

Timothy J. Ferguson

Curriculum Vitae

Department of Mathematics, University of Alabama, Tuscaloosa, AL
Associate Professor

Employment

Department of Mathematics, University of Alabama, Tuscaloosa, AL
Associate Professor
Fall 2020–Present

Department of Mathematics, University of Alabama, Tuscaloosa, AL
Assistant Professor
Fall 2014–Fall 2020

Mathematics Department, Vanderbilt University, Nashville, TN
Assistant Professor (non-tenure track) Fall 2011–Spring 2014

Education

University of Michigan, Ann Arbor, Michigan
2006–2011
Ph.D. in Mathematics, April 2011
Advisor: Peter Duren

University of Richmond, Richmond, VA
2002–2006
B.S. with honors in Mathematics, Minors in Computer Science and Latin

University of Warwick, Coventry, England
Study Abroad Program through University of Richmond
Jan. 2005–June 2005

Publications

At the University of Alabama

Ferguson, Timothy. *Good Lambda Inequalities and Variable Orlicz Hardy Spaces*. Submitted.

Ferguson, Timothy. *Bergman and Szegő projections, Extremal Problems, and Square Functions*. Submitted.

Ferguson, Timothy, Tao Mei and Brian Simanek. *H^∞ -calculus for semigroup generators on BMO*. *Advances in Mathematics* 347 (2019), 408–441.

- Ferguson, Timothy. *Equivalence among variable exponent Hardy or Bergman spaces*. Journal of Mathematical Analysis and Applications 475 (2019), no. 1, 173–189.
- Acharyya, Soumyadip and Timothy Ferguson. *Sums of Weighted Differentiation Composition Operators*. Complex Analysis and Operator Theory 13 (2019), no. 3, 1465–1479.
- Ferguson, Timothy and William Ross. *The range and valence of a real Smirnov function*. Analysis and Mathematical Physics 9 (2019), no. 1, 497–521.
- Ferguson, Timothy. *Regularity of Extremal Functions in Weighted Bergman and Fock Type Spaces*. Rocky Mountain Journal of Mathematics 49 (2019), no. 1: 47–71.
- Ferguson, Timothy. *Bounds on Integral Means of Bergman Projections and their Derivatives*. Houston Journal of Mathematics 45 (2019), no. 2, 567–588.
- Ferguson, Timothy. *Uniform Approximation of Extremal Functions in Weighted Bergman Spaces*. Comput. Methods Funct. Theory 18 (2018), no. 3, 439–453.
- Ferguson, Timothy. *Bounds on the Norm of the Backward Shift and Related Operators in Hardy and Bergman Spaces*. Illinois Journal of Mathematics 61 (2017), no. 1-2, 81–96.
- Ferguson, Timothy. *Bergman-Hölder Functions, Area Integral Means and Extremal Problems*. Integral Equations and Operator Theory 87 (2017), no. 4, 545–563.
- Ferguson, Timothy. *Extremal Problems in Bergman Spaces and an Extension of Ryabykh's H^p Regularity Theorem for $1 < p < \infty$* . Indiana University Mathematics Journal 66 (2017), no. 1. 259–274.

Before the University of Alabama

- Bell, Steven, Timothy Ferguson, and Erik Lundberg. *Self-commutators of Toeplitz operators and isoperimetric inequalities*. Math. Proc. R. Ir. Acad. 144 (2014), no. 2. DOI: 10.3318/PRIA.2014.114.03
- Ferguson, Timothy. *Solution of extremal problems in Bergman spaces using the Bergman projection*. Comput. Methods Funct. Theory. 14 (2014), no. 1, 35–61.
- Ferguson, Timothy. *Linear Extremal Problems in Bergman Spaces and an Extension of Ryabykh's Theorem*. Illinois J. Math. 55 (2011), no. 2, 555–573.
- Ferguson, Timothy and Charles Johnson. *Gangster Operators and Invincibility of Positive Semidefinite Matrices*. Linear Algebra Appl. 433 (2010), 2096–2110.
- Ferguson, Timothy. *Continuity of Extremal Elements in Uniformly Convex Spaces*. Proc. Amer. Math. Soc. 137 (2009), no. 8, 2645–2653.
- Lepping, Ronald P., C.-C. Wu, Daniel Berdichevsky, and Timothy Ferguson. *Estimates of magnetic cloud expansion at 1 AU*. Ann. Geophysicae, 26 (2008), 1919-1933.
- Lepping, Ronald P., Daniel Berdichevsky, and Timothy Ferguson. *Estimated errors in magnetic cloud model fit-parameters with force free cylindrically symmetric assumptions*. J. Geophys. Res., 108(A10) (2003), 1356.

Presentations

- Invited Talk. *Variable Exponent Spaces of Analytic Functions*. April 27, 2019. Analysis Day, University of Michigan-Dearborn.
- Equivalence among variable exponent Hardy or Bergman spaces*. January 16, 2019. Joint Mathematics Meetings. Baltimore, MD.
- (Coauthor of presentation with Xuan Wang. Xuan presented). *Harmonic Conjugation in Variable Exponent Harmonic Bergman Spaces*. Southeastern Analysis Meeting. March 15–17, 2019. University of Alabama, Tuscaloosa, AL.
- Uniform Approximation of Extremal Functions in Weighted Bergman Spaces*. April 15, 2018. American Mathematical Society Spring Southeastern Sectional Meeting. Vanderbilt University, Nashville, TN.
- The Range and Valence of a Real Smirnov Function*. March 24, 2018. Southeastern Analysis Meeting. Georgia Institute of Technology, Atlanta, Georgia.
- Norm of the Backward Shift and Related Operators in Hardy and Bergman Spaces*. March 18, 2017. Southeastern Analysis Meeting. University of Tennessee, Knoxville.
- The Range and Valence of Real Smirnov Functions*. Jan. 5, 2017. Joint Mathematics Meetings. Atlanta, Georgia.
- Regularity for Extremal Problems in Bergman Spaces of Extremal Problems for Analytic Functions and Their Connections to Other Topics*. Sept. 21, 2016. Baylor University.
- Mean Holder Continuity, Area Integral Means and Extremal Problems*. July 21, 2016. International Workshop on Operator Theory and Applications. Washington University, St. Louis.
- Regularity for Extremal Problems in Bergman Spaces of Extremal Problems for Analytic Functions and Their Connections to Other Topics*. March 16, 2016. University of Michigan, Ann Arbor.
- Regularity for Extremal Problems in Bergman Spaces of Analytic Functions and the p -Harmonic Equation*. October 23, 2015. University of Alabama, Birmingham. Mathematics Colloquium.
- The p -Harmonic Equation and Extremal Problems in Bergman Spaces*. March 29, 2015. American Mathematical Society Southeastern Sectional Meeting (Special Session on Nonlinear Operator Theory and Partial Differential Equations). University of Alabama, Huntsville.
- Extremal Problems in Bergman Spaces and an Extension of Ryabykh's Hardy Space Regularity Theorem*. March 8, 2015. Southeastern Analysis Meeting, University of Georgia.
- Regularity of Extremal Functions in Weighted Bergman and Fock Type Spaces*. March 8, 2014. Southeastern Analysis Meeting, Clemson University.

- Regularity of Extremal Functions in Weighted Bergman and Fock Type Spaces.* January 17, 2014. Joint Mathematics Meetings, Baltimore, Maryland.
- Self-commutators of Toeplitz operators and isoperimetric inequalities.* May 23, 2013. Hilbert Function Spaces, Gargnano, Italy.
- Self-commutators of Toeplitz operators and isoperimetric inequalities.* March 15, 2013. Southeastern Analysis Meeting, Virginia Tech.
- Presentation on the paper *Duality of multiparameter Hardy spaces H^p on spaces of homogeneous type* by Yongsheng Han, Ji Li, and Guozhen Lu. Internet Analysis Seminar, Georgia Tech, June 11 and June 14, 2012.
- Bounds on integral means of Bergman projections.* March 11, 2012. American Mathematical Society Spring Southeastern Section Meeting. University of South Florida, Tampa, Florida.
- Presentation on the paper *Carleson Measures for Analytic Besov Spaces* by Arcozzi, Rochberg, and Sawyer. Internet Analysis Seminar, St. Simon's Island, Georgia. June 12 and June 17, 2011. Sponsored by Georgia Tech.
- Explicit Solutions of some Extremal Problems in Bergman Spaces.* March 17, 2011. Southeastern Analysis Meeting, University of Florida.
- Regularity of Solutions to Extremal Problems in Bergman Spaces.* January 9, 2011. Joint Mathematics Meetings, New Orleans.
- Regularity of Extremal Problems in Bergman Spaces and Extensions of Ryabykh's Theorem.* Special Session on Operator Theory. AMS Southeastern Sectional Meeting, University of Richmond, VA, November 6, 2010.
- Extremal Problems in Bergman Spaces and an Extension of Ryabykh's Theorem.* Southeastern Analysis Meeting, Georgia Institute of Technology, March 26, 2010.
- Extremal Problems in Bergman Spaces and an Extension of Ryabykh's Theorem.* Analysis Seminar, University of Tennessee, Knoxville, November 4, 2009.
- Extremal Problems in Bergman Spaces and an Extension of Ryabykh's Theorem.* Geometric Function Theory Seminar, University of Michigan, October 28, 2009.
- Continuity of Extremal Elements in Uniformly Convex Spaces and Ryabykh's Theorem.* Universidad Autonoma de Madrid, Madrid, Spain, June 23, 2009.
- Continuity of Extremal Elements in Uniformly Convex Spaces and Ryabykh's Theorem.* Southeastern Analysis Meeting XXV, University of South Florida, March 22, 2009.
- Continuity of Extremal Elements in Uniformly Convex Spaces and Ryabykh's Theorem.* Joint Mathematics Meetings, January 6, 2009.
- Continuity of Extremal Elements in Uniformly Convex Spaces.* Geometric Function Theory Seminar, University of Michigan, September 10, 2008.

Solving the Dirichlet problem with Rational Data. Joint Mathematics Meetings: Special Session in Research in Mathematics by Undergraduates, Phoenix, AZ, January 8, 2004.

Ferguson, Timothy, and Lenny Jones. *Maximum LCM Partitions: Part II.* Joint Mathematics Meetings: AMS Session on Number Theory, I, San Diego, CA. January 6, 2002.

Students

Xuan Wang. *Harmonic Conjugation in Variable Exponent Harmonic Bergman Spaces* (Ph.D. thesis). Completed in Spring 2020.

Khalid Said. Current Ph.D. student.

Conferences Organized

Southeastern Analysis Meeting (SEAM 35). University of Alabama, March 15-17, 2019.

AMS Special Session on Analytic Function Spaces and Operators on Them. Joint Mathematics Meetings, Jan. 9, 2016, Seattle, Washington. Co-organizer with Hyun Kwon.

Other Service

Referee for: Proceedings of the American Mathematical Society, Illinois Journal of Mathematics, Complex Variables and Elliptic Equations, Proceedings of the Royal Society of Edinburgh, Section A; Collectanea Mathematica, Complex Analysis and Operator Theory, Computational Methods and Function Theory.

Reviewer for Mathematical Reviews.

Outreach

Working with an undergraduate student to study zeros of Bergman space extremal problems (Fall 2019).

Helped organize the University of Alabama high school mathematics tournament in the 2016–2017, 2017–2018, and 2018–2019 academic years.

Mentored a graduate student who is part of an underrepresented group as part of the “Tide Together” program in 2016–2017.

Basic Extremal Problems. Talk given to Pi Mu Epsilon, the undergraduate math honor society at the University of Alabama. Nov. 5, 2014.

Famous Proofs of the Pythagorean Theorem. Talk given in the Vanderbilt Undergraduate Mathematics Seminar. October 8, 2013.

Spoke to the Math Club at Linganore High School in Frederick County, Maryland. December, 2011.

Teaching Experience

Courses Taught:

At the University of Alabama:

Math 125 Calculus I,
Math 126 Calculus II,
Math 146 Honors Calculus II.
Math 227 Calculus III.
Math 247 Honors Calculus III.
Math 355. Probability.
Math 485/585 Intro. Complex Variables/Intro. Complex Calculus
Math 486/586 Real Analysis.
Math 587 Real Analysis II.
Math 580 (Graduate) Real Analysis I.
Math 583 (Graduate) Complex Analysis
Math 681 (Graduate) Real Analysis II
Math 684 (Graduate) Complex Analysis II.
Math 686 (Graduate) Functional Analysis

At Vanderbilt University:

Math 261 Complex Analysis, Spring 2013
Math 196 Differential Equations with Linear Algebra, Fall 2013, Spring 2014
Math 194 Linear Algebra, Fall 2012
Math 175 Multivariable Calculus, Fall 2013
Math 155B Accelerated Single Variable Calculus II,
Spring 2012 (2 sections) and Fall 2012

At University of Michigan:

Math 115 Calculus I, Fall 2007 and Fall 2008

Courses for which I was teaching assistant:

At Vanderbilt University:

Math 155A Accelerated Single Variable Calculus I, Fall 2011.

At University of Michigan:

Math 215 Multivariate Calculus, Spring 2010, Fall 2010
Math 216 Introduction to Differential Equations, Fall 2009, Spring 2011

Funding Received

NSF DMS 1900-600. Southeastern Analysis Meeting (SEAM 35). \$31,174. PI on grant.

Received RGC grant from the University of Alabama entitled “Regularity Results for Extremal Problems in Spaces of Analytic and Harmonic Functions.” This grant supports summer research. \$4500.

Received funding to speak at the Southeastern Analysis Meeting at the Georgia Tech in March 2018.

Received funding to speak at the Southeastern Analysis Meeting at the University of Tennessee in March 2017.

Received funding to speak at the Southeastern Analysis Meeting at the University of Georgia in March 2015.

Received funding to speak at the Southeastern Analysis Meeting at Clemson University in March 2014.

Received funding to speak at the Hilbert Function Space conference in Gargnano, Italy in May 2013.

Received funding to speak at the Southeastern Analysis Meeting at Virginia Tech in March 2013.

Received funding to attend the Workshop on the Corona Problem at the Fields Institute in Toronto, Canada in June 2012.

Received funding in June 2012 to attend the follow up meetings to the Internet Analysis Seminar on Multiparametric Harmonic Analysis, sponsored by Georgia Tech.

Received funding in June 2011 to attend the follow up meetings to the Internet Analysis Seminar on the Dirichlet Space, sponsored by Georgia Tech.

Received funding to speak at the Southeastern Analysis Meeting at the University of Florida in March 2011.

Received funding to speak at the Southeastern Analysis Meeting at the Georgia Institute of Technology in March 2010.

Received funding to speak at the University of Tennessee, Knoxville, November 2009.

Received funding to speak at the Universidad Autonoma de Madrid, June 2009.

Received funding to speak at the Southeastern Analysis Meeting at the University of South Florida, Tampa in March 2009.

Enhanced Fellowship from the University of Michigan Mathematics Department - Provided full funding for 4 semesters.