

Jingzhi Tie

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- EDUCATION**
- ◇ **University of Toronto**, Toronto, Canada.
Ph.D. in Mathematics, June 1995.
Thesis Title: Analysis on the Heisenberg Group and its Application to Complex Analysis.
Advisor: Peter C. Greiner.
 - ◇ **University of Victoria**, Victoria, Canada.
M.Sc. in Applied Mathematics, November 1989.
Thesis Title: Derivation of the Boltzmann Equations from BBGKY Hierarchy.
Advisor: Reinhard Illner.
 - ◇ **Lanzhou University**, Lanzhou, China.
B.Sc. in Mathematics, July 1985.
- AWARDS**
- ◇ January 2007–December 2007, NSC of Republic of China Grant.
 - ◇ January 2000–December 2000, UGARF research grant.
 - ◇ August 1996–July 1998, NSERC postdoctoral fellowship.
 - ◇ November 30, 1995, The Malcolm Slingsby Robertson Prize for Best Dissertation.
 - ◇ May 1992–May 1995, Ontario Graduate Scholarships.
 - ◇ Sept. 1990–May 1992, Department of Mathematics Scholarships.
 - ◇ Sept. 1987–Sept. 1989, University of Victoria Fellowships.
- RESEARCH INTERESTS**
- Geometric Analysis on nilpotent Lie group.
 - Harmonic analysis on the Heisenberg group.
 - Pseudo-differential and singular integral operators, partial differential equations.
 - Several complex variables.
- RESEARCH PROJECTS**
- ◇ Sub-gradient estimates and Liouville-type theorems for the CR heat equation on the Heisenberg group.
Collaborators: Shu-Cheng Chang and Chin-Tung Wu.
 - ◇ The sub-Riemannian Geometry on the Engel group.
Collaborator: Malcolm F. Adams.
 - ◇ Mathematical Finance.
Collaborator: Qing Zhang and Duy Nguyen
- ACADEMIC POSITION HELD**
- ◇ **2006-present**, Associate Professor with tenure, University of Georgia.
 - ◇ **January 2007-December 2007**, Visiting Associate Researcher, Academia Sinica, Republic of China.
 - ◇ **1999–2005**, Assistant Professor, University of Georgia.
 - ◇ **1998-1999**, Visiting Assistant Professor, University of California, Irvine.
 - ◇ **1996-1998**, NSERC Postdoctoral Fellow, University of Maryland at College Park, The Fields Institute and Yale University.

- ◇ 1994-1996, Instructor, University of Toronto.

PUBLICATION **Monographs**

- ◇ [1.] (Joint with **Carlos Berenstein** and **Der-Chen Chang**) **Laguerre Calculus and its Applications to Harmonic Analysis on the Heisenberg Group**. AMS/IP Studies in Advanced Mathematics, vol. **22**, American Mathematical Society, International Press, 328pp, **2001**.
- ◇ [2.] (Joint with **D-C. Chang** and **P.C. Greiner**) **Analysis on the Model Weakly Pseudo-Convex Domain**. In preparation.

Journal Articles

- ◇ [1.] (Joint with **R. Illner**), On Directed Diffusion with Measurable Background, *J. Math. Meth. in Appl. Sci.* Vol. **16**, 681-690, **1993**.
- ◇ [2*.] Embedding \mathbf{C}^1 into \mathbf{H}_1 , *Canad. J. Math.* Vol. **47**(6), 1317-1328, **1995**.
- ◇ [3*.] The Inverse of Some Differential Operators on the Heisenberg Group, *Comm. in PDEs*, vol.**20**, No.**7 & 8**, 1275-1302, **1995**.
- ◇ [4*.] (Joint with **Der-Chen Chang**) Estimates for Spectral Projection Operators of the Sub-Laplacian on the Heisenberg Group. *J. Analyse. Math.* vol.**71**, 315-347, **1997**.
- ◇ [5*.] The Explicit Solution of the $\bar{\partial}$ -Neumann Problem in the Non-isotropic Siegel Domain. *Canad. J. Math.*.. vol.**49** no. **6**, 1299-1322, **1997**.
- ◇ [6.] (Joint with **Der-Chen Chang**) Applications of Laguerre calculus to Dirichlet problem of the Heisenberg Laplacian. Finite or infinite dimensional complex analysis (Fukuoka, 1999), 47-53, *Lecture Notes in Pure and Appl. Math.*, vol. **214**, Dekker, New York, **2000**.
- ◇ [7*.] (Joint with **Der-Chen Chang**) Estimates for the Powers of the sub-Laplacian on the Non-isotropic Heisenberg Group. *J. Geo. Analysis*, vol. **10**, no. 4, 653-678, **2000**.
- ◇ [8*.] (Joint with **Der-Chen Chang**) An identity related to the Riesz Transforms on the Heisenberg Group. *Complex Variables Theory Appl.* vol.**40**, no. 4, 395-421, **2000**.
- ◇ [9*.] (Joint with **Der-Chen Chang**) Some Differential Operators Related to the Heisenberg Sub-Laplacian. *Math. Nach.* vol. **221**, 19-39, **2001**.
- ◇ [10*.] (Joint with **Der-Chen Chang** and **Robert Gilbert**) Bergman Projection and Weighted Holomorphic Functions, **Operator Theory: Advances and Applications**. **143**, 147-169, **2003**.
- ◇ [11.] (Joint with **Der-Chen Chang** and **Peter Greiner**) Sub-Riemannian Geometry and Subelliptic PDEs, **Function Theory in Several Complex Variables**, Editors: **Carl H FitaGerald** and **Sheng Gong**, *Proceedings of a Satellite Conference to the ICM in Beijing 2002*, 1-36, **2004**.
- ◇ [12*.] (Joint with **Der-Chen Chang**) Hermit operator and Subelliptic Operators, *Acta Math. Sin. (Engl. Ser.)* **21**, no. 4, 803-818 **2005**.
- ◇ [13*.] (Joint with **Ovidiu Calin** and **Der-Chen Chang**) Hermite Operator on the Heisenberg Group, *Harmonic Analysis, Signal Processing and Complexity: Festschrift in Honor of the 60th Birthday of Carlos A. Berenstein*, 37-54, **2005**.
- ◇ [14*.] The fundamental solution and heat kernel of the twisted Laplacian on \mathbb{R}^{2n} . *Communication in PDEs*, **31**, no.7-9,1047-1069, **2006**.
- ◇ [15*.] (Joint with **Ovidiu Calin** and **Der-Chen Chang**) Fundamental Solutions for Hermite and Subelliptic Operators, *J. Analyse. Math.*, **100**, 223-248, **2006**.
- ◇ [16*.] (Joint with **Der-Chen Chang** and **Peter Greiner**) Laguerre Calculus on the Heisenberg group and Bessel-Fourier transform on \mathbb{C}^n , *Sciences in China, Series A*, **49**, no. 11, 1722-1739, **2006**.

- ◇ [17*.] (Joint with **M.W. Wong**) The wave kernel of the twisted Laplacian on \mathbb{C}^n , Modern trends in pseudo-differential operators, 107–115, *Oper. Theory Adv. Appl.*, **172**, **2007**.
- ◇ [18.] (Joint with **Der-Chen Chang** and **Peter C. Greiner**) A Geometric Formula for the Fundamental Solution of the Kohn Laplacian, *Proceedings of ICCM*, **2007**.
- ◇ [19*.] (Joint work with **M.W. Wong**) The Heat Kernel and Green Functions of Sub-Laplacians on the Quaternion Heisenberg Group, *Journal of Geometric Analysis*, **19**, 191-210, **2009**.
- ◇ [20*.] (Joint with **Der-Chen Chang** and **Shu-Cheng Chang**) Laguerre Calculus and Paneitz Operator on the Heisenberg group, *Sci. China Ser. A*, **52**, No. 12, 2549-2966, **2009**.
- ◇ [21*.] (Joint with **Shucheng Chang** and **Chin-Tung Wu**) Subgradient Estimate and Liouville-type Theorems for the CR Heat Equation on Heisenberg groups, *Asian Journal of Mathematics*, Volume 14, Number 1, 41-72, March 2010.
- ◇ [22*.] (Joint with **Duy Nguyen** and **Qing Zhang**), An Optimal Trading Rule Under A Switchable Mean-Reversion Model, *Journal of Optimization Theory and Applications*, Published online on January 24, 2013. DOI 10.1007/s10957-012-0260-x
- ◇ [23*.] (Joint with **Duy Nguyen** and **Qing Zhang**), Stock Trading Rules under a Switchable Market, *Mathematical Control and Related Fields*, Volume 3, Number 2, 209-231, June 2013.
- ◇ [24*.] (Joint with **Malcolm R. Adams**), On Sub-Riemannian Geodesics Induced by the Engel Fields, *Math. Nach.*, To appear February 2013.

Works not yet Accepted

- ◇ [25*.] (Joint with **Shu-Cheng Chang** and **Ting-Jung Kuo**), Yau's Gradient Estimate and Liouville Theorem for Positive Pseudoharmonic Functions in a Complete Pseudohermitian $(2n + 1)$ -manifold, Submitted to *Canadian Journal of Mathematics*, November 2012.
- ◇ [26*] (Joint with **Der-Chen Chang** and **Shu-Cheng Chang**), Calabi-Yau Theorem and Hodge-Laplacian Heat Equation in a Closed Strictly Pseudoconvex CR Manifold, Submitted to *Journal of Differential Geometry*, January 2013.
- ◇ [27*] (Joint with **Shu-Cheng Chang**, **Yen-Wen Fan** and **Ting-Jung Kuo**), Matrix Li-Yau-Hamilton Inequality for the CR Heat Equation in Pseudo-Hermitian $(2n+1)$ -Manifolds, Preprint.

TEACHING Courses taught:

- ◇ Fall 1999: Calculus (**57**)(two sections).
- ◇ Spring 2000: ODE (**27**) .
- ◇ Fall 2000: Calculus (**32**), Real Analysis(**7**).
- ◇ Spring 2001: PDEs (**7**).
- ◇ Summer 2001: Calculus (**30**).
- ◇ Fall 2001: Calculus (**64**) (two sections).
- ◇ Spring 2002: Calculus (**35**).
- ◇ Summer 2002: ODEs (**29**).
- ◇ Fall 2002: Calculus (**60**) (two sections).
- ◇ Spring 2003: Graduate PDEs (**10**), First-Year Seminars(**15**).
- ◇ Summer 2003: ODE (**17**).
- ◇ Fall 2003: Calculus (**30**), Real Analysis (**7**).
- ◇ Spring 2004: Introduction to Analysis (**31**).

- ◇ Summer 2004: ODE (**19**).
- ◇ Fall 2004: Calculus (**35**), Integral Calculus (**28**).
- ◇ Spring 2005: Geometry for Elementary Teachers (**30**), Freshman Seminar (**14**).
- ◇ Fall 2005: Calculus (**35**), Real Analysis (**14**).
- ◇ Spring 2006: Introduction to PDEs (**15**).
- ◇ Summer 2006: Introduction to Differential Equations (**20**).
- ◇ Fall 2006: Calculus (**25**), Geometry for Elementary Teachers (**35**).
- ◇ Spring 2008: Calculus (two sections**30**), Introduction to PDEs (**9**).
- ◇ Summer 2008: Introduction to Differential Equations (**20**).
- ◇ Fall 2008: Integral Calculus (**29**), Sequences and Series (**16**).
- ◇ Spring 2009: Calculus (28), Graduate Complex Analysis (13).
- ◇ Summer 2009: Introduction to Differential Equations(20).
- ◇ Fall 2009: Integral Calculus (29).
- ◇ Spring 2010: Multivariable Calculus (23), Introduction to Differential Equations(21).
- ◇ Summer 2010: Introduction to Higher Mathematics (22)
- ◇ Fall 2010: Real Analysis (13), Foundation of Geometry I (28).
- ◇ Spring 2011: Foundation of Geometry II (14).
- ◇ Summer 2011: Multivariable Calculus (40)
- ◇ Fall 2011: Calculus (two sections**70**).
- ◇ Spring 2012: Graduate PDEs (14).
- ◇ Summer 2012: Introduction to Higher Mathematics (20)
- ◇ Fall 2012: Real Analysis (11), Integral Calculus (36)
- ◇ Spring 2013: Real Analysis II (7).
- ◇ Summer 2013: Introduction to Higher Mathematics (18)

GRADUATE STUDENTS

- ◇ Preliminary Advisor: Phong Luu, Emily Jennings.
- ◇ Co-Advisor: Duy Nguyen.
- ◇ **Ph.D. Committee:** Moustapha Pemy, Jianbao Wu, Lirong Yu, Chao Zhuang, Jie Yu, Yang Liu, Dong-Hoon Shin, etc.
- ◇ **Qual Exam Committee:** Real Analysis (5 times), Complex Analysis (3), Algebra (1).

SEMINARS

- ◇ Organize and give talks in the analysis seminars, harmonic analysis seminars.
- ◇ Talks in applied math seminar, probability seminar, sub-Riemannian geometry seminar and VIGRE seminar.

INVITED TALKS

- ◇ [1.] Fundamental solutions of some differential operators on the Heisenberg groups. *Analysis, PDEs and Mathematical Physics Seminar*, University of Toronto, Jan. 30, 1995.
- ◇ [2.] The explicit solution of the $\bar{\partial}$ -Neumann problem in the non-isotropic Siegel domain. *Analysis Seminar*, York University, Oct. 6, 1995.
- ◇ [3.] The explicit solution of the $\bar{\partial}$ -Neumann problem in the non-isotropic Siegel domain. Contributed talk in *CMS Winter Meeting*, Simon Fraser University, Dec. 9 1995
- ◇ [4.] The $\bar{\partial}$ -Neumann problem. *Complex and Harmonic Analysis Seminar*. University of Maryland, March 20, 1997.

- ◇ [5.] Boundary value problem of sub-elliptic operator. *Complex and Harmonic Analysis Seminar*. University of Maryland, Sept. 19, 1997.
- ◇ [6.] $\bar{\partial}$ -Neumann problem. Workshop on *Microlocal Methods in Geometric Analysis and Mathematical Physics*, the Fields Institute, Oct. 27, 1997.
- ◇ [7.] The Riesz transform on the Heisenberg group. *Analysis Seminar*. Yale University, April 17, 1998.
- ◇ [8.] Singular integrals characteristions of \mathbf{H}^p on the Heisenberg group. *Complex and Harmonic Analysis Seminar*. University of Maryland, April 30, 1998
- ◇ [9.] $\bar{\partial}$ operators. *Analysis Seminar*, University of California at Irvine, Oct. 13, 1998.
- ◇ [10.] Heisenberg group and $\bar{\partial}$ operators. *Colloquium*, University of Georgia, March 15, 1999.
- ◇ [11.] Laguerre functions and analysis on the Heisenberg Group. *NATO Advanced Study Institute: Special Functions 2000*, Arizona State University, Tempe, Arizona, U.S.A. May 29 to June 9, 2000
- ◇ [12.] Solvability of PDO on the Heisenberg Group. *AMS/MAA Southeast Conference*, Georgia Institute of Technology, Atlanta, GA, March 8-11, 2002.
- ◇ [13.] Laguerre Calculus on the Heisenberg group and Fourier-Bessel transform on C^n . *Workshop in analysis and geometry in Carnot-Caratheodory spaces*, University of Arkansas, March 7-8,2003.
- ◇ [14.] Heisenberg group and its connection with complex analysis. *Colloquium*, Department of Mathematics, Florida International University, January 29, 2004.
- ◇ [15.] Laguerre Calculus. *Analysis Seminar*, Department of Mathematics and Statistics, York University, March 8, 2004.
- ◇ [16.] Laguerre Calculus on the Heisenberg group and Fourier-Bessel transform on C^n . *AMS Southeast Conference*, Florida State University, Tallahassee, March 11, 2004.
- ◇ [17.] Fundamental solution of the Hermite operator on the Heisenberg group. *AARMS-CRM Workshop on Singular Integrals and Analysis on CR Manifolds*, Dalhousie University, Halifax, Nova Scotia, May 2-May 9, 2004.
- ◇ [18.] Fundamental solution of the Kohn Laplacian on the quadratic CR Manifolds. *Seventh New Mexico Analysis Seminar*, University of New Mexico, Albuquerque, New Mexico, October 14-17, 2004.
- ◇ [19.] Fundamental solution of the twisted Laplacian on C^n . *Minimal Surfaces, Subelliptic PDEs and Geometric Analysis*, Dartmouth College, March 8-12,2005.
- ◇ [20.] Analysis on the Heisenberg group and its connection with complex analysis. *Colloquium*, Inner Mongolia University, July 21, 2005.
- ◇ [21.] PDEs on the Heisenberg group. *Lecture series*, Lanzhou University, July 23 to July 27, 2005.
- ◇ [22.] Sub-Riemannian Geometry on the Heisenberg group. *Lecture series*, Nankai University, July 31 to Aug 5, 2005.
- ◇ [23.] Analysis on the Quadratic CR-manifold. *The 13th International Conference on Finite or Infinite Dimensional Complex Analysis and Applications (ICFIDCAA 2005)*, Shantou University, China, Aug. 8-12, 2005.
- ◇ [24.] Analysis on the Engel Fields. *Workshop on Analytic and Algebraic Methods in Complex and CR Geometry*, BIRS, Banff, Canada, Sept. 3-8, 2005.
- ◇ [25.] Sub-Riemannian Geometry on Engel Group. Workshop on Geometrical Analysis, National Center for Theoretical Sciences, Hsinchu, Taiwan, January 16, 2007.
- ◇ [26.] The solution of Hamilton's equations on Engel group. Workshop On Geometry and Analysis, Academic Sinica, Taipei, Taiwan, March 5, 2007.

- ◇ [27.] Laguerre Calculus and Analysis on the Heisenberg group. 2007 NCTS Topical Program in Analysis and Geometry, May 4, 11, 18, 2007.
 - ◇ [28.] Sub-Riemannian Geometry on the Heisenberg group. NTU, Student-Faculty Colloquium. June 4, 2007.
 - ◇ [29.] Sub-Riemannian Geometry and Elliptic Integrals. Students-Faculty Colloquium, Hong Kong University of Science and Technology. June 29, 2007.
 - ◇ [30.] Sub-Riemannian Geometry on the Heisenberg Group and Engel Group. Colloquium, Zhongshan University, June 31, 2007.
 - ◇ [31.] Solvability of linear PDEs. Colloquium, Tatong University. Nov. 11, 2007.
 - ◇ [32.] Carnot-Carathéodory Distance on the Heisenberg group. Geometry Seminar, National Central University. Nov. 21, 2007.
 - ◇ [33.] Sub-Riemannian Geometry on \mathbb{R}^4 . Annual Meeting of Mathematical Society of ROC, Academic Sinica, Dec. 23, 2007.
 - ◇ [34.] Geometric Analysis on the Heisenberg Group, Colloquium, MUN, St. Johns, Canada, April 25, 2008.
 - ◇ [35.] Weighted Sobolev Spaces on Heisenberg Group, Workshop on Harmonic Analysis, NCTS, Hsinchu, Taiwan, May 16, 2008.
 - ◇ [36.] Weighted Sobolev Spaces on Heisenberg Group, Workshop on Pseudo-Differential Operators and Complex Analysis, York University, Toronto, August 4th, 2008.
 - ◇ [37.] Boundary Value Problem of Sub-Laplacian on the Heisenberg Group, Geometry and Analysis Seminar, TIMS, NTU, Taipei, June 2, 2009.
 - ◇ [38.] Spherical Harmonics on the Heisenberg Group, Geometry and Analysis Seminar, TIMS, NTU, Taipei, May 28, 2010.
 - ◇ [39.] The Sube-Laplacian Comparison Theorem in a Complete Pseudo-Hermitian 3-Manifold, Spring Lecture Series, Department of Mathematics, University of Arkansas, April 9th, 2011
 - ◇ [40.] Sub-Riemannian Geometry on Pseudo-Hermitian manifold. Geometry Seminar, Taida Institute of Mathematical Sciences, National Taiwan University, December 22, 2012.
- CONFERENCE ATTENDED ◇ [1.] *NATO Advanced Study Institute: Harmonic Analysis*. At the Il Ciocco Resort Hotel, Tuscany, Italy. July 2 to July 15, 2000.
- ◇ [2.] *SEAM XVII Conference 2001*, Organizing committee, University of Georgia, Athens, March 2-3, 2001.
 - ◇ [3.] *AMS-IMS-SIAM summer research conference on Harmonic Analysis*, Mount Holyoke College, South Hadley, MA. June 24- July 5, 2001.
 - ◇ [4.] *Spring Lecture Series in Mathematical Sciences*, University of Arkansas, April 11-13, 2002.
 - ◇ [5.] *CBMS Conference*, the University of North Carolina, May 13-18, 2002
 - ◇ [6.] *CBMS Conference*, Wayne State University, May 18-22, 2003.
 - ◇ [7.] Organizing a special session on Harmonic Analysis and PDEs. *the Fourth ISAAC Congress*, York University in Toronto, Canada, August 11-16, 2003.
 - ◇ [8.] *A Celebration of Carlos Berenstein's Mathematics: Harmonic Analysis, Signal Processing and Complexity*, at George Mason University, Fairfax, Virginia, May 17-22, 2004.
 - ◇ [9.] *NSF/CBMS Regional Conference in the Mathematical Sciences*, The School of Mathematics at Georgia Institute of Technology, May 23 - 28, 2004.
 - ◇ [10.] 1999-2001: Organize the Harmonic Analysis Seminars. Give numerous talks in the Analysis Seminar.
 - ◇ [11.] *54th Midwest PDE seminar*, Wayne State University, November 19-21, 2004.

- ◇ [12.] *Conference in Complex Analysis*. University of Wisconsin, Madison, March 16-19, 2006.
- ◇ [13.] *International Conference on Geometric Analysis*, NTU June 18-23, 2007.
- ◇ [14.] *Spring Lecture Series*, Department of Mathematics, University of Arkansas, April 12-14, 2012

SERVICES

- ◇ **F**all 2000-Spring 2001: Personnel committee.
- ◇ **2002**: Kossack Calculus Committee.
- ◇ **2003**: Kossack Calculus Committee.
- ◇ **2004-06**: Graduate Committee.
- ◇ **2010-2012**: Executive Committee.
- ◇ **2012-2014**: Curriculum Committee.
- ◇ **2013**: Kossack Calculus Committee.