

Leonid Slavin

## Curriculum Vitae

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### Education and degrees earned:

- 2004 – Ph.D. in Mathematics, Michigan State University; advisor: Alexander Volberg
- 1996 – M.S. in Engineering, Department of Mechanics and Control Processes, St. Petersburg State Technical University, Russia; advisor: Anatoly Pervozvanski

### Positions held:

- August 2016 – present: Associate Professor, University of Cincinnati
- August 2009 – August 2016: Assistant Professor, University of Cincinnati
- January–May 2008: member, the Fields Institute for Research in Mathematical Sciences, Toronto
- September 2007–July 2009: Postdoctoral Fellow, University of Missouri–Columbia
- August 2004–August 2007: Postdoctoral Fellow, University of Connecticut

**Research interests:** Singular integral operators, maximal functions, weights, Hardy spaces, and BMO. The main focus has been on the Bellman functions and the related questions of transference between results for martingales and their continuous analogs. Most recent interests are in Monge-Ampère equations arising in Bellman contexts and connections between the geometry of developable surfaces and optimizers in sharp inequalities; dimension-free estimates for averaging classes associated with semigroup kernels; best dimensional estimates in weak-type inequalities; non-infinitesimal and non-autonomous Bellman functions; sharp estimates on trees; the Erdős–Falconer conjecture on the sphere; and the Beurling–Ahlfors transform in higher dimensions.

### External research funding:

1. Research participant, Russian Science Foundation grant 14-41-00010, Summers 2015-2018; \$12,000
2. PI, Simons collaboration grant 317925, 2014-2020; \$35,000
3. PI, NSF grant DMS-1001567, “Weighted, non-local, and product-type Bellman estimates in harmonic analysis.” July 2010–August 2014; \$144,000.
4. PI, NSF grant “Topics in pure and applied harmonic analysis.” Awarded as DMS-0701254 to University of Connecticut, June 2007–March 2008; continued as DMS-0838619 at University of Missouri, April 2008–January 2010; continued as DMS-1041763 at University of Cincinnati, January 2010–June 2011; \$120,000

### External conference funding:

1. PI, NSF grant DMS-2000161, “Collaborative Research: Ohio River Analysis Meetings 2020-2022.” February 2020–January 2023; \$16,000
2. co-PI, NSF grant DMS-1700077, “Collaborative Research: Ohio River Analysis Meetings 2017-2019.” February 2017–January 2020; \$32,244
3. co-PI, NSF grant DMS-1412170, “Collaborative Research: Ohio River Analysis Meetings 2014-2016.” February 2014–January 2017; \$15,400
4. co-PI, NSF grant DMS-1305523, “The 2013 Ohio River Analysis Meeting.” February 2013–January 2014; \$10,000

**Internal research funding:** Taft Summer Research fellowship, Summer 2014; \$8,500

**Internal conference funding:**

1. Taft Research Center conference grants for ORAM 2013, 2015, 2017, 2019 (with M. Goldberg and G. Speight): between \$2,000 and \$6,000 per meeting
2. Conference funding from various University of Cincinnati sources for ORAM 2011, 2013, 2015, 2017, 2019 (with M. Goldberg and G. Speight): between \$4,000 and \$7,500 per meeting
3. Taft Research Seminar grant “Bellman functions in harmonic analysis.” Winter 2011. \$16,000

**Publications and preprints.** All submitted, accepted, or published papers are available at <http://homepages.uc.edu/~slavinld/Papers/>

1. An  $A_2$ -refinement of the Helson–Szegő theorem. Submitted.
2. The  $A_\infty \rightarrow A_1$  action of the maximal operator on trees, w. W. Ou and V. Vasyunin. Submitted.
3. A brief Bellman theory of BLO, with V. Vasyunin. Preprint.
4. Dimension-free estimates for semigroup BMO and  $A_p$ , with P. Zatitskii. To appear in Indiana Univ. Math. J.
5. The BMO  $\rightarrow$  BLO action of the maximal operator on  $\alpha$ -trees, with A. Osękowski and V. Vasyunin. To appear in St. Petersburg Math. J.; translated from Russian: Algebra i Analiz Vol. 31 (2019), No. 5, 106-153
6. The John–Nirenberg constant of  $BMO^p$ ,  $1 \leq p \leq 2$ . Submitted.
7. Best constants for a family of Carleson sequences. Adv. Math., Vol. 289 (2016), pp. 685-724
8. Inequalities for BMO on  $\alpha$ -trees, with V. Vasyunin. Int. Math. Res. Not. IMRN 2016, No. 13, 4078-4102
9. The John–Nirenberg constant of  $BMO^p$ ,  $p > 2$ , with V. Vasyunin. St. Petersburg Math. J. Vol. 28 (2017), No. 2, 181-196; translated from Russian: Algebra i Analiz Vol. 28 (2016), No. 2, 72-96.
10. Weak integral conditions for BMO, with A. Logunov, D. Stolyarov, V. Vasyunin, and P. Zatitskiy. Proc. Amer. Math. Soc., Vol. 143, No. 7 (2015), pp. 2913-2926
11. Sharp  $L^p$  estimates on BMO, with V. Vasyunin. Indiana Univ. Math. J., Vol. 61, No. 3 (2012), pp. 1051-1110
12. Sharp results in the integral-form John–Nirenberg inequality, with V. Vasyunin. Trans. Amer. Math. Soc., Vol. 363, No. 8 (2011), pp. 4135-4169
13. New estimates for the Beurling–Ahlfors operator on differential forms, with S. Petermichl and B. Wick. J. of Operator Theory, Vol. 65, No. 2 (2011), pp. 307-324
14. Monge–Ampère equations and Bellman functions: the dyadic maximal operator, with A. Stokolos and V. Vasyunin. C. R. Acad. Sci. Paris, Ser. I 346 (2008), pp. 585-588
15. The  $s$ -function and the exponential integral, with A. Volberg. Contemporary Mathematics, Vol. 444 (2007), pp. 215-228
16. Bellman function and the  $H^1 - BMO$  duality, with A. Volberg. Contemporary Mathematics, Vol. 428, 2007, pp. 113-126

**Lecture courses:** L. Slavin (editor), V. Vasyunin. Cincinnati lectures on Bellman functions, pp. 1-33, <https://arxiv.org/pdf/1508.07668.pdf>

**Talks:**

*Domestic conferences.* Analysis in Missouri: a Midwestern symposium, 09/05/2019; AMS Spring Central Sectional Meeting, Indiana University, 04/02/2017; AMS Spring Southeastern Sectional Meeting, University of Georgia, 03/05/2016; AMS-MAA 2016 Joint national meeting, Seattle, Washington, 01/06/2016; AMS Spring Central Sectional Meeting, Michigan State U, 03/15/2015; AMS Spring Western Sectional Meeting, University of New Mexico and 13th New Mexico Analysis Seminar, 04/06/2014; AMS Spring Southeastern Sectional Meeting, University of Tennessee,

03/22/2014; AMS Fall Center Sectional Meeting, Washington University in St. Louis, 10/18/2013; AMS Fall Center Sectional Meeting, University of Akron, 10/21/2012; AMS Fall Eastern Sectional Meeting, Rochester Institute of Technology, 09/22/2012; AMS Spring Southeastern Sectional Meeting, Georgia Southern University, 03/13/2011; AMS Spring Western Sectional Meeting, University of New Mexico, 04/18/2010; AMS Spring Southeastern Sectional Meeting, University of Kentucky, 03/27/2010; AMS-MAA 2009 Joint national meeting, Washington D.C., 01/06/2009; 8th Prairie Analysis Seminar, University of Kansas, 11/08/2008; 24th Southeastern Analysis Meeting, Vanderbilt University, 03/05/2008; AMS Fall Eastern Section Meeting, University of Connecticut, 10/29/2006; AMS Fall Western Section Meeting, University of Utah, 10/07/2006; 5th Prairie Analysis seminar, Kansas State University, 10/14/2005.

*Domestic seminars and colloquia (external talks only):* Kent State University, 02/21/2019 and 02/22/2019; Ohio State University, 10/23/2018; University of Rochester, 12/01/2017; University of Alabama, 10/25/2017; University of Kentucky, 10/25/2011; Washington University in St. Louis, 04/18/2011; University of Missouri, 11/04/2010; University of Arizona, 03/23/2010; Texas A&M University, 02/01/2009; Wayne State University, 01/20/2009; Lehigh University, 01/12/2009; University of South Carolina, 10/24/2008; University of Illinois in Chicago, 04/30/2008; Michigan State University, 03/25/2008; University of South Florida, 02/12/2007; Kansas State University, 01/19/2007; Louisiana State University, 01/04/2007; Georgia Institute of Technology, 11/29/2006; DePaul University, 04/07/2004; Washington University in St. Louis, 02/16/2004.

*International conferences.* 28th St. Petersburg Analysis Meeting, St. Petersburg, Russia, 06/29/2019; 27th St. Petersburg Analysis Meeting, St. Petersburg, Russia, 08/07/2018; 26th St. Petersburg Analysis Meeting, St. Petersburg, Russia, 06/25/2017; 24th St. Petersburg Analysis Meeting, St. Petersburg, Russia, 06/25/2015; ISAAC 9th Congress, invited talk at the special session “Approximation theory and Fourier analysis,” Krakow, Poland, 08/06/2013; Program “Bellman function technique in harmonic analysis,” Institut Mittag-Leffler, Djursholm, Sweden, 07/11/2013; 22nd St. Petersburg Analysis Meeting, St. Petersburg, Russia, 06/27/2013; 21st St. Petersburg Analysis Meeting, St. Petersburg, Russia, 06/26/2012; the 9th International Conference on Harmonic Analysis and PDE, El Escorial, Spain, 06/12/2012; 20th St. Petersburg Analysis Meeting, St. Petersburg, Russia, 06/26/2011; Fonctions de Bellman en Analyse Harmonique, INRIA, Antibes, France, 06/17/2011; 19th Summer Analysis Meeting, St. Petersburg, Russia, 07/06/2010; 18th Summer Analysis Meeting, St. Petersburg, Russia, 06/25/2009; 17th Summer Analysis Meeting, St. Petersburg, Russia, 06/28/2008; 16th Summer Analysis Meeting, St. Petersburg, Russia, 06/29/2007; 15th Summer Analysis Meeting, St. Petersburg, Russia, 07/08/2006.

*International seminars.* Chebyshev Laboratory, St. Petersburg State University, St. Petersburg, Russia, 06/17/2013; Kharkov National University, Kharkov, Ukraine, 07/22/2010; Kurchatov Institute, Moscow, Russia, 07/19/2010.

**Recent research collaborators:** A. Osękowski (University of Warsaw, Poland), V. Vasyunin (St. Petersburg Department, Steklov Mathematical Institute, Russia), A. Logunov (St. Petersburg State University, Russia), D. Stolyarov (St. Petersburg State University, Russia), P. Zatitskii (St. Petersburg State University, Russia), A. Stokolos (Georgia Southern University), K. Moen (University of Alabama), W. Ou (Scripps College).

**Ph.D. students supervised:** Brandon Sweeting (present).

**Teaching at the University of Cincinnati:** Calculus I, Calculus II, Multivariable Calculus, Applied Calculus, Differential Equations, Advanced Technical Calculus, Introduction to Analysis, Linear Algebra, Real Analysis, Dynamical Systems, Harmonic Analysis

**Service:***Mathematical Community Service:*

- Co-organizer of a special session at the Spring SE AMS meeting, March 2016
- Co-organizer of ORAM 2011-2020
- Organizer of the Bellman function mini-conference, January 2011
- A referee (in the last 5 years) for: *Memoirs of the AMS*, *Transactions of the AMS*, *Proceedings of the AMS*, *Journal d'Analyse Mathématique*, *IMRN*, *Journal of Geometric Analysis*, *Journal of Fourier Analysis and Applications*, *Publicacions Matemàtiques*, *New York Journal of Math*, *Studia Math*, *Mediterranean Journal of Mathematics*, *Prob. Math. Statistics*.
- A reviewer for *AMS Mathematical Reviews*

*Visitors hosted at University of Cincinnati:* D. Stolyarov (St. Petersburg State University, Russia, two weeks in Fall 2016 and Spring 2017), P. Zatitskii (St. Petersburg State University, Russia, six weeks in Fall 2015), A. Osękowski (University of Warsaw, Poland), R. Shterenberg (University of Alabama-Birmingham), V. Vasyunin (Steklov Institute, Russia, 10 weeks in Winter 2011), K. Makarov (University of Missouri), V. Peller (Michigan State University), R. Sims (University of Arizona), B. Wick (Georgia Institute of Technology), K. Ott (University of Kentucky), J. Brennan (University of Kentucky).

*Conferences organized:*

- Special session “Sharp inequalities and Bellman functions in Harmonic Analysis,” Spring South-eastern AMS sectional meeting, 03/5-6/2016 (joint with K. Moen and A. Stokolos)
- Ohio River Analysis Meetings, Springs 2011-2020 (odd years: University of Cincinnati; even years: University of Kentucky)
- Bellman function mini-conference, University of Cincinnati, 01/31/2011

*Other events organized:*

- University of Cincinnati Math Bowl (chair): 2012, 2013, 2016
- University of Cincinnati Calculus Contest (chair): 2012, 2013, 2016
- Taft Research Seminar, “Bellman function method in harmonic analysis,” UC, Winter 2011

*Departmental Committees:* Calculus exams (2009-2010); Workload (2009-2010); Lectures & Colloquia (2010-2011); Graduate Student Seminar (chair, 2010-2011); Committee for restructuring the actuarial program (2010-2011); Math Bowl and Calculus Contest (2011-2020; chair, 2011-2012, 2012-2013, 2015-2016; member: all other years); Academic Focus Planning (2012-2013); Executive (2012-2013, 2015-2016); Analysis Preliminary Exam (chair, 2013-2014; member, 2012-2013); Academic Misconduct (2012-2013); Taft Graduate Fellowship Review (2013-2014); Graduate Affairs (2015); VAP Hiring (2014-2015, 2016-2017, 2017-2018); Qualifying Exam (2015-2016); Tenure-track hiring (actuarial) (2015-2016).

*Other departmental service:* Complex Analysis preliminary exam (2010-2011, 2011-2012); Analysis group reorganization proposal (2011); adaptation of the Real Analysis course to semesters (2012); Ph.D. dissertation committees of Xining Li and Marcos Lopez (2015); Graduate Advisor (2013-2014, 2014-2015, 2015-2016, 2019-2020); Undergraduate Advisor (2018-2019, 2019-2020); Linear Algebra coordinator (Fall 2014); Multivariable Calculus coordinator (Fall 2018); Ph.D. thesis advisor: Brandon Sweeting (present).

*University Committees:* Taft Executive Board (2019-2020); organizational committee for AMS Spring 2021 sectional meeting (2019-2020).

**Professional memberships:** American Mathematical Society