Garving Kevin Luli, Curriculum Vitae

CONTACT
INFORMATION

Department of Mathematics
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RESEARCH
INTERESTS

Analysis (harmonic analysis, Whitney extension, multivariate interpolation and approximation, PDE's in fluid mechanics and geometry, real algebraic geometry, and theoretical computer science)

EMPLOYMENT

- Professor, **Department of Mathematics, UC Davis**, July 2021 -
- Associate Professor, **Department of Mathematics, UC Davis**, July 2017 - June 2021.
- Assistant Professor, **Department of Mathematics, UC Davis**, August 2013 - June 2017.
- Gibbs Assistant Professor, **Department of Mathematics, Yale University**, July 2010 - June 2013.

VISITING
POSITIONS

- Visiting member, Yau Mathematical Sciences Center, Tsinghua University, China, July, 2015, 2011, 2010.
- Visitor, Chinese University of Hong Kong, China, April, August, 2015.
- Visitor, Harvard University, November, 2015

EDUCATION

Princeton University

Ph.D., Mathematics, June 2010.

- Advisor:
  Professor Charles Fefferman

Stanford University

M.S., Statistics, June 2005

B.S., with Honors in Mathematics, June 2005

Minor in Physics, June 2005

Drew College Preparatory School

Valedictorian, June 2001

HONORS AND
GRANTS

- NSF DMS Award #2247429, 2023-2026
- Simons Foundation: Collaboration Grants for Mathematicians, 2022-2027
- Chancellor's Fellow, 2019-2024.
- New Research Initiatives and Collaborative Interdisciplinary Research (Large Grant), 2016-2017.

- NSF CAREER Award, DMS # 1554733, 2016-2021.
- NSF Grant, DMS #1265668, 2013-2016.
- Stanford University undergraduate research award, 2005.
- Robert C. Byrd Scholar, 2001-2005.

PAPERS

1. *Univariate range- restricted interpolation algorithms*, with F. Jiang, C. Liang, and Y. Liang,
   Journal of Computational and Applied Mathematics, 425: 115040, 2023.

2. *On C^m solutions to systems of linear inequalities*, with K. O'Neill,
   Advances in Mathematic, 422(1): 109025, 2023.

3. *Smooth selection for infinite sets*, with F. Jiang and K. O'Neill,
   Advances in Mathematics, 407: 108566, 2022.

4. *C^2 Interpolation with Range Restriction*, with F. Jiang and F. Fefferman,
   Rev. Mat. Iberoam., 39(2): 649-710, 2022.

5. *On the Shape Fields Finiteness Principle*, with F. Jiang and K. O'Neill,
   International Mathematics Research Notices, 2022(23): 18895-18918

6. *C^m Semialgebraic Sections on the Plane*, with C. Fefferman,
   J. Math. Soc. Japan, 1-53 (February, 2022). DOI: 10.2969/jmsj/86258625

7. *Vaping discussion in the COVID-19 pandemic: An observational study using Twitter data.*, with Lyu JC, Ling PM.
   PLoS One, 2021 Dec 8;16(12):e0260290. doi: 10.1371/journal.pone.0260290. PMID: 34879077; PMCID: PMC8654216.

8. *COVID-19 Vaccine–Related Discussion on Twitter: Topic Modeling and Sentiment Analysis*, with C. Lyu and H. Le,
   J Med Internet Res, 2021;23(6):e24435, DOI: 10.2196/24435

9. *Understanding the Public Discussion About the Centers for Disease Control and Prevention During the COVID-19 Pandemic Using Twitter Data: Text Mining Analysis Study*, with C. Lyu,
   J Med Internet Res, 2021;23(2):e25108, DOI: 10.2196/25108

10. *Algorithms for Nonnegative $C^2(R^2)$ Interpolation*, with F. Jiang,
    Advances in Mathematics, 385:107756, 2021.

11. *$C^2(R^2)$ Nonnegative extension by bounded-depth operators*, with F. Jiang,
    Advances in Mathematics, 2020, https://doi.org/10.1016/j.aim.2020.107391.

12. *Nonnegative $C^2(R^2)$ interpolation*, with F. Jiang,
    Advances in Mathematics, Volume 375, 2 December 2020, 107364.

13. *Solutions to a System of Equations for C^m Functions*, with C. Fefferman,
    Rev. Mat. Iberoam., Electronically published on June 30, 2020. doi: 10.4171/rmi/1217 (to appear in print)

14. *Generators for the C^m-closures of Ideals*, with C. Fefferman,
    Rev. Mat. Iberoam., Electronically published on June 30, 2020. doi: 10.4171/rmi/1218.

15. *On one-dimension semi-linear wave equations with null conditions*, with P. Yu and S. Yang,
    Advances in Mathematics, Volume 329, 30 April 2018, Pages 174-188.

16. *Interpolation of data by smooth nonnegative functions*, with C. Fefferman and A. Israel,
Rev. Mat. Iberoam., Volume 33, Issue 1, 2017, pp. 305-324

17. *Finiteness Principles for Smooth Selection*, with C. Fefferman and A. Israel,
Geom. Funct. Anal., (2016) 26: 422-477.

18. *On the generalized Buckley-Leverett Equation*, with J. Burczak, R. Granero-Belinchón,
J. Math. Phys., 57, 041501 (2016).

19. *Fitting a Sobolev function to data: Part I*, with C. Fefferman and A. Israel,
Rev. Mat. Iberoam., Volume 32, Issue 1, 2016, pp. 275-376.

20. *Fitting a Sobolev function to data: Part II*, with C. Fefferman and A. Israel,
Rev. Mat. Iberoam., Volume 32, Issue 2, 2016, pp. 649-750.

21. *Fitting a Sobolev function to data: Part III*, with C. Fefferman and A. Israel,
Rev. Mat. Iberoam., Volume 32, Issue 3, 2016, pp. 1039-1126

22. *Polynomial Ideals Arising from Equations for C^m Functions,*, Andrea Bonfiglioli,
Rita Fioresi and Alberto Parmeggiani, (ed),
Topics in Mathematics, Quaderno UMI, 2015.

23. *The Brenner-Hochster-Kollár and Whitney Problems for Vector-Valued Functions and Jets*, with C. Fefferman,
Rev. Mat. Iberoam., 30 (2014), no. 3, 875-892.

24. *The Structure of Sobolev Extension Operators*, with C. Fefferman and A. Israel,
Rev. Mat. Iberoam, Volume 30, Issue 2, 2014, pp. 419-429.

25. *Sobolev Extension By Linear Operators*, with C. Fefferman and A. Israel,
J. Amer. Math. Soc. 27 (2014), no. 1, 69-145.

26. *The spine of an SQG almost-sharp front* , with C. Fefferman and J. Rodrigo,
Nonlinearity 25 (2012), no. 2, 329-342.

27. *$C^{m,\omega}$ Extension by Bounded-depth Linear Operators*,
Advances in Mathematics, 224 (2010), no. 5, 1927-2021.

28. *On the Capillary Problem for Compressible Fluids*, with R. Finn,
Journal of Mathematical Fluid Mechanics, **9** (2007), 87-103.

29. *Analysis and Interpretation of Hard X-ray Emission from the Bullet Cluster (1ES 0657558), the Most Distant Cluster Observed by RXTE*, with V. Petrosian, G. Madejski, The
Astrophysical Journal, **652** (2006), 948-954.

Books

- (with P. Yu) English and Chinese translations of *Finite Groups* by J. P. Serre, International Press, 2016.

Book Reviews

- Luli, K. "Methods of geometric analysis in extension and trace problems," Bulletin of the AMS 2015, 1 and 2.

ADVISEES	:

- PhD students: Fushuai (Black) Jiang, 2016-2021 (current postion: Novikov Post-doctoral Fellow at the University of Maryland)
- Postdocs: Kevin O'Neill, 2018-2021 (current position: Gibbs Assistant Professor at Yale University)
- Undergraduate students: Edith He, Maximilien Gilli, Chen Liang, Yutong Liang.

TEACHING EXPERIENCE, DEPARTMENT AND UNIVERSITY SERVICE

UC Davis

- 2022-2023
  - Math 201C, Math 127B, Math 189, Math 021C
  - Memember, Summer AI Mentoring
  - Member, KAP Search Committee
  - Member, Letters and Science College Assembly
  - Organizer for The 15th Whitney Problems Online Workshop, 2023

- 2021-2022
  - FRS 003 First-Year Seminar, Math 201C, Math 189, Math 021C
  - Member, Math Displays, Career and Other Events Committee
  - Member, New Faculty Mentoring
  - Applied Math admissions committee
  - Member, Letters and Science College Assembly

- 2020-2021
  - Math 21, Math 189, Math 201C
  - KAP hiring committee
  - Qualifying exam committee for Raaghav Ramani
  - Applied Math admissions committee
  - AI Mentor
  - Summer REU, 2021
  - Organizer for The 14th Whitney Problems Online Workshop, 2021

- 2019-2020
  - Math 21C Calculus III, Math 201C graduate analysis III
  - Applied Math and PDE Seminar organizer
  - FRC member
  - Chair selection committee
  - Graduate Studies Fellowship Review Committee
  - Qualifying exam committee for Austin Tran

- 2018-2029
  - Math 21C Calculus III, Math 189 Advanced Problem Solving, Math 201C graduate analysis III
  - Applied Math and PDE Seminar organizer
  - FRC member
  - Graduate Student Internal Fellowship Review Committee

- 2016-2017
  - Math 21C Calculus III, 150C Representation Theory
  - Applied Math and PDE Seminar Organizer
  - Department Newsletter Editor
  - Member of GGAM

- 2015-2016

- Math 180 Topics in Analysis, 21A Calculus I, 150A Represention Theory
- Academic Senate Representative
- In-residence faculty
- Organizer for Applied Math & PDE Seminar (Fall)
- Member of GGAM
- Graduate program committee

- 2014-2015
  - Math 21C Calculus III, 150A Group Theory, Math 280 Topics in Harmonic Analysis
  - In-residence faculty
  - Reviewer for the PSA Travel Award for postdocs at Davis
  - Organizer for Combined Applied Math & PDE seminar (Spring)
  - Graduate program committee: Contributed problems to the qualifying exams; graduate students admissions.
  - Member of GGAM

- 2013
  - Math 21A Calculus I, 21C Calculus III

Yale University

- 2012
  - Math 246A Ordinary Differential Equations
  - Math 480 Senior Seminar
  - Math 325 Introduction to Functional Analysis (Graduate)
  - Freshman, Sophomore Academic Advisor

- 2011
  - Math 246A Ordinary Differential Equations
  - Math 480 Senior Seminar
  - Math 325 Introduction to Functional Analysis (Graduate)
  - Freshman Academic Advisor

- 2010
  - Math 246A Ordinary Differential Equations
  - Math 320 Introduction to Measure Theory (Graduate)
  - Math 480 Senior Seminar
  - Ph.D. Qualifying Exam Committee

TALKS

- The 15th Whitney Problems Workshop (Online), 2023
- Seminar Talk, Yau Mathematical Sciences Center, Tsinghua University, 2023, June.
- Seminar Talk, Beijing International Center for Mathematical Research, Peking University, 2023, June.
- The 14th Whitney Problems Workshop (Online), 7/8/2021
- CUNY, New York, Harmonic Analysis and PDEs Seminar, 12/4/2020.
- University of Wisconsin, Madison, Analysis Seminar, 10/20/2020.
- Beijing International Center of Mathematical Research, Peking University, PDE/Analysis Seminar, 12/11/2018.
- Chinese Academy of Mathematics and Systems Sciences (CAS), Colloqium, 12/10/2018.
- McGill University, Canada, Analysis Seminar, 10/26/2018.
- Czech Academy of Sciences, International Conference Applications of Mathematics 2018, August 22-25, 2018.

- Trinity College, Ireland, The 11th Whitney Problems Workshop, August 13-17, 2018.
- University of British Columbia, Diff. Geom, Math. Phys., PDE Seminar, 01/09/2018.
- University of Central Florida, Colloqium, October 27, 2017.
- Whitney Extension Problems: C^m and Sobolev functions on subsets of $\mathbb{R}^n$, Haifa, Israel, May 29, 2016 - June 2, 2016
- Chinese University of Hong Kong, Seminar, 3/23/2016
- Chinese University of Hong Kong, Seminar, 12/3/2015
- Eighth Whitney Problems Workshop, Luminy, France, 10/23/2015-10/27/2015
- Chinese University of Hong Kong, Special Lecture Series, China, 8/13/2015-8/19/2015
- School of Mathematics, Fudan University, China, 5/29/2015
- Chinese Academy of Sciences, China, 5/27/2015
- Chinese University of Hong Kong, Colloquium, 4/30/2015
- 33nd Annual Western States Mathematical Physics Meeting, Caltech, 2/16/2015
- GGAM Mini Conference, UC Davis, 2/3/2015
- Whitney Problems Workshop, Williamsburg, 8/19/2014.
- Student-Run Applied & Math Seminar, UC Davis, 4/16/2014.
- Combined Applied Math & PDEs, UC Davis, 11/5/2013
- Whitney Problems Banff International Research Station Workshop, 4/22/2013
- 38th Arkansas Spring Lecture Series, 4/5/2013
- University of Hawaii, Colloquium, 2/20/2013
- SUNY at Stony Brook, Colloquium, 2/7/2013
- Michigan State University, East Lansing, Colloquium, 2/5/2013
- University of Massachusetts at Amherst, Colloquium, 2/4/2013
- University of Oregon, Eugene, Colloquium, 1/30/2013
- Texas A&M University, Colloquium, 1/28/2013
- Washington University in St. Louis, Colloquium, 1/24/2013
- University of Virginia, Colloquium, 1/22/2013
- UC Davis, Colloquium, 1/18/2013
- City University of Hong Kong, 1/14-1/17/2013
- Ohio State University, Recruitment talk, 1/09/2013.
- Fields Institute Focus Program on Whitney Problems, 8/27/2012.
- SIAM Conference on Analysis of Partial Differential Equations, San Diego, 11/14-11/17,2011.
- Whitney Problems Workshop, Williamsburg, 8/1/2011.
- Analysis Seminar at Tsinghua University, Beijing, China, 6/23, 2011.
- Applied Analysis Seminar at Yale University, 9/28, 2010
- Calculus of variations, singular integrals, and compressible flows, Madrid, Spain, 9/21-9/27, 2010.
- AIM workshop on Differentiable structures on finite sets, 8/6/2010.
- Analysis Seminar at the University of Connecticut, 2/26/2010.
- Analysis Seminar at the University of Pennsylvania, 2/3/2010.
- Analysis Seminar at SUNY Stony Brook, 1/20/2010.
- AIMS Fifth International Conference on Dynamical Systems and Differential Equations, title of talk presented: "Radial Solutions to the Capillarity Problem for Compressible Fluids," 2005.