

## CURRICULUM VITAE

MELKANA BRAKALOVA-TREVITHICK

04/01/02

### DEGREES

**Ph.D., Sofia University, Sofia, BG, 1988.**

Thesis: On the Asymptotic Behavior of Quasiconformal and Conformal Strip Mappings.

Advisor: L. Iliev, Bulgarian Academy of Sciences.

Consultant: A. A. Goldberg, Lvov State University, Ukraine, USSR

**Ed.M., Harvard University, Cambridge, MA, 1993.**

**M.S. (Mathematics), Sofia University, Sofia, Bulgaria, 1981.**

### AWARDS

**The Arthur White Teaching Chair, Hotchkiss School, 2000.**

### ACADEMIC APPOINTMENTS

- Institute for Mathematical Sciences and USB Department of Mathematics, SUNY, Stony Brook, NY, visitor, 2002-2003.
- The Hotchkiss School, Lakeville, CT, Teacher of Mathematics, September 1993–current.
- Harvard University, KSG Summer Program, Cambridge, MA, Analytics Instructor, August 1995.
- Tufts University, Medford, MA, Visiting Lecturer, Spring 1993.
- American University in Bulgaria, Blagoevgrad, BG, Assistant Professor, 1991-1992.
- Washington University, St. Louis, MO, Visiting Assistant Professor, 1990-1991.
- University of Minnesota, Minneapolis, MN, Visiting Lecturer, 1989 - 1990.
- University of Regensburg, Regensburg, West Germany, Wissenschaftliche Hilfskraft, Fall 1988 - Spring 1989.
- Bulgarian Academy of Sciences, Institute of Mathematics, Sofia, Bulgaria, Researcher, 1986 - 1991.
- Sofia University, Sofia, BG, Teaching Assistant, Fall 1986.
- High Institute of Engineering and Architecture, Sofia, Bulgaria, Teaching Assistant, 1984.

Typeset by  $\mathcal{A}\mathcal{M}\mathcal{S}$ - $\mathcal{T}\mathcal{E}\mathcal{X}$

## PAPERS

- –with Jenkins, J., On a paper of Carleson. Ann.Acad. Sci. Fenn. vol. 27, 2002, 485-490.
- – with Coughlin, D. , Teaching Fractals and Dynamical Systems at the Hotchkiss School, in *Fractals, Computer Graphics, and Mathematics Education*, edited by B. Mandelbrot and M. Frame, MAA Notes No. 58, 2002, 35-48.
- – with Jenkins, J., On the existence of Solutions of Beltrami Equations with  $\|\mu\|_\infty = 1$  , Jour. Anal. Math., vol. 76, 1998, 67-92.
- – with Jenkins, J. On the Local Behavior of Certain Homeomorphisms II - vol. 237, Zapiski Nauchnykh Seminarov POMI, 11-20, 1997
- – with Jenkins, J. On the Behavior of Homeomorphisms at a Point - Kodai Math. Journal, vol. 17, No. 2, 201-213, 1994
- – Generalization of the Teichmüller Theorem, Lecture Notes in Math. 1351: 69-77, Springer Verlag, 1988.
- – On the Asymptotic Behavior of Some Quasiconformal and Strip Conformal Mappings. Rend. Acad. Bul. Sci., (I) 41:11-14, 1988
- –On the Asymptotic Representation of Some Quasiconformal Mappings. Proceedings, Conference on Complex Analysis, Varna, Bulgaria, 1987.
- –On the Asymptotic Behavior of Some Conformal Strip Mappings. Proceedings, Conference on Constructive Theory of Functions, Sofia, , 65-71,1988.
- – Asymptotic Behavior of Strip Mappings of Some Symmetric Strips. Proceedings, Conference on Complex Analysis and Applications, Sofia, 127-134, 1986.

## COURSES TAUGHT

- Differential Equations: Dynamics and Chaos (USB Math. Dept.)
- Computer Assisted Math Problem Solving (USB Math. Dept.)
- Multivariable Calculus (USB Math Department, The Hotchkiss School, Washington University, Sofia University)
- College Geometry (independent study, Hotchkiss School)
- Real and Complex Analysis (independent study, Hotchkiss School)
- Electrostatics and Electromagnetism (independent study, Hotchkiss School)
- Mathematical Logic (independent study, Hotchkiss School)
- Fractals and Dynamical Systems (Hotchkiss School)
- Analytics (Kennedy School of Government, Harvard University)
- Topics in College Mathematics: Fractals and Dynamical Systems (The Hotchkiss School)
- Geometry and Algebra (The Hotchkiss School)
- Precalculus (The Hotchkiss School, Harvard University)
- Calculus (The Hotchkiss School, Washington University, Sofia University)
- Lines of Reasoning: Geometry as a Tool for Critical Thinking (Tufts University)
- Statistics (American University in Bulgaria)
- Linear Algebra (Hotchkiss School, Washington University)
- Introduction to Non-Euclidean Geometry (University of Minnesota)
- Differential Equations and Applications (Hotchkiss School, University of Minnesota)
- Introduction to Elementary Mathematics (University of Minnesota)

- Introduction to Differential Geometry (High Institute of Engineering and Architecture)
- Ordinary and Partial Differential Equations (High Institute of Engineering and Architecture)

## INVITED TALKS

- On a paper of Carleson, Washington University, St. Louis, MO, March 2002.
- Iterations, Newton's Method and Fractals, Hamilton College, Clinton, NY, February 2002.
- Using Technology in the Classroom to Understand New and Old Mathematics, June Reunion Faculty Lecture, Hotchkiss School, Lakeville, CT, June 2000.
- Exploring Geometry and Fractals with GSP, Hotchkiss School, conference organized by the Connecticut Association of Independent Schools, April, 1998.
- Teaching Fractals and Dynamical Systems at the Hotchkiss School, Conference on Teaching Fractals and Dynamical Systems, Yale University, December 12-13, 1997.
- Fractals and the Science of Chaos, 1997 June Reunion Faculty Lecture, Hotchkiss School, Lakeville, CT, June 1997
- Teaching Dynamical Systems and Fractals and Using Technology in the Classroom ( TI - 82, Geometers Sketched) , Lock Haven University, PA, July 1995
- On the existence of Solutions of Beltrami Equations, November 1994, Washington University, St. Louis
- Chaos, Fractals and Dynamical Systems, Cheshire Academy, April, 1994. Conference organized by Connecticut Association for Independent Schools.
- Calculus Reform at Harvard, Lock Haven University, Lock Haven, PA, June, 1993.
- Introductory Lectures in the Theory of Plane Quasiconformal Mappings, Aristotle University, Thessaloniki, Greece, January 1992.
- On a Problem of Teichmüller, University of Michigan, Ann Arbor, MI, July 1991.
- On the Local Behavior of Solutions of Beltrami Equations, University of Kentucky, Lexington, KY, May 1991.
- On the Behavior of Conformal and Quasiconformal Mappings, Washington University, St. Louis, MO, May 1990.
- A Generalization of Teichmüller-Wittich Theorem, R. Nevanlinna Colloquium on Complex Analysis, University of Joensuu, Joensuu, Finland, August 1987.
- On the Behavior of Quasiconformal Mappings at a Point, Lvov State University, Lvov, USSR, October 1986.

## CONFERENCE PRESENTATIONS

- On a paper of Carleson, AMS and MAA Joint Mathematics Meeting, San Diego, CA, January 2002.
- On solutions of the Beltrami Equation, AMS and MAA Joint Mathematics Meeting, Baltimore, MD, January 1998.
- On a Problem of Teichmüller , International Conference on Complex Analysis and its Applications, Varna, Bulgaria, September '91.
- On the Local Behavior of Solutions of Beltrami Equations, Symposium in Complex Analysis, University of Wisconsin, Madison, WI, USA, June '91.

- Behavior of Quasiconformal Mappings at a Point, AMS and MAA Joint Mathematics Meeting, San Francisco, CA, USA, January '91.
- Asymptotic Expansion of Some Conformal Strip Mappings, International Colloquium on Complex Analysis and Sixth Romanian -Finish Seminar, University of Bucharest, Rumania, June '89.
- On the Representation of Quasiconformal and Conformal Mappings, International Conference on Complex Analysis, Herzeg Novi, Yugoslavia, May '88.
- A Generalization of Teichmüller-Wittich Theorem, 13th R. Nevanlinna Colloquium on Complex Analysis, Joensuu, Finland, August '87.
- On the Asymptotic Representation of Some Quasiconformal Mappings, International Conference on Complex Analysis and Its Applications, Varna, BG May '87.
- On the Asymptotic Behavior of Some Conformal Strip Mappings, International Conference on Constructive Theory of Functions, Varna, Bulgaria, May '87.
- Asymptotic Behavior of Strip Mappings of Some Symmetric Strips, International Conference on Complex Analysis and its Applications, Varna, BG, May '85.

#### SEMINAR/WORKSHOP PRESENTATIONS

- On the Measurable Riemann Mapping Theorem, Complex Analysis and Geometry Seminar, USB Department of Mathematics and Institute for mathematical Sciences, SUNY, Stony Brook, December 2002.
- Newton's Method for Cubic Polynomials, Minicourse/ Dynamics Learning Seminar, USB Department of Mathematics and Institute for mathematical Sciences, SUNY, Stony Brook, September 2002.
- On the Geometry of the Mandelbrot set, Newton's Method for Cubic Polynomials –description and students' projects, Workshop in Fractal Geometry, Yale University, Nee Haven, August 2000.
- On the Necessity of the Hamiltons Condition, On a Problem of Teichmüller, Washington University, St. Louis, MO, 1990-1991
- On the Local Behavior of Quasiconformal Mappings and Their Applications, University of Minnesota, Minneapolis, MN 1989-1990.
- Introduction to the Theory of Plane Quasiconformal Mappings, series of lectures, University of Regensburg, Regensburg, West Germany, 1988-1989.
- Presentations in the field of Geometric Function Theory, Bulgarian Academy of Sciences, Institute of Mathematics, Sofia, Bulgaria, 1983-1988.

#### WORKSHOP PARTICIPATION

- Summer Workshop in Fractal Geometry, organized by B. Mandelbrot and M. Frame, Yale University, August 7 - 11, 2000.
- PIMMS Fractal Workshop, Gateway Community College, July 8-14, 2000.
- Dynamical Systems Short Course, Salve Regina University, Newport, RI, June 15-19, 1997.
- NSF Enhancement Workshop on Teaching Differential Equation using Dynamical Systems Perspective, Boston University, June 2-5, 1996.
- Secondary School Mathematics and Technology Conference. Philips Exeter, Academy, June 19-June 24, 1994. Attended two courses: A Dynamical Introduction to Fractals, and An Introduction to the Geometers Sketchpad.

## NSF SPONSORED PROGRAMS

- Research Program in Dynamical Systems, Cornell University, June 28-August 20, 1999.
- Workshop on Technology in the Geometry Classroom, Geometry Center, University of Minnesota, Minneapolis, MN. June 04-June 28, 1996.

## SCHOLARSHIPS

- Emma Gildersleeve Lane Scholarship, Harvard University, 1993
- Graduate Fellowship, Sofia University, Sofia, Bulgaria, 1983-1986

## LANGUAGES

Fluent in English, Russian, Bulgarian. Working knowledge in German and French.

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