

# Curriculum Vitae

Jiří Lebl

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## Education:

PhD in Mathematics, Spring 2007, University of California, San Diego (UCSD)

Thesis: *Singularities and Complexity in CR Geometry* Advisor: Prof. Peter Ebenfelt

BA (Spring 2001) and MA (Spring 2003) in Mathematics, San Diego State University (SDSU)

## Employment:

2010–present Teaching Visitor, *University of California, San Diego (UCSD)*

2007–present J. L. Doob Research Assistant Professor ('07–'10) / Adjunct Assistant Professor ('10–'11)  
*University of Illinois at Urbana-Champaign (UIUC)*

2004–2007 Teaching Assistant, *University of California, San Diego (UCSD)*

2003 Programmer, *Red Hat, Inc.*, Raleigh, NC

2002 Teaching Assistant in Mathematics, *San Diego State University (SDSU)*

2000–2001 Programmer, *Eazel, Inc.*, Mountain View, CA

1999 Programmer/Consultant, *Spyder, Inc.*, San Diego, CA

1996–1998 Programmer/Consultant, *Trega, Inc.*, San Diego, CA

## Grants:

2009–2012: PI on NSF grant DMS-0900885, *Singularities and Complexity in CR Geometry* (\$99,898).

## Publications and Preprints:

- [1] John P. D'Angelo and Jiří Lebl, *Pfister's theorem fails in the Hermitian case*, to appear in Proc. Amer. Math. Soc., preprint arXiv:1010.3215.
- [2] John P. D'Angelo and Jiří Lebl, *Hermitian symmetric polynomials and CR complexity*, to appear in J. Geom. Anal., preprint arXiv:1003.0126.
- [3] Jiří Lebl and Han Peters, *Polynomials constant on a hyperplane and CR maps of hyperquadrics*, preprint arXiv:0910.2673.
- [4] Jiří Lebl, *Normal forms, Hermitian operators, and CR maps of spheres and hyperquadrics*, preprint arXiv:0906.0325.
- [5] Jiří Lebl, *Pullback of varieties by finite maps*, preprint arXiv:0812.2498.
- [6] Jiří Lebl and Daniel Lichtblau, *Uniqueness of certain polynomials constant on a line*, Linear Algebra Appl., **433** (2010), no. 4, 824–837, MR 2654111, arXiv:0808.0284.
- [7] Jiří Lebl, *Algebraic Levi-flat hypervarieties in complex projective space*, to appear in J. Geom. Anal., preprint arXiv:0805.1763.
- [8] John P. D'Angelo and Jiří Lebl, *On the complexity of proper holomorphic mappings between balls*, Complex Var. Elliptic Equ., **54** (2009), nos. 2–3, 187–204, MR 2513534, arXiv:0802.1739.
- [9] Jiří Lebl, *Levi-flat hypersurfaces with real analytic boundary*, Trans. Amer. Math. Soc., **362** (2010), no. 12, 6367–6380, arXiv:0710.3801.
- [10] John P. D'Angelo and Jiří Lebl, *Complexity results for CR mappings between spheres*, Internat. J. Math., **20** (2009), no. 2, 149–166, MR 2493357, arXiv:0708.3232.
- [11] Jiří Lebl, *Extension of Levi-flat hypersurfaces past CR boundaries*, Indiana Univ. Math. J., **57** (2008), no. 2, 699–716, MR 2414332, arXiv:math.CV/0612071.
- [12] John P. D'Angelo, Jiří Lebl, and Han Peters, *Degree Estimates for Polynomials Constant on a Hyperplane*, Michigan Math. J. **55** (2007), no. 3, 693–713, MR 2372622, arXiv:math.CV/0609713.
- [13] Jiří Lebl, *Nowhere minimal CR submanifolds and Levi-flat hypersurfaces*, J. Geom. Anal., **17** (2007), no. 2, 321–341, MR 2320166, arXiv:math.CV/0606141.

## Textbooks/Class Notes:

*Notes on Diffy Qs: Differential Equations for Engineers*, 269 pages. Introductory differential equations textbook for UIUC Math 286. Available for download at <http://www.jirka.org/diffyqs/>.

*Basic Analysis: Introduction to Real Analysis*, 161 pages. Introductory real analysis textbook for UIUC Math 444. Available for download at <http://www.jirka.org/ra/>.

*Hermitian Forms Meet Several Complex Variables: Minicourse on CR Geometry Using Hermitian Forms*, 61 pages. Notes for a half-semester graduate mini-course on Hermitian forms and CR geometry given at UIUC in spring 2010. Available for download at <http://www.jirka.org/scv-mini/>.

The two undergraduate books above have been, are being currently, or are planned to be used at several universities. Apart from my own usage at UIUC and UCSD, these include Dartmouth College, University of Tennessee, Vancouver Island University, Eastern Illinois University, and Grand Valley State University (and perhaps others that I do not know about).

## Research Interests:

My primary interests lie in *complex analysis* in general and CR geometry in particular. My research in CR geometry has also led me to study problems in real and complex algebraic geometry, discrete geometry, combinatorics, number theory, and experimental mathematics using computers. My research philosophy is not to simply solve problems within the confines of a particular area, but to look for connections with (and applications to) other areas of mathematics and computer science.

In particular, I have spent the majority of my time so far studying singularities and complexity in CR geometry. That is, studying CR manifolds and mappings between them. Two particular problems I have worked on involve the singularity structure of a singular Levi-flat hypersurface, and proper holomorphic mappings between balls and hyperquadrics. See my research statement for further information.

Favorite MSC 2000 classification numbers: 32, 14, 30.

## Presentations: (only conference talks listed)

*Hermitian forms and rational maps of hyperquadrics*, CIRM - CR-Geometry and PDE's - IV, June 2010, Leviso Terme, Italy.

*Polynomials constant on a hyperplane and CR maps of spheres*, Special session AMS meeting, March 2010, Lexington, KY.

*Hermitian forms and rational maps of hyperquadrics*, RTG Workshop on Holomorphic Maps and Iterations, March 2010, Ann Arbor, MI.

*Uniqueness of certain polynomials constant on a hyperplane*, Applications of Computer Algebra 2009, Montréal, Canada.

*Singular Levi-flat hypersurfaces in complex projective space*, Conference on Complex and CR Geometry, Partial Differential Equations and Invariant Theory in honor of Joseph J. Kohn, July 2008, Prague, Czech Rep.

*Singular Levi-flat hypersurfaces in complex projective space*, CIRM - CR-Geometry and PDE's - III, June 2008, Leviso Terme, Italy.

*Levi-flat hypersurfaces with real analytic boundary*, Special session CMS meeting, December 2007, London, Canada.

*Extensions of Levi-flat hypersurfaces past CR boundaries*, Special session AMS meeting, October 2007, Chicago, IL.

*Singularities of Levi-Flat Hypersurfaces*, International Conference in PDE, Complex Analysis, and Differential Geometry, June 2006, Notre Dame, IN.

I have also given seminar/colloquium talks at UCSD, UIUC, UW-Madison, SUNY-Stony Brook, Cal State San Marcos, City College of New York, University of Vienna, and San Diego State University about my research and several complex variables in general.

## Awards:

Appeared in *List of Teachers Ranked as Excellent by Their Students* for spring 2010 for UIUC Math 595.

The Honor Society of Phi Kappa Phi, spring 2003.

## Teaching Experience:

I have written three free online textbooks. The first one on differential equations, covering material of Math 286 (UIUC) plus a little extra. The second one on real analysis covering the material of Math 444 (UIUC). The third one is a graduate

course on Hermitian forms in CR geometry. All are available for free download, see above. As I mentioned above they have been or are being currently used at several universities.

At UCSD I am currently teaching differential equations (20D) and vector calculus (20C).

At UIUC I have taught advanced calculus (Math 380), finite mathematics (Math 124), differential equations (Math 286 and 285), matrix analysis (Math 225), real analysis (Math 444), and a graduate course on CR geometry (Math 595).

While a masters student at SDSU I have taught mathematics for elementary school teachers (Math 210). As a PhD student at UCSD, I have been leading problem sections and grading for Calculus (Math 20B), Real Analysis (Math 140A, 142A, and 240A/B/C) and Complex Analysis (220A/C). I ran qualification examination preparation sessions for the Real Analysis exam at UCSD.

### **Programming/Computer Experience:**

I have extensive programming experience, mostly in C and C++. Other languages I have had some acquaintance with are Tcl, Perl, PHP, BASIC, Pascal, GEL, Lisp, Matlab/Octave, Maple, and others. I have been a major contributor to the GNOME project for several years (<http://www.gnome.org>), and have been employed as a programmer several times. I was a member of the GNOME steering committee and later a member of the GNOME Foundation board of directors. I have had several programming tutorials published in Linux and GNOME related publications, and have given several talks on GNOME, programming and security at GNOME and Linux conferences. I am the author and maintainer of the free software mathematics package Genius (<http://www.jirka.org/genius.html>), which includes its own programming language, GEL. I have extensive knowledge of L<sup>A</sup>T<sub>E</sub>X, having (apart from writing two theses, three textbooks, and several research papers) for example written the thesis style for San Diego State University mathematics department.

### **Service:**

I have co-organized (with John D'Angelo and Alex Tumanov) a special session at the AMS regional meeting at Urbana-Champaign on March 27-29 2009 titled *Holomorphic and CR Mappings*.

I have refereed papers for Pure and Applied Mathematics Quarterly, Trends in Math (Birkhäuser-Verlag), and Illinois Journal of Mathematics.

The three textbooks mentioned above are all freely available online and modification is explicitly allowed. The mathematics software package Genius is also freely available for download and modification. I have also contributed over 150 entries to the Planetmath (<http://planetmath.org>) encyclopedia.

### **Citizenship: USA**

### **References:**

Prof. Peter Ebenfelt, University of California, San Diego, [pebenfel@ucsd.edu](mailto:pebenfel@ucsd.edu)  
Prof. John P. D'Angelo, University of Illinois at Urbana-Champaign, [jpda@math.uiuc.edu](mailto:jpda@math.uiuc.edu)  
Prof. Dmitri Zaitsev, Trinity College Dublin, Ireland, [zaitsev@maths.tcd.ie](mailto:zaitsev@maths.tcd.ie)  
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