159. October 2014 *Spectral Ensemble Kalman Filters* (with Ivan Kasanicky, Martin Vejmelka, Krystof Eben, Viktor Fuglik, Marie Turcicova, Jaroslav Resler, and Pavel Jurus), European Meteorological Society Annual Meeting, Prague, Czech Republic
160. June 2014 *A coupled weather and wildland fire forecasting system with assimilation of satellite remote sensing data,* Invited plenary lecture (with Jonathan D. Beezley, Mary Ann Jenkins, Adam K. Kochanski, Volodymyr Y. Kondratenko, Lixin Lu, Sher Schranz, Martin Vejmelka), 5th IMACS Conference on Mathematical Modelling and Computational Methods in Applied Sciences and Engineering Modelling 2014, Roznov pod Radhostem, Czech Republic
161. March 2014 *4DVAR by Ensemble Kalman Smoothers: Parallel 4DVAR without tangents and adjoints* (with S. Gratton and E. Bergou), SIAM Conference on Uncertainty Quantification, Savannah, Georgia
162. March 2014 *Convergence of Square Root Ensemble Kalman Filters in the Large Ensemble Limit*, E. Kwiatkowski and J. Mandel, SIAM Conference on Uncertainty Quantification, Savannah, Georgia
163. January 2014 *Convergence of the ensemble Kalman filter in the large sample limit and in high and infinite dimension* (with Jonathan D. Beezley, Loren Cobb, and Evan Kwiatkowski), Joint Mathematics Meetings, Baltimore, Maryland.
164. July 2013 *Stochastic solution of large least squares systems in variational data assimilation*, Invited plenary lecture (with S. Gratton and E. Bergou), Preconditioned Iterative Methods (PIM13), Prague, Czech Republic
165. May 2013 *New developments in WRF-SFIRE*, Invited plenary lecture (with Adam Kochnanki, Jonathan Beezley, Volodymyr Kondratenko, and Martin Vejmelka), Numerical Wildfires, Cargese, Corsica, France
166. May 2013 *Forecasting of smoke and wildfire emissions using WRF-Sfire*, Adam Kochanski (presenting), J. D. Beezley, J. Mandel, and C. B. Clements, Numerical Wildfires, Cargese, Corsica, France
167. January 2013 *Hybrid 4DVAR and nonlinear ensemble Kalman smoother methods* (with S. Gratton and E. Bergou), American Meteorological Society 93rd Annual Meeting, Austin, TX
168. January 2013 *Assimilation of fire perimeter data into the fire spread model SFIRE coupled with the WRF model*, Volodymyr Kondratenko (presenting), J. D. Beezley, J. Mandel, and A. Kochanski, poster, American Meteorological Society 93rd Annual Meeting, Austin, TX

169. January 2013 *Wildland fire emissions forecasting by coupled atmosphere-fire model WRF-SFIRE and WRF-Chem*, Adam Kochanski (presenting), J. D. Beezley, J. Mandel, and C. B. Clements, American Meteorological Society 93rd Annual Meeting, Austin, TX
170. June 2012 *Convergence of the Ensemble Kalman Filter in Hilbert Space*, University of Toulouse Paul Sabatier, France
171. October 2011 *Tracking Emerging Infectious Disease Epidemics In Real-Time Using Bayesian Data Assimilation*, A Krishnamurthy (presenting), L. Cobb, J. Mandel, and J. Beezley, Poster, GEOMED 2011, Victoria, BC, Canada
172. August 2011 *Tracking Emerging Infectious Disease Epidemics In Real-Time Using Spectral Bayesian Data Assimilation,* A. Krishnamurthy (presenting), L. Cobb, J. Mandel and J. Beezley, Joint Statistical Meetings (JSM), Section on Statistics in Epidemiology
173. June 2011 *Spectral and morphing ensemble Kalman filters and applications* (with J. D. Beezley, L. Cobb, A. Krishnamurthy, A. K. Kochanski, K. Eben, P. Jurus, and J. Resler), 31st Annual International Symposium on Forecasting, Prague, Czech Republic
174. June 2011 Invited plenary lecture, *Wildland fire modeling on computer clusters* (with J. D. Beezley, N. Dobrinkova, G. Jordanov, A. K. Kochanski, V. Y. Kondratenko, and B. Sousedik), International conference Monitor II, Bolzano, Italy.
175. January 2011 *Spectral and morphing ensemble Kalman filters*, with Jonathan D. Beezley, and Loren Cobb, AMS 91st Annual Meeting, Seattle, WA, January 2011
176. December 2010 *Evaluation of The Fire Plume Dynamics Simulated by WRF-Fire*, A. Kochanski (presesenting), M. Jenkins, S. K. Krueger, J. Mandel, J. D. Beezley, C. B. Clements, AGU Fall Meeting, 2010
177. December 2010 *Wildland fire simulation by WRF-Fire* (poster, with J. D. Beezley, A.K. Kochanski, V. Y. Kondratenko, B. Sousedik, E. Anderson, and J. Daniels), AGU Fall Meeting, San Francisco, CA
178. December 2010 Invited plenary lecture, *Coupled atmosphere-wildland fire simulation by WRF-Fire*, IMA Workshop Numerical Solutions of Partial Differential Equations: Fast Solution Techniques
179. November 2009 *Morphing ensemble Kalman filter and applications* (with J. Beezley), UCD CCM Colloquium
180. October 2009 *Convergence of the Ensemble Kalman Filter* (with L. Cobb and J Beezley), Department of Statistics, Colorado State University, Fort Collins, CO
181. August 2009 Invited plenary speaker, *Adaptive multilevel BDDC,* 19th International Conference on Domain Decomposition, Zhangjiajie, China
182. August 2009 Invited lecture, *Coarse space through the ages,* 19th International Conference on Domain Decomposition, Zhangjiajie, China
183. August 2008 Invited speaker, *Data assimilation by morphing ensemble Kalman filters with application to wildland fires*, Workshop on sensing in environmental systems, LNCC, Petropolis, Brazil
184. April 2008 *Towards a Real-Time Data Driven Wildland Fire Model* (with the wildfires team), IPDPS08, Miami

185. August 2007 Invited plenary speaker, *Multilevel and multispace BDDC*, with B. Sousedik and C. Dohrmann, Computational Methods with Applications, Computational Linear Algebra and Applications, Harrachov, Czech Republic
186. October 2006 Invited speaker, *Ensemble Kalman Filters for Wildfire Simulation* (with the DDDAS wildfires team), Center for Subsurface Modeling Industrial Sponsors meeting, University of Texas at Austin
187. April 2006 Invited lecture, *Coupled Weather-Wildfire Modeling Driven by Sensor and Image Data*, (with the DDDAS wildfires team), NSF Workshop on Cyber-Based Combustion Science, NSF, Arlington, VA
188. July 2003 Invited plenary speaker, Industrial Mathematics and Mathematical Modelling, Rožnov pod Radhoštěm, Czech Republic, *Tutorial on Mathematical Foundations of Iterative Substructuring Methods*
189. June 2003 Fast Solvers for Partial Differential Equations, Oberwolfach (by invitation only), *An Algebraic Convergence Theory for Primal and Dual Substructuring Methods by Constraints*
190. March 2003 Sixth IMASC Symposium on Interative Methods in Linear Algebra, *Algebraic Convergence Theory for Substructuring*
191. January 2002 Invited plenary speaker, International Conference on Domain Decomposition 14, Cocoyoc, Mexico, *Iterative substructuring for fluid-solid acoustics*
192. June 2001 Invited speaker, Modelling 2001, Plzen, Czech Republic, *Iterative Substructuring for Coupled Fluid-Solid Acoustics*
193. May 2001 Fast Solvers for Partial Differential Equations, Oberwolfach (by invitation only), Germany, *Adaptive Aggregation in Algebraic Multigrid*
194. April 2001 Copper Mountain Conference on Multigrid Methods, *Approximation and Coupling Estimators for Algebraic Multigrid*
195. May 1999 Fast solution of differential equations, Oberwolfach, Germany (by invitation only), *Analysis of FETI substructuring methods*
196. August 1999 *Robust balancing domain decomposition* (with P. Krzyzanowski), International Conference on Computational Mechanics, Boulder, CO.
197. May 1999 8th Copper Mountain Conference on Multigrid Methods, *Fast Computation of Energy Minimal Coarse Basis Functions by Smoothing and Projection*
198. 1994 SIAM Annual Meeeting, San Diego, *Iterative Methods for Thin p-Version Finite Elements*
199. 1993 Invited speaker, 7th International Symposium on Domain Decomposition Methods, Penn State, *Domain Decomposition for Plates*
200. 1993 MAFELAP'93, Brunel University, U.K., *Balancing domain decomposition*
201. 1993 MAFELAP'93, Brunel University, U.K., *Iterative methods for high order elements*
202. 1992 AMS-SIAM Summer Seminar "Eploiting Symmetry in Applied and Numerical Analysis," Fort Collins, CO, *An abstract theory for the domain reduction methods*
203. 1992 Copper Mountain Conference on Iterative Methods, *Adaptive preconditioners*

204. 1992 Sixth International Symposium on Domain Decomposition Methods, Como, Italy, *Domain Decomposition on Unstructured Domains*
205. 1992 Second International Conference on Spectral and High-Order Methods, Monpellier, France, *An iterative solver for p-version finite elements in three dimensions*
206. 1991 Invited Speaker, Miniconference on Domain Decomposition, Lexington, KY, *Balancing domain decomposition preconditioners*
207. 1991 Invited Speaker, Summer Conference on Domain Decomposition, Lambrecht, Germany, *Adaptive iterative solvers by incomplete elimination*
208. 1991 Fifth Copper Mountain Conference on Multigrid Methods, F*ast iterative solver for finite elements using incomplete elimination*
209. 1991 MSC User's Conference, Los Angeles, March, *Fast iterative solver for finite elements using incomplete elimination*
210. 1990 Copper Mountain Conference on Iterative Methods, *On Schur complement and block diagonal preconditioning*
211. 1989 SIAM Annual Meeting, San Diego, *Iterative methods for the p-version finite element method*
212. 1989 Invited Speaker, International Conference on Spectral and High Order Methods for partial Differential Equations, Como, Italy, *Iterative solvers by substructuring for the p-version finite element method*
213. 1989 Third International Conference on Domain Decomposition methods, Houston, TX, *Domain decomposition preconditioning for the p-version finite element method*
214. 1989 Fourth Copper Mountain Conference on Multigrid Methods, Copper Mountain, CO, *Two-Level domain decomposition preconditioning for the p-version finite element method in three dimensions*
215. 1988 Invited speaker, Second International Conference on Domain Decomposition Methods, Los Angeles, *Iterative solution of elliptic equations with refinement: The two-level case*
216. 1988 Finite Element Circus, University of Maryland, College Park, MD, *Parallel preconditioning for the p-version finite element method*
217. 1987 Third Copper Mountain Conference on Multigrid Methods, *Fourier analysis of a multigrid method for 3D elasticity problems*
218. 1987 Second Conference on Multigrid Methods, Oberwolfach, Germany (by invitation only), *A multigrid method for singular and eigenvalue problems*
219. 1987 Finite Element Circus, Cornell University, *Multigrid methods for singular and eigenvalue problems*
220. 1985 Invited speaker, 2nd Copper Mountain Conference on Multigrid Methods, *Multigrid convergence for nonsymmetric, indefinite variational problems and one smoothing step*
221. 1985 Invited speaker, 2nd European Conference on Multigrid Methods, *On multigrid and iterative aggregation methods for nonsymmetric problems*
222. 1984 Conference on Multigrid Methods, Oberwolfach, Germany (by invitation only), *Algebraic study of multigrid methods for symmetric, definite problems.*
223. 1983 Workshop on Defect Correction Methods, Oberwolfach, Germany (by invitation only), *On some two-level iterative methods*

224. 1982 XXI International Symposium on Mathematical Programming, Bonn, Germany, *On iterative methods for linear inequalities*

Colloquium Lectures

2021 University of Wyoming
2018 Colorado State University (2, CIRA and Math department)
2016 University of Wyoming
2015 Colorado School of Mines, Golden, CO
2013 Worcester Polytechnic Institute, Worcester, MA
2012 CERFACS, Toulouse, France; Universite Paul-Sabatier, Toulouse, France
2011 Department of Applied Mathematics, University of Colorado Boulder; Institute for Mathematics and Scientific Computing, Karl-Franzens University, Graz, Austria; Department of Statistics, Pennsylvania State University
2010 Max-Planck Institute, Leipzig, Germany
2009 Institute of Informatics of the Czech Academy of Sciences, Prague, Czech Republic, Department of Statistics, State University, Fort Collins, CO
2008 Czech Technical University, Czech Academy of Sciences, Prague, Czech Republic
2006 National Center for Atmospheric Research, Department of Mathematics, Colorado State University, Fort Collins, CO
2004 Technical University Ostrava, Czech Technical University Praha, Czech Republic
2003 University of Kentucky, Colorado Linux Users and Enthusiasts, University Colorado at Boulder
2002 Sandia National Laboratories, Albuquerque
2000 Department of Aerospace Engineering, University of Colorado at Boulder
1999 University of Wyoming
1996 Colorado School of Mines
1995 Colorado State University
1994 University of Wyoming
1993 Courant Institute, INRIA (Rocquencourt, France), West Bohemian University (Plzen, Czech Republic)
1992 Rice University, University of Texas at Austin
1990 Pennsylvania State University, Stanford University, IBM T.J. Watson Research Cenver, Colorado State University, Purdue University
1989 Courant Institute, University of Southern California
1988 University of Wyoming
1987 IBM TJ Watson Research Center, Courant Institute, Stanford University, Yale University, Oxford University
1986 University of Wisconsin-Madison

Other Professional Activities

Panel

Member of panel on *HPC for urgent decision making,* Supercomputing 2019

Society Memberships

Society for Industrial and Applied Mathematics (SIAM), American Mathematical Society, American Meteorological Society, International Association of Wildland Fire

Editorial Boards

2013-present Numerical Methods in Partial Differential Equations
2018-present Foundations of Data Science
1998-2005 SIAM J. Numerical Analysis

Other Professional Service

2015 One NSF advisory panel
2014 One NSF advisory panel
2013 One NSF advisory panel
2011 Two NSF advisory panels
2009 One NSF advisory panel
2008 Two NSF advisory panels
2007 Two NSF advisory panels
2006 One NSF advisory panel
2005 One NSF advisory panel, one DOE advisory panel
2004 Two NSF advisory panels, one DOE advisory panel
2003 Program Chair, Sixth IMACS International Symposium on Iterative Methods in Scientific Computing, Denver
2002 One NSF Advisory panel
2001 One NSF Advisory panel and one invited workshop
2000 Two NSF Advisory panels
1999 Two NSF Advisory panels
1998 Co-chair, Tenth International Symposium on Domain Decomposition, Boulder, CO, August, Principal editor of proceedings.
1998 NSF advisory panel
1997 Three NSF advisory panels
1996 Two NSF advisory panels
1995 NSF advisory panel
1995 NSF advisory panel
1994 NSF advisory panel
1993 NSF advisory panel
1992-present Member of IMACS committee on Numerical Linear Algebra.
1991 Program Chair, Fifth Copper Mountain Conference on Multigrid Methods; guest editor of special issue of Communications in Applied Numerical Mathematics.
1991 Member of international program committee, IMACS International Symposium on Iterative Methods in Linear Algebra, Brussels, March 1991
1989 Co-chair, Fourth Copper Mountain Conference on Multigrid Methods, co-editor of proceedings
1987-2002 Program committee member, Copper Mountain Conferences on Multigrid Methods
1987 Program Chair, Third Copper Mountain Conference on Multigrid Methods, co-editor of

Proceedings.
1987-1990 Chair of the Computational Mathematics Group Colloquium Series, University of
Colorado at Denver.
1984-1986 Program Chair and Co-Organizer (with I. Marek, head of the Numerical Mathematics
Department) of a monthly seminar on Multigrid Methods at Charles University, Prague.

Consultantships

1993 D. H. Brown Associates, Inc., Port Chester, NY, competitive analysis of parallel computers.
1988 Noetic Technologies Corp., St. Louis, MO, finite element methods.
1988 IBM Corporation, Research Division, NY, hybrid computing.
1984-1985 Project Optimization of Thermoelastic Systems, supported by Skoda Plzen Co. Czechoslovakia (with J. Nečas and T. Roubicek).
1978 Research Institute of Education, Prague, Czechoslovakia, statistics.

Reviewer and Referee Service

Grant agencies: Reviewer for U.S. National Science Foundation, U.S. Department of Energy, British Research Council, European Research Council, European Commission FP7, Czech Grant Agency, Croatian Grant Agency, Netherland Science Foundation, USDA. Member of proposal evaluation panels at the National Science Foundation and the Department of Energy.
Journals: Referee for Applied Mathematics and Computation, Journal of Optimization Theory and Applications, Applications of Mathematics, Journal of Computational Physics, Applied Numerical Mathematics, SIAM Journal on Numerical Analysis, Mathematics of Computation, International Journal for Numerical Methods in Engineering, Computer Methods in Applied Mathematics and Engineering, Computers & Mathematics with Applications, Numerical Partial Differential Equations, Simulation, Electronic Transactions in Numerical Analysis, Transactions on Modeling and Computer Simulation, Neurocomputing, International Journal of Wildland Fire, Journal of Fire Sciences, Q.J. Royal Meteorological Society, Fire Safety Journal, Mathematical Biosciences, Physica D, Signal Processing,
Reviewer for Mathematical Reviews and Zentralblatt für Mathematik.

Students Graduated

PhD

2023 Basma Tumi
2021 James Haley
2021 Marie Turčičová (Charles University Prague)
2018 Angel Farguell Caus (Automomous University of Barcelona)
2017 Ivan Kasanický (Charles University Prague)
2015 Volodymyr Kondratenko

2012 Nina Dobrinkova (Bulgarian Academy of Sciences)
2011 Minjeong Kim
2009 Jonathan D. Beezley
2008, 2010 Bedrich Sousedik (CU Denver and Czech Technical University)
2002 Mirela Popa
1998 Radek Tezaur
1997 Marian Brezina
1990 G. Scott Lett

MS

2024 Tyler Spears
2024 Jonathon Hirschi
2019 Lauren Hearn
2018 Eric Hu
2014 Evan Kwiatkowski
2010 Volodymyr Kondratenko
2009 Myung Joo Song
2005 Charles Glaze, Sumbal Jullion
2002 Gantulga Tsedendorj
1997 Abderrahman Seffriouri
1988 Victor Bandy, Joe Ottero

Contracts and Grants

2023-2026 *Technology Development to Integrate Innovative Observation Capabilities into Coupled Wildfire Models for Improved Active Fire Forecasting,* NASA 80NSSC23K1344, Co-PI and site PI $566,287 (PI Kyle Hilburn, Colorado State University, $2,945,252)

2023-2026 *Distributed Spacecraft with Heuristic Intelligence to Monitor Wildfire Spread for Responsive Control,* NASA 80NSSC23K1118, Co-PI and site PI, $384,062 (PI Sreeja Nag, Bay Area Environmental Research Institute, $1,551,251)

2023-2025 *CC* Regional Computing: Enhancing Computing at Regional Schools in the Rocky Mountain Advanced Computing Consortium (RMACC),* NSF OAC-2322260, Co-PI, PI Shelley Knuth, CU Boulder, $986,140.

2022-2024 *Integration and Evaluation of WRF-SFIRE Application for Interoperability in Wildfire Decision Making*, NASA 80NSSC22K1717, Co-PI and subcontract PI, $119,457 (PI Kyle Hilburn , CSU, $249,870)

2022-2024 *AET/ESDT: Towards a NU-WRF-based Digital Twin for Mega-Wildfires over N. America: Assessments of Smoke Transport Impacts on Air Quality, Health and Societal Resources*, NASA 80NSSC22K1405, $179,890.00 (PI Milton Halem, University of Maryland Baltimore County, $1,365,870)

2020-2023 *CC* Compute: Accelerating Science and Education by Campus and Grid Computing*, NSF OAC-2019089, PI, $399,938

2019-2024 *Coupled Interactive Forecasting of Weather, Fire Behavior, and Smoke Impact for Improved Wildland Fire Decision Making*, NASA 80NSSC19K1091, Co-PI and subcontract PI, $ 291,629 (PI Kyle Hilburn , CSU, $630,097)

2017-2022 *PREEVENTS Track 2: A fast-response wildland fire modeling framework for prediction and risk assessment,* Co-PI and subcontract PI, $580,659 (NSF ICER-1664175, PI Steven Krueger, U. Utah, $2,024,452)

2016-2017 *Modeling support for FASMEE experimental design*, Co-PI and subcontract PI, $45,885 (Joint Fire Science Program and BLM 16-4-5-03, PI Adam Kochanski, U. Utah, $142,879)

2013-2018 *Wildland Fire Behavior and Risk Prediction,* Co-PI and subcontract PI, $359,855 (NASA grant NNX13AH59G to Colorado State University, Sher Schranz, PI, $618,903)

2013-2016 *Advanced random field methods in data assimilation for short-term weather prediction*, Grant Agency of the Czech Republic grant 13-34856S, CZK 8,000,000 (approx. $328,000), PI (at the Czech Academy of Sciences)

2012-2017 *Data assimilation in scientific computing*, NSF DMS-1216481, $399,981, PI

2013-2014 *Daily Forecasts of Wildland Fire Impacts on Air quality in the Pacific Northwest: Enhancing the Air Indicator Report for Public Awareness and Community Tracking (AIRPACT) Decision Support,* $149,018, subcontract PI, $18,197 (NASA grant NNX12AQ85G to Washington State University, Steve Edburg, PI)

2009-2011 *Improved Tracking for Emerging Diseases from Climate Change*, NIH 1 RC1 LM010641-01, $613,030, Co-PI (Loren Cobb, PI)

2009 *TESLA S1070 GPU supercomputing server,* NVIDIA, equipment valued $4,300

2008-2012 *MRI-Consortium: Acquisition of a Supercomputer by the Front Range Computing Consortium,* NSF CNS-0821794, $2,796,500, Co-PI (with CU-Boulder and NCAR, Henry Tufo, PI)

2008-2013 *Collaborative Research: CDI-Type II-The Open Wildland Fire Modeling E-community: A Virtual Organization Accelerating Research, Education, and Fire Management Technology*, NSF EGS-0835579, $653,556, PI. Part of $1.6M group of collaborative grants with NCAR and University of Utah, Lead PI.

2008 *Continued Funding for the Wildland Fires Project, UCD CLAS CRISP, $13,123*

2007-2011 *Adaptive Multilevel Iterative Substructuring Methods,* NSF DMS-0713876, $209,965, PI

2007-2009 *CSR-CSI: Collaborative Research: Dynamic Sensor/Computation Network for Wildfire Management,* NSF CNS-0719641, $99,999, PI. Part of collaborative group of grants with University of Kentucky and RPI, Craig Douglas, Lead PI.

2007-2008 *Data Assimilation in Atmospheric Sciences,* PI, NSF DMS-0623983, $99,965.

2004-2005 *Adaptive Strategies for the Salinas FETI-DP Solver* (renewal), PI, Sandia National Laboratories, $48,961.

2004-2007 *Acquisition of an IBM BlueGene/L Supercomputer,* CU-Denver PI, NSF CNS 0420985, $119,332. Part of $1.5M group of collaborative grants with CU-Boulder and NCAR.

2003-2004 *Adaptive Strategies for the Salinas FETI-DP Solver* (renewal), PI, Sandia National Laboratories, $49,999.

2003-2008 *Data Dynamic Simulation for Disaster Management* (with Leo Franca and Tolya Puhalskii, UCD; Janice Coen, NCAR; Craig Douglas, University of Kentucky; Tony Vodacek and Bob Kremmens, Rochester Institute of Technology; and Wei Zhao, Texas A&M), lead PI, NSF ITR grant, $2,064,000. UCD part NSF ITR 0325314, $621,001.

2003 *Adaptive Strategies for the Salinas FETI-DP Solver*, PI, Sandia National Laboratories, $39,893.

2000–2001 *Acquisition of a High-Performance Parallel Computer for Mathematical Sciences and Applications*, NSF DMS-0079719 Co-PI (Andrew Knyazev, PI), $100,000.

2000-2004 *Scalable Submesh Computing,* NSF DMS-0074278, PI, $155,000.

1997–2001 *High Performance simulation of Multiphysics Problems* (CO-PI and subcontract PI; Carlos Felippa, CU-Boulder PI), NSF ECS-9725504, $312,000.

1998–2001 *Sensitivity Analysis Of Coupled Acoustic Problems to Structural Boundary Conditions and Efficient Numerical Solution Algorithms*, Co-PI (at CU-Boulder, Charbel Farhat, PI), ONR N-00014-95-1-0663, $320,000.

1995-1998 *Sensitivity Analysis Of Coupled Acoustic Problems to Structural Boundary Conditions and Efficient Numerical Solution Algorithms,* (with Charbel Farhat, CU-Boulder), subcontract PI, 3 years, $161,000, ONR grant N-00014-95-1-0663

1995-1996 *Mathematical Sciences Computing Research Environments,* NSF DMS-9508328, with T. Russell, L. Franca, A. Knyazev, C. Liu, $50,000.

1994-1996 *Artificial Intelligence in Numerical Computing* – CISE Postdoctoral Research Associateship for S. Ghosal, Co-PI with Harvey Greenberg, NSF Grant ASC-9404734, $42,000.

1994 *Advanced Iterative Solvers for High Order Finite Elements,* NSF Grant SBIR DMI-9360015, at Solvers International, Inc., PI, $64,857.

1993-1996 *Parallel Methods for Large-Scale Computations,* NSF Grant ASC-9121431, PI, $240,595.

1992-1997 *GAFD Turbulence and Coupled Fields,* NSF grant no. ASC-9217394 (Grand Challenge, through CU Boulder), subcontract PI , $312,500. Carlos Felippa, PI.

1991 *Fast Iterative Solvers for MSC/EMAS,* MacNeal-Schwendler Corporation, PI, $50,000

1990-1993 *Multilevel Algorithms for Advanced Computers,* NSF grant no. DMS-9015259, $240,000 (with S. McCormick, T. Manteuffel, and T. Russell)

1989 *Junior Faculty Development Award,* University of Colorado at Denver, $4,500.

1988 *Fourth Copper Mountain Conference on Multigrid Methods,* US Air Force AFOSR-89-0224, $26,885 (S. McCormick,nPI).

1987-1990 *Multilevel Algorithms for Advanced Computers,* NSF DMS-8704169, $560,000 (S. McCormick, PI)