

Curriculum Vitae

PETER G. BINEV

June 2016

Current Address

Department of Mathematics
University of South Carolina
Columbia, SC 29208, U.S.A.

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Date of Birth

March 5, 1959

Place of Birth

Sredets, province of Burgas, Bulgaria

Education

- **Ph.D. in Mathematics, University of Sofia, May 1985**

Advisor: Prof. Vasil A. Popov

Dissertation: “Error Estimates in Spline Approximation”

- **M.Sc. in Mathematics, University of Sofia, July 1980**

Advisor: Prof. Vasil A. Popov

Thesis: “End Effects in Approximation by Rational and Spline Functions”

Course Profile (Mathematical Sciences):

Real, Complex, Harmonic, and Functional Analysis – Ordinary and Partial
Differential Equations – Analytic and Differential Geometry – Linear and
Higher Algebra – Numerical Analysis – Numerical Differential Equations
– Approximation Theory – Mathematical Optimization – Probability and
Statistics – Data Bases – Software Engineering

Main Research Interests

- Numerical Methods for PDE
- Image and Surface Processing
- Wavelets and Multiresolution Analysis
- Nonlinear Approximation Theory
- Nano-Scale Imaging
- Learning Theory
- Conservation Laws
- Subdivision

Professional Experience

- Associate Professor, Department of Mathematics,
University of South Carolina, (*Columbia, SC, USA*,)
August 2007 – present
- Adjunct Professor, Department of Chemistry and Biochemistry,
University of South Carolina, (*Columbia, SC, USA*,)
October 2014 – present
- Research Professor, Industrial Mathematics Institute, Department of
Mathematics, **University of South Carolina**, (*Columbia, SC, USA*,)
January 2000 – August 2007
- Associate Professor, Faculty of Mathematics and Informatics,
University of Sofia, (*Sofia, Bulgaria*,)
June 1993 – February 2006 (*on leave starting January 2000*)
- Visiting Lecturer, Department of Mathematics,
University of South Florida, (*Tampa, FL, USA*,) January – May 1999
- Visiting Lecturer, School of Computing and Mathematical Sciences,
University of Greenwich, (*London, UK*,) September – December 1997
- Visiting Professor, Department of Mathematics,
University of Duisburg, (*Duisburg, Germany*,) September – October 1995
- Postdoctoral Research Fellow (Advisor: Kurt Jetter)
Department of Mathematics, **University of Duisburg**, (*Duisburg, Germany*,)
April 1991 – February 1992
- Visiting Lecturer, Department of Mathematics,
University of South Florida, (*Tampa, FL, USA*,) August – December 1990
- Postdoctoral Research Fellow (Advisor: S.B. Stechkin)
Theory of Functions Department, **Steklov Mathematical Institute, Moscow**,
(*Moscow, Russia*,) September – December 1986
- Assistant Professor, Faculty of Mathematics and Informatics,
University of Sofia, (*Sofia, Bulgaria*,) December 1984 – May 1993
- Research Fellow, Department of Mathematics,
University of Sofia, (*Sofia, Bulgaria*,) June 1981 – December 1984

Collegiate Honors, Organizations, and Activities

- Contact Organizer of BIRS workshops **14w5048** “Imaging and Modeling in Electron Microscopy - Recent Advances”, Banff, Canada, May 18-23, 2014 and **17w5055** “Mathematical Advances in Electron Microscopy”, Oaxaca, Mexico, Oct 15-20, 2017
- Seeding grant by National Academies Keck Futures Initiative, 2011 - 2013
- Member of the Special Scientific Committee in Computer Science and Applied Mathematics (the body that awards Ph.D. and Professor titles in these areas in Bulgaria), 1998 – 2004
- Member of the Ruling Body of the Scientific Fund of the University of Sofia, 1997 – 2003
- Head of the Masters Program in Computer Graphics at the University of Sofia, 1996 – 2003
- Member of the Scientific Committee in Mathematics and Mechanics of the Bulgarian National Science Fund, 1998 – 1999
- Fellowship from a TEMPUS program, University of Greenwich, UK, Fall 1997
- Habilitation for a tenured Associate Professor position at the University of Sofia, June 1993
- DAAD Fellowship, University of Duisburg, Germany, Jan 1991 – Feb 1992
- 1989 Rector’s Award for the Best Young Scientist of the Year, University of Sofia, Bulgaria
- Postdoctoral Research Fellowship, Steklov Mathematical Institute, Moscow, Russia, Sep - Dec 1986
- Graduate Scholarship, University of Sofia, 1981 – 1984
- First Prize of Mathematical Balkaniade (University Students Mathematics Competition), Belgrade, Yugoslavia, 1977

Grant Support

- P.I., University of South Carolina Visiting Scholar Program “Interdisciplinary Collaboration in Electron Tomography - Z. Saghi”, \$12,931.00, 11/01/15 – 10/31/16.
- P.I., NSF DMS 1222390 “ATD Collaborative Research: Theory and Algorithms for High Dimensional Learning”, \$300,000.00, 09/01/12 – 08/31/16.
- Co-PI, State of South Carolina “Center of Economic Excellence for Data Analysis, Simulation, Imaging, and Visualization”, \$2,000,000.00 endowment starting Fall 2010.
- **Participant in the realization of the following research projects**
 - Co-PI, National Academies Keck Futures Initiative grant # NAKFI IS11 “Smart Data Acquisition for Nanoscale Imaging”, \$100,000.00, 05/03/11 – 06/30/13.
 - Co-P.I., NSF DMS-0915104 “Collaborative Research: An ADT Proposal: Fast Point Cloud Surface Reconstruction Algorithms”, \$450,000.00, 09/01/09 – 8/31/12.
 - Co-PI, MURI/ARO W911NF-07-1-0185 “Model Classes, Approximation, and Metrics for Dynamic Processing of Urban Terrain Data”, \$5,000,000.00, 05/01/07 – 12/31/12
 - Co-P.I., Radiance Technologies, Inc./Army - STTR 08S-0152 “Phase II - Software for Generating Geometrically and Topologically Accurate Urban Terrain Models Using Implicit Methods”, \$300,000.00, 05/19/08 – 03/06/10.
 - Co-P.I., NSF DMS-0721621 “CMG Collaborative Research: Development of New Statistical Learning Theory and Techniques for Improvement of Convection Parameterization in Climate Models”, \$120,000.00, 10/01/07 – 09/30/10.
 - Co-P.I., ONR/DEPSCoR N00014-07-1-0978 “Capturing Sparsity In High Dimensional Data”, \$750,000, 05/10/07 – 05/31/10.
 - Co-P.I., ONR - DURIP N00014-08-1-0996 “Computational Foundation for Investigations in Capturing Sparsity in Very High Dimensions”, \$111,624.00, 05/04/08 – 05/30/09.
 - Personnel, ONR N0014-03-1-0051 “Analysis and Numerical Algorithms for Data Processing and Fast Solution of PDE’s” \$954,001.00, 10/01/02 - 09/30/08
 - Personnel, ONR/DEPSCoR N00014-05-1-0715 “Nonlinear Methods for Supervised Learning: Defense Applications” \$913,058.00, 06/01/05 - 08/31/08
 - Co-P.I., ARO Grant W911NF-05-1-0227 “Advanced Mathematical Methods for Processing Large Data Sets”, \$259,982.00, 06/01/05 - 08/31/08
 - Personnel, NSF Grant DMS-354707 “Collaborative Research: Algorithms for Sparse Data Representation”, \$189,000.00, 09/15/04 - 08/31/08
 - Senior Personnel, Radiance Technologies, Inc./US Army 06S-1483 “Software for Generating Geometrically and Topologically Accurate Urban Terrain Models using Implicit Methods”, \$46,999.00, 08/09/06 – 02/08/08
 - Personnel, UF/USAF F49620-03-1-0381 “Multiresolution Methods for Vision-Based Guidance, Navigation and Control” \$600,000.00, 06/15/03 - 01/14/08
 - Co-P.I., Radiance Technologies, Inc./US Army grant 07S-1356 “Super-Resolution of Infrared Imagery from Video”, \$37,995.00, 05/04/07 - 10/31/07
 - Personnel, ONR/DEPSCoR N0014-03-1-0675 “Compression of Large Data Sets with Geometry” \$548,431.00, 06/01/03 - 05/31/07

Administrative and Committee Duties at the University of South Carolina

◇ University Committees

- Scholastic Standards and Petitions 2012/2015, member; chair in 2014/2015
- Instructional Development 2012/2015, member; chair in 2012/2013
- Senate Steering Committee 2011/2012, 2014/2015 member
- Carolina Core Committee 2011/2012, member (ex officio)
- Academic Program Liaison Committee 2011/2012, member (ex officio)
- Curricula and Courses 2009/2012, member; chair in 2011/2012
- Judicial Council 2008/present, member
- Office of Academic Integrity 2007/present, faculty associate

◇ College of Arts and Sciences Committees

- Information Technology Advisory Committee 2010/present, member
- IMI Advisory Council 2009/2010, member

◇ Department of Mathematics Committees

- Colloquium Committee 2015/2016, member
- Faculty Advisory Council 2014/2016, member
- Hiring Committee 2009/2015, member
- Graduate Advisory Council 2008/2015, member
- Computer Committee 2007/2013, 2014/present, chair
- Applied and Computational Math Committee 2009/2013, chair;
2014/2016 member
- Events Committee 2008/2009, member
- Computational Math Committee 2007/2009, member
- Undergraduate Advisor 2007/2009, upper division majors

Teaching Experience

◇ in USA

- University of South Carolina (2000–2015)

Undergraduate Courses:

Calculus I – Calculus II – Vector Calculus – Calculus for Business Administration and Social Sciences – Elementary Differential Equations – Discrete Mathematics for Computer Science – Discrete Mathematics I – Wavelets – Numerical Linear Algebra – Linear Algebra – Numerical Analysis

Graduate Courses:

Applied Mathematics I – Applied Mathematics II – Numerical Linear Algebra – Foundations of Computational Mathematics I – Differential Equations I & II

- University of South Florida (1990, 1999)

Undergraduate Courses:

Engineering Calculus – College Algebra – Applied Finite Mathematics

◇ in Bulgaria

- University of Sofia (1983–2001, 2004)

Undergraduate Courses:

Numerical Analysis – Numerical Methods for PDE's – Calculus – Computer Graphics

Graduate Courses:

Splines and Their Applications – Multivariate Splines – Curves and Surfaces in CAGD – Wavelets and Their Applications – Geometric Modeling – Advanced Computer Graphics – Image Processing

◇ in UK

- University of Greenwich (Fall 1997)

Graduate Course: Algorithms

◇ in Germany

- University of Duisburg (Fall 1995)

Graduate Course: Wavelets

Supervised Graduate Students

Past Doctoral Students

1. **Toby Sanders**, University of South Carolina (May 2015)
Dissertation title: *Image Processing and 3-D Reconstruction in Tomography*
2. **Kamala Hunt Diefenthaler**, University of South Carolina (December 2013)
Dissertation title: *Analysis and Processing of Irregularly Distributed Point Clouds*
3. **Bozhidar Angelov Stanchev**, Bulgarian Special Scientific Committee in Computer Science and Applied Mathematics (June 2008)
Dissertation title: *A Method for Extraction of a Multiresolution Triangular Mesh as Approximation of Surface Presented by Set of Points*

Current Doctoral Students from University of South Carolina

1. **Jennifer Tabat** (expected graduation in 2016)
Working dissertation title: *Processing and Alignment of Point Cloud Data*

Masters Students from University of South Carolina - 4

Masters Students from University of Sofia - 45

Sponsored Postdoctoral Scholars

1. **Francesca Tantardini**, University of Bochum, Germany
February 2014 - June 2014
2. **Benjamin Berkels**, RWTH - Aachen, Germany
January 2011 - May 2012
3. **Daniel Savu**, Auburn University
January 2010 - May 2011
4. **Philipp Lamby**, Texas A&M University
February 2008 - August 2011

Masters Students and Titles of Their Theses

From University of South Carolina

1. **Holly Lynn Watson**, M.S. – December 2011
Multi-Parameter Algorithms for Smoothing Data as Applied to Curves, Contours, and Images
2. **Benjamin Ingram**, M.S. – December 2008
Adapting Physical Suite Data to Various Climate Models
3. **Lida Xie**, M.A. – August 2007
Level Set Method and Its Application in Surface Reconstruction
4. **Elizabeth A. Perez**, M.A. – May 2005
A Tree Algorithm for Adaptive Learning

From University of Sofia

1. **Emil Roni Levi**, 10238 – July 2004
Method for Construction of Collections of Translation-Invariant Symmetric Biorthogonal Filters
2. **Nikola Ivanov Kosturski**, 42617 – July 2002
Algorithms for Approximation of Offsets of Spline Curves
3. **Nadezhda Zlatkova Staneva**, 42182 – July 2002
Graphics Editor for Creation and Animation of Moving Objects in the Output Format of Macromedia Flash
4. **Milena Boyanova Knizharova**, 10603 – July 2002
Subdivision Algorithms for Adaptive Representation of Surfaces
5. **Georgi Todorov Georgiev**, 10319 – July 2002
Construction of Finite Symmetric Biorthogonal Filters with Optimal Properties
6. **Nely Alexieva Alexieva**, 41564 – July 2001
Fractals and Their Dimension
7. **Martin Tsevetanov Marinov**, 42411 – July 2001
Geometric Modeling via Subdivision Schemes
8. **Iliana Ignatova Ignatova**, 10571 – July 2001
Analysis and Realization of Adaptive Algorithms for Numerical Solution of Elliptic PDE
9. **Georgi Dimitrov Harizanov**, 41823 – July 2001
Enhancement of Color Images via Complex Wavelets
10. **Petar Radoslavov Radkov**, 41848 – November 2000
Generation, Visualization, and Morphing of Surfaces

11. **Nikolay Vladimirov Radionov**, 41773 – September 2000
Modeling of 3D objects via NURBS
12. **Anelia Nedelcheva Angelova**, 42202 – July 2000
Methods for Identification of Characteristic Points on Human Face
13. **Evgenia Doncheva Arabadjieva**, 10435 – July 2000
Modeling and Visualization of Vegetation in Three Dimensions
14. **Ivaylo Velikov Todorov**, 41386 – Dec 1999
Hypertext for Real-Time Processing of Large Amounts of Information
15. **Gabriel Petrov Dobrev**, 41383 – Dec 1999
Environment for Building of Graphics User Interface
16. **Milen Evstatiev Lazarov**, 41218 – Nov 1999
Image Compression using Fractals
17. **Ivan Alexandrov Gelov**, 41313 – Nov 1999
Modeling and Visualization of Gaseous Phenomena
18. **Nina Vladimirova Drenovska**, 41808 – Oct 1999
Gradient Based Wavelet Methods in Image Processing
19. **Mihail Petrov Balabanov**, 41748 – Oct 1999
Modeling of Moving Life Forms having Continuous Elastic Boundary and a Skeleton
20. **Zornitsa Atanasova Karaulanova**, 41710 – July 1999
Construction of Wavelet Filters for Approximation of Hilbert Transform
21. **Anton Rumenov Maleev**, 41820 – July 1999
System for Analysis of Reconstruction Algorithms in Computer Tomography
22. **Emil Stefanov Dotchevski**, 41651 – April 1999
System for Real Time Visualization of 3D Photorealistic Terrains with Continuous Levels of Resolution
23. **Ivaylo Rumenov Beltchev**, 41657 – April 1999
Software Package BOOM 2 for Visualization and Editing of 3D Scenes
24. **Valeria Ivanova Pelova**, 41609 – April 1999
Morphing of Digital Images based on Wavelet Transforms
25. **Alexander Alexandrov Alexandrov**, 41846 – Nov 1998
Object Oriented System for Visualization of 3D Objects
26. **Venelin Nikolaev Efremov**, 41073 – Oct 1998
Compression of Video Sequences via Wavelets
27. **Rositsa Nakova Zhelyazkova**, 10304 – Sep 1998
Wavelets, Algorithms, and Applications

28. **Viktor Velinov Naskov**, 41288 – July 1998
Digital Processing Improving the Quality of Audio Recording
29. **Peter Ivaylov Todorov**, 41233 – July 1998
Digital Realization of Sound Effects
30. **Nikolay Hristov Balov**, 9475 – July 1998
A Modification of J. Shapiro's Method for Image Compression
31. **Maria Tsvetkova Tsvetkova**, 41474 – July 1998
Program Realization for Modeling of a Hydraulic Shock
32. **Krastio Stanislavov Lilov**, 10270 – July 1998
Homotopic Invariants to Reaction-Diffusion Systems
33. **Petar Asenov Bozhinov**, 9970 – December 1997
Wavelets for Solutions of Differential Equations
34. **Lazar Ivanov Ivanov**, 41487 – September 1997
Image Enhancement Using Wavelet Analysis
35. **Vasil Motkov Bumov**, 9777 – July 1997
Filtering and Processing of Images via Wavelets
36. **Ivayla Nedelcheva Vacheva**, 41667 – July 1997
Wavelet Constructions in Bounded Domains
37. **Daniela Dimitrova Hristova**, 9989 – July 1997
Self-similar Sets Defined through Symmetries
38. **Ana Hristova Iontcheva**, 10123 – July 1997
Numerical Solution of Differential Equations via Integrated Wavelets
39. **Radka Kalaydjieva**, 9898 – July 1995
Investigation of Subdivision Schemes for Construction of Surfaces
40. **Miglena Valentinova Stefanova**, 40527 – July 1995
Symmetric Orthogonal Wavelets
41. **Iliya Panayotov Slavchev**, 9818 – July 1995
Interpolation of Curves and Surfaces via Rational B-Splines with Contraction Parameters
42. **Galina Hristova Vatkova**, 9806 – July 1995
Correctness and Singularity of Interpolation via Shifted Box Splines
43. **Elena Ivanova Tzenova**, 9794 – July 1995
Multiresolution Representation with Several Scaling Functions
44. **Yulian Dimitrov Spasov**, 40937 – November 1994
An Improvement of the Technique of Regular Space Subdivision in Ray Tracing
45. **Hristo Venelinov Kojouharov**, 9647 – July 1994
Algorithms for Building of Smooth Surfaces via Box Splines

Recently Organized Conferences and Workshops

- **Imaging and Modeling in Electron Microscopy - Recent Advances**
(BIRS workshop 14w5048), Banff, Canada, May 18 - 23, 2014
Contact Organizer
- **3rd Dolomites Workshop on Constructive Approximation and Applications**
Alba di Canazei, Trento, Italy, September 9 - 14, 2012
Session Organizer: Approximation in high dimension
- **Eighth International Conference on Mathematical Methods for Curves and Surfaces**
Oslo, Norway, June 28 - July 3, 2012
Minisymposium Organizer: Nonlinear Approximation
- **New Frontiers in Imaging and Sensing**
Columbia, SC, February 17 - 22, 2011
Co-organizer
- **Imaging in Electron Microscopy II**
Columbia, SC, February 18 - 23, 2010
Co-organizer
- **33rd SIAM Southeastern-Atlantic Section Conference,**
Columbia, SC, April 4 - 5, 2009
Co-organizer
- **Sixth International Conference on Numerical Methods and Applications - NM&A'06,**
Borovets, Bulgaria, August 20 - 24, 2006
Co-organizer

Invited Presentations at Conferences and Workshops 2002-present

- **Classification Algorithms on Adaptive Binary Trees**
Learning Theory and Approximation,
Oberwolfach, Germany July 3 - 9, 2016
- **Near-Best hp-Adaptive Tree Approximation**
International Conference on Spectral and High-Order Methods (ICOSAHOM),
Rio De Janeiro, Brazil June 27 - July 1, 2016
- **Data Assimilation in Reduced Modeling**
Fifteenth International Conference in Approximation Theory,
San Antonio, Texas May 22 - 25, 2016
- **Approximation by Reduced Modeling**
Nonlinear Approximation in High Dimensions,
Aachen, Germany May 13 - 14, 2016
- **Reduced Modeling in Data Assimilation**
Challenges in high dimensional analysis and computation,
San Servolo, Italy May 1 - 6, 2016
- **Data Dependent Reduced Modeling**
International Conference on Multivariate Approximation,
Schloss Rauischholzhausen, Germany March 31 - April 5, 2016
- **Adaptive Approximation in High Dimensions**
DTRA/NSF workshop "Algorithms for Threat Detection",
Arlington, VA July 13 - 15, 2015
- **Near-Optimal Adaptive Approximations**
VI Jaen Conference on Approximation,
Ubeda, Jaen, Spain June 28 - July 3, 2015
- **Learning Theory and Adaptive Partitioning in High Dimensions**
Foundations of Computational Mathematics conference (FoCM 2014),
Workshop C3 : Learning Theory,
Montevideo, Uruguay December 18 - 20, 2014
- **Tree Algorithms for Classification**
Foundations of Computational Mathematics conference (FoCM 2014),
Workshop B1 : Approximation Theory,
Montevideo, Uruguay December 15 - 17, 2014

- **Near-Best hp-Adaptive Approximation**
*Foundations of Computational Mathematics conference (FoCM 2014),
Workshop A5: Multiresolution and Adaptivity in Numerical PDEs,*
Montevideo, Uruguay December 11 - 13, 2014
- **Subdivision of Measures and Related Topics**
*First International Conference on Subdivision, Geometric and Algebraic
Methods, Isogeometric Analysis and Refinability in Tuscany (SMART 2014),*
Pontignano, Italy September 28 - October 1, 2014
- **Distribution Dependent Subdivision Schemes**
8th International Conference CURVES and SURFACES,
Paris, France June 12 - 18, 2014
- **How can Mathematics help Electron Microscopy?** (discussion moderator)
*BIRS workshop 14w5048: Imaging and Modeling in Electron Microscopy -
Recent Advances,* Banff, Canada May 18 - 23, 2014
- **Nonlinear Approximation in High Dimensions**
Algorithms for Thread Detection Workshop,
Boulder, CO March 10 - 12, 2014
- **On Adaptive Approximation in High Dimensions**
Nonlinear Approximations and Applications,
Moscow, Russia October 29 - November 1, 2013
- **Instance optimality for hp-type approximation**
Multiscale and High-Dimensional Problems,
Oberwolfach, Germany July 28 - August 3, 2013
- **On Adaptivity in Point-Cloud Approximation**
Constructive Theory of Functions, Sozopol, Bulgaria June 10 - 15, 2013
- **Recent Developments of Approximation Theory and Greedy Algorithms**
Reduced Order Modeling in General Relativity,
Pasadena, CA June 6 - 7, 2013
- **Nonlinear Approximation in High Dimensions**
14th International Conference on Approximation Theory,
San Antonio, TX April 6 - 10, 2013
- **Adaptive Methods for Classification**
Algorithms for Thread Detection Workshop,
San Diego, CA November 26 - 29, 2012
- **Sparse Occupancy Trees for High Dimensional Problems**
3rd Dolomites Workshop on Constructive Approximation and Applications,
Alba di Canazei, Trento, Italy September 9 - 14, 2012

- **On Adaptive Strategies in Finite Element Methods**
Computational Methods in Applied Mathematics (CMAM2012),
 Berlin, Germany July 30 - August 3, 2012
- **On the Greedy Approach to the Reduced Basis Method**
Workshop on Model Order Reduction in PDE Constrained Optimization,
 Hamburg, Germany July 25 - 27, 2012
- **Adaptive Partitioning Algorithms for Classification**
Eighth International Conference on Mathematical Methods for Curves and Surfaces, Oslo, Norway June 28 - July 3, 2012
- **Sparse Tree Approximation in High Dimensions**
Applied Harmonic Analysis and Multiscale Computing,
 Edmonton, Canada July 25 - 28, 2011
- **Advanced Image Formation in Electron Microscopy**
Aachen Conference on Computational Engineering Science,
 Aachen, Germany July 13 - 15, 2011
- **Advanced Data Acquisition in Electron Microscopy**
FoCM 2011 Workshop on Approximation Theory,
 Budapest, Hungary July 8 - 10, 2011
- **Sparse Occupancy Trees for Approximation and Classification**
Workshop on Theoretical Aspects of High-Dimensional Problems and Information-Based Complexity, Bonn, Germany June 20 - 24, 2011
- **Point cloud processing using reliable sets**
2011 Algorithm Workshop, Boston, MA June 7 - 9, 2011
- **Classification using nonlinear approximation**
International Symposium on Approximation Theory,
 Nashville, TN May 17 - 21, 2011
- **High Quality Image Formation by Unconventional Data Acquisition in STEM**
New Frontiers in Imaging and Sensing,
 Columbia, SC February 17 - 22, 2011
- **Greedy algorithms for the Reduced Basis Method**
Multivariate Approximation and Interpolation with Applications,
 Edinburgh, UK September 6 - 10, 2010
- **“Localized” Nonlocal Means with Application to Electron Microscopy**
Wavelet and Multiscale Methods,
 Oberwolfach, Germany August 1 - 7, 2010
- **On the Greedy Approach to Reduced Basis Method**
I Jaen Conference on Approximation,
 Ubeda, Jaen, Spain July 4 - 9, 2010

- **Nonlinear Approximation of Surfaces**
Seventh International Conference on Curves and Surfaces,
 Avignon, France June 24 - 30, 2010

- **Sparse Occupancy Trees**
Workshop about High Dimensional Problems and Solutions,
 Paris, France June 21 - 22, 2010

- **Scattered Data Approximation in High Dimensions**
International Conference on Constructive Theory of Functions,
 Sozopol, Bulgaria June 3 - 9, 2010

- **Adaptive Approximation of Surfaces**
Thirteenth International Conference in Approximation Theory,
 San Antonio, Texas March 6 - 10, 2010

- **Nonlinear Processing of HAADF STEM Data**
Imaging in Electron Microscopy II, Columbia, SC February 18 - 23, 2010

- **Sparsity in Adaptive Approximation**
Nonlinear and Adaptive Approximation, Castle Reizensburg (Günzburg),
 Germany September 30 - October 3, 2009

- **Coarsening in Adaptive Approximation**
33rd SIAM Southeastern-Atlantic Section Conference, Columbia, SC
April 4 - 5, 2009

- **Near-Best Approximation in High Dimensions**
International Conference on Multivariate Approximation, Haus Bommerholz,
 Witten, Germany September 21 - 26, 2008

- **High Dimensional Learning via Sparse Occupancy Trees**
Learning Theory and Approximation, Oberwolfach, Germany
June 29 - July 5, 2008

- **Coarsening in Adaptive Finite Element Methods**
Wolfgang Pauli Institute workshop "Adaptive numerical methods for PDE's",
 Vienna, Austria January 21 - 24, 2008

- **Sparse Occupancy Trees and Adaptive Approximation in High Dimensions**
Nonlinear and Adaptive Approximation in High Dimensions, Physikzentrum
 Bad Honnef, Germany December 10 - 15, 2007

- **Adaptive Methods and Near-Best Tree Approximation**
Adaptive Numerical Methods for PDEs, Oberwolfach, Germany
June 10-16, 2007

- **Adaptive Approximation via Sparse Occupancy Trees**
6th International Conference on Large-Scale Scientific Computations, Sozopol,
 Bulgaria June 5 - 9, 2007

- **Tree-based Adaptive Learning Algorithms**
Twelfth International Conference in Approximation Theory, San Antonio, Texas
 March 4 - 8, 2007

- **On the Adaptive Strategies in Finite Element Methods**
*Sixth International Conference on Numerical Methods and Applications -
 NM&A'06*, Borovets, Bulgaria
 August 20 - 24, 2006

- **Adaptive Surface Fitting to Point Clouds**
Sixth International Conference on Curves and Surfaces, Avignon, France
 June 29 – July 5, 2006

- **Adaptive Finite Element Methods with Optimal Complexity**
Mini-Workshop: Convergence of Adaptive Algorithms, Oberwolfach, Germany
 August 14 - 20, 2005

- **Mathematical Learning of Large Point Clouds**
5th International Conference on Large-Scale Scientific Computations, Sozopol,
 Bulgaria
 June 6 - 10, 2005

- **Universal Algorithms for Learning Theory**
Constructive Theory of Functions, Varna , Bulgaria
 June 1 - 7, 2005

- **Adaptive Learning of Functions**
AMS Meeting #999 - Southeastern Section, Nashville, Tennessee
 October 16 - 17, 2004

- **Near best tree approximation**
Approximation and Probability, Bédlewo, Poland
 September 20 - 24, 2004

- **Nonlinear Methods in Learning Theory**
Eleventh International Conference in Approximation Theory, Gatlinburg,
 Tennessee
 May 18 - 22, 2004

- **Adaptive Tree Approximation**
Applicable Harmonic Analysis, Banff, Alberta, Canada
 June 7 - 12, 2003

- **Near Best Adaptive Approximation**
Advances in Constructive Approximation, Nashville, Tennessee
 May 14 - 17, 2003

- **Subdivision and Adaptive Approximation of Surfaces**
6th Ideal Data Representation Workshop: SC Marathon, Columbia,
 South Carolina
 November 5 - 14, 2002

- **Adaptive Tree Approximation for Progressive Compression of
 Surfaces**
Fifth International Conference on Curves and Surfaces, Saint-Malo, France
 June 27 – July 3, 2002

- *4th International Conference on Numerical Methods and Applications*,
Sofia, Bulgaria
[ORGANIZER] August 19 - 23, 1998
- *Large-Scale Scientific Computations*,
Varna, Bulgaria June 7 - 11, 1997
- *2nd International Conference on Multivariate Approximation Theory*,
Haus Bommerholz, Germany September 29 – October 4, 1996
- *Advanced Topics in Multivariate Approximation*,
Montecatini Terme, Italy September 27 – October 3, 1995
- *Minisemester on Approximation and Computational Complexity*,
Banach Center, Warsaw, Poland February 1995
- *International Conference on Multivariate Approximation Theory*,
Haus Bommerholz, Germany September 1994
- *Third International Conference on Numerical Methods and Applications*,
Sofia, Bulgaria August 21 - 26, 1994
- *Open Problems in Approximation Theory*,
Voneshta Voda, Bulgaria June 18 - 24, 1993
- *Constructive Theory of Functions'91*,
Varna , Bulgaria June 1991
- *Second International Conference on Numerical Methods and Applications*,
Sofia, Bulgaria August 22 - 27, 1988
- *Constructive Theory of Functions'87*,
Varna , Bulgaria May 1987
- *XXVII Semester on Approximation Theory and Function Spaces*, Banach Cen-
ter, Warsaw, Poland Spring
1986
- *First International Conference on Numerical Methods and Applications*,
Sofia, Bulgaria August 1984
- *Constructive Theory of Functions'84*,
Varna, Bulgaria May 1984

Colloquium and Invited Seminar Talks

The following list does not include talks presented at conferences and workshops, as well as regular seminar talks at the institution of affiliation through employment or a long term visit, namely, University of South Carolina, University of Sofia, University of South Florida, University of Greenwich, University of Duisburg, and Steklov Mathematical Institute.

- *Approximation by Reduced Modeling*, seminar talk at Università degli Studi di Milano, Milan, Italy
May 10, 2016
- *Data Assimilation in Reduced Modeling*, seminar talk at Université Paris-Dauphine, France
January 5, 2016
- *Data Assimilation in Reduced Modeling*, colloquium talk at University of Hawaii at Manoa, Honolulu, HI
December 16, 2015
- *A Mathematical Perspective to Electron Microscopy*, ECE Seminar Series at Rice University, Houston, TX
September 25, 2015
- *A near-best tree approximation algorithm for hp-adaptivity*, seminar presentation at Università degli Studi di Milano, Milan, Italy
October 2, 2014
- *Compressed Sensing and Electron Microscopy*, presentation at Oberseminar Analysis of RWTH-Aachen, Germany
May 12, 2014
- *Tree Approximation for hp-Adaptivity*, presentation at Oberseminar “Aktuelle Themen der Numerik” of RWTH-Aachen, Germany
May 8, 2014
- *Instance Optimal hp-Adaptive Approximation*, presentation at Oberseminar Wissenschaftliches Rechnen of Universität zu Köln, Cologne, Germany
May 7, 2014
- *Near-Best hp-Adaptive Tree Approximation*, presentation at Numerical Analysis Seminar at University of Maryland, College Park, MD
February 18, 2014
- *On hp-adaptive tree approximation*, presentation at the Analysis Seminar at University of Texas at Austin
October 18, 2013

- *Near-best hp-adaptive approximation on trees*, presentation at the Numerical Analysis Seminar at Texas A&M University
September 25, 2013
- *Tree Approximation in High Dimensions*, presentation at Numerical Analysis Seminar at University of Maryland, College Park, MD
April 23, 2013
- *Adaptivity in Finite Element Methods*, seminar presentation at Università degli Studi di Milano, Milan, Italy
September 17, 2012
- *Classification Algorithms using Adaptive Partitioning*, presentation at Institute for Geometry and Practical Mathematics, RWTH - Aachen, Aachen, Germany
July 12, 2012
- *Greedy Approach to Reduced Basis Method*, seminar presentation at University of Hawaii, Honolulu, HI
March 7, 2012
- *Data Processing and Visualization*, open lecture at the University of Sofia, Sofia, Bulgaria
May 28, 2010
- *Optimal Results in Adaptive Approximation*, colloquium presentation at Helmholtz Zentrum München, Munich, Germany
September 28, 2009
- *Adaptive Methods in Learning Theory*, seminar presentation at University of Pittsburgh, Pittsburgh, PA
August 21, 2009
- *Learning Theory, or how to extract knowledge from data*, 11th lecture of the IT Leaders Academy (distinguished lecture series), University of Sofia, Sofia, Bulgaria
July 13, 2009
- *Advanced Processing Methods in Scanning Electron Microscopy*, Aachen Institute for Computational Engineering Science, RWTH - Aachen, Germany
July 8, 2009
- *Adaptive Methods and Near-Best Tree Approximation*, seminar presentation at Tel Aviv University, Tel Aviv, Israel
March 12, 2009
- *Piecewise Linear Approximation in High Dimensions*, Institute for Geometry and Practical Mathematics, RWTH - Aachen, Germany
July 10, 2008

- *Statistical Learning Theory and Adaptive Approximation*, seminar presentation at University of Maryland, College Park, MD
November 28, 2007
- *Approximation via Sparse Occupancy Trees*, USC NanoCenter, Columbia, SC
November 9, 2007
- *Tree-based Adaptive Learning Algorithms*, seminar presentation at Rice University, Houston, Texas
September 10, 2007
- *Geometric Modeling and Surface Processing*, cycle of lectures at the Faculty of Mathematics and Informatics of the University of Sofia, Sofia, Bulgaria
July 23 - 27, 2007
- *Tree Approximation - A Quest for Optimality*, Colloquium, Department of Mathematics, University of South Carolina, Columbia, SC
February 22, 2007
- *Adaptive Strategies in Finite Element Methods*, SIAM student chapter seminar series at USC, Columbia, SC
February 7, 2007
- *Sparse Occupancy Trees*, Institut für Geometrie und praktische Mathematik, RWTH - Aachen, Germany
June 23, 2006
- *Mathematical Learning of Large Point Clouds*, Colloquium of the Faculty of Mathematics and Informatics, University of Sofia, Bulgaria
June 23, 2005
- *Learning a Surface*, Toyota Technological Institute at Chicago, University of Chicago, Chicago, IL
April 6, 2005
- *Convergence Rates for Adaptive Methods*, Computational Mathematics Seminar, University of Pittsburgh, Pittsburgh, PA
April 8, 2004
- *Adaptive Finite Element Methods with Convergence Rates*, Center for Computational Mathematics and Applications, Penn State University, State College, PA
March 17, 2003
- *On Adaptive Refinement for Elliptic PDEs*, Numerical Analysis Seminar, Texas A&M University, College Station, TX
October 15, 2001
- *Adaptive Numerical Methods for elliptic PDEs*, Numerical Analysis Seminar, University of Pittsburgh Pittsburgh, PA
May 1, 2001

- *Approximations with Tree Structure*, Wavelet-Harmonic Analysis Seminar, University of Maryland, College Park, MD
March 15, 2001
- *Adaptive Refinement Methods for Elliptic PDEs*, IMI General Seminar, University of South Carolina, Columbia, SC
May 18, 1999
- *Complex Wavelets and Hilbert Transform*, Institute for Applied Mathematics and Statistics, University of Hohenheim, Stuttgart, Germany
December 1997
- *Interpolatory properties of partial sums of Fourier series*, Oberseminar Rhein-Ruhr, Duisburg, Germany
May 17, 1991
- *colloquium presentations on the seminar of Hans Wallin*, Umeå University, Umeå, Sweden
November 1987
- *presentation on the Mathematical Colloquium*, Linköping University, Linköping, Sweden
November 1987
- *three colloquium presentations on the seminars of S. M. Nikolskii, S. B. Stechkin, and S. A. Telyakovskii*, Steklov Mathematical Institute, Moscow, Russia
Fall 1986
- *two colloquium presentations on the seminars of D. E. Menshov / P. L. Ulyanov and B.S. Kashin / V. N. Temlyakov*, Moscow State University, Moscow, Russia
Fall 1986
- *colloquium presentation on the General Mathematics Seminar*, Petersburg Department of Steklov Institute of Mathematics, Russia
October 1986
- *colloquium presentation on the City Seminar in Constructive Function Theory of G. I. Natanson*, St. Petersburg (Leningrad) State University, Russia
October 1986
- *On Whitney's Constants*, Gdansk Division of the Institute of Mathematics of the Polish Academy of Sciences, Sopot, Poland
October 1985
- *On the Nikolskii's Effect for Spline and Rational Functions Approximation*, invited presentation at the student research conference, University of Dresden, Germany
April 1980

Publications

Books and chapters in books

1. T. VOGT, W. DAHMEN, P. BINEV, EDS., *Modeling Nanoscale Imaging in Electron Microscopy*, Nanostructure Science and Technology, Springer, New York, 2012.
2. P. BINEV, F. BLANCO-SILVA, D. BLOM, W. DAHMEN, P. LAMBY, R. SHARPLEY AND T. VOGT, *High Quality Image Formation by Nonlocal Means Applied to High-Angle Annular Darkfield Scanning Transmission Electron Microscopy (HAADF-STEM)*, Chapter 5 in [1], p. 127-145.
3. P. BINEV, W. DAHMEN, R. DEVORE, P. LAMBY, D. SAVU, AND R. SHARPLEY, *Compressed Sensing and Electron Microscopy*, Chapter 4 in [1], p. 73-126.
4. A. ANDREEV, M. APOSTOLOVA, P. BINEV, B. BOYANOV, T. BOYANOV, S. DIMOVA, D. DRYANOV, A. IOTOVA, G. NIKOLOV, R. LAZAROV, M. NIKOLCHEVA, M. PETKOV, AND T. CHERNOGOROVA, *Collection of Problems on Numerical Analysis*, Sofia University Publ. House, Sofia, 1994 (in Bulgarian), 333 p.

Refereed papers published in scientific journals and conference proceedings

1. T. SANDERS, M. PRANGE, C. AKATAY, P. BINEV, *Physically motivated global alignment method for electron tomography*, Advanced Structural and Chemical Imaging **1**:4 (2015).
2. N. MEVENKAMP, P. BINEV, W. DAHMEN, P.M. VOYLES, A.B. YANKOVICH, B. BERKELS, *Poisson noise removal from high-resolution STEM images based on periodic block matching*, Advanced Structural and Chemical Imaging **1**:3 (2015).
3. A.B. YANKOVICH, B. BERKELS, W. DAHMEN, P. BINEV, P.M. VOYLES, *High-precision scanning transmission electron microscopy at coarse pixel sampling for reduced electron dose*, Advanced Structural and Chemical Imaging **1**:2 (2015).
4. P. BINEV, A. COHEN, W. DAHMEN, AND R. DEVORE, *Classification Algorithms using Adaptive Partitioning*, Annals of Statistics **42** (2014), 2141-2163.
5. A.B. YANKOVICH, B. BERKELS, W. DAHMEN, P. BINEV, S.I. SANCHEZ, S.A. BRADLEY, AO LI, I. SZLUFARSKA, AND P.M. VOYLES, *Picometre-precision analysis of scanning transmission electron microscopy images of platinum nanocatalysts*, Nature Communications **5** (2014), Article number: 4155.
6. B. BERKELS, P. BINEV, D.A. BLOM, W. DAHMEN, R.C. SHARPLEY, T. VOGT, *Optimized imaging using non-rigid registration*, Ultramicroscopy **138** (2014), 46-56.

7. A. BELOCHITSKI, P. BINEV, R. DEVORE, M. FOX-RABINOVITZ, V. KRASNOPOLSKI, AND P. LAMBY, *Tree Approximation of the Long Wave Radiation Parameterization in the NCAR CAM Global Climate Model*, Journal of Computational and Applied Mathematics **236** (2011), 447-460.
8. P. BINEV, A. COHEN, W. DAHMEN, R. DEVORE, G. PETROVA, P. WOJTASZCZYK, *Convergence Rates for Greedy Algorithms in Reduced Basis Methods*, SIAM J. Math. Anal. **43** (2011), 1457-1472.
9. P. BINEV, W. DAHMEN, AND P. LAMBY, *Fast high-dimensional approximation with sparse occupancy trees*, Journal of Computational and Applied Mathematics **235** (2011), 2063-2076.
10. P. BINEV, A. COHEN, W. DAHMEN, AND R. DEVORE, *Universal Piecewise Polynomial Estimators for Machine Learning*, in *Curve and Surface Design: Avignon 2006*, (P. Chenin et al., eds.) Nashboro Press (2007), 48-77.
11. P. BINEV, A. COHEN, W. DAHMEN, AND R. DEVORE, *Universal algorithms for learning theory. Part II : piecewise polynomial functions*, Constructive Approximation **26** (2007), 127-152.
12. P. BINEV, A. COHEN, W. DAHMEN, R. DEVORE, AND V. TEMLYAKOV, *Universal algorithms for learning theory - Part I: piecewise constant functions*, Journal of Machine Learning Research **6** (2005), 1297-1321.
13. A. KURDILA, M. NECHYBA, R. PRAZENICA, W. DAHMEN, P. BINEV, R. DEVORE, AND R. SHARPLEY, *Vision-Based Control of MicroAirVehicles: Progress and Problems In Estimation*, 43rd IEEE Conference on Decision and Control (2004), 1635-1642.
14. PETER BINEV, WOLFGANG DAHMEN, RONALD DEVORE, AND NIRA DYN, *Adaptive Approximation of Curves*, in *APPROXIMATION THEORY: A volume dedicated to Borislav Bojanov*, D. K. Dimitrov et al., eds., Marin Drinov Academic Publishing House, Sofia (2004), 43-57.
15. PETER BINEV AND RONALD DEVORE, *Fast Computation in Adaptive Tree Approximation*, Numer. Math. **97** (2004), 193-217.
16. PETER BINEV, WOLFGANG DAHMEN, RONALD DEVORE, *Adaptive Finite Element Methods with Convergence Rates*, Numer. Math. **97** (2004), 219-268.
17. PETER BINEV, WOLFGANG DAHMEN, RONALD DEVORE, PENCHO PETRUSHEV, *Approximation Classes for Adaptive Methods*, Serdica Math. J. **28** (2002), 391-416.
18. P. G. BINEV, P. PETRUSHEV, E. B. SAFF, O. TRIFONOV, *Distribution of Interpolation Points of Best L_2 -Approximants (n -th Partial Sums of Fourier Series)*, Constructive Approx. **9** (1993), 445-472.

19. P. G. BINEV AND K. JETTER, *Estimating the condition number for multivariate interpolation problems*, Numerical Methods of Approximation Theory, Vol. **9**, (ISNM, Vol. **105**,) D. Braess, L. L. Schumaker, eds., Birkhäuser, Basel (1992), 39-50.
20. P. G. BINEV AND K. JETTER, *Cardinal Interpolation with Shifted 3-directional Box Splines*, Proc. Royal Soc. Edinburgh, Sect. A **122** (1992), 205-220.
21. P. G. BINEV AND K. JETTER, *Euler Splines from 3-directional Box Splines*, Constructive theory of functions'91, (Proc. Intern. Conf., Varna, 1991,) Publ. House Bulg. Acad. Sci., Sofia (1992), 1-8.
22. P. G. BINEV, *Error estimate for box spline interpolation*, Constructive theory of functions'87, (Proc. Intern. Conf., Varna, 1987,) Publ. House Bulg. Acad. Sci., Sofia (1987), 50-55.
23. P. G. BINEV, *$O(n)$ -bound for Whitney constants*, Compt. Rend. Acad. Bulg. Sci. **38** (1985), 1303-1305.
24. P. G. BINEV AND K. G. IVANOV, *On a representation of mixed finite differences*, Serdica, **11** (1985), 259-268.
25. P. G. BINEV, *Spline interpolation of bounded functions in the class $L_p[0,1]$* , Serdica, **11** (1985), 42-47.
26. P. G. BINEV, *Convergence and superconvergence in Hermite spline-interpolation*, Numerical methods and applications'84, (Proc. Intern. Conf., Sofia, 1984,) Publ. House Bulg. Acad. Sci., Sofia (1985), 179-184.
27. P. G. BINEV, *Superconvergence in the spline-interpolation*, Constructive theory of functions'84, (Proc. Intern. Conf., Varna, 1984,) Publ. House Bulg. Acad. Sci., Sofia (1984), 164-170.

Preprints

1. P. BINEV, A. COHEN, W. DAHMEN, R. DEVORE, G. PETROVA, P. WOJTASZCZYK, *Data Assimilation in Reduced Modeling*, arXiv:1506.04770 [math.NA], 27 p., (submitted to SIAM/ASA Journal on Uncertainty Quantification)
2. P. BINEV, *Tree approximation for hp-adaptivity*, IMI Preprint Series 2015:07, University of South Carolina, 12 p.
3. P. BINEV, F. BLANCO-SILVA, D. BLOM, W. DAHMEN, R. SHARPLEY AND T. VOGT, *Super-resolution image reconstruction by nonlocal means applied to high angle annular darkfield scanning transmission electron microscopy (HAADF-STEM)*, IMI Preprint Series 2009:06, University of South Carolina, 12 p.

Extended abstracts published in *Oberwolfach Reports* based on invited talks presented at Mathematisches Forschungsinstitut Oberwolfach, Germany

1. P. BINEV, *Instance optimality for hp-type approximation*, Oberwolfach Report, **39/2013**, 2192-2194.
2. P. BINEV, *“Localized” Nonlocal Means with Application to Electron Microscopy*, Oberwolfach Report, **33/2010**, 1961-1964.
3. P. BINEV, *High Dimensional Learning via Sparse Occupancy Trees*, Oberwolfach Report, **30/2008**, 1675-1678.
4. P. BINEV, *Adaptive Methods and Near-Best Tree Approximation*, Oberwolfach Report, **29/2007**, 1669-1673.
5. P. BINEV, *Adaptive Finite Element Methods with Optimal Complexity*, Oberwolfach Report, **37/2005**, 2101-2104.

Extended Abstracts for the Microscopy & Microanalysis meetings

1. T. SANDERS, M. PRANGE, P. BINEV, C. AKATAY AND I. ARSLAN, *Robust Physical Alignment Models for Electron Tomography*, Microscopy and Microanalysis **21**, Suppl. 3 (2015), 2335-2336. doi:10.1017/S1431927615012453
2. I. ARSLAN, T. SANDERS, P. BINEV, B. C. GATES AND A. KATZ, *New Discrete Tomographic Reconstruction Method for Electron Tomography*, Microscopy and Microanalysis **21**, Suppl. 3 (2015), 2331-2332. doi:10.1017/S143192761501243X
3. T. SANDERS, J. D. ROEHLING, K. J. BATENBURG, B. C. GATES, A. KATZ, P. BINEV, I. ARSLAN, *Advanced 3-D Reconstruction Algorithms for Electron Tomography*, Microscopy and Microanalysis **20**, Suppl. 3 (2014), 794-795. doi:10.1017/S1431927614005698.
4. A.B. YANKOVICH, B. BERKELS, W. DAHMEN, R. SHARPLEY, P. BINEV AND P. VOYLES, *Measuring Surface Atom Bond Length Contraction in Au and Pt Nanoparticles Using High-Precision STEM Imaging*, Microscopy and Microanalysis **19**, Suppl. 2 (2013), 1688-1689. doi:10.1017/S143192761301043X.
5. B. BERKELS, R. SHARPLEY, P. BINEV, A. YANKOVICH, F. SHI, P. VOYLES AND W. DAHMEN, *High Precision STEM Imaging by Non-Rigid Alignment and Averaging of a Series of Short Exposures*, Microscopy and Microanalysis **18**, Suppl. 2 (2012), 300-301. doi:10.1017/S1431927612003352.