

CURRICULUM VITAE

David Benko

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Experience:

- 2008- University of South Alabama, Assistant Professor
- 2004-08 Western Kentucky University, Assistant Professor
- 2001-04 Texas A&M University, Postdoctoral Fellow
- 1997-01 University of South Florida, Teaching Assistant
- 1995-97 University of Szeged (JATE), Hungary, Teaching Assistant

Education:

- 1997-01 University of South Florida, Ph.D. Student in Mathematics
- 1995-97 University of Szeged, Hungary, Ph.D. Student in Mathematics
- 1993-95 University of Szeged, Hungary, Master Student in Mathematics and in Mathematics Education
- 1992-93 University of Warwick, Coventry, England, Attended Mathematics and Computer Science courses
- 1991-92 University of Szeged, Hungary, Undergraduate Student in Mathematics
- 1989-91 University of Loránd Eötvös, Hungary, Undergraduate Student in Mathematics

Degrees:

- 2006 Ph.D. in Mathematics, University of Szeged, advisor: V. Totik
- 2001 Ph.D. in Mathematics, University of South Florida, advisor: V. Totik
- 1996 M.S. in Mathematics Education, University of Szeged
- 1995 M.S. in Mathematics, University of Szeged

Research topics: approximation theory, numerical analysis, potential theory

Publications:

- (with P. Dragnev and V. Totik) Convexity of harmonic densities, *Revista Mat. Iberoam.* (to appear)
- (with P. Dragnev) Balayage ping-pong: a convexity of equilibrium measures, *Constr. Approx.* (to appear)
- The Riemann zeta function and the striped anaconda, *Polygon* (to appear)
- The Basel problem as a telescoping series, *College Math. J.* (to appear in May, 2012)
- (with S. B. Damelin and P. D. Dragnev) On supports of equilibrium measures with concave signed equilibria, *J. Comput. Anal. Appl.* (2012) Vol. 14, No. 4
- Weighted polynomial approximation for weak convex external fields, *J. Math. Anal. Appl.*, (to appear: 385 (2012) 447–457)
- Get rich slowly, almost surely, *The Mathematical Gazette* (to appear)
- A lottery-like stock market, *Math Horizons*, (2011 febr.), 24-28
- (with C. Ernst and D. Lanphier) Asymptotic bounds on the integrity of graphs and separator theorems for graphs, *SIAM. J. Discrete Math*, 23 (2009), 265-277
- (with A. Kroó) A Weierstrass-type theorem for homogeneous polynomials, *Trans. Amer. Math. Soc.*, 361 (2009), 1645-1665
- (with D. Biles, M. P. Robinson, J. Spraker) Numerical Approximation for Singular Second Order Differential Equations (2009), *Mathematical and Computer Modeling*, 49, 1109-1114
- (with D. Biles, M. P. Robinson, J. Spraker) Nyström methods and singular second-order differential equations, *Comput. Math. Appl.* 56 (2009), 1975-1980
- A new approach to Hilbert's third problem, *Amer. Math. Monthly* 114 (2007), 665-676
- (with S. B. Damelin and P. Dragnev) On the support of the equilibrium measure for arcs of the unit circle and for real intervals, *Electron. Trans. Numer. Anal.* 25 (2006), 27-40
- The support of the equilibrium measure, *Acta Sci. Math. (Szeged)* 70 (2004), no. 1-2, 35-55
- (with T. Erdélyi, and J. Szabados) The full Markov-Newman inequality for Müntz polynomials on positive intervals, *Proc. Amer. Math. Soc.* 131 (2003), no. 8, 2385-2391
- (with T. Erdélyi) Markov inequality for polynomials of degree n with m distinct zeros, *J. Approx. Theory* 122 (2003), no. 2, 241-248
- Approximation by weighted polynomials, *J. Approx. Theory* 120 (2003), no. 1, 153-182
- (with V. Totik) Sets with interior extremal points for the Markoff inequality, *J. Approx. Theory* 110 (2001), no. 2, 261-265

Other works:

- The equilibrium measure and the Saff conjecture, Ph.D. dissertation (2006), University of Szeged, Hungary
- Approximation by weighted polynomials, Ph.D. dissertation (2001), University of South Florida
- On Slowly Diverging Series, Polygon (1995), V.2, 89-100
- On the Number of Legal Chess Positions, Alpha (1995), no.1, 10-11
- Fast decreasing polynomials, Master thesis (1995), University of Szeged
- On the generalization of the Fundamental Theorem of Algebra, University of Szeged, Research Competition (1995)
- On Slowly Converging Series, Polygon (1994), IV.2, 95-108

In books:

- my pearl idea is given in the 4th edition of the popular book "Proofs from the BOOK" (p. 54) and my paper "A new approach to Hilbert's third problem" is cited in the book (p.61)
- a result of mine is stated in E.B. Saff, V. Totik, Logarithmic potentials with external fields. Appendix B by T. Bloom. Grundlehren der Mathematischen Wissenschaften [Fundamental Principles of Mathematical Sciences], 316. Springer-Verlag, Berlin, 1997, p. 355
- one of my theorems with proof will be included in the second edition of E.B. Saff, V. Totik, Logarithmic potentials with external fields. Appendix B by T. Bloom

Conferences organized:

- 2008 MAA Sectional Meeting at WKU (member of the organizing committee)
- 2007 27th Annual Mathematics Symposium at WKU (with D. Lanphier and the Math Dept.)
- 2006 26th Annual Mathematics Symposium at WKU (with P. Sepanski and the Math Dept.)
- 2005 25th Annual Mathematics Symposium at WKU (with P. Sepanski and the Math Dept.)
- 2005 Fourth Summer School on Potential Theory – International Conference, Debrecen, Hungary (with B. Farkas, N. Levenberg, Sz. Révész and S. Szabó)
- 2005 Special Session at the Spring Southeastern AMS Sectional Meeting at WKU (with S. Damelin)

Conference presentations and invited talks:

- 2011 Visiting Scholar, Indiana University-Purdue University, Fort Wayne
Invited colloquium talk
"On a remarkable infinite series"
- 2011 University of Mississippi
Invited colloquium talk
" Riesz potentials and the equilibrium measure"
- 2011 X. International conference on approximation and optimization in the Caribbean
San Salvador, El Salvador
"Balayage techniques in potential theory"
- 2010 MAA Florida Chapter meeting, University of West Florida
"Play it again Sam" – an iterated balayage technique
- 2010 New Perspectives in Univariate and Multivariate Orthogonal Polynomials,
Banff International Research Station, Canada
Workshop only by invitation, paid lodging and meals
"Play it again Sam" – an iterated balayage technique
- 2010 University of South Florida
Invited seminar talk with P. Dragnev
"Ping pong balayage and convexity of equilibrium measures"
- 2010 Ninth Summer School on Potential Theory, Nyiregyhaza, Hungary
"The circular balayage algorithm"
Chairing a session
- 2010 Jaen Conference on Approximation, Jaen, Spain
"The support of the equilibrium measure"
- 2009 MAA Florida Chapter meeting, University of West Florida
"Tennis, anyone?"
- 2009 Eighth Summer School on Potential Theory, Budapest, Hungary
"Harmonic functions"
Chairing a session
- 2009 MAA sectional meeting, Indiana University-Purdue University, Indianapolis, IN
"A random walk on Wall Street"
- 2009 Visiting Scholar, Indiana University-Purdue University, Fort Wayne
Invited colloquium talk
"The integrity of graphs"

- 2008 University of South Alabama
Invited job interview talk
"Uniform approximation by weighted polynomials"
- 2008 Georgia Southern University
Invited colloquium talk
"Homogeneous polynomials"
- 2007 Modern Approaches in Asymptotics of Polynomials,
Banff International Research Station, Canada,
Workshop only by invitation, paid lodging and meals
"Uniform approximation by weighted polynomials"
- 2007 Indiana University-Purdue University, Indianapolis
Invited colloquium talk
"A new solution to Hilbert's third problem"
- 2007 Visiting Scholar, Indiana University-Purdue University, Fort Wayne
Invited colloquium talk
"Approximation by homogeneous polynomials"
- 2007 Sixth Summer School on Potential Theory, Sofia, Bulgaria
"The support of the equilibrium measure"
- 2007 University of Szeged, Hungary
Invited colloquium talk
"A new solution to Hilbert's third problem"
- 2007 Renyi Institute of Mathematics, Budapest, Hungary
Invited seminar talk
"A new solution to Hilbert's third problem"
- 2007 Georgia Southern University
Invited colloquium talk
"A new solution to Hilbert's third problem"
- 2007 University of North Florida
Invited colloquium talk
"A new solution to Hilbert's third problem"
- 2007 Twelfth International Conference in Approximation Theory, San Antonio, Texas
Invited minisymposium talk
"Uniform approximation by weighted polynomials"
Chairing two sessions
- 2007 University of Hohenheim, Stuttgart, Germany
Invited colloquium talk
"A new solution to Hilbert's third problem"

- 2007 GSF - Research Center for Environment and Health, Neuherberg, Germany
Invited talk
"Uniform approximation by weighted polynomials"
- 2006 Geometric Potpourri Seminar, University of Illinois at Urbana-Champaign
Invited talk
"A new solution to Hilbert's third problem"
- 2006 Approximation Seminar, University of Hohenheim, Stuttgart, Germany
Invited talk
"Approximation by homogeneous polynomials"
- 2006 Numerical Analysis and Approximation Theory, Cluj-Napoca, Romania
"The Balayage algorithm"
- 2006 Air Force Institute of Technology
Invited colloquium talk
"A new approach to Hilbert's third problem"
- 2006 Analysis Seminar, Georgia Tech University
Invited talk
"Approximation by homogeneous polynomials"
- 2005 Fourth Summer School on Potential Theory, Debrecen, Hungary
"Weighted energy problem on the unit circle"
Chairing a session
- 2005 Fejér-Riesz conference, Eger, Hungary
"Approximation by homogeneous polynomials"
- 2005 Indiana University - Purdue University Fort Wayne
Invited colloquium talk
"A new approach to Hilbert's third problem"
- 2005 Spring Southeastern AMS Sectional Meeting at WKU
"Unbounded extremal measures"
Chairing a session
- 2005 Computational Analysis Seminar, Vanderbilt University
Invited talk
"Weighted polynomials on the real line"
- 2004 Constructive Functions Tech-04, Georgia Institute of Technology
"Weighted polynomials on the real line"
Chairing a session

- 2004 Alfred Renyi Institute of Mathematics, Budapest, Hungary
Invited talk
Title: "Weighted polynomials"
- 2004 Third Summer School in Potential Theory, Kecskemet, Hungary
"On the logarithmic energy of a signed measure"
Chairing a session
- 2004 Joint Mathematics Meetings, Phoenix, Arizona
"A new solution to Hilbert's Third Problem"
- 2003 Advances in Constructive Approximation, Nashville, Tennessee
"The support of the extremal measure"
- 2003 Second Summer School in Potential Theory, Szeged, Hungary
Invited talk
"An integral representation formula"
- 2002 Constructive Function Theory Conference, Varna, Bulgaria
"Markov inequality for polynomials with m distinct zeros"
- 2002 Freud's Workshop, Budapest, Hungary
"About the equilibrium measure"
- 2002 Center for Approximation Theory Annual Symposium
"Markov inequality for polynomials with m distinct zeros"
- 2001 CMFT Conference, Aveiro, Portugal
"Approximation by weighted polynomials"
- 2000 Turán's Conference, Budapest, Hungary
"The weak convex property of external fields"
- 1999 Suncoast MAA Conference, Florida
"Caps and Colors"
- 1998 Suncoast MAA Conference, Florida
"On the generalization of the Harmonic series"
- 1997 Suncoast MAA Conference, Florida
"On several applications of the number e "

Talks accessible for students:

- 2011 Mobile Mathematics Society, Satori coffee house
"Ebay and the art of bidding"
- 2010 Math Circle, University of South Alabama
"How much Pi can you find in a casino?"

- 2010 Girls exploring science event, University of South Alabama
"Finding Pi with string, a needle or a die"
- 2010 Math Circle, University of South Alabama
"The grandest of all grand slams"
- 2009 Math Circle, University of South Alabama
"Making sense of the weather predictions"
- 2009 Mobile Mathematics Society, Satori coffee house
"A random walk on Wall Street"
- 2008 Math Circle, University of South Alabama
"A random walk on Wall Street"
- 2008 28th Mathematics Symposium at Western Kentucky University
"A random walk on Wall Street"
- 2007 27th Mathematics Symposium at Western Kentucky University
"The Cons and Cons of Ebay"
- 2006 Mathematics Club, Vanderbilt University
Invited talk
"Jacobi and the chocolate factory"
- 2006 26th Mathematics Symposium at Western Kentucky University
"The harmony of distant cities"
- 2005 25th Mathematics Symposium at Western Kentucky University
"Jacobi and the chocolate factory"
- 2004 24th Mathematics Symposium at Western Kentucky University
"The hidden geometry of the hyper convex functions"
Chairing a session

Grants:

- 2011 Since the Fall of 2011 I have been organizing the Math Circle with four colleagues. Sponsored by Alabama Space Grant Consortium and Alabama EPSCoR.
- 2007 WKU Junior Faculty Scholarship (\$4,000)
- 2001 Participant of a grant of V. Totik by the Hungarian National Science Foundation (T022983)

Teaching:

- Nominated for Provost's Award for Outstanding Teaching as a Graduate Student (1999)
- High student evaluations

Students:

- conducted 3 senior research projects at WKU
- 2011 I was a mentor in an undergraduate research project (UCUR) at USA

Courses taught:

Calculus I, II, Calculus and Analytic Geometry I, II, Differential Equations, Applied Differentiable Equations I, College Algebra, Linear Algebra, Business Calculus, Engineering Calculus, Engineering Mathematics III, Applicable Mathematics I, II, Number Theory, Finite Mathematics, Advanced Calculus I, Multivariable Calculus, Numerical Analysis, Real Analysis

Committee work and service:

At USA:

- 2012-2015 representing AMS at the Committee on American Mathematics Competitions
- 2011- member of the Faculty Senate
- 2011- course coordinator of the Finite Mathematics course
- 2011- scholarship committee
- 2011- student affairs committee
- 2010-2011 chair of the student affairs committee
- 2010-2011 library committee
- 2009-2010 graduate committee
- 2009-2010 scholarship committee
- 2009- e-companion and course compass online homework ad-hoc committee
- 2008-2009 social and student affairs committee
- 2008-2009 library committee
- 2008-2009 colloquium committee

At WKU:

- Chair of a Search Committee
- Chair of the Colloquium/Symposium Committee
- Head Search Committee
- Chair of Book committee
- Teacher Education Committee
- Pi-Mu-Epsilon Honorary National Mathematics Society Committee
- Supervising the operation and maintenance of the computer laboratory

Journals refereed for:

- Asian Journal and Mathematics

- Constructive Approximation
- Demonstratio Mathematica
- International Journal of Computer Mathematics
- Journal of Approximation Theory
- Journal of the London Mathematical Society
- Mathematics of Computation
- Rocky Mountain Journal of Mathematics
- SIAM Journal on Numerical Analysis
- two books containing survey and research papers

Programming languages: Basic, Visual Basic, Pascal, Assembly

Scholarships:

- 2000, 1999, 1998 Tharp Endowed Award (\$2,000), University of South Florida, (awarded to the best two-three graduate students in Mathematics)
- 1995 University of Szeged Scholarship given to outstanding students
- 1992 TEMPUS Scholarship to the University of Warwick, Coventry, England, (tuition waiver and paid lodging)

Awards

At Zsigmond Moricz High-School

- 1986 contests for first-year students (250 students), in Mathematics 1st prize, in Physics 1st prize, in Chemistry 2nd prize
- other years: Mathematics 1st prize
- basketball, 3-point shooting competition: 1st prize

At University of Szeged:

- 1995 Research Competition, 2nd Prize
title of work: "On the generalization of the Fundamental Theorem of Algebra"
- 1992 Investing competition (with virtual money) organized by AISEC: 1st prize

National Competitions in Hungary

1. 1986 KOMAL, Computer Science (for any high school students) 1st prize
2. 1987 KOMAL, Mathematics (for second year high school students) 2nd prize
(with 269 points, winner had 272 points)
3. 1987 Janos Neumann Computer Science Contest (for any high school students),
game programs category, program: maze painting, 10th prize

4. 1987 Mikrovilag magazine (participants: any Hungarian citizen. Quiz problems from Computer Science and Mathematics): 1st prize
5. 1988 Janos Neumann Computer Science Contest (for any high school students), teaching programs category, program: modeling the oscilloscope, 2nd prize
6. 1989 Fourth Microcomputer Meeting (for any high school students), Physics category, program: modeling the planetary movements, 3rd prize
7. 1989 KOMAL, Mathematics (for fourth year high school students) 1st prize achieving maximum score 250 (the winner of the second prize had 212 points)
8. 1989 OKTV in Mathematics (for third and fourth year students in standard high schools) 2nd prize (the first ten students gained admittance to university with no entrance exam)
9. 1990 Kurschak Competition in Mathematics (for any high-school student and freshmen undergraduate students), 4th Prize
10. 1994 Schweitzer Competition in Mathematics (for any undergraduate and master students), 4th prize
11. 1995 Schweitzer Competition in Mathematics (for any undergraduate and master students), 4th prize

Memberships: MAA, AMS, Janos Bolyai Mathematical Society

Erdős Number: 2 (with multiplicity 3)

Interests: USTA 4.0 level tennis player, expert level chess player. (My Father is an International Chess Grandmaster, former world champion candidate.)

I have discovered a method in potential theory which enables me to create amazing fractal-like images. This is my new hobby now and it is part of my research plans. For example, here is a “sunrise” and a “dog”. More pictures and animations can be found at www.fractaldogs.com.

