David V. Cruz-Uribe, OSF
Curriculum Vitae

Department of Mathematics
University of Alabama
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Citizenship U.S.

Education

- A.B. in mathematics, University of Chicago, 1985.
- Ph.D. in mathematics, University of California, Berkeley, 1993, Donald Sarason, advisor.

Faculty Positions

- Research Assistant Professor, Purdue University, 1993 to 1996.
- Assistant Professor, Trinity College, 1996 to 2002.
- Associate Professor, Trinity College, 2002 to 2005.
- Full Professor, Trinity College, 2005 to 2015.
- Professor and Chair, University of Alabama, 2015 to present.

Prior Administrative Experience (Trinity College)

- Departmental Calculus Review, September 2012 to June 2014.
- Departmental Statistics Review, April 2011 to May 2012.
- Chairman, Department of Mathematics, July 2008 to June 2010.
- College Appointments and Promotions Committee, 2007-2009.
- Faculty Parliamentarian, 2001-2008.
- College Academic Affairs Committee, 2001-2004. Chairman, 2003-2004.
- Committee on Academic Standards and Excellence; 1999-2001. Chairman, 2000-2001.
- College Retention Team, 1998-2002.

Teaching Experience

Calculus, differential equations for engineering students, real analysis, Fourier analysis, partial differential equations, foundations of mathematics, elementary statistics for economics and the social sciences.

Trinity First Year Program Seminars

- 2007, 2009, 2012: Rich and Poor, White and Colored: Race and Class in the U.S. and Trinity College
- 2004: Imagining Heaven and Hell: Utopia and Dystopia in Literature and Film
- 2001: The Radical Christian Ideal
- 2000: Radical Christian Poverty

Student Research Supervised

- 2015: Independent Study, Greg Convertito , *Lebesgue measure and integral*.
- 2014-15: Senior Honors Thesis, Philip Cho, *Sturm-Liouville theory*.
- 2014: Independent Study, Philip Cho, *Lebesgue measure and integral*.
- 2013-14: Interdisciplinary Science Program Independent Research, Greg Convertito, *An elementary calculus problem with surprising connections to number theory*; *p-hyperbolic trig functions*.
- 2013: Independent Study, Philip Cho, *Introductory harmonic analysis*
- 2012: Independent Study, Greg Vaughan, *Nowhere differentiable functions on the real line*
- 2010: Senior Honors Thesis, Adam Wright, *The Kalman filter: the optimal linear estimator*.
- 2008: Senior Honors Thesis, Haley Lepo, *Numerical evidence for the Muckenhoupt conjecture*.
- 2005: Interdisciplinary Science Program Independent Research, Leighann Kinter, Lisa Pham, *Classifying cubic equations*.
- 2004: Interdisciplinary Science Program Independent Research, James Piette, *Monte Carlo analysis of poker hands*
- 2002: Interdisciplinary Science Program Independent Research, Daniel Fitch, *Computing the maximal operator*.

Grants and Awards

- National Science Foundation research grant 1362425, 2014-2017.
- Ministerio de Ciencias e Innovacion, Spain, foreign investigator on research grant MTM2012-30748, 2012-2015.
- Ministerio de Ciencias e Innovacion, Spain, foreign investigator on research grant MTM2009-08934, 2009-2012.
- Trinity College Faculty Research Committee, Summer Research Grant, 2009.

- Consejeria de Innovacion, Ciencia y Empresa of the Junta de Andalucia, Spain, research grant, Summer, 2009.
- Consiglio Nazionale delle Ricerche, Italy, research grant, January, 2009.
- Trinity College Stewart-Dowart Faculty Development Fund, 2000 to present.
- Ford Foundation Minority Postdoctoral Fellowship, 1998-1999.
- National Science Foundation Minority Graduate Fellowship, 1989-1992.
- Phi Beta Kappa, University of Chicago chapter, 1984.

Research Interests

Harmonic analysis, especially weighted norm inequalities and extrapolation theory, variable Lebesgue spaces, applications of harmonic analysis to PDEs

Research Publications

(1) *Extrapolation in weighted variable Lebesgue spaces*, Trans. Amer. Math. Soc., to appear. (Joint with L. Wang.)

(2) *Regularity results for weak solutions of elliptic PDEs below the natural exponent*, Ann. Mat. Pura Appl., to appear (2015). (Joint with K. Moen, and S. Rodney.)

(3) *Convergence in measure of approximate identities in variable Lebesgue spaces*, Anal. Appl. (Singap.), to appear. (Joint with A. Fiorenza.)

(4) *Logarithmic bump conditions for Calderón-Zygmund operators on spaces of homogeneous type*, Publ. Mat., 59, 1 (2015), 17–43. (Joint with T.C. Anderson and K. Moen.)

(5) *Variable Lebesgue Spaces and Hyperbolic Systems*, Advanced Courses in Mathematics, CRM Barcelona, Birkhauser, Basel, 2014. (Joint with A. Fiorenza, M. Ruzhansky, J. Wirth.)

(6) *Errata to Gaussian bounds for degenerate parabolic equations [J. Funct. Anal. 255 (2008), no. 2, 283-312]*, J. Funct. Anal. 267 (2014), no. 9, 3507–3513. (Joint with C. Rios.)

(7) *Variable Hardy spaces*, Indiana Univ. Math. J. 63, 2 (2014), 447–493. (Joint with D. Wang.)

(8) *The Kato problem for operators with weighted ellipticity*, Trans. Amer. Math. Soc., to appear. (Joint with C. Rios.)

(9) *A note on the off-diagonal Muckenhoupt-Wheeden conjecture*, Advanced Courses in Mathematical Analysis V, World Scientific, 2013 (to appear). (Joint with J.M. Martell and C. Pérez.)

(10) *Logarithmic bump conditions and the two-weight boundedness of Calderón-Zygmund operators*, Adv. Math. 255 (2014), 706–729. (Joint with A. Reznikov and A. Volberg.)

(11) *A fractional Muckenhoupt-Wheeden theorem and its consequences*, Integr. Equ. Oper. Theory 76 (2013), 421-446. (Joint with K. Moen.)

(12) *Regularity of solutions to degenerate p-Laplacian equations*, J. Math. Anal. Appl. 401 (2013), 1, 458–478. (Joint with K. Moen and V. Naibo.)

(13) *One and two weight norm inequalities for Riesz potentials*, Illinois J. Math., 57 (2013), 1, 295-323. (Joint with K. Moen.)

(14) *Weighted norm inequalities for the maximal operator on variable Lebesgue spaces*, J. Math. Anal. Appl. 394 (2012), 2, 335-367. (Joint with A. Fiorenza and C.J. Neugebauer.)

(15) *Variable Lebesgue Spaces: Foundations and Harmonic Analysis*, Birkhauser, Applied and Numerical Harmonic Analysis, 2013. (Joint with A. Fiorenza.)

(16) *Interpolation of positive operators on variable Lebesgue spaces*, Math Inequal. Appl., 15 (2012), 3, 639-644.

(17) *Sharp weighted estimates for classical operators*, Adv. Math., 229 (2012), 1, 408–441. (Joint with J.M. Martell and C. Pérez.)

(18) *Sharp norm inequalities for commutators of classical operators*, Publ. Mat., 56 (2012) 1, 147–190. (Joint with K. Moen.)

(19) *On the continuity of minimizers for quasilinear functionals*, Czechoslovak Math. J., 62(137) (2012), 1, 111–116. (Joint with P. Di Gironimo and L. D'Onofrio.)

(20) *On a general weighted Hardy type inequality in the variable exponent Lebesgue spaces*, Rev. Mat. Univ. Complut. Madrid, 25 (2012), 2, 335-367. (Joint with F. Mamedov.)

(21) *The maximal operator on weighted variable Lebesgue spaces*, Frac. Calc. Appl. Anal., 14 (3), 2011, 361-374. (Joint with L. Diening and P. Hästö.)

(22) *On the continuity of solutions to degenerate elliptic equations*, J. Diff. Eq. 250 (2011), 6, 2671–2686. (Joint with C. Sbordone and P. Di Gironimo.)

(23) *The solution of the Kato problem for degenerate elliptic operators with Gaussian bounds*, Trans. Amer. Math. Soc., 364 (2012), 7, 3449-3478. (Joint with C. Rios.)

(24) *Convergence in variable Lebesgue spaces*, Publ. Mat. 54(2) (2010), 441-459. (Joint with A. Fiorenza.)

(25) *Sharp weighted estimates for approximating dyadic operators*, Electron. Res. Announc. Math. Sci. 17, 2010. (Joint with J.M. Martell and C. Pérez.)

(26) *Weights, Extrapolation and the Theory of Rubio de Francia*, *Operator Theory: Advances and Applications*, Birkhauser, Basel, 2011. (Joint with J.M. Martell and C. Pérez.)

(27) *A new proof of the boundedness of maximal operators on variable Lebesgue spaces*, Boll. Unione Mat. Ital. (9) 2 (2009), no. 1, 151–173. (Joint with L. Diening and A. Fiorenza.)

(28) *$L \log L$ results for the maximal operator in variable L^p spaces*, Trans. Amer. Math. Soc. 361 (2009), 2631-2647. (Joint with A. Fiorenza.)

(29) *The structure of increasing weights on the real line*, Houston J. Math. 34 (2008), 3, 951-983. (Joint with L. Forzani and D. Maldonado.)

(30) *Gaussian bounds for degenerate parabolic equations*, J. Funct. Anal. 255 (2008), 283–312. (Joint with C. Rios.)

(31) *Sharp two-weight inequalities for singular integrals, with applications to the Hilbert transform and the Sarason conjecture*, Adv. Math. 216 (2007), 2, 647–676. (Joint with J.M. Martell and C. Pérez.)

(32) *The Fractional maximal operator on variable L^p spaces*, Rev. Mat. Iberoamericana 23 (2007), 3, 743-770. (Joint with C. Capone and A. Fiorenza.)

(33) *Approximate identities in variable L^p spaces*, Math. Nach. 280 (2007), 256-270. (Joint with A. Fiorenza.)

(34) *Weighted endpoint estimates for commutators of fractional integrals*, Czech. Math. J. 57 (2007), 153–160. (Joint with A. Fiorenza.)

(35) *Extensions of Rubio de Francia's extrapolation theorem*, Proceedings of El Escorial, 2004, Collect. Math. (2006) 1-37. (Joint with J.M. Martell and C. Pérez.)

(36) *The boundedness of classical operators on variable L^p spaces*, Ann. Acad. Sci. Fenn. Math. 31 (2006), 239-264. (Joint with A. Fiorenza, J.M. Martell and C. Pérez.)

(37) *Weighted weak-type inequalities and a conjecture of Sawyer.* Int. Math. Res. Not. 30 (2005), 1849–1871. (Joint with J.M. Martell and C. Pérez.)

(38) *Extrapolation from A_∞ weights and applications*, J. Funct. Anal. 213 (2004), 412-439. (Joint with J.M. Martell and C. Pérez.)

(39) *The maximal function on variable L^p spaces*, Ann. Acad. Sci. Fenn. Math. 28 (2003), 223-238, and 29 (2004), 247-249. (Joint with A. Fiorenza and C.J. Neugebauer.)

(40) *Endpoint estimates and weighted norm inequalities for commutators of fractional integrals*, Publ. Mat. 47 (2003), 103-131. (Joint with A. Fiorenza.)

(41) *The Hardy-Littlewood maximal operator on variable-L^p spaces*, Seminar of Mathematical Analysis (Malaga/Seville, 2002/2003), 147-156, Colecc. Abierta, 64 Univ. Sevilla Secr. Publ., Seville, 2003.

(42) *On the two-weight problem for singular integral operators*, Ann. Scuola Norm. Sup. Pisa Cl. Sci. (5) Vol. I (2002), 821-849. (Joint with C. Pérez.)

(43) *Sharp error bounds for the trapezoidal rule and Simpson's rule*, J. Ineq. Pure Appl. Math. 3, Issue 4 (2002), Article 49. (Joint with C.J. Neugebauer.)

(44) *Localization and extrapolation in Lorentz-Orlicz spaces*, Function Spaces, Interpolation Theory and Related Topics, M. Cwikel *et al.* Eds., de Gruyter, Berlin, 2002, 273-284. (Joint with M. Krbec.)

(45) *The A_∞ property for Young functions and weighted norm inequalities*, Houston J. Math. 28 (2002), 169-182. (Joint with A. Fiorenza.)

(46) *A new proof of weighted weak-type inequalities for fractional integrals*, Comment. Math. Univ. Carolinae, 42 (2001), 481-485.

(47) *The minimal operator and the geometric maximal operator in $\mathbb{R}^n$,* Studia Math. 144 (2001), 1-37.

(48) *New proofs of two-weight norm inequalities for the maximal operator*, Georgian Math. J. 7 (2000), 33-42.

(49) *Fourier Analysis*, translation and revision of the Spanish edition by Javier Duoandikoetxea, Amer. Math. Soc., Providence, December, 2000.

(50) *Two-weight, weak-type norm inequalities for fractional integrals, Calderón-Zygmund operators and commutators*, Indiana Math. J. 49 (2000), 697-722. (Joint with C. Pérez.)

(51) *Two weight extrapolation via the maximal operator*, J. Funct. Anal. 174 (2000), 1-17. (Joint with C. Pérez.)

(52) *Sharp two-weight, weak-type norm inequalities for singular integral operators*, Math. Res. Let. 6 (1999), 417-427. (Joint with C. Pérez.)

(53) *Weighted norm inequalities for geometric fractional maximal operators*, J. Fourier Anal. Appl. 5 (1999), 45-66. (Joint with C.J. Neugebauer and V. Olesen.)

(54) *Weighted norm inequalities for the centered maximal operator on $\mathbb{R}^+$*, Richerche di Mat. 48 (1999), 225-241. (Joint with C.J. Neugebauer.)

(55) *Weighted norm inequalities for the geometric maximal operator*, Publ. Mat. 42 (1998), 239-263. (Joint with C.J. Neugebauer.)

(56) *The class $A_\infty^+(g)$ and the one-sided reverse Hölder inequality*, Canadian Bulletin Math. 40 (1997), 169-173.

(57) *A new proof of the two weight norm inequality for the one-sided fractional maximal operator*, Proc. Amer. Math. Soc. 125 (1997), 1419-1424.

(58) *Weighted norm inequalities for a family of one-sided minimal operators*, Illinois J. Math. 41 (1997), 77-92. (Joint with C. J. Neugebauer and V. Olesen.)

(59) *Norm inequalities for the minimal and maximal operator, and differentiation of the integral*, Publ. Mat. 41 (1997), 577-604. (Joint with C. J. Neugebauer and V. Olesen.)

(60) *Piecewise monotonic doubling measures*, Rocky Mtn. J. Math. 26 (1996), 2, 1-39. (Published version of dissertation.)

(61) *The one-sided minimal operator and the one-sided reverse Hölder inequality*, Studia Math. 116 (1995), 255-270. (Joint with C. J. Neugebauer and V. Olesen.)

(62) *The structure of the reverse Hölder classes*, Trans. Amer. Math. Soc. 347 (1995), 2941-2960. (Joint with C. J. Neugebauer.)

(63) *The invertibility of the product of unbounded Toeplitz operators*, Integral Equations Operator Theory 20 (1994), 231-237.

(64) *The class $L \log L$ with weights*, The Madison Symposium on Complex Analysis, Contemporary Mathematics, vol. 137, AMS, Providence, 1992.

Work in Progress

(1) *Two weight norm inequalities for fractional integral operators and commutators*, lecture notes for a short course at the 6th International Course of Mathematical Analysis in Andalucía, held in Antequera, Spain, September 8–12, 2014, submitted.

(2) *Elementary proofs of one weight norm inequalities for fractional integral operators and commutators*, submitted.

(3) *Greedy bases in variable Lebesgue spaces*, submitted. (Joint with E. Hernandez and J.M. Martell.)

(4) *$H = W$ in degenerate Sobolev spaces with matrix A_p weights*, submitted. (Joint with K. Moen and S. Rodney.)

(5) *The relations between grand, small and variable Lebesgue spaces*, in preparation. (Joint with A. Fiorenza.)

(6) *The structure of weights in variable Lebesgue spaces*, in preparation. (Joint with L. Wang.)

(7) *Sharp A-harmonic approximations*, in preparation. (Joint with L. Diening.)

(8) *The p-Laplacian and Sobolev inequalities on large sets*, in preparation. (Joint with S. Rodney.)

(9) *L^p Kato estimates for degenerate elliptic operators*, in preparation. (Joint with J.M. Martell and C. Rios.)

(10) *Three-factor polynomials, a Diophantine equation, and building a bigger box*, submitted. (Joint with G. Convertito.)

(11) *The maximal operator on variable exponent spaces of homogenous type*, in preparation. (Joint with P. Shukla.)

(12) *Necessity of BMO for the boundedness of commutators on Banach function spaces*, in preparation. (Joint with L. Chaffee.)

(13) *Extrapolation on generalized Orlicz spaces*, in preparation. (Joint with P. Hästö.)

(14) *The maximal operator on convex set functions*, in preparation. (Joint with M. Bownik.)

Invited Talks

- 2015: Analysis seminar, University of Oregon; analysis seminar, University of Naples (Faculty of Science); invited talk, special session on harmonic analysis, Congress of the RSME, Granada, Spain; AMS special session on harmon analysis and applications, E. Lansing, Michigan; Colloquium talk, University of Vermont.
- 2014: Analysis seminar, Brown University; Trimester in Harmonic Analysis and PDEs, Hausdorff Institute, Bonn; Analysis seminar, Ludwig-Maximilians Universität, Munich; undergraduate colloquium, Cape Breton University, Nova Scotia; short course on weighted norm inequalities at the 6th International Course of Mathematical Analysis in Andalucía, Antequera, Spain; colloquium, SUNY Albany; analysis seminar, Mighigan State University.
- 2013: Analysis seminar, Ohio State; Analysis seminar, Ludwig-Maximilians Universität, Munich; Invited lecture, ICMAT workshop on harmonic analysis, Madrid; minicourse on variable Lebesgue spaces, ICMAT trimester on harmonic analysis, Madrid; undergraduate colloquium, Cape Breton University, Nova Scotia.
- 2012: Colloquium speaker, Baylor University; Colloquium speaker, University of Alabama; Southeastern Analysis Meeting (SEAM XXVIII); Colloquium speaker, Universidad de Malaga, Spain; Colloquium speaker, Universidad de Sevilla, Spain; AMS Special Session on Harmonic Analysis and Nonlinear PDEs, University of Akron; analysis seminar, Brown University.
- 2011: AMS Special session on harmonic analysis and partial differential equations, New Orleans; special session on harmonic analysis, Congress of the RSME, Avila, Spain; Conference in Harmonic Analysis and Partial Differential Equations in honour of Eric Sawyer, Toronto; Short course on variable Lebesgue spaces, CRM, Barcelona.

- 2010: University of Calgary; Special session on extrapolation and interpolation, Functional Analysis in Valencia, 2010; Harmonic Analysis and Applications: a conference in honor of the 70th birthday of Richard Wheeden, Sevilla; Harmonic Analysis and Related Topics: international summer school and workshop, Lisbon (three lecture short course); AMS Special Session on Harmonic Analysis, UCLA; analysis seminar, Brown University.
- 2009: University of Naples (Faculty of Science); AMS Special Session on Harmonic Analysis, Boca Raton.
- 2007: University of Calgary; University of Naples (Faculty of Science); AMS Special Session on Harmonic Analysis, Albuquerque.
- 2006: ICM Satellite Conference on harmonic analysis, Sevilla (Spain).
- 2005: Brown University.
- 2004: El Escorial Conference on Harmonic Analysis and Partial Differential Equations, Spain.
- 2003: Mathematical Institute of the Czech Academy of Sciences; Istituto de CNR, Naples, Italy.
- 2002: University of Naples (Faculty of Science); Functional Analysis Seminar, University of Sevilla.
- 2001: University of the Basque Country (Bilbao); New Mexico Analysis Seminar.
- 1999: New Mexico Analysis Seminar; Autonomous University of Barcelona; University of Naples (Faculty of Science); University of Naples (Faculty of Architecture); Mathematical Institute of the Czech Academy of Sciences.
- 1998: Brown University, Autonomous University of Madrid.
- 1997: Autonomous University of Madrid; University of Naples; SUNY Albany; Yale University; AMS special session on harmonic analysis (Albequerque); Rutgers University.
- 1996: Howard University; Vassar College; Center of Communications Research–La Jolla; Williams College; University of Malaga.
- 1995: AMS special session on harmonic analysis (Burlington); University of California, Berkeley; New Mexico State; University of Malaga; Wabash Extramural Analysis Conference; University of Indiana; University of Chicago.
- 1994: Wabash Extra-mural Analysis Conference; Southeastern Analysis Meeting.

Professional Activities

- Co-organizer, *Special session on Recent Advances in Variable Exponent Spaces and Non-linear Problems*, Joint meeting of the AMS, EMS and the Portuguese Mathematical Society, Porto, Portugal, June 2015.
- External member of thesis committee for Theresa C. Anderson, Brown University, March 2015.
- Panelist, NSF proposal review panel, February 2015.
- Co-organizer, *Special session on advances in harmonic analysis and partial differential equations*, AMS sectional meeting, Halifax, Canada, October 2014.
- Co-organizer, *Special session on weighted norm inequalities and related topics*, AMS sectional meeting, Albuquerque, NM, April 2014.
- Supervised talk on undergraduate research by Greg Convertito at MathFest, July 2013. (Greg awarded certificate for outstanding presentation by MAA.)
- Dissertation pre-examiner for Anna Kairema, University of Helsinki, March 2013.
- Co-organizer, *Special Session on Harmonic Analysis and Partial Differential Equations*, AMS sectional meeting, Lawrence, KS, March 2012.
- Invited participant, AIM Workshop, *Weighted singular integral operators and non-homogenous harmonic analysis*, October 2011.
- Co-organizer, *Recent developments in elliptic and degenerate elliptic partial differential equations, systems, and geometric measure theory* Banff International Research Station, Banff, Canada, March 2008.
- Invited speaker, Classical Magnet School, Hartford: 2008.
- Invited lecturer, graduate course on variable Lebesgue spaces, University of Naples, May 2007.
- Co-organizer, AMS special session on harmonic analysis, Williamstown, MA, October, 2001.
- Mentor, New England Board of Higher Education Science Network, 1999 to 2005.
- Research adjunct, Institute for Defense Analysis, CCR-LaJolla, Summer 1998, 2001.
- Invited speaker, Classical Magnet Program (Quirk Middle), 1998 to 2004.
- Invited speaker, Classical Magnet Program (Hartford Public High), December 1997, Spring 2002.
- Invited lecturer, trimester in variational problems, University of Naples, July 1997.

- Volunteer instructor, Minority Middle School Summer Science Program, Purdue School of Science, Summer 1994, 1995.
- MARC/AIM application review committee, Purdue, 1994.
- Member, Berkeley Mathematics Opportunity Committee, 1990-1993.
- Instructor, Mathematics Opportunity Committee preliminary examination workshop, Berkeley, 1990-1992.

Other Information

- Read and speak (to a limited degree): Italian, Spanish, French.
- Professed lay brother, Secular Franciscan Order.