David Russell Luke

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Education

University of California, Berkeley. Applied mathematics, B.A. *cum laude*, 1991

University of Washington, Seattle. Applied mathematics, M.Sc., December 1997

University of Washington, Seattle. Applied mathematics, Ph.D., June 2001

Appointments

April 2017- current: Full Professor (W3) of Continuous Optimization and its Applications

September 2010-March 2017 : Associate Professor (W2) of Continuous Optimization and its Applications, Institut für Numerische und Angewandte Mathematik, Universität Göttingen

September 2009-September 2010: Associate Professor with tenure, Department of Mathematical Sciences, University of Delaware

September 2004-August 2009: Assistant Professor, Department of Mathematical Sciences, University of Delaware

December 2002 - August 2004: Pacific Institute for Mathematical Sciences Postdoctoral Fellow, Simon Fraser University

July 2001- April 2003: Postdoctoral Research Assistant, Institut für Numerische und Angewandte Mathematik, Universität Göttingen

September 1998 - June 2001: Graduate Student Research Fellow, NASA/Goddard Space Flight Center

Grants and Awards

25. 2021 – 2025: Deutsche Forschungsgemeinschaft (DFG), SFB1456-B01, "Mathematics of atomic orbital tomography" (co-PI with Stefen Mathias, 2 PhD)

24. 2021 – 2025: DFG, SFB1456-C02, "Stochastic computed tomography: theory and algorithms for single-shot X-FEL imaging" (co-PI with Helmut Grubmüller, 2 PhD)

23. 2020 – 2023 DFG individual grant "Nonconvex Quadratic Composite Minimization: Theory and Algorithms" (1 PhD)

22. 2020 – 2024 DFG GRK2088 Teilprojekt B5, " Discrete Topological Optimization Techniques for the Statistical Analysis of Tree Structures" (co-PI with Stephan Huckemann, 1 PhD)

21. 2020 – 2024 DFG GRK2088 Teilprojekt B5, "Probabilistic Analysis and Stochastic Algorithms in Fixed Point Theory" (co-PI with Anja Sturm, 1 PhD)

20. November 2016: Ruf to a full Professor (W3) for mathematical optimization at the Humboldt University of Berlin

19. 2016 – 2019 Australian Research Council DP160101537, "Relaxed reflection methods for feasibility and matrix completion problems" (partner Investigator with Jonathan Borwein and Jeffrey Hogan, 564,979AUD)

18. 2015 – 2019: Deutsche Forschungsgemeinschaft (DFG), SFB755-A4, "Statistical Multi-scale Analysis for Photonic Imaging: from modelling to algorithms" (co-PI with Axel Munk, 1 Postdoc + 1 PhD)

17. 2015 – 2019: DFG, SFB755-C2, "Inverse Scattering Problems Without Phase" (co-PI with Thorsten Hohage, 2 PhD)

16. 2015 – 2020 DFG GRK2088 Teilprojekt B5, "Probabilistic Analysis and Stochastic Algorithms in Fixed Point Theory" (co-PI with Anja Sturm, 1 PhD)

15. 2015 – 2017 German-Israeli Foundation, "Algorithms for Structured Nonconvex Optimization: theory and practice", (co-PI with Marc Teboulle, 180.000€)

14. 2013–2016: Bundesministerium für Bildung und Forschung (BMBF), "Effiziente Rekonstruktion aus hochdimensionalen unvollständigen Daten in der zerstörungsfreien Materialprüfung (ZeMat) (co-PI with Felix Krahmer, 1 PhD)

13. 2011 – 2015: DFG, SFB755-A4, "Statistical Multi-scale Analysis for Photonic Imaging: from modelling to algorithms" (co-PI with Axel Munk, 1 Postdoc + 1 PhD)

12. 2011 – 2015: DFG, SFB755-C2, "Inverse Scattering Problems Without Phase" (co-PI with Thorsten Hohage, 2 PhD)

11. 2011 – 2013 DFG GRK1023, "Lagrangian and convex algebraic duality with applications to sparse/rank matrix optimization", (Mitglieder, 1 PhD)

10. 2011 – 2012: Deutscher Akademischer Austausch Dienst (DAAD), "Inverse Scattering in the Time Domain", (PI, 3848€)

9. 2009: National Science Foundation Major Research Infrastructure: "Acquisition of a Facility for Computational Approaches to Molecular-Scale Problems ", September 2009 (senior scientific personnel, $451051)

8. 2009: National Science Foundation, DMS-0712796 Amendment 001, Summer Undergraduate Research Supplement (PI, $4375)

7. 2009: National Science Foundation, DMS-0852454 Summer School on Inverse Problems, University of Delaware, June 15-July 3 (PI, $20291)

6. 2009: Institute for Mathematics and its Applications Participating Institution Summer School on Inverse Problems, University of Delaware, June 15-July 3 (PI, $70000)

5. 2007 – 2010: National Science Foundation, Division of Mathematical Sciences DMS-0712796, "Optimization of Density Functional Methods for Atomic Structure Calculations" (PI, $179000)

4. 2007: University of Delaware Center for Teaching Excellence, "Strengthening mathematics instruction with automated algorithmic mastery activities" (co-PI, $20000)

3. 2005 – 2006: Univ. Delaware Research Found., "Phase Contrast Tomography" (PI $25000)

2. 2002 – 2003: Pacific Institute for Mathematical Sciences Fellowship ($75000)

1. 1998 – 2001: NASA Graduate Student Research Fellow ($60000)

Teaching

- Regular teaching load 2 courses per semester (9 hours/week), engineering, applied mathematics and optimization.
- Short Courses:
  - School on Variational Analysis, April 19-25, 2015, Paseky nad Jizerou, Czech Republic
  - IMA Participating Institution Graduate Summer Program: Mathematics of Inverse Problems, June 15 – July 3, 2009. "Variational Analysis of Inverse Problems"
- Student Supervision:
  - *Postdoc*: Dr. Mina Saee, Postdoctoral Researcher (2020-2022); Dr. Dao Minh (external supervisor, Newcastle University, Australia, 2016-2018); Dr. Yurii Malitsky, Postdoctoral Researcher (2017-2019); Dr. Matthew Tam, Postdoctoral Researcher (2016-2018); Dr. Ron Shefi, Postdoctoral Researcher (2016); Dr. Shoham Sabach, Alexander von Humboldt Postdoctoral Fellow (2013-2015); Dr. Charitha Cherugondi, Postdoctoral Researcher (2011-2015).
  - *Ph.D.*: Henrika Härer, Dr. rer.nat (2025 expected) Dinh Thi Lan, Dr. rer.nat (2024 expected), Laura Fieback, Dr. rer.nat (2024 expected), Sanaz Behboodi, Dr. rer.nat (2024 expected), Titus Pinta, Dr. rer.nat (2024 expected), Florian Lauster, Dr. rer.nat (2022 expected), Arian Berdellima, Dr. rer. nat. (2020), Anna Martins, Dr. rer. nat. (2019), Neal Hermer, Dr. rer. nat. (2019), Nguyen Hieu Thao, Dr. rer. nat. (2017), David James, Dr. rer. nat. (co-advisor, 2017), Erdem Altuntac, Dr. rer. nat. (2016); Patrick Neumann, Dr. rer. nat. (2015), Robert Hesse, Dr. rer. nat. (2014)
  - *M.Sc./Diplom*:
    Jazib Zafar (2022), Charlotte Ackva (2021)[1], Henrika Härer (2020), Frida Randen (2020), Markus Meier (2020), Juneyoung Yang (2020), Igor Kartamyschew (2020), Alexander Dornheim (2020), Florian Lauster (2018), Max Pentzlin (2017), Xiao Yang (2017), Marco Pagel (2016), Sabrina Fiedler (2016), Rebecca Nahme (2015), Jörn Kroll (2015), Anna-Lena Martins (2015), Neal Hermer (2015), Lena Meyer (2014), Pär Mattsson, M.Sc. (2013), Christopher Gempfer (2013), Brian Rife, M.Sc. (2008)
  - *Visiting Postbachelor Researchers*: Rubén Campoy, Universidad de Alicante (Doctoral visitor, spring 2017); Dao Minh , Newcastle University, Australia (Postdoc, November, 2016); Ohad Giladi , Newcastle University, Australia (Postdoc, November, 2016); Matthew Tam, Newcastle University, Australia (PhD, October-March, 2013/2014); Maxime Leong, Paris 6, France (PhD, May-August 2014)

Recent Professional Service and Outreach

- *University Administration*
  - Member of the Dean's Council and Chief Financial Officer of the Mathematics Faculty, 2019-2021.
  - Director, Institute für Numerische und Angewandte Mathematik, 2018-2019.
  - Studienkommission 2010-
  - Chair, Berufungskomission, W1-Juniorprofessur "Mathematische Optimierung", 2017
  - Chair, Berufungskomission, W1-Juniorprofessur "Mathematik des Operations Research", 2014-2015
  - Advisory Board of the Institute für Numerische und Angewandte Mathematik, 2013-
  - Internationalisierungsbeauftragter der Math. Fakultät, 2010-

[1] Won the German OR Society's Prize for the best Masters Thesis, 2022.

- *Editorial Boards*
  - 2021-current, Associate Editor, *SIAM Journal on Optimization* (SIOPT).
  - 2020-current, Associate Editor, *Journal of Optimization Theory and Applications* (JOTA).
  - 2019-current, Section Editor for Continuous Optimization, *Open Journal of Mathematical Optimization* (OJMO).
  - 2019-current, Associate Editor, *Journal of Nonsmooth Analysis and Optimization* (JNSAO)
  - 2017-current, Associate Editor, *Advances in Computational Mathematics* (ACOM).
  - 2017-current, Associate Editor, *ESAIM: Control, Optimization and Calculus of Variations* (COCV).
  - 2018-2021, Associate Editor, *Optimization*.

- *Grant Review/Prize Committee*
  - *Ralph E. Kleinman Prize Committee (SIAM)*. 2017, Chair 2018.
  - Deutsche Forschungsgemeinschaft, 2015, 2016, 2017, 2021
  - Israeli Science Foundation, 2015
  - Austrian Science Fund (FWF), 2013, 2015, 2016, 2017, 2020
  - Berufungskomission, Universität Braunschweig, 2013
  - Natural Sciences and Engineering Research Council of Canada, 2013/14, 2017, 2021
  - National Science Foundation (NSF-USA), 2013/14
  - French National Research Agency (ANR), 2012

- *Recent Conference Organization*

12. SIAM Conference on Imaging Science March 2022, Minisymposium Organiser, "Advances in optimisation for image processing: new applications, algorithms and theory" with Marc Teboulle (Tel Aviv University)
11. SIAM Conference on Optimization July 2021, Minisymposium Organiser, "Structured Non-Convex and Non-Smooth Optimization" with Shoham Sabach (Technion)
10. DMV Annual Meeting 2020, Section Co-organiser "Continuous and Discrete Optimization", with Christoph Helmberg (Chemnitz) and Stefan Ulbrich (TU Darmstadt)
9. Thematic Programme Co-organiser, "Modern Maximal Monotone Operator Theory: From Nonsmooth Optimization to Differential Inclusions". Erwin Schrödinger Institute for Mathematics and Physics, University of Vienna, Jan.28-Mar.8, 2019.
8. Minisymposium Organizer, ISMP, Bordeaux, France, July 2018.
7. Meeting Organizer, Splitting Algorithms, Modern Operator Theory, and Applications, Casa Matematica Oaxaca (CMO) and Banff International Research Station, Sept. 17-22, 2017
6. Meeting Organizer, Central European Set-Valued and Variational Analysis Meeting, Göttingen, October 24, 2015
5. Minisymposium Organizer, "Algorithms for Nonsmooth-Nonconvex Optimization: theory and practice", International Symposium on Mathematical Programming, 2015
4. Minisymposium Organizer, "Recent Results on Linear Convergence for Iterative Proximal Algorithms in Nonconvex Settings", British-French-German Conference on Optimization, 2015.
3. "Mathematical Signal Processing and Phase Retrieval", Göttingen, Sept.1-3, 2014
2. Minisymposium Organizer, "Set-valued Analysis: recent results and applications", SIAM Conference on Optimization, San Diego, May, 2014

1. Minisymposium Organizer, "Variational methods in image processing: theory and algorithms", SIAM Conference on Imaging Sciences, Hong Kong, May, 2014

- *Software Development* (i) Contributor to Wien2k release 7.3, a computational chemistry toolbox by P. Blaha *et al* from T.U. Vienna. This package has over 2000 registered users.
  (ii) ProxToolbox, a software toolbox for projection algorithms
  (iii) SAMSARA, a reverse communication nonlinear optimization toolbox. (iv) SCAT, Symbolic Convex Analysis Toolbox (contributor and maintainer of original toolbox by J.M. Borwein and C. Hamilton).

Other Synergistic Activities and Affiliations

- *Institute for Mathematics and its Applications*. Long-term visitor to the Institute for Mathematics and its Applications, Minneapolis September 1-December 31, 2005
- *Industry collaboration*. Nanofilm, GmbH, Göttingen.
  Lambda Physik, Göttingen
  IAV, Giffhorn.
- *James Webb Space Telescope, NASA/GSFC, 1998-2001.* NASA/GSFC Graduate Student Fellow under Richard G. Lyon. Developed large-scale phase retrieval algorithms for James Webb Space Telescope (JWST) prototypes.
- Graduate and Postdoctoral Advisers:
  - Prof. James V. Burke, Department of Mathematics, University of Washington, Seattle. Graduate adviser
  - Prof. Rainer Kress, Institut für Numerische und Angewandte Mathematik, Universität Göttingen, Germany. Postdoctoral sponsor
  - Prof. Jonathan Borwein, University of Newcastle, Australia. Postdoctoral sponsor
  - Prof. Adrian Lewis, Department of Operations Research, Cornell University, Postdoctoral sponsor
- Professional Societies: American Mathematical Society (AMS), Society for Industrial and Applied Mathematics (SIAM), Gesellschaft für Angewandte Mathematik (GAMM), Deutsche Mathematiker-Vereinigung (DMV)

Languages

- English (native), German (fluent), French (reading), Spanish (rusty), Latin (long gone)

Research Keywords

Variational analysis, continuous optimization, convex and nonconvex programming, projection algorithms, operator splitting methods, convex duality, monotone operator theory, fixed point algorithms, atomic structure calculations, inverse problems, scattering theory, signal processing, data analysis.

Publications

Refereed Journals

70. D. Schmitt, J. P. Bange, W. Bennecke, A.A. AlMutairi, G. Meneghini, K. Watanabe, T. Taniguchi, D. Steil, D. R. Luke, R. T. Weitz, S. Steil, G. S. M. Jansen, S. Brem, E. Malic, S. Hofmann, M. Reutzel and S. Mathias " Formation of moiré interlayer excitons in space and time", Nature 608, 499–503 (2022). DOI 10.1038/s41586-022-04977-7

69. A. Berdellima, F. Lauster and D. R. Luke. "α-firmly Nonexapansive Operators on Metric Spaces", J. Fixed Point Theory and Applications (2022) 24:14.

68. H. N. Thao, O. Soloviev, D. R. Luke and M. Verhaegen, "Projection methods for high numerical aperture phase retrieval", Inverse Problems, (2021).

67. F. Lauster and D. R. Luke, " Convergence of proximal splitting algorithms in CAT(k) spaces and beyond ", Fixed Point Theory Algorithms Sci Eng 2021, 13 (2021).

66. G. S. M. Jansen, M. Keunecke, M. Duevel, C. Moeller, D. Schmitt, W. Bennecke, F. J. S. Kappert, D. Steil, D. R. Luke, S. Steil, S. Mathias, "Efficient orbital imaging based on ultrafast momentum microscopy and sparsity-driven phase retrieval", New Journal of Physics, 22 063012 (2020).

65. H. N. Thao, D. R. Luke, O. Soloviev, M. Verhaegen, "Phase retrieval with sparse phase constraint", SIAM J. Mathematics of Data Science, **2**(1):246-263 (2020).

64. D. R. Luke and A.-L. Martins, "Convergence Analysis of the Relaxed Douglas-Rachford Algorithm ", *SIAM J. on Optimization*, **30**(1):542–584(2020).

63. D. R. Luke, and M. Teboulle and N.H. Thao, "Necessary conditions for linear convergence of iterated expansive, set-valued mappings", *Mathematical Programming A*, (2020) 180:1-31. DOI: 10.1007/s10107-018-1343-8.

62. D. R. Luke, S. Sabach and M. Teboulle , "Optimization on Spheres: Models and Proximal Algorithms with Computational Performance Comparisons", *SIAM J. Mathematical Data Science*, **1**(3), 408-445 (2019).

61. N. Hermer, D. R. Luke and A. Sturm, "Random Function Iterations for Consistent Stochastic Feasibility", *Numerical Functional Analysis and Optimization*, **40**(4):386–420 (2019). DOI:10.1080/01630563.2018.1535507.

60. D. R. Luke, N. H. Thao and M. K. Tam, "Implicit Error Bounds for Picard Iterations on Hilbert Spaces ", *Vietnam J. Mathematics*, **46**(2), 243–258 (2018).

59. D. R. Luke, N. H. Thao and M. K. Tam, "Quantitative convergence analysis of iterated expansive, set-valued mappings ", *Mathematics of Operations Research* **43**(4):1143-1176 (2018). DOI: 10.1287/moor.2017.0898.

58. F. Lauster, D. R. Luke and M. K. Tam, "Symbolic Computation with Monotone Operators ", *J. Set Valued and Variational Analysis*, **26**:353–368 (2018), DOI 10.1007/s11228-017-0418-7.

57. D. R. Luke and R. Shefi, "A Globally Linearly Convergent Method for Pointwise Quadratically Supportable Convex-Concave Saddle Point Problems", *J. Math. Anal. and Appl.* **457**(2), 1568–1590 (2018).

56. A. Kruger, D. R. Luke and N. H. Thao, "Set Regularities and Feasibility Problems ", *Mathematical Programming B*, (2018) 168: 279–311 DOI:10.1007/s10107-016-1039-x.

55. A. Kruger, D. R. Luke and N. H. Thao, About Subtransversality of Collections of Sets *Set-Valued and Variational Analysis*, **25**(4), 701–729 (2017).

54. D. R. Luke, S. Sabach, M. Teboulle, and K. Zatlawey "A Simple Globally Convergent Algorithm for the Nonsmooth Nonconvex Single Source Localization Problems" *J. Global Optimization* (2017) **69**: 889–909. https://doi.org/10.1007/s10898-017-0545-6.

53. C. Charitha, J. Dutta and D. R. Luke, "Lagrange Multipliers, (Exact) Regularization and Error Bounds for Monotone Variational Inequalities ", *Mathematical Programming A*, (2017) 161: 519–549. DOI 10.1007/s10107-016-1022-6.

52. T. Aspelmeier, C. Charitha and D. R. Luke, "Local Linear Convergence of the ADMM/Douglas–Rachford Algorithms without Strong Convexity and Application to Statistical Imaging", *SIAM J. on Imaging Sciences* **9**(2) pp. 842-868(2016).

51. R. Hesse, D. R. Luke, S. Sabach and M. K. Tam, "Proximal Heterogeneous Block Input-Output Method and application to Blind Ptychographic Diffraction Imaging". *SIAM J. on Imaging Sciences*, **8**(1):426–457 (2015).

50. R. Hesse, D. R. Luke and P. Neumann, "Alternating Projections and Douglas-Rachford for Sparse Affine Feasibility". *IEEE Transactions on Signal Processing*, **62**(18):4868–4881, 2014.

49. J. Hagemann, A.-L. Robisch, D. R. Luke, C. Homann, T. Hohage, P. Cloetens, H. Suhonen, and T. Salditt, "Reconstruction of wave front and object for inline holography from a set of detection planes ". *Optics Express*, **22**(2014): 11552-11569.

48. H. H. Bauschke, D. R. Luke, H. Phan and X. Wang, "Restricted normal cones and sparsity optimization with affine constraints". *Foundations of Computational Mathematics*, **14**(1):63–83 (2014).

47. R. Hesse and D. R. Luke, "Nonconvex notions of regularity and convergence of fundamental algorithms for feasibility problems". *SIAM Journal on Optimization*, **23**(4), 2397-2419, 2013.

46. H. H. Bauschke, D. R. Luke, H. Phan and X. Wang, "Restricted normal cones and the method of alternating projections: applications". *J. Set Valued and Variational Analysis*, **21**:475–501 (2013).

45. H. H. Bauschke, D. R. Luke, H. Phan and X. Wang, "Restricted normal cones and the method of alternating projections: theory". *J. Set Valued and Variational Analysis*, 21:431–473 (2013).

44. D. R. Luke, "Prox-regularity of rank constraint sets and implications for algorithms". *J. Math. Imaging and Vision*, **47**(3): 231–238 (2013).

43. D. R. Luke, "Local Linear Convergence of Approximate projections onto regularized sets". *Nonlinear Analysis*, **75**:1531–1546 (2012).

42. T. Arens, A. Lechleiter and D. R. Luke, "MUSIC for Extended Scatterers as an Instance of the Factorization Method". *SIAM J. Appl. Math.*, **70**(4):1283–1304 (2009).

41. A. S. Lewis, D. R. Luke and J. Malick, "Local convergence for alternating and averaged nonconvex projections". *Foundations of Computational Mathematics*, **9**(4):485–513(2009).

40. L. D. Marks and D. R. Luke, "Robust Mixing for *Ab-Initio* Quantum Mechanical Calculations". *Phys. Rev. B.*, **78**:075114–075126 (2008).

39. D. R. Luke, "Finding Best Approximation Pairs Relative to a Convex and a Prox-regular Set in a Hilbert Space". *SIAM J. Optim.* **19**(2):714–739 (2008).

38. J. M. Borwein and D. R. Luke, "Dynamics of a Ramanujan-type Continued Fraction with Cyclic Coefficients". *The Ramanujan Journal*, **16**:285–304(2008).

37. D. R. Luke and Anthony Devaney, "Identifying scattering obstacles by the construction of nonscattering waves". *SIAM J. Appl. Math.*, **68**:271–291 (2007).

36. D. R. Luke and R. Potthast, "The Point Source Method for Inverse Scattering in the Time Domain". *Mathematical Methods in the Applied Sciences*, **29**(3):online(2006).

35. H. H. Bauschke and P. L. Combettes and D. R. Luke, "A Strongly Convergent Reflection Method for Finding the Projection onto the Intersection of Two Closed Convex Sets in a Hilbert Space". *J. of Approx. Theory*, **141**(1):63-69 (2006).

34. J. M. Borwein and D. R. Luke, "Dynamics of a Ramanujan-type Continued Fraction with Cyclic Coefficients". *The Ramanujan Journal*, **16**:285–304 (2008).

33. J. M. Borwein and D. R. Luke, "Dynamics of a Continued Fraction of Ramanujan with Random Coefficients". *Abstract and Applied Analysis*, **2005**(5):449–467(2005).

32. D. R. Luke, "Image synthesis for inverse obstacle scattering using the Eigenfunction Expansion Theorem", *Computing*, **75**(2-3):181–196(2005).

31. D. R. Luke, "Relaxed Averaged Alternating Reflections for Diffraction Imaging", *Inverse Problems*, **21**:37-50 (2005).

30. H. H. Bauschke, P. L. Combettes and D. R. Luke, "Finding Best Approximation Pairs Relative to Two Closed Convex Sets in Hilbert Spaces". *J. Approx. Theory*, **127**:178-192 (2004).

29. D. R. Luke, "Multifrequency inverse obstacle scattering: the point source method and generalized filtered backprojection". *Mathematics and Computers in Simulation*, **66**:297-314 (2004).

28. J. V. Burke and D. R. Luke, "Variational analysis applied to the problem of optical phase retrieval". *SIAM J. Contr. Optim.*, **42**(2):576-595 (2003).

27. H. H. Bauschke, P. L. Combettes, and D. R. Luke, "A Hybrid Projection Reflection Method for Phase Retrieval", *J.Opt.Soc.Amer.A*, **20**(6):1025-1034 (2003).

26. D. R. Luke and R. Potthast, "The no response test - a sampling method for inverse scattering problems". *SIAM J. Appl. Math.*, **63**(4):1292-1312 (2003).

25. H. H. Bauschke, P. L. Combettes, and D. R. Luke, "Phase retrieval, error reduction algorithm, and Fienup variants: A view from convex optimization". *J. Opt. Soc. Am. A*, **19**:1334-1345 (2002).

24. D. R. Luke, J. V. Burke and R. G. Lyon, "Optical Wavefront Reconstruction: Theory and Numerical Methods", *SIAM Review*, **44**:169-224 (2002).

Refereed Conference Proceedings and Book Chapters

23. A. Daniilidis, D. R. Luke and M. K. Tam, "Characterizations of Super-regularity and its Variants", in *Splitting Algorithms, Modern Operator Theory and Applications*, H. H. Bauschke, D. R. Luke and R. Burachik eds. Springer, (2019).

22. S. Hosseini, D. R. Luke and A. Uschmajew, "Tangent and Normal Cones for Low-Rank Matrices", in *Nonsmooth Optimization and Its Applications*, Hosseini, Seyedehsomayeh, Mordukhovich, Boris S., Uschmajew, Andre (Eds.), Birkhauser, (2019).

21. D. R. Luke, A. Martins and M. K. Tam. "Relaxed Cyclic Douglas-Rachford Algorithms for Nonconvex Optimization ", ICML 2018 Workshop: Modern Trends in Nonconvex Optimization for Machine Learning, Stockholm, July 2018.

20. D. R. Luke and Yura Malitsky, "Block-coordinate primal-dual method for the nonsmooth minimization over linear constraints", in *Distributed and Large-Scale Optimization*, P. Giselsson and A. Rantzer, editors. Springer Verlag, 2018.

19. J. M. Borwein and D. R. Luke, "Duality and Convex Optimization", in *Handbook of Imaging*, 2nd Ed. Otmar Scherzer, ed. Springer Verlag, Heidelberg, 2015.

18. Jingwei Liang, Jalal Fadili, Gabriel Peyré and Russell Luke "Activity Identification and Local Linear Convergence of Douglas–Rachford under Partial Smoothness", Proceedings of the Fifth International Conference on Scale Space and Variational Methods in Computer Vision, 2015.

17. R. Hesse, D. R. Luke and P. Neumann, "Projection Methods for Sparse Affine Feasibility: results and counterexamples", *Signal Processing with Adaptive Sparse Structured Representations*, (Lausanne, 2013).

16. J. M. Borwein and D. R. Luke, "Duality and Convex Optimization", in *Handbook of Imaging*, Otmar Scherzer, ed. Springer Verlag, Heidelberg, pages 229–270, 2011.

15. J. M. Borwein and D. R. Luke, "Entropic regularization of the ℓ_0 function". In *Fixed-Point Algorithms for Inverse Problems in Science and Engineering*, H. Bauschke, R. Burachik, P. Combettes, V. Elser, D. R. Luke, and H. Wolkowicz, editors. Springer Verlag, New York, pages 65–92, 2011.

14. H. H. Bauschke, P. L. Combettes and D. R. Luke, "A New Generation of Iterative Transform Algorithms for Phase Contrast Tomography". *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing*, (Philadelphia, 2005 - greater than 50% rejection rate).

13. H. H. Bauschke, P. L. Combettes, and D. R. Luke, "On the structure of Some Phase Retrieval Algorithms", *Proceedings of the IEEE International Conference on Image Processing*, (Rochester, NY, September 22-25, 2002) pp.841-844.

12. D. R. Luke and R. Potthast, "The Point Source Method in Acoustic Scattering : numerical reconstruction of the scattered field from far field measurements of inhomogeneous media", *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing* (Orlando, FL, May 13-17, 2002) pp.IV-3541-IV-3544.

Books

11. A. Egner, D. R. Luke and T. Salditt editors, *Nanoscale Photonic Imaging*, Springer Verlag, 2020.

10. H. Bauschke, R. Burachik, and D. R. Luke editors, *Splitting Algorithms, Modern Operator Theory, and Applications*, Springer Verlag, 2019.

9. H. Bauschke, R. Burachik, P. Combettes, V. Elser, D. R. Luke, and H. Wolkowicz, editors, *Fixed-Point Algorithms for Inverse Problems in Science and Engineering*, Springer Verlag, 2011.

8. D. H. Bailey and J. M. Borwein and N. J. Calkin and R. Girgensohn and D. R. Luke and V. H. Moll, *Experimental Mathematics in Action*, A. K. Peters Ltd. (2007).

Invited Articles

7. D. R. Luke, "Phase Retrieval, What's New?" SIAM Optimization Activity Group Newsletter, 2017.

6. D. R. Luke, "Calculus Without Derivatives" [book review]. SIAM Rev. (2015).

5. D. R. Luke, "On the regularity of fixed-point iterations and practical convergence results", *Oberwolfach Reports*, Oktober, 2012.

4. D.R. Luke, "The factorization method for inverse problems" [book review]. SIAM Rev. 51 (2009), no. 2, 446–449.

3. D. R. Luke, "E Unibus Fissiparousness: a review of *Everything and More* by David Foster Wallace", *SIAM Rev.*, 47(1):178-182 (2005)

2. D. R. Luke, "A Simple Multiresolution Technique for Diffraction Image Recovery," *Pacific Institute for the Mathematical Sciences Newsletter*, **7**(2):17-20 (2003)

Thesis

1. *Analysis of Optical Wavefront Reconstruction and Deconvolution in Adaptive Optics*,
   D. R. Luke, Ph.D. Dissertation, June 2001.
   Download: `http://num.math.uni-goettingen.de/ r.luke/publications/Dissertation.pdf`

Recent Invited Conferences/Lectures

- Modern Nonsmooth Optimization, Seattle, August 8-10, 2022
- Workshop on Nonlinear Functional Analysis and Its Applications, Haifa, April 4-6, 2022
- SIAM Conference on Imaging, Berlin, March 21-25, 2022
- Colloquium, University of California at Merced, February 24, 2022
- Numerical Analysis and Optimization Seminar, Dortmund, January 17, 2022
- Plenary, Workshop on Optimization, Metric Bounds, Approximation and Transversality, 13-17 December, 2021
- Oxford Data Science Seminar, November 8, 2021
- One World Mathematics of Information, Data and Signals Seminar, September 16, 2021
- Max Plank Institute for Mathematics in the Sciences, Leipzig, Numerical Algebra and Optimization Seminar, Sept 13, 2021
- Fields Institute/University of Waterloo, "Optimization: Theory, Algorithms, Applications Lecture Series", September 9, 2021
- 7th Annual Loma Linda Workshop, August 2-4, 2021
- SIAM Conference on Optimization, July 20-23, 2021
- ESI Workshop Tomographic Reconstructions and their Startling Applications, Vienna, March 18, 2021
- 64th Annual Meeting of the Australian Mathematical Society Dec. 9, 2020
- Workshop on Geometry and Optimization in Honor of Victor Zalgaller Dec. 8, 2020, Haifa Israel.

- Workshop on Optimization, Metric Bounds and Transversality, Australia, 30. November-4. December, 2020
- Mathematical Foundations of Optimisation in Data Science November 24, 2020, Cambridge, UK
- One World Optimization Seminar, May 4, 2020
- Game, Dynamics and Optimization Rome, Feb. 24, 2020
- Plenary, XIII Brazilian Workshop on Continuous Optimization, Rio de Janeiro, Brazil, September 23 – 27, 2019
- 71st Workshop: Advances in Nonsmooth Analysis and Optimization, ERICE 24 June - 1 July 2019
- Linnaeus Excellence Center LCCC, "Large-Scale and Distributed Optimization", Lund, Sweden, June 14-16, 2017.
- Hausdorff Center for Mathematics Workshop "Nonsmooth Optimization and its Applications", Bonn, May 15 - May 19, 2017
- Continuous Optimization: Challenges and Applications, The Technion, Israel, September 5-8, 2016
- Nonsmooth and Stochastic Optimization with Applications to Energy Management, WIAS, Berlin, May 10-12, 2016
- Joint Annual Meeting of GAMM and DMV, Braunschweig, March 7-11, 2016
- International Seminar on Optimization and Related Areas (ISORA), Lima, October 5-9, 2015
- International Symposium on Mathematical Programming, Pittsburg, July, 2015
- Universität Würzburg, Seminar zur Optimierung, June 2015
- International Conference on Variational Analysis, Optmization and Quantitative Finance, Limoges, May 2015
- New Trends in Optimization for Imaging, TSIMF, Sanya, China, January 19-23, 2015
- Optimization Seminar, Technion, Isreal, January 11, 2015
- Plenary, ALEL 2014, International Conference on Optimization, Seville, 5-7 June, 2014
- SIAM Conference on Imaging Science, Hong Kong, 12-14 May 2014
- 2014 SIAM Conference on Optimization, San Diego, 19-22 May, 2014
- Plenary, French-German Conference on Mathematical Image Analysis, Paris, 13-15 January, 2014