Dmitriy Leykekhman

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Appointments

2013–present	Associate Professor, Department of Mathematics, University of Connecticut
2007–2013	Assistant Professor, Department of Mathematics, University of Connecticut
2005–2007	Pfeiffer-VIGRE Post-Doctoral Associate, CAAM, Rice University
2004	Lecturer, Department of Mathematics, Cornell University (Summer and Fall semesters)
2003	Givens Research Associate, Argonne National Laboratory (Summer)
2001–2003	Teaching Assistant, Department of Mathematics, Cornell University
2000–2001	Research Assistant on NSF Grant, Cornell University
1998–2000	Teaching Assistant, Department of Mathematics, Cornell University

Education

Cornell University	Mathematics	PhD, August 2004 *Thesis Title:* "Pointwise Weighted Error Estimates for Parabolic Finite Element Equations" *Advisor:* Lars B. Wahlbin
Cornell University	Mathematics	MS, January 2001
New York University	Mathematics	BA, May 1998

Research Interests

Numerical methods for the solution of partial differential equations, with emphasis on finite element methods. Mathematical theory of conforming and non-conforming finite element methods. Local and pointwise behavior of the finite element solutions. Numerical approximation of optimal control problems governed by partial differential equations.

Honors and Awards

Givens Associate at Argonne National Laboratory, Summer 2003
VIGRE Graduate Fellowships, Spring 2003
NSF Graduate Research Assistantship, Fall 2000 and Spring 2001
Sidney Goldwater Roth Prize in Mathematics, 1998
Dean's Honors List, 1998
Junior Mathematical Award, 1997

Funding

Recent Publications

1. D. Leykekhman and B. Li,
   Weak discrete maximum principle of finite element methods in convex polyhedra, submitted, arXiv:1907.06871.

2. D. Leykekhman
   Pointwise error estimates for C^0 interior penalty approximations of biharmonic problems,
   submitted

3. D. Leykekhman, B. Vexler, D. Walter
   Numerical Analysis of Sparse Initial Data Identification for Parabolic Problems,
   submitted, arXiv: 1905.01226

4. V. Chousionis, D. Leykekhman, M. Urbański
   On the dimension spectrum of infinite subsystems of continued fractions,
   accepted to AMS Transactions

5. V. Chousionis, D. Leykekhman, M. Urbański
   The dimension spectrum of graph directed Markov systems,
   Sel. Math. New Ser. (2019) 25:40.

6. H. Antil, D. Leykekhman
   A brief introduction to PDE-constrained optimization. Frontiers in PDE-constrained optimization, IMA Vol. Math. Appl.,**163**, Springer, New York, (2018), 3–40.

7. D. Leykekhman and B. Vexler
   Discrete maximal parabolic regularity for Galerkin finite element methods for non-autonomous parabolic problems,
   SIAM J. Numer. Anal., **56** (2018), No. 4, 2178–2202.

8. D. Leykekhman and B. Vexler
   Optimal a priori error estimates of parabolic optimal control problems with a moving point control,
   Solvability, regularity, and optimal control of boundary value problems for PDEs, Springer INdAM Ser., 22, Springer, Cham, 2017, 327–356.

9. D. Leykekhman and B. Vexler
   Global and interior pointwise best approximation results for the gradient of Galerkin solutions for parabolic

problem,
SIAM J. Numer. Anal., **55** (2017), No. 4, 2025–2049.

10. D. Leykekhman and B. Li
    Maximum-norm stability of the finite element Ritz projection with mixed boundary conditions,
    Calcolo **54** (2017) no. 2, 541–565.

11. D. Leykekhman and B. Vexler
    Discrete maximal parabolic regularity for Galerkin finite element methods,
    Numer. Math. **135** (2017), no. 3, 923–952.

12. D. Leykekhman and M. Pruitt
    On the Positivity of Discrete Harmonic Functions and the Discrete Harnack Inequality for Piecewise Linear Finite Elements,
    Math. Comp. **86** (2017), 1127–1145

13. D. Leykekhman and B. Vexler
    A priori error estimates for three dimensional parabolic optimal control problems with pointwise control,
    SIAM J. Control Optim., **54** (2016), No. 5, pp. 2403–2435.

14. D. Leykekhman and B. Vexler
    Pointwise best approximation results for Galerkin finite element solutions of parabolic problems,
    SIAM J. Numer. Anal., **54** (2016), No. 3, 1365–1384.

15. D. Leykekhman and B. Vexler
    Finite Element Pointwise Results on Convex Polyhedral Domains,
    SIAM J. Numer. Anal., **54** (2016), No. 2, 561–587.

16. D. Leykekhman and B. Vexler
    Optimal a priori error estimates of parabolic optimal control problems with pointwise control,
    SIAM J. Numer. Anal., **51** (2013), No. 5, 2797–2821.

17. D. Leykekhman, D. Meidner, and B. Vexler
    Optimal error estimates for finite element discretization of elliptic optimal control problems with finitely many pointwise state constraints,
    Computational Optimization and Applications, **55** (2013), No. 3, 769–802.

18. D. Leykekhman and M. Heinkenschloss
    Discontinuous Galerkin Methods for the Solution of Advection-Dominated Elliptic Linear-Quadratic Optimal Control Problems. Local Error Analysis,
    SIAM J. Numer. Anal. **50** (2012), No. 4, 2012–2038.

19. D. Leykekhman
    Investigation of Commutative Properties of Discontinuous Galerkin Methods in PDE Constrained Optimal Control Problems,
    Journal of Sci. Comp. **53**, Number 3 (2012), 483–511.

20. J. Guzmán, D. Leykekhman, and M. Neilan
    A family of non-conforming elements and the analysis of Nitsches method for a singularly perturbed fourth order problem,
    Calcolo, **49**, Number 2 (2012), 95–125.

21. J. Guzmán and D. Leykekhman
    Pointwise error estimates of finite element approximations to the Stokes problem on convex polyhedra,
    Math. Comp. **81** (2012), 1879-1902

22. A. Demlow, D. Leykekhman, A.H. Schatz, and L.B. Wahlbin
    Best approximation property in the W_∞^1 norm for finite element methods on graded meshes,
    Math. Comp. **81** (2012), 743–764.

23. M. Heinkenschloss and D. Leykekhman
    Local Error Estimates for SUPG Solutions ofAdvection-Dominated Elliptic Linear-Quadratic Optimal Control Problems,
    SIAM J. Numer. Anal., **47** (2010), No. 6, 4607–4638.

24. J. Guzmán, D. Leykekhman, J. Rossmann, and A.H. Schatz
    Optimal max-norm error estimates for the finite element method and Hölder estimates for the Green's function on convex polyhedral domains,
    Numer. Math., **112** (2009), no. 2, 221–243.

25. E. Burman, J. Guzmán, and D. Leykekhman
    Weigthed a priori error estimates for continuous interior penalty method,
    IMA J. Numer. Math. **29** (2009), no. 2, 284–314.

26. D. Leykekhman and L.B. Wahlbin
    A posteriori error estimate by recovered gradients in the parabolic finite element equation,
    BIT Numerical Mathematics, **48**, Number 3 (2008), 585-605 .

27. D. Leykekhman
    Uniform error estimates in the finite element methods for a singularly perturbed reaction-diffusion problem,
    Math. Comp. **77** (2008), 21–39.

28. D. Leykekhman
    Pointwise localized error estimates for parabolic finite element equations,
    Numer. Math. **96** (2004), no. 3, 583–600.

Technical Reports

1. M. Heinkenschloss and D. Leykekhman,
   Local Error Estimates for SUPG Solutions of Advection-Dominated Elliptic Linear-Quadratic Optimal Control Problems,
   Tech. Report TR08 30, Department of Computational and Applied Mathematics, Rice University, Houston, TX 770051892, 2008.

2. D. Leykekhman and M. Heinkenschloss,
   Local Error Analysis of Discontinuous Galerkin Methods for Advection-Dominated Elliptic Linear-Quadratic Optimal Control Problems ,
   Tech. Report TR10 11, Department of Computational and Applied Mathematics, Rice University, Houston, TX 770051892, 2010.

Invited Talks

1. IGDK 1754, Technische Universität München, Germany, July 15, 2019

2. Numerical Analysis Seminar, University of Maryland, College Park, April 9, 2019

3. Workshop: High Order Structure-Preserving Numerical Methods Algorithms, Analysis and Applications, Sanya, January 14–18, 2019

4. Mini-Workshop: Numerical Analysis for Non-Smooth PDE-Constrained Optimal Control Problems, Oberwolfach, December 16–22, 2018

5. 2018 NSF-CBMS: Computational Methods in Optimal Control, Jackson State University, July 26, 2018

6. 14th Viennese Conference on Optimal Control and Dynamic Games, July 3–6, 2018

7. Applied and Computational Math Seminar, George Mason University, November 17, 2017

8. Foundations of Computational Mathematics, Barcelona, July 10–19, 2017

9. Third International Conference on Engineering and Computational Mathematics (ECM2017), Hong Kong Polytechnic University, May 31–June 2, 2017

10. Applied Mathematics Seminar, University of Utah, May 15, 2017

11. Workshop "Space-time Methods for Time-dependent Partial Differential Equations", Oberwolfach, March 13-17, 2017

12. Numerical Analysis and PDE Seminar, University of Delaware, October 6, 2016

13. IGDK 1754 Talk, TU München, November 20, 2015

14. Oberseminar Numerik, University of Tübingen, November 19, 2015

15. IWH Symposium on Simul. and Optim. of Extreme Fluids, Heidelberg University, November 10-12, 2014

16. CMA Guest lecture, University of Oslo, August 29, 2014

17. Optimization and Scientific Computing Seminar, University of Graz, August 19, 2014

18. Computational and Applied Mathematics Seminar, Chalmers, August 13, 2014

19. Numerical Analysis Seminar, University of Maryland, College Park, April 16, 2013

20. Colloquium, WPI, March 29, 2013

21. Computational Mathematics Seminar, University of Pittsburgh, February 26, 2013

22. Eigenvalues/singular values and fast PDE algorithms, Banff, June 24–29, 2012

23. Seminari d'equacions en derivades parcials i aplicacions, Universitat Politècnica de Catalunya, March 15, 2012

24. Numerical Analysis and PDE Seminar, University of Delaware, December 8, 2011

25. New England Numerical Analysis Day, University of Massachusetts Dartmouth, April 16, 2011

26. Scientific Computing Seminar, Brown University, March 20, 2009

27. PDE and Image Analysis Seminar, University of Connecticut, February 2009

28. PDEs and Numerical Methods Seminar, Penn. State University, April 14, 2008

29. Numerical Analysis Seminar, University of Maryland, March 13, 2007

30. Mathematical Colloquium, University of Central Florida, February 2007

31. Mathematical Colloquium, University of Connecticut, January 25, 2007

32. CAAM Graduate Seminar, Rice University, November 2006

33. Geometry and Analysis Seminar, Rice University, February 8, 2006

34. CAAM Colloquium, Rice University, November 2004

35. Mathematical Sciences Graduate Students Seminar, Cornell University, December 2003

Contributed Talks

1. OCIP 2019, Technische Universität München, Germany, March 11–13, 2019

2. GAMM 89th Annual Meeting, Munich, Germany, March 19–23, 2018

3. Finite Element Circus, UMBC, October 20–21, 2017

4. ENUMATH 2017 Conference, Voss, Norway, September 25–29, 2017

5. Finite Element Circus, Rutgers University, April 21–22, 2017

6. Finite Element Circus, WPI, Worcester, MA, October 14–15, 2016

7. INdAM meeting OCERTO 2016, Cortona, Italy, June 20–24, 2016

8. MAFELAP 2016, Brunel University, UK, June 14–17, 2016

9. DelMar Numerics Day, George Mason University, Fairfax, VA, May 14, 2016

10. Finite Element Circus, University of Maryland, College Park, MD, April 15–16, 2016

11. OCIP 2016, Technische Universität München, Germany, March 14–16, 2016

12. Finite Element Circus, University of Massachusetts, Dartmouth, MA, October 16–17, 2015

13. GAMM 86th Annual Meeting, Lecce, Italy, March 23–27, 2015

14. Finite Element Circus, IMA, Minneapolis, MN, October 24–25, 2014

15. Finite Element Circus, University of Delaware, October 18–19, 2013

16. SIAM Conference on Control and Its Applications 2013, San Diego, CA, July 8–10, 2013

17. MAFELAP 2013, Brunel University, UK, June 11–14, 2013

18. OCIP 2013, Technische Universität München, Germany, March 11–13, 2013

19. WONAPDE 2013, University of Concepción, Chile, January 13–18, 2013

20. Finite Element Circus, University of Pittsburgh, October 19–20, 2012

21. Finite Element Circus, Rutgers University, April 13–14, 2012

22. OCIP 2012, Technische Universität München, Germany, March 12–14, 2012

23. ICIAM 2011, Vancouver, Canada, July 18–22, 2011

24. Workshop on Numerical Methods for Optimal Control and Inverse Problems, Technische Universität München, Germany, March 14–16, 2011

25. Finite Element Circus, Brown University, April 30 - May 1, 2010

26. WONAPDE 2010, University of Concepción, Chile, January 11–15, 2010

27. MAFELAP 2009, Brunel University, UK, June 9–12, 2009

28. Finite Element Circus, Rensselaer Polytechnic Institute, October 24–25, 2008

29. Finite Element Circus, Cornell University, October 19–20, 2007

30. Finite Element Circus, University of Maryland-College Park, April 20–21, 2007

31. Finite Element Rodeo, University of Houston, March 2–3, 2007

32. MAFELAP 2006, Brunel University, UK, June 13–16, 2006

33. Finite Element Rodeo, Texas A&M, March 3–4, 2006

34. Finite Element Circus, Rutgers University, October 21–22, 2005

35. WONAPDE 2004, University of Concepción, Chile, January 13–16, 2004

36. Finite Element Circus, Cornell University, November 7–8, 2003

37. Finite Element Circus, University of Maryland-College Park, March 8–9, 2002

Professional Services and Synergistic Activities

- Co-Organizer of *Mini-Workshop: Numerical Analysis for Non-Smooth PDE-Constrained Optimal Control Problems*, Oberwolfach, Germany, December 16-22, 2018

- Organizer for minisymposium "Global and local error estimates for problems with singularities or low regularity", MAFELAP 2013, Brunel University, Uxbridge, UK, June 11-14, 2013 (co-organized with A. Demlow).

- Co-Organizer of *Exterior Finite Element Calculus, NSF/CBMS Regional Conference in the Mathematical Sciences*, Brown University, June 2012

- Organizer of *Finite Element Circus*, University of Connecticut, October 2011

- Organizer for minisymposium "Mathematical aspects of finite element methods", MAFELAP 2009, Brunel University, Uxbridge, UK, June 2009 (co-organized with A. Demlow).

- Panel and external reviewer for NSF and AFOSR

- Refereed papers for SIAM Journal on Numerical Analysis, Mathematics of Computation, Numerische Mathematik, SIAM Journal of Scientific Computing, Computer Methods in Applied Mechanics and Engineering, BIT Numerical Mathematics, Applied Numerical Mathematics, Applied Mathematics and Computation, Journal of Computational and Applied Mathematics, International Journal of Mathematics and Mathematical Sciences, Journal of Differential Equations, Mathematics and Computers in Simulation, Numerical Methods for Partial Differential Equations, SIAM Journal on Control and Optimization, IMA Journal of Numerical Analysis

- Reviewing for Math. Reviews

Teaching Experience

1. MATH 2410, Differential Equations, University of Connecticut (Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2019)

2. MATH 1132, Calculus 2, University of Connecticut (Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2019)

3. MATH 1071, Calculus for Business and Economics, University of Connecticut (Spring 2014)

4. MATH 5510, Numerical Analysis I, University of Connecticut (Fall 2013, Fall 2016, Fall 2019)

5. MATH 1110, Survey of Calculus with Applications , University of Connecticut (Fall 2012)

6. MATH 1131, Calculus 1 , University of Connecticut (Fall 2012, Spring 2013)

7. MATH 3511, Numerical Analysis 2, University of Connecticut (Spring 2012)

8. MATH 2210, Applied Linear Algebra, University of Connecticut (Spring 2012, Spring 2014, Fall 2015, Fall 2018)

9. MATH 2110, Multivariable Calculus, University of Connecticut (Fall 2011, Fall 2013)

10. MATH 5520, Introduction to the Finite Element Method, University of Connecticut (Spring 2009, Spring 2011)

11. MARN 5898, Special Topics in Marine Sciences, University of Connecticut (Spring 2010)

12. MATH 1050Q, Mathematical Modeling in the Environment, University of Connecticut (Spring 2009, Fall 2009, Spring 2010, Fall 2010)

13. MATH 3795, Introduction to Computational Mathematics, University of Connecticut (Fall 2008)

14. MATH 115Q, Calculus I, University of Connecticut (Spring 2008)

15. MATH 116Q, Calculus II, University of Connecticut (Fall 2007, Spring 2008)

16. CAAM 402, Analysis II, Rice University (Spring 2006, Spring 2007)

17. CAAM 552, Partial Differential Equations, Rice University (Fall 2005, Fall 2006)

18. CAAM 336, Differential Equations in Science and Engineering, Rice University (Spring 2005)

19. Instructor, Calculus for Engineers (MATH 191), Cornell University (Fall 2004)

20. Instructor, Calculus for Engineers (MATH 192), Cornell University (Summer 2004)

21. Instructor, Calculus 1 (MATH 111), Cornell University (Fall 2001)

22. Instructor, Calculus for Engineers (MATH 192), Cornell University (Fall 2000)

23. Teaching Assistant, Calculus for Engineers (MATH 294), Cornell University (Spring 2003)

24. Teaching Assistant, Numerical Analysis (MATH 425), Cornell University (Spring 2002, Fall 2003)

25. Teaching Assistant, Complex Analysis (MATH 612), Cornell University (Spring 2000)

26. Teaching Assistant, Applied Complex Analysis (MATH 422), Cornell University (Spring 1999)

Copies of teaching evaluations are available upon request

Ph.D. Advisees

- Cagnur Corekli, graduated 2016 (University of Connecticut).

- Kyle Allaire

- Andrew Miller

Skills

Experience with Matlab, C

Languages

English, Russian

Citizenship

USA

References

References available upon request