

CURRICULUM VITAE

Mark A. Abramson

Utah Valley University
Department of Mathematics (MS 261)
Suite LA 121U
Orem, UT 84058-6703
Phone: (801) 863-7106
Email: Mark.Abramson@uvu.edu

Education

- Ph.D.** 2003, Rice University (Computational and Applied Mathematics)
Advisors: John E. Dennis, Jr., Charles Audet
- M.S.** 2012, University of Washington (Aeronautics and Astronautics)
- M.A.** 2001, Rice University (Computational and Applied Mathematics)
- M.S.** 1994, Air Force Institute of Technology (Operations Research)
- M.S.** 1994, Air Force Institute of Technology (Applied Mathematics)
- B.S.** 1987, Brigham Young University (Computational Mathematics; minor in Statistics)

Professional History

- 2017–present: Department of Mathematics, Utah Valley University, Orem, Utah
Associate Professor of Mathematics
- 2015–2017: Department of Mathematics, Brigham Young University, Provo, Utah
Visiting Associate Professor of Mathematics
- 2008–2015: The Boeing Company (Boeing Research and Technology), Seattle, Washington
Senior Mathematician
- 2002–2008: Department of Mathematics and Statistics, Air Force Institute of Technology (AFIT), Wright-Patterson AFB, Ohio
2008–2011: *Adjunct Associate Professor of Mathematics*
2006–2008: *Associate Professor of Mathematics*
2003–2007: *Deputy Head, Department of Mathematics*
2002–2006: *Assistant Professor of Mathematics*
- 1999–2002: Department of Computational and Applied Mathematics, Rice University, Houston, Texas
PhD Student
- 1997–1999: Operations Analysis Branch, Plans Division, Assistant Chief of Staff, C/J3, Republic of Korea-US Combined Forces Command/United States Forces, Korea, Yongsan AIN, Republic of Korea
Senior Air Analyst
- 1994–1997: Air Force Logistics Management Agency, Maxwell-Gunter AFB, Alabama
Senior Logistics Policy Analyst
- 1992–1994: Graduate School of Engineering, Air Force Institute of Technology, Wright-Patterson AFB, Ohio
Graduate Student
- 1987–1992: 31 Test and Evaluation Squadron, Edwards AFB, California
Advanced Cruise Missile Avionics Analyst

Teaching and Mentoring

Courses Taught

Utah Valley University:

MATH 1060 – Trigonometry: Fall 2018, Spring 2019
MATH 1210 – Calculus I: Spring 2018 (2), Spring 2019, Fall 2019 (2), Fall 2020 (2)
MATH 1220 – Calculus II: Fall 2017 (2), Spring 2020 (2), Spring 2021 (2)
MATH 2270 – Linear Algebra: Spring 2018, Spring 2020
MATH 2280 – Ordinary Differential Equations: Fall 2017
MATH 3640 – Introduction to Optimization: Fall 2019
MATH 4610 – Numerical Analysis I: Fall 2020
MATH 4620 – Numerical Analysis II: Spring 2019, Spring 2021

Brigham Young University:

MATH 113 – Calculus II: Fall 2015 (2), Fall 2016
MATH 302 – Advanced Engineering Mathematics I: Winter 2017
MATH 313 – Linear Algebra: Winter 2016 (2), Winter 2017
MATH 410 – Numerical Analysis I: Fall 2016

Boeing Company Courses Taught/Developed:

ENG 1048 – Introduction to Multidisciplinary Optimization (web-based)
ENG 1049 – Fundamentals of Multidisciplinary Optimization, Part I/II (web-based)

Air Force Institute of Technology:

MATH 002 – Calculus and Matrix Algebra Review: Fall 2002–2004, Summer 2004, Fall 2006
MATH 501 – Mathematics for the Operational Sciences I: Fall 2002–2007
MATH 502 – Mathematics for the Operational Sciences II: Winter 2003–2008
MATH 509 – Mathematical Methods for the Physical Sciences: Spring 2005
MATH 521 – Applied Linear Algebra: Fall 2002, Spring 2006–2007
MATH 674 – Numerical Analysis I: Spring 2003

Student Advising/Mentoring

Griffin Kent, Summer Research Student, Utah Valley University, Summer 2019, Summer 2020.

Christian “Tac” Mortenson, Summer Research Student, Utah Valley University, Summer 2018.

Clay Whiffen, Summer Research Student, Utah Valley University, Summer 2018.

Gavin W. Smith (Ph.D., Washington State University, 2013), Boeing Summer Intern, 2012.

O’Reilly, Kevin R. (M.S., Space Systems, 2006), *Quantitative Object Reconstruction using Abel Transform Tomography and Mixed Variable Optimization*, AFIT. Sponsor: Los Alamos National Laboratory (LANL).

Magallanez, Raymond (M.S., Operations Research, 2007), *Surrogate Strategies for Computationally Expensive Optimization Problems with CPU-time correlated functions*, AFIT. Sponsor: LANL.

Bethea, David M. (M.S., Operations Research, 2008), *Improving Mixed Variable Optimization of Computational and Model Parameters in Engineering Using Multiple Surrogate Functions*, AFIT. Sponsor: LANL.

Rachael L. Pingel (B.S., Mathematics, Brigham Young University, 2008), Summer Undergraduate Intern, AFIT, 2006, 2007.

Graduate Thesis Committee Involvement

Striver, Todd A. (Ph.D., AFIT, Operations Research, 2004), *Pattern Search Ranking and Selection Algorithms for Mixed-Variable Stochastic Systems*. Advisor: James W. Chrissis

Sherman, Nathan P. (Ph.D., AFIT, Operations Research, 2006), *Analysis and Control of Unreliable, Single-Server Retrieval Queues with Infinite-Capacity Orbit and Normal Queue*. Advisor: Jeffrey P. Kharoufeh

Walston, Jennifer G. (Ph.D., AFIT, Operations Research, 2007), *Search Techniques for Multi-Objective Optimization of Mixed Variable Systems having Stochastic Responses*. Advisor: James W. Chrissis

Dunlap, John E. (M.S., AFIT, Operations Research, 2005), *On the Use of Surrogates in Mixed Variable Optimization of Stochastic Simulation Systems*. Advisor: James W. Chrissis

Booher, Timothy B. (M.S., AFIT, Operations Research, 2006), *Optimal Periodic Inspection of a Stochastically Degrading System*. Advisor: Jeffrey P. Kharoufeh

Mixon, Dustin G. (M.S., AFIT, Applied Mathematics, 2006), *Doppler-only Multistatic Radar*. Winner of *Dean's Award*, 2006. Advisor: Matthew C. Fickus

Tharaldson, Derek D. (M.S., AFIT, Operations Research, 2006), *Optimization of a Multi-Echelon Repair System via Generalized Pattern Search with Ranking and Selection: A Computational Study*. Advisor: James W. Chrissis

Tisdell, Jason E. (M.S., AFIT, Statistics, 2006), *Point Estimates and Associated Confidence Intervals in Log Space Back-Transformed from Normal Space*. Advisor: Edward D. White III

Beal, Josh M. (M.S., Mathematics, Miami University, 2006). Advisors: Olga A. Brezhneva and Amit Shukla.

Trail, Casey (M.S., Mathematics, Miami University, 2007). Advisor: Olga A. Brezhneva

Paciencia, Todd A. (M.S., AFIT, Operations Research, 2008). *Multi-objective Optimization of Mixed Variable Stochastic Systems using Single-Objective Formulations*. Advisor: James W. Chrissis

Sparkman, Bryan T. (M.S., AFIT, Operations Research, 2008). *Scramjet Fuel Injection Array Optimization Utilizing Mixed Variable Pattern Search with Kriging Surrogates*. Advisor: James W. Chrissis

Research

Publications (* UVU student, ** other UVU faculty):

Articles in Pre-publication:

Abramson, Mark A., Wesley D. Smith, and Clay Whiffen*, *Mathematical models of strobe rockets, in preparation.*

Abramson, Mark A., *Recursive mesh adaptive direct search for multifidelity optimization, in preparation.*

Abramson, Mark A., Andrew J. Booker, Evin J. Cramer, and Joseph P. Simonis, *Mixed variable mesh adaptive direct search algorithm for multifidelity optimization, in preparation.*

Refereed Publications:

1. Abramson, Mark A., Griffin D. Kent*, and Gavin W. Smith, *Penetration depth between two convex polyhedra: an efficient stochastic global optimization approach, IEEE Transactions on Visualization and Computer Graphics*, submitted.

2. Knaeble**, Brian, Braxton Osting, and Mark A. Abramson (2019), Regression analysis of unmeasured confounding, *Epidemiologic Methods*, **9** (1): 20190028.
3. Abramson, Mark A., Lennart Frimannslund, and Trond Steihaug (2014), A subclass of generating set search with convergence to second-order stationary points, *Optimization Methods and Software* **29** (5), 900-918.
4. Abramson, Mark A., Thomas J. Asaki, J. E. Dennis, Jr., Raymond Magallanez, and Matthew J. Sottile (2012), An efficient class of direct search surrogate methods for solving expensive optimization problems with CPU-time-related functions, *Structural and Multidisciplinary Optimization* **45** (1), 53-64.
5. Abramson, Mark A., Charles Audet, J. E. Dennis, Jr., and Sébastien Le Digabel (2009), ORTHOMADS: A deterministic MADS instance with orthogonal directions, *SIAM Journal on Optimization* **20** (2), 948-966.
6. Sriver, Todd A., James W. Chrissis, and Mark A. Abramson (2009), Pattern search ranking and selection algorithms for mixed variable simulation-based optimization, *European Journal of Operational Research* **198** (3), 878-890.
7. Sherman, Nathan P., Jeffrey P. Kharoufeh, and Mark A. Abramson (2009), An M/G/1 retrial queue with unreliable server for streaming multimedia applications, *Probability in the Engineering and Informational Sciences* **23** (2), 281-304.
8. Abramson, Mark A., Charles Audet, James W. Chrissis, and Jennifer Walston (2009), Mesh adaptive direct search algorithms for mixed variable optimization, *Optimization Letters* **3** (1), 35-47.
9. Sparkman, Bryan T., James W. Chrissis, M. R. Gruber, and Mark A. Abramson (2008). Optimization of a Scramjet fuel injection array: An application of mixed variable generalized pattern search with Kriging surrogates. AIAA 2008-5861, Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, September 10-12, 2008, Victoria, British Columbia, Canada.
10. Abramson, Mark A., Thomas J. Asaki, J. E. Dennis, Jr., Kevin R. O'Reilly, and Rachael L. Pingel (2008), Quantitative object reconstruction using Abel transform x-ray tomography and mixed variable optimization, *SIAM Journal on Imaging Sciences* **1** (3), 322-342.
11. Abramson, Mark A., Olga A. Brezhneva, J. E. Dennis, Jr., and Rachael L. Pingel (2008), Pattern search in the presence of degenerate linear constraints, *Optimization Methods and Software* **23** (3), 297-319.
12. Beal, Josh A., Amit Shukla, Olga A. Brezhneva, and Mark A. Abramson (2008), Optimal sensor placement for enhancing sensitivity to change in stiffness for structural health monitoring, *Optimization and Engineering* **9** (2), 119-142.
13. Abramson, Mark A., Charles Audet, and J. E. Dennis, Jr. (2007), Filter pattern search algorithms for mixed variable constrained optimization problems, *Pacific Journal of Optimization* **3** (3), 477-500.
14. Abramson, Mark A. and Charles Audet (2006), Convergence of mesh adaptive direct search to second-order stationary points, *SIAM Journal on Optimization* **17** (2), 606-619.
15. Abramson, Mark A., Charles Audet, and J. E. Dennis, Jr. (2006), Nonlinear programming by mesh adaptive direct searches, *SIAG/Optimization Views-and-News* **17** (1), 2-11.
16. Abramson, Mark A. (2005), Second-order behavior of pattern search, *SIAM Journal on Optimization* **16** (2), 515-530.
17. Abramson, Mark A. (2004), Mixed variable optimization of a load-bearing thermal insulation system using a filter pattern search algorithm, *Optimization and Engineering* **5** (2), 157-177.

18. Abramson, Mark A., Charles Audet, and J. E. Dennis, Jr. (2004), Generalized pattern searches with derivative information, *Mathematical Programming, Series B* **100** (1), 3-25.
19. Abramson, Mark A. and James W. Chrissis (1998), Sequential quadratic programming and the ASTROS structural optimization system, *Structural Optimization* **15** (1), 24-32.
20. Abramson, Mark A. and Harry A. Berry (1996). Applying neural networks to demand forecasting, *Air Force Journal of Logistics*, **20** (3/4), Summer-Fall 1996, 1-4, 9. (Reprinted in *Logistics on the Move*, Air Force Logistics Management Agency, April 1999, pp. 47-51.)
21. Smith, Stella T., Mark A. Gray, and Mark A. Abramson (1996). Individual mobilization augmentees in logistics, *Air Force Journal of Logistics*, **20** (1), 14-16.

Patents:

Abramson, Mark A., *Recursive Search and Poll Method for Solving Multifidelity Optimization Problems*, Patent Application No. 14/829,580, filed 18 August 2015.

Abramson, Mark A., Andrew J. Booker, Evin J. Cramer, and Joseph P. Simonis, *Search and Poll Method for Solving Multifidelity Optimization Problems*, Patent Pending, Application No. 14/794,792, filed 8 July 2015.

Other Publications:

Abramson, Mark A., Andrew J. Booker, and Evin J. Cramer (2014), Mesh Adaptive Direct Search with Decomposition, Technical Report S&A-TECH-14-006, The Boeing Company, October 2014.

Abramson, Mark A., Thomas A. Grandine, William D. McGarry, and Gavin W. Smith (2014), Computing the Penetration Depth of Two Polytopes, Technical Report S&A-TECH-14-004, The Boeing Company, September 2014.

Abramson, Mark A., Andrew J. Booker, Evin J. Cramer, and Joseph P. Simonis (2014), Mesh Adaptive Direct Search for Multifidelity Optimization, Technical Report S&A-TECH-14-003, The Boeing Company, September 2014.

Abramson, Mark A. and Andrew Cary (2010), Assessment of Algorithms for Large-Scale Aerodynamic Shape Optimization with Expensive Analysis Codes, Technical Report PPT-TECH-10-006, The Boeing Company, December 2010.

Heidari, Mohammad A., Mark A. Abramson, Theodore F. Yantis, Joseph Pajot, and Paul D. Frank (2010), Computing Maximum Power Flow for Worst Case Engine Vibration Related Noise, Technical Report PPT-TECH-10-001, The Boeing Company, July 2010.

Meza, Juan, Aran Garcia-Lekue, Mark A. Abramson, and J. E. Dennis, Jr. (2007), Derivative-free optimization methods for surface structure determination of nanosystems, In 6th International Congress on Industrial and Applied Mathematics; Zurich, Switzerland, LBNL-63523, July 16-20, 2007.

Pingel, Rachael L., Abramson, Mark A., Thomas J. Asaki, and J. E. Dennis, Jr. (2006), Characteristic shape sequences for measures on images. Technical Report, TR06-17, Department of Computational and Applied Mathematics, Rice University, Houston, TX.

Abramson, Mark A., Ted Lewis, Steve Reynolds, Steve Long, Doug Blazer, and Wayne Faulkner (1997). Optimal allocation of assets in a multi-echelon inventory environment, *Proceedings of the Air Force Logistics Symposium 1997*, Wright-Patterson Air Force Base, Ohio, April 14-16, 1997.

Abramson, Mark Aaron (2002). *Pattern Search Algorithms for Mixed Variable General Constrained Optimization Problems*. Ph.D. Thesis, Department of Computational and Applied Mathematics, Rice University, Houston, Texas.

Abramson, Mark Aaron (1994). *Application of Sequential Quadratic Programming to Large-scale Structural Design Problems*. M.S. Thesis, Graduate School of Engineering, Air Force Institute of Technology, Wright-Patterson AFB, Ohio.

Conference Presentations and Invited Lectures: (* denotes different speaker)

Abramson, Mark A., Griffin D. Kent, and Gavin W. Smith, A global optimization approach to computing penetration depth between two convex polytopes, *American Mathematical Society Fall Western Sectional Meeting* (formerly at the University of Utah, Salt Lake City, Utah), October 24-25, 2020.

Abramson, Mark A., Direct search applied to computation of penetration depth between two polytopes arising from discretized geometry models, *6th International Conference on Continuous Optimization (ICCOPT)*, Berlin Germany, August 5-8, 2019.

Abramson, Mark A., Mesh adaptive direct search algorithms for multifidelity optimization, *30th European Conference on Operational Research*, Dublin, Ireland, June 23-26, 2019.

Abramson, Mark A., Directional direct search algorithms for mixed variable constrained optimization, Mathematics Department Colloquium, Utah Valley University, Orem, Utah, March 8, 2019.

Abramson, Mark A., Directional direct search algorithms for mixed variable constrained optimization, Applied Mathematics Seminar, Utah State University, Logan, Utah, March 7, 2019.

Abramson, Mark A., Mesh adaptive direct search algorithms for multifidelity optimization, *Optimization Days*, Montreal, Quebec, Canada, May 7-9, 2018.

Abramson, Mark A., Mesh adaptive direct search algorithms for multifidelity optimization, *SIAM Conference on Optimization*, Vancouver, British Columbia, Canada, May 22-25, 2017.

Abramson, Mark A., Mesh adaptive direct search algorithms for multifidelity optimization, Department of Industrial and Systems Engineering, Lehigh University, Bethlehem, Pennsylvania, March 22, 2016.

Abramson, Mark A., Mesh adaptive direct search algorithms for multifidelity optimization, Applied Math Seminar, Brigham Young University, Provo, Utah, March 10, 2016.

Abramson, Mark A., Mesh adaptive direct search for nonlinear and mixed variable constrained optimization, Air Force Institute of Technology, Graduate School of Engineering and Management, Wright-Patterson AFB, Ohio, November 17, 2015.

Abramson, Mark A., Mesh adaptive direct search for nonlinear and mixed variable constrained optimization, United States Air Force Academy, Colorado Springs, Colorado, March 2, 2015.

Abramson, Mark A., Mesh adaptive direct search for nonlinear and mixed variable constrained optimization, Wake Forest University, Winston-Salem, North Carolina, February 4, 2015.

Abramson, Mark A., Mesh adaptive direct search for nonlinear and mixed variable constrained optimization, Brigham Young University, Provo, Utah, January 22, 2015.

Abramson, Mark A., Mesh adaptive direct search algorithms for mixed variable optimization, StataCorp, College Station, Texas, April 8, 2014.

Abramson, Mark A., Mesh adaptive direct search methods for mixed variable optimization, ExxonMobil Research and Engineering, Clinton, New Jersey, April 4, 2014.

Abramson, Mark A., Mesh adaptive direct search methods for mixed variable optimization, Chrysler LLC, Auburn Hills, Michigan, March 3, 2014.

Abramson, Mark A., Multidisciplinary Optimization, 2-day Ed Wells course, The Boeing Company, October 28-29, November 19-20, 2013.

Abramson, Mark A., An industrial perspective on global optimization, *SIAM Annual Meeting*, San Diego, CA, July 8-12, 2013.

Abramson, Mark A., Adventures in industrial strength optimization, Department of Industrial and Systems Engineering, University of Washington, Seattle, Washington, April 27, 2010.

Abramson, Mark A., Applied Mathematics at Boeing, SIAM Student Chapter, Department of Computational and Applied Mathematics, Rice University, Houston, Texas, April 20, 2010.

Abramson, Mark A., Adventures in industrial strength optimization, Department of Computational and Applied Mathematics, Rice University, Houston, Texas, April 19, 2010.

Abramson, Mark A., Thomas J. Asaki, David M. Bethea, J.E. Dennis, Jr., Raymond Magallanez, Matthew J. Sottile, Exploiting Simulation Time Reductions in Expensive Optimization Problems, *International Symposium on Mathematical Programming*, Chicago, Illinois, August 23-28, 2009.

Abramson, Mark A., Mesh Adaptive Direct Search Algorithms for Constrained Mixed Variable Optimization, Mathematics Department, University of Washington, Seattle, Washington, November 18, 2008.

*Bethea, David M., Mark A. Abramson, Thomas J. Asaki, J.E. Dennis, Jr., Matthew Sottile, Optimization of model and computational parameters in expensive engineering simulations, *SIAM Conference on Optimization*, Boston, Massachusetts, May 10-13, 2008.

Abramson, Mark A., *Lennart Frimannslund, Trond Steihaug, A subclass of generating set search with second-order convergence, *SIAM Conference on Optimization*, Boston, Massachusetts, May 10-13, 2008.

Abramson, Mark A., Mesh adaptive direct search algorithms for mixed variable constrained black box optimization, Air Force Research Laboratory, Sensors Directorate, Wright-Patterson AFB, Ohio, March 15, 2008.

Abramson, Mark A., Mesh adaptive direct search algorithms for constrained mixed variable optimization, MITRE Corporation, Bedford, Massachusetts, February 28, 2008.

Abramson, Mark A., Mesh adaptive direct search algorithms for constrained mixed variable optimization, Oak Ridge National Laboratory, Oak Ridge, Tennessee, February 21, 2008.

Abramson, Mark A., Mesh adaptive direct search algorithms for constrained mixed variable optimization, Department of Mathematics, University of Tennessee, Knoxville, Tennessee, February 20, 2008.

Abramson, Mark A., Mesh adaptive direct search algorithms for mixed variable constrained optimization, Department of Mathematics, Missouri University of Science and Technology, Rolla, Missouri, February 15, 2008.

Abramson, Mark A., Mesh adaptive direct search algorithms for mixed variable constrained optimization, Department of Mathematics and Statistics, University of New Mexico, Albuquerque, New Mexico, January 31, 2008.

Abramson, Mark A., Mesh adaptive direct search algorithms for constrained mixed variable optimization, MITRE Corporation, McLean, Virginia, December 21, 2007.

Abramson, Mark A., Mesh adaptive direct search algorithms for constrained mixed variable optimization, National Security Agency, Ft Meade, Maryland, December 19, 2007.

Abramson, Mark A., Mesh adaptive direct search algorithms for constrained mixed variable optimization, Metron Incorporated, Reston, Virginia, December 6, 2007.

Abramson, Mark A., Mesh adaptive direct search algorithms for constrained mixed variable optimization, The Boeing Company, Bellevue, Washington, November 29, 2007.

Abramson, Mark A., Thomas J. Asaki, J. E. Dennis, Jr., Kevin R. O'Reilly, Rachael L. Pingel, Quantitative Object Reconstruction via Abel Transform X-Ray Tomography, *First Annual Chemical-Biological-Radiological-Nuclear (CBRN) Symposium*, United States Air Force Academy, Colorado, November 8-9, 2007.

Abramson, Mark A., Thomas J. Asaki, David A. Bethea, J. E. Dennis, Jr., Raymond Magallanez, Matthew Sottile, Improving parameter optimization performance, *INFORMS Annual Meeting*, Seattle, Washington, November 4-7, 2007.

Abramson, Mark A., Thomas J. Asaki, J. E. Dennis, Jr., Kevin R. O'Reilly, Rachael L. Pingel, Quantitative object reconstruction tomography by mixed variable optimization, *INFORMS Midwest Regional Conference*, Northwestern University, Evanston, Illinois, August 24-25, 2007.

Abramson, Mark A., Thomas J. Asaki, J. E. Dennis, Jr., Kevin R. O'Reilly, Rachael L. Pingel, Quantitative object reconstruction via x-ray tomography, Abel transforms, and mixed variable optimization, *Second International Conference on Continuous Optimization (ICCOPT-II)*, McMaster University, Hamilton, Ontario, Canada, August 13-16, 2007.

Abramson, Mark A., Special Topics in Optimization, Invited lecturer, *Data Sciences Summer School*, Los Alamos National Laboratory, Los Alamos, New Mexico, July 17-19, 2007.

*Walston, Jennifer, James W. Chrissis, and Mark A. Abramson, Search techniques for multi-objective optimization of mixed-variable systems having stochastic responses, *22nd European Conference on Operational Research*, Prague, Czech Republic, July 8-11, 2007.

Abramson, Mark A., Thomas J. Asaki, J. E. Dennis, Jr., Kevin R. O'Reilly, Rachael L. Pingel, Quantitative object reconstruction using x-ray tomography and mixed variable optimization, Los Alamos National Laboratory X-Ray Workshop, Boulder, Colorado, May 16-18, 2007.

Abramson, Mark A., Charles Audet, and John E. Dennis, Jr., Mesh adaptive direct search algorithms for black box constrained optimization, *AFOSR Program Meeting*, Arlington, Virginia, May 7-9, 2007.

*Magallanez, Raymond, Mark A. Abramson, Thomas J. Asaki, J. E. Dennis, Jr., and Matt Sottile, Surrogate strategies for computationally expensive optimization problems with CPU time-correlated functions, Los Alamos National Laboratory, Los Alamos, New Mexico, April 5, 2007.

Abramson, Mark A., Thomas J. Asaki, J. E. Dennis, Jr., Kevin R. O'Reilly, and Rachael L. Pingel, Quantitative object reconstruction using x-ray tomography and mixed variable optimization, *AMS Sectional Meeting*, Miami University, Oxford, Ohio, March 16-17, 2007.

Abramson, Mark A., Mesh adaptive direct search algorithms for black box constrained optimization, Brigham Young University, February 22, 2007.

*Juan C. Meza, Aran Garcia-Lekue, Mark Abramson, and John Dennis, Jr., Surface structure determination of nanostructures using a mesh adaptive optimization method, *SIAM Conference on Computational Science and Engineering*, Costa Mesa, California, February 19-23, 2007.

Abramson, Mark A., Arantzazu Garcia-Lekue, Raymond Magallanez, Juan C. Meza, and J. E. Dennis, Jr., NOMADm: A MATLAB software package for surrogate-based black box optimization, *SIAM Conference on Computational Science and Engineering*, Costa Mesa, California, February 19-23, 2007.

Abramson, Mark A., Mesh adaptive direct search algorithms for black box constrained optimization, Exxon-Mobil Upstream Research Company, Houston, Texas, February 9, 2007.

Abramson, Mark A., Mesh adaptive direct search algorithms for solving nasty black box constrained optimization problems, Air Force Research Laboratory, Propulsion Directorate, Wright-Patterson AFB, Ohio, November 21, 2006.

Aran Garcia-Lekue, *Juan C. Meza, Mark A. Abramson, J. E. Dennis, Jr., and M. V. Van Hove, Surface structure determination using simplified physics surrogates, *Second International Workshop on Surrogate Modelling and Space Mapping for Engineering Optimization*, Technical University of Denmark, Lyngby, Denmark, November 9-11, 2006.

Abramson, Mark A., Kevin R. O'Reilly, Thomas J. Asaki, Rachael L. Pingel, and J. E. Dennis, Jr., Quantitative object reconstruction using x-ray tomography and mixed variable optimization, *INFORMS Annual Meeting*, Pittsburgh, Pennsylvania, November 5-8, 2006.

Abramson, Mark A., Direct search methods and second-order optimality conditions, *8th Midwest Optimization Conference*, Miami University, Oxford, Ohio, October 13-14, 2006.

O'Reilly, Kevin R., Mark A. Abramson, Thomas J. Asaki, J. E. Dennis, Jr., James W. Chrissis, and Rachael L. Pingel, Quantitative object reconstruction using x-ray tomography and mixed variable optimization, *INFORMS Military Applications Society Conference*, Mystic, CT, July 24-26, 2006.

O'Reilly, Kevin R., Mark A. Abramson, Thomas J. Asaki, J. E. Dennis, Jr., and Rachael L. Pingel, A mixed variable optimization approach to the quantitative reconstruction of objects in x-ray tomography, Boeing Corporation (Phantom Works), Seattle, WA, June 29, 2006.

*O'Reilly, Kevin R., Mark A. Abramson, and Thomas J. Asaki. Quantitative object reconstruction using Abel transform tomography and mixed variable optimization, Los Alamos National Laboratory, Los Alamos, NM, March 9, 2006.

*Kharoufeh, Jeffrey P. and Mark A. Abramson, Optimal periodic inspection of a system subject to wear and shock degradation, *INFORMS Annual Meeting*, San Francisco, California, November 13-16, 2005.

Abramson, Mark A. and Charles Audet, Second-order convergence of mesh adaptive direct search, *INFORMS Annual Meeting*, San Francisco, California, November 13-16, 2005.

Abramson, Mark A., Mixed-variable optimization of a load-bearing thermal insulation system, Los Alamos National Laboratory, Los Alamos, New Mexico, June 29, 2005.

Abramson, Mark A., Second order convergence of some direct search methods, *SIAM Conference on Optimization*, Stockholm, Sweden, May 15-19, 2005.

*Brezhneva, Olga A., Mark A. Abramson and J. E. Dennis, Jr., Pattern search methods under the presence of degeneracy, *SIAM Conference on Optimization*, Stockholm, Sweden, May 15-19, 2005.

Abramson, Mark A., Introduction to applied optimization (tutorial), *1st AIAA Multidisciplinary Design Optimization Specialist Conference*, as part of the *46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Austin, Texas, April 18-21, 2005.

Abramson, Mark A., Direct search methods for engineering optimization, Miami University, Department of Mathematics and Statistics, Oxford, Ohio, March 24, 2005.

Abramson, Mark A., Direct search methods for engineering optimization, *53rd Test Wing Scientist and Engineer Conference*, Eglin AFB, Florida, February 8-10, 2005.

Abramson, Mark A., Second-order behavior of pattern search, *First International Conference on Continuous Optimization (ICCOPT-I)*, Rensselaer Polytechnic Institute, Troy, New York, August 2-4, 2004.

Abramson, Mark A., Gilles Couture, NOMAD and NOMADm: Software Demonstrations, *Surrogate Optimization Workshop*, Rice University, Houston, Texas, May 24-25, 2004.

Abramson, Mark A., A second-order analysis of pattern search, *Optimization Days 2004*, Montreal, Canada, May 10-12, 2004.

Abramson, Mark A., Pattern search algorithms for mixed variable optimization, *Air Force Operations Research Symposium 2003*, Hanscom AFB, Massachusetts, October 22-24, 2003.

Abramson, Mark A., Pattern search algorithms for engineering optimization, University of Dayton, Department of Mechanical and Aerospace Engineering, Dayton, Ohio, October 9, 2003.

Abramson, Mark A., Charles Audet, J. E. Dennis, Jr., Applying a mixed variable filter pattern search algorithm to thermal insulation system design, *16th International Symposium on Mathematical Programming*, Denmark Technical University, Copenhagen, Denmark, August 18-22, 2003.

Abramson, Mark A., J. E. Dennis, Jr., *Industrial Strength Optimization*, Series of Lectures, Wright-Patterson AFB, Ohio, August 7, 2003.

Abramson, Mark A., NOMADm: A new software package for mixed variable general constrained optimization, *71st Military Operations Research Society Symposium (MORSS) 2003*, Marine Base Quantico, Virginia, June 10-12, 2003.

Abramson, Mark A., Generalized pattern search algorithms for engineering optimization, University of Michigan, Department of Mechanical Engineering, Ann Arbor, Michigan, March 29, 2003.

Abramson, Mark A., Charles Audet, J. E. Dennis, Jr., Pattern search for mixed variable optimization problems, Institute for Mathematics and its Applications (IMA) Short Course: *Industrial Strength Optimization*, IMA, University of Minnesota, Minneapolis, Minnesota, January 6-7, 2003.

Abramson, Mark A., Generalized pattern search algorithms for mixed variable optimization, Air Force Institute of Technology, Department of Operational Sciences, Wright-Patterson AFB, December 2, 2002.

*J. E. Dennis, Jr., Charles Audet, Mark A. Abramson, Optimization using surrogates for engineering, Los Alamos Computer Science Institute (LACSI) Symposium 2002, Los Alamos, New Mexico, October 13-16, 2002.

Abramson, Mark A., Applying GPS methods to the design of a load bearing thermal insulation system, *SIAM Conference on Optimization*, Toronto, Canada, May 20-22, 2002.

Abramson, Mark A., ROK-US air power vs. North Korean long-range artillery, *66th Military Operations Research Society Symposium (MORSS) 1998*, Naval Postgraduate School, Monterey, California, June 23-25, 1998, SECRET RELROK.

Software:

- Sole designer and primary developer of the NOMADm MATLAB® software for solving nonlinear and mixed variable constrained optimization problems, in which functions may be black boxes, computationally expensive, discontinuous, nonsmooth, etc., and derivatives may not be available. NOMADm was used extensively by MathWorks, Inc. (the creator/owner of MATLAB®) in the development of the Pattern Search Solver in their Global Optimization Toolbox® [see previously named Genetic Algorithm and Direct Search (GADS) Toolbox User's Guide, p. 3].
- Original author of the Readiness-Based Leveling (RBL) FORTRAN code that controls and optimally allocates base and depot stock levels for all repairable spare parts in the US Air Force inventory.

Grants:

Optimization Tools for DART Network Design, Pacific Maritime Environmental Laboratory, National Oceanic and Atmospheric Administration, *\$6778, July–September 2005 (Principal Investigator).

Quantitative Object Reconstruction for X-Ray Imaging, Los Alamos National Laboratories, *\$22,090, October 2005–September 2008 (Principal Investigator).

Quantitative Reconstruction of Light Source Curves and Surfaces, Los Alamos National Laboratories, *\$9,910, October 2005–September 2008 (Principal Investigator).

Algorithms for Blackbox Optimization Using Surrogate Functions, Air Force Office of Scientific Research, *\$18,090, March 2007–November 2008 (Co-Principal Investigator with Charles Audet and John Dennis).

Center for Nonlinear Optimization of Discrete and Continuous Variables (at Lawrence Berkeley Laboratories), Department of Energy, travel money only (for consulting), July 2006–June 2008.

* amount restricted by federal law (e.g., salary for military faculty and students was prohibited)

Service

Editorial Service:

- Editorial Board, *Optimization and Engineering* (2008-present)
- Reviewer, *ACM Transactions on Mathematical Software*
- Reviewer, *ASME Journal of Mechanical Design*
- Reviewer, *European Journal on Operational Research*
- Reviewer, *Boeing Technical Journal*
- Reviewer, *Computational Optimization and Applications*
- Reviewer, *Information Systems and Operations Research*
- Reviewer, *Journal of Computational and Applied Mathematics*
- Reviewer, *Journal of Global Optimization*
- Reviewer, *Journal on Optimization Theory and Applications*
- Reviewer, *Mathematical Programming*
- Reviewer, *Optimization and Engineering*
- Reviewer, *Optimization Letters*
- Reviewer, *Optimization Methods and Software*
- Reviewer, *SIAM Journal on Optimization*
- Reviewer, *Smart and Sustainable Manufacturing Systems*

Institutional Service:

- UVU (2017-present):
 - Member, Faculty Senate, 2017-2020
 - Member, Ad Hoc Hiring Committee for Applied Math position, Spring 2020
 - Member, Outreach Committee, Department of Mathematics, 2017-present
 - Member, Interdisciplinary Data Science Degree Committee, 2017-present
 - Member, Research Committee, Department of Mathematics, 2017-2018
- BYU (2015-17):
 - Session Chair, BYU Annual Student Research Conference, 2016
 - Member, Calculus Committee, Department of Mathematics, 2015-2017
- AFIT (2002-2008):
 - Member, AFIT Faculty Research Council, 2007-2008
 - Member, AFIT Curriculum and Degree Requirements Committee, 2005-2007
 - Chair, Curriculum Committee, Department of Mathematics and Statistics, 2005-2007
 - Deputy Head, Department of Mathematics and Statistics, 2003-2006
 - Web Site Coordinator, Department of Mathematics and Statistics, 2003-2007
 - AFIT Catalog Representative, Department of Mathematics and Statistics, 2002-2005

Professional Affiliations:

- Member, Optimization Subcommittee, NAFEMS
- Society for Industrial and Applied Mathematics (SIAM)
- SIAM Activity Group on Optimization (SIAG/OPT)
- Mathematical Programming Society (MPS)
- Tau Beta Pi (National Engineering Honor Society)
- Omega Rho (National Operations Research Honor Society)

Honors and Awards

Academic and Professional:

- Boeing Technology Replication Award (company-wide), *Design Explorer* software, 2014
- Boeing Meritorious Invention Disclosure Award, *Computational system to provide active feedback and closed loop operation for Active Cradle and Metrology*, 2014
- Boeing Meritorious Invention Disclosure Award, *Stochastic constrained optimization*, 2012
- Mathematics Department nominee and runner-up for Gage H. Crocker Outstanding Professor Award, Air Force Institute of Technology, 2007
- PhD Thesis nominated for the Tucker Prize of the Mathematical Programming Society, 2003
- Passed Rice University Ph.D. thesis defense “with distinction”, 2002
- Best Article by a Junior Officer in 1996, *Air Force Journal of Logistics*, 1996
- Most Significant Article, *Air Force Journal of Logistics*, Summer 1996
- Mervin E. Gross Award (as top graduating student), AFIT Graduate School of Engineering, March 1994
- AFIT Distinguished Graduate, March 1994
- Air Force ROTC 4-Year Scholarship, 1981-2, 1984-7
- Numerous mathematics department scholarships, Brigham Young University, 1981-2, 1984-7

Military:

- Air Force Meritorious Service Medal, June 2008
- Defense Meritorious Service Medal, June 1999
- Air Force Commendation Medal, June 1992
- Air Force Achievement Medal, First Oak Leaf Cluster, June 1992
- Air Force Achievement Medal, December 1990
- *31 TES Company Grade Officer of the Quarter*, Oct-Dec 1990

Computer Language Skills

Expert-level proficiency in Matlab and Fortran
Proficient in C++, C, Python, Perl

References

1. Margaret H. Wright, Silver Professor of Computer Science, Courant Institute of Mathematical Sciences, New York University, 251 Mercer Street, New York, NY 10012. (212) 998-3056. mhw@cs.nyu.edu.
2. John E. Dennis, Jr., Noah Harding Professor Emeritus and Research Professor, Department of Computational and Applied Mathematics, Rice University. 8419 42nd Avenue SW, Seattle, WA 98136-2360. (206) 932-3793. dennis@caam.rice.edu.
3. Charles Audet, Professor, Département de Mathématiques et de Génie Industriel, École Polytechnique du Montréal and GERAD, C.P. 6079 Succ. Centre-ville, Montréal (Québec), H3C 3A7, Canada. (514) 340-4711 x4510. Charles.Audet@gerad.ca.
4. Alan V. Lair, Professor and Department Head, Department of Mathematics and Statistics, Air Force Institute of Technology, AFIT/ENC, Building 641, 2950 Hobson Way, Wright-Patterson AFB, OH 45433. (937) 255-3098. alan.lair@afit.edu.
5. Juan Meza, Dean, School of Natural Sciences, University of California-Merced, 5200 N. Lake Rd., Merced, CA 95343. (209) 228-4487. jcmeza@ucmerced.edu.
6. Evin Cramer, Technical Fellow, The Boeing Company, PO Box 3707, MC 42-58, Seattle, WA 98124-2207. 425-373-2680. evin.j.cramer@boeing.com.