

Curriculum Vitæ

Qing Han

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EDUCATION

- 1993: Ph.D., Courant Institute, New York University
Thesis: Nodal Sets and Singular Sets of Solutions to Differential Equations
Advisor: Fang-Hua Lin
- 1986: B.S., Peking University, Beijing, China

RESEARCH FIELDS

Partial Differential Equations and Analysis in Differential Geometry

PROFESSIONAL EXPERIENCE

- 8/03-Present Professor, University of Notre Dame
- 10/02-7/03 Visiting Member, Max-Planck Institute for Mathematics, Leipzig
- 8/99-7/03 Associate Professor, University of Notre Dame
- 8/98-7/99 Visiting Member, Courant Institute, New York University
- 8/94-7/99 Assistant Professor, University of Notre Dame
- 9/93-7/94 Dickson Instructor, University of Chicago

FELLOWSHIP

- 9/99-9/03 Sloan Foundation Research Fellowship

AWARDS

- 4/00 Kaneb Teaching Awards, University of Notre Dame

RESEARCH GRANTS

- 6/07-5/10 National Science Foundation Grant DMS 06-54261
- 6/04-5/07 National Science Foundation Grant DMS 03-54948
- 7/01-6/04 National Science Foundation Grant DMS 01-00260
- 6/98-5/01 National Science Foundation Grant DMS 98-01250
- 6/95-5/98 National Science Foundation Grant DMS 95-01122

OTHER APPOINTMENTS

- 3/07-2/10 Cheung Kong (Yangtze) Scholar, Peking University, Beijing, China
(The program of Yangtze Scholars is administered by the Ministry of Education in China. Each year, 100 Yangtze Scholars are named in all disciplines with 3-5 in mathematics. Duties include three month service in the host institute each year.)

OTHER PROFESSIONAL EXPERIENCE

- 7/95 Visitor, University of Ulm, Ulm, Germany
- 7/96 Visitor, University of British Columbia, Vancouver
- 7/99 Visitor, National Tsing-Hua University, Tsingchu, Taiwan
- 7/00 Visitor, National Tsing-Hua University, Tsingchu, Taiwan
- 8/02 Visitor, National Tsing-Hua University, Tsingchu, Taiwan
- 9/02 Visitor, Fudan University, Shanghai, China
- 6/04 Visitor, National Tsing-Hua University, Tsingchu, Taiwan
- 7/04 Visitor, University of Hokkaido, Sapporo, Japan
- 11/04 Visitor, Centro Di Ricerca Matematica Ennio De Giorgi, Pisa, Italy
- 6/05 Visitor, Fudan University, Shanghai, China
- 7/05 Visitor, Peking University, Beijing, China
- 6/06 Visitor, Peking University, Beijing, China
- 5-7/07 Yangtze Scholar, Peking University, Beijing, China
- 5-7/08 Yangtze Scholar, Peking University, Beijing, China

EDITORS

- 2006- *Analysis*, Oldenbourg Verlag, München (analysis-international.de)

CONFERENCE ORGANIZED

- 4/00: *Special Session on Partial Differential Equations in AMS Regional Conference*, (with B. Hu), University of Notre Dame
- 3/02: *Special Session on Partial Differential Equations in AMS Regional Conference*, (with L. Wang), University of Michigan
- 6/03: *NSF-CBMS Regional Conference on Fully Nonlinear Equations in Geometry*, (with M. Gursky), University of Notre Dame
- 8/03: *Conference on Partial Differential Equations & Applications*, (with A. Himonas and B. Hu), University of Notre Dame
- 12/05: *Midwest PDE Seminar*, (with A. Himonas and B. Hu), University of Notre Dame

- 4/06: *Special Session on Nonlinear Partial Differential Equations in AMS Regional Conference*, (with M. Gursky), University of Notre Dame
- 6/07: *Nonlinear Differential Equations and Applications*, (with S. Zhou), Peking University, China
- 6/08: *International Conference on Nonlinear Differential Equations and Applications*, (with B. Guan), Harbin Institute of Technology, Harbin, China

PUBLICATIONS

- [1] Q. Han, J. Arrieta & J. Hale, *Eigenvalue problems for nonsmoothly perturbed domains*, J. Diff. Eqs., 91(1991), 24-52.
- [2] Q. Han & F.-H. Lin, *Nodal sets of solutions of parabolic equations, II*, Comm. Pure Appl. Math., 48(1994), 1219-1238.
- [3] Q. Han & F.-H. Lin, *On the geometric measure of nodal sets of solutions*, J. Partial Diff. Eqs., 7(1994), 111-131.
- [4] Q. Han, *Singular sets of solutions to elliptic equations*, Indiana Univ. Math J., 43(1994), 983-1002.
- [5] Q. Han, *Deforming convex surfaces by curvature functions*, Analysis, 17(1997), 113-127.
- [6] Q. Han, R. Hardt & F.-H. Lin, *Geometric measure of singular sets of elliptic equations*, Comm. Pure Appl. Math., 51(1998), 1425-1443.
- [7] Q. Han, *On the Schauder estimates of solutions to parabolic equations*, Annali Scuola Di Pisa, 27(1998), 1-26.
- [8] Q. Han, *Schauder estimates for elliptic operators with applications to nodal sets*, J. Geom. Analysis, 10(2000), 455-480.
- [9] Q. Han & F.-H. Lin, *Rank zero and rank one sets of harmonic maps*, Methods and Appl. of Analysis, 7(2000), 1-26.
- [10] Q. Han & T.-C. Lin, *Vortex solutions of the d-wave Ginzburg-Landau equation*, Nonlinearity, 15(2002), 257-269.
- [11] Q. Han, N. Nadirashvili & Y. Yuan, *Linearity of homogeneous order one solutions to elliptic equations in dimension three*, Comm. Pure Appl. Math., 56(2003), 425-432.
- [12] L. Capogna & Q. Han, *Pointwise Schauder estimates for subelliptic second order linear equations*, Harmonic Analysis at Mount Holyoke (South Hadley, MA, 2001), 45-69, Contemp. Math., 320, Amer. Math. Soc., Providence, RI, 2003.

- [13] Q. Han, J.-X. Hong & C.-S. Lin, *Small divisors in nonlinear elliptic equations*, Cal. Var. & P.D.E., 18(2003), 31-56.
- [14] Q. Han, J.-X. Hong & C.-S. Lin, *Local isometric embedding of surfaces with nonpositive Gaussian curvature*, J. Diff. Geometry, 63(2003), 475-520.
- [15] Q. Han, R. Hardt & F.-H. Lin, *Singular sets of higher order elliptic equations*, Comm. P.D.E., 28(2003), 2045-2063.
- [16] Q. Han, *Singular sets of harmonic functions in \mathbb{R}^2 and their complexifications in \mathbb{C}^2* , Indiana Univ. Math J., 53(2004), 1365-1380.
- [17] Q. Han, *The structure and measure of singular sets of solutions to elliptic equations*, Variational Problems and Related Topics, 100-116, Ed. by M. Misawa & T. Suzuki, Kyoto University, 2004.
- [18] Q. Han, *On the isometric embedding of surfaces with Gauss curvature changing sign cleanly*, Comm. Pure Appl. Math., 58(2005), 285-295.
- [19] Q. Han, *Local isometric embedding of surfaces with Gauss curvature changing sign stably across a curve*, Cal. Var. & P.D.E., 25(2005), 79-103.
- [20] Q. Han, J.-X. Hong & C.-S. Lin, *On Cauchy problems for degenerate hyperbolic equations*, Trans. A.M.S., 358(2006), 4021-4044.
- [21] Q. Han, *Local solutions to a class of Monge-Ampère equations of the mixed type*, Duke Math. J., (136)2007, 421-473.
- [22] Q. Han & F.-H. Lin, *Isometric embedding of torus*, Methods & Applications of Analysis, Special issue dedicated to N. Trudinger, to appear.

PREPRINTS

- [23] Q. Han, *Smooth local solutions to degenerate hyperbolic Monge-Ampère equations*, submitted.
- [24] Q. Han, *Smooth local isometric embedding of surfaces with Gauss curvature changing sign cleanly*, submitted.
- [25] Q. Han & M. Khuri, *Smooth solutions of a class of mixed type differential equations*, submitted.
- [26] Q. Han & M. Khuri, *Local isometric embedding of surfaces with Gauss curvature of mixed sign*, submitted.
- [27] Q. Han, *Smooth solutions of degenerate elliptic differential equations*, submitted.
- [28] Q. Han, *On the well-posedness of degenerate hyperbolic equations*, submitted.

- [29] Q. Han & Y. Liu, *Degenerate hyperbolic equations with a low degree degeneracy*, submitted.

BOOKS

- [30] Q. Han & F.-H. Lin, *Elliptic Partial Differential Equations*, Courant Institute Lecture Notes, Volume 1, American Mathematical Society, Providence, RI, 2000.
- [31] Q. Han & J.-X. Hong, *Isometric Embedding of Riemannian Manifolds in Euclidean Spaces*, Mathematical Surveys and Monographs, Volume 130, American Mathematical Society, Providence, RI, 2006.

LECTURE NOTES

- [32] Q. Han, *Local Isometric Embedding of Surfaces in \mathbb{R}^3* , Lecture Note No. 18, Max-Planck Institute for Mathematics, Leipzig, 2003.

SERIES LECTURES

- 6/26-6/30/05: 8 hour lectures on *Nodal Sets of Harmonic Functions in 2nd Contemporary Partial Differential Equations: Frontier and Prospect*, Eastern China Normal University, China, organized by W.-M. Ni
- 7/11-7/28/05: 18 hour lectures on *The Growth of Harmonic Functions in the 9th Special Lecture Series*, Peking University, China, organized by G. Tian
- 6/12-6/30/06: 18 hour lectures on *A Basic Introduction of Geometric Measure Theory in the 10th Special Lecture Series*, Peking University, China, organized by G. Tian
- 7/10-7/14/06: 8 hour lectures on *A Priori Estimates of Solutions of Elliptic Differential Equations in Summer School on Geometric Analysis*, University of Science and Technology of China, China, organized by X.-X. Chen and X.-N. Ma
- 7/1/-7/3/06: 5 hour lectures on *A Basic Introduction of Geometric Integral Formulas* in Xi'an Jiaotong University, China
- 5/28-5/30/07: 6 hour lectures on *Degenerate Differential Equations* in Wuhan University, China
- 7/10-7/14/07: 12 hour lectures on *Nonlinear Equations and Applications in Geometry in the 11th Special Lecture Series*, Peking University, China, organized by G. Tian
- 7/24-7/27/08: 10 hour lectures on *Regularities of Solutions of Elliptic Differential Equations in Summer School of Geometric Analysis*, University of Science and Technology of China, China

SELECTED INVITED TALKS

2000

➤ *February: International Workshop on Free Boundary Problem*, Royal Institute of Technology, Stockholm, Sweden

➤ *October: Colloquium*, University of Arkansas, Fayetteville

2002

➤ *August: International Conference on Nonlinear Analysis, Satellite Conference, International Congress of Mathematics 2002*, Institute of Mathematics, Academia Sinica, Taipei, Taiwan

2003

➤ *May: Calculus of Variation*, University of Warwick, Coventry, UK

➤ *June: A Workshop in Geometric and Global Properties in PDE with Applications*, Royal Institute of Technology, Stockholm, Sweden

➤ *August: BIRS Workshop: Monge-Ampère Type Equations and Applications*, Banff International Research Station, Banff, Alberta

➤ *November: Intensive Research Period on Geometric Analysis*, Centro Di Ricerca Matematica Ennio De Giorgi, Pisa, Italy

2004

➤ *May: Colloquium*, Cornell University, Ithaca

➤ *May: Workshop on Reaction-Diffusion Equations and Related Topics*, National Center for Theoretical Sciences, Tsinchu, Taiwan

➤ *June: RIMS Symposium on Variational Problems and Related Topics*, Kyoto University, Kyoto, Japan

➤ *July: Contemporary Partial Differential Equations - Frontier and Prospect*, Nanjing University, Nanjing, China

➤ *July: International Conference on Elliptic and Parabolic Equations*, Jilin University, Changchun, China

➤ *October: AMS Regional Conference*, Northwestern University, Evanston

➤ *November: 54th Midwest PDE Seminar*, Wayne State University, Detroit

2005

➤ *July: 2nd Contemporary Partial Differential Equations - Frontier and Prospect*, Eastern China Normal University, Shanghai, China

➤ *August: 3rd Pacific Rim conference on Mathematics*, Shanghai, China

➤ *November: Workshop on Recent Results in Nonlinear Elliptic Equations and their Interactions with Geometry*, MSRI, Berkeley

➤ *November: Florida Conference of Partial Differential Equations*, University of Florida, Gainesville

2006

➤ *April: Colloquium*, University of Arkansas, Fayetteville

- *May: The Sixth East Asia Conference on PDE*, Wuhan University, Wuhan, China
- *May: Conference on Nonlinear Differential Equations*, Huangshan, China
- *July: Conference on Geometry and Analysis*, Ningbo University, Ningbo, China
- *November: The Second International Conference on Finsler Geometry*, Cairo, Egypt

2007

- *March: Colloquium*, University of Oklahoma, Oklahoma City
- *June: Conference on Geometry and Analysis*, Chern Institute, Nankai University, Nankai, China
- *July: 4nd Contemporary Partial Differential Equations - Frontier and Prospect*, Yantai University, Yantai, China
- *August: International Conference on Geometry and Analysis*, Nanjing University, Nanjing, China
- *August: PIMS Differential Geometry and Analysis Summer School (2 lectures)*, University of Washington, Seattle

2008

- *March: Workshop on Mixed-Type Equations and Applications*, American Institute of Mathematics
- *April: Colloquium*, Stony Brook University, Stony Brook
- *June: International Conference on Complex Analysis and Harmonic Analysis*, Fuzhou Normal University, Fuzhou, China
- *July: International Conference of Kahler Geometry and Conformal Geometry*, University of Science and Technology of China, Hefei, China