

# Guangliang Chen

1623 Carl Street, Apartment 7  
Lauderdale, MN 55108  
Phone: (651) 206-4865  
E-mail: glchen@math.umn.edu  
Website: <http://www.math.umn.edu/~glchen>

- Research Interests** High Dimensional Data Analysis & Modeling, Analysis of Large Data Sets, Multiscale Geometric Analysis, Statistical Regression and Testing
- Education**
- PhD in Mathematics** Expected Summer 2008  
**Master of Science in Mathematics** March 2007  
University of Minnesota Twin Cities, Minneapolis, MN  
Advisor: Assistant Professor Gilad Lerman Cumulative GPA: 3.95/4.00  
Thesis: On Hybrid Flat-Surfaces Modeling and Multiscale Analysis
- Related Coursework: Mathematical Modeling and Methods of Applied Mathematics, Numerical Analysis and Scientific Computing, Topics in Applied Mathematics, Introduction to the Mathematics of Image and Data Analysis
- Master of Science in Statistics** Expected Summer 2008  
University of Minnesota Twin Cities, Minneapolis, MN  
Advisor: Professor Dennis Cook Cumulative GPA: 3.95/4.00  
Plan-B Project: On Hybrid Linear Modeling and Its Applications in Statistics
- Related Coursework: Topics in Dimension Reduction for Regression, Statistical Consulting, Introduction to Stochastic Processes, Applied Statistical Methods, Theory of Statistics, Regression Graphics
- Bachelor of Science in Mathematics** July 2003  
Special Class for the Gifted Young, University of Science & Technology of China (USTC), Hefei, China  
Advisor: Professor Junming Xu Overall GPA: 3.75/4.00
- Related Coursework: Calculus, Linear Algebra, Ordinary/Partial Differential Equations, Real/Complex Analysis, Differential Geometry, Probability Theory, Mathematical Statistics, Combinatorics, Graph Theory and Its Applications
- Research Experience**
- Research Assistant** January 2008 – present  
School of Mathematics, University of Minnesota, Minneapolis, MN
- ❖ Working with Professor Lerman on the problem of detecting d-planes within a background of uniformly distributed noise
    - Implemented the Matlab codes which work accurately and efficiently
    - Obtained preliminary theoretical results, trying to prove things rigorously
- Research Assistant** September 2006 – December 2007  
School of Mathematics, University of Minnesota, Minneapolis, MN
- ❖ Worked with Professor Lerman on a project on hybrid linear modeling under an NSF grant
    - Designed and developed an algorithm, carried out theoretical analysis, contrived various numerical techniques, and implemented the Matlab codes
    - Submitted two papers for publication, one presenting a theoretical version of the algorithm with justification and analysis, the other having a practical version as well as numerical results
    - Applied for patent with the University's Office for Technology Commercialization and passed the initial evaluation process, resulting in a provisional application filed by the office
  - ❖ Participated in a biological project about analyzing DNA microarray data via multiscale analysis
    - Revised the existing Matlab codes and improved significantly their accuracy and efficiency
    - Processed the ChIP-on-chip experimental data with the new codes, and obtained better results leading to published paper in Bioinformatics

**Course Participant**

January 2007 – May 2007

School of Statistics, University of Minnesota, Minneapolis, MN

- ❖ Worked on a class project about dimension reduction in regression
  - Programmed two statistical regression models using R and presented to class
  - Contributed the codes to the instructor for future teaching and research use

**Research Assistant**

May 2005 – August 2005 &amp; May 2006 – August 2006

School of Mathematics, University of Minnesota, Minneapolis, MN

- ❖ Worked on a high dimensional multiscale analysis project in collaboration with Professor Lerman and Rick Chartrand of Los Alamos National Laboratory (LANL); supported by LANL
  - Aided in building a mathematical model and performing statistical assessment
  - Developed the software in Matlab, and conducted various numerical experiments for testing
  - Applied the software to the project data and identified 7 cars correctly out of 10 given

**Visiting Researcher**

August 10 – 25, 2006

Los Alamos National Laboratory, Los Alamos, NM

- ❖ Communicated with the collaborator, conducted more experiments, and finalized the project
- ❖ Wrote a technical report which was published in Los Alamos National Laboratory

**Honors & Awards**

Travel Grant, IPAM, University of California, Los Angeles, CA	2008
Travel Grant, IPAM, University of California, Los Angeles, CA	2007
Travel Grant, IPAM, University of California, Los Angeles, CA	2007
Travel Grant, MSRI, University of California, Berkeley, CA	2006
Travel Grant, IPAM, University of California, Los Angeles, CA	2005
National Scholarship, USTC, Hefei, China	2002
Huawei Scholarship, USTC, Hefei, China	2002
Outstanding Student Scholarship, USTC, Hefei, China	1999
Outstanding Freshman Scholarship, USTC, Hefei, China	1998

**Publications**

- G. Chen and G. Lerman, *Detection of  $d$ -Planes within a Background of Uniformly Distributed Noise*, in preparation.
- G. Chen and G. Lerman, *Spectral Curvature Clustering*, submitted to International Journal of Computer Vision (currently under review), November 2007
- G. Chen and G. Lerman, *Curvature-Driven Diffusion and Hybrid Flat-Surfaces Modeling*, accepted by Foundations of Computational Mathematics (subject to revision), 2007
- G. Lerman, J. McQuown, A. Blais, B. Dynlacht, G. Chen and B. Mishra, *Functional Genomics via Multiscale Analysis: Application to Gene Expression and ChIP-on-chip Data*, Bioinformatics, 2006
- G. Chen, G. Lerman and R. Chartrand, *Multiscale Analysis for Muon-Scattering Data*, Technical Report LA-UR 06-7504, Los Alamos National Laboratory, 2006

**Professional Training**

- Workshop: Graph Cuts and Related Discrete or Continuous Optimization Problems February 25 – 29, 2008  
Institute of Pure and Applied Mathematics (IPAM), University of California, Los Angeles, CA
- Workshop: Numerical Tools and Fast Algorithms for Massive Data Mining, Search Engines and Applications October 22 – 26, 2007  
IPAM, University of California, Los Angeles, CA
- Short Course: Sparse Representations and High Dimensional Geometry May 30 – June 1, 2007  
IPAM, University of California, Los Angeles, CA
- Graduate Workshop: Mathematical Aspects of Computational Biology June 19 – 30, 2006  
Mathematical Science and Research Institute (MSRI), University of California, Berkeley, CA
- SIAM Conference on Imaging Science May 15 – 17, 2006  
Radisson University Hotel, Minneapolis, MN
- Workshop: New Mathematics and Algorithms for 3-D Image Analysis January 9 – 12, 2006  
Institute of Mathematics and its Applications (IMA), University of Minnesota, Minneapolis, MN

	Graduate Summer School: Intelligent Extraction of Information from Graphs and High Dimensional Data IPAM, University of California, Los Angeles, CA	July 10 – 16, 2005
	Undergraduate Research Practice The Chinese Academy of Sciences, Beijing, China	July 2002
<b>Presentations</b>	University of Minnesota, School of Statistics, Class Project Presented to class the paper <i>Principal Curves</i> by T. Hastie and W. Stuetzle (1989)	December 7, 2007
	University of Minnesota, School of Statistics, Class Project Presented to class an introduction to <i>Statistical Forecasting</i>	May 4, 2007
	University of Minnesota, School of Statistics, Class Project Presented to class, as a group representative, results of a <i>case study</i> of determining the level of lead in soil	February 16, 2007
	University of Minnesota, School of Statistics, Class Project Presented to class the implementations in the language R of two models, <i>Principal Components</i> and <i>Principal Fitted Components</i> , in the paper <i>Fisher Lecture: Dimension Reduction in Regression</i> by D. Cook (2007)	December 14, 2006
	University of Minnesota, School of Mathematics, Oral Preliminary Examination Presented to committee professors some preliminary results of my research on <i>Hybrid Linear Modeling</i>	December 12, 2006
<b>Teaching Experience</b>	<b>Teaching Assistant</b> School of Mathematics, University of Minnesota, Minneapolis, MN	September 2003 – May 2006, September 2007 – present
	❖ <b>Discussion Instructor</b> of Calculus I, Short Calculus, College Algebra and Probability, Fall 2004/5/7 & Spring 2005/6	
	➤ Led recitation sections of over 30 undergraduates which improved oral presentation skills	
	➤ Wrote weekly quizzes, posted their solutions online, graded quizzes and exams, kept a record of the scores using Excel	
	➤ Collaborated with instructors and other TA's on course progress and grading policies which improved communication skills	
	❖ <b>Math Tutor</b> at the University's Tutorial Services	Fall 2003 & Spring 2004
	❖ <b>Grader</b> for Linear Algebra, Image Processing	Fall 2003 & Spring 2004/7
<b>Skills</b>	Programming and software: C, Matlab, Mathematica, Latex, R, Arc, MacAnova, Microsoft Office Suite Operating Systems: UNIX, LINUX, DOS, Windows 2000/XP/Vista Languages: Chinese (native), English (fluent), French & German (beginner)	
<b>Activities</b>	<b>Vice President</b> Friendship Association of Chinese Students & Scholars (FACSS), University of Minnesota, Minneapolis, MN	June 2006 – May 2007
	❖ Planned and facilitated all FACSS events with other executive committee members	
	❖ Organized seminars on health, tax returns, job search, and immigration independently	
	<b>Secretary</b> FACSS, University of Minnesota, Minneapolis, MN	June 2005 – May 2006
	❖ Answered emails, wrote weekly information exchanges, recorded meeting agendas	
	❖ Helped about 70 new Chinese students with airport pickup and temporary housing	
<b>Affiliations</b>	American Mathematical Society	2005 – present
	Society for Industrial and Applied Mathematics	2005 – present
	Minnesota Center for Industrial Mathematics	2004 – present

**References**

**Gilad Lerman** - Thesis Advisor in Mathematics and Chairman of the Oral Preliminary Exam Committee  
Assistant Professor of Mathematics  
School of Mathematics  
University of Minnesota  
206 Church Street SE, 127 Vincent Hall  
Minneapolis, MN 55455  
Phone: (612) 624-5541  
Email: lerman@umn.edu

**Fadil Santosa** - Member of the Oral Preliminary Exam Committee  
Professor of Mathematics, and Director of the Minnesota Center for Industrial Mathematics  
School of Mathematics  
University of Minnesota  
206 Church Street SE, 127 Vincent Hall  
Minneapolis, MN 55455  
Phone: (612) 626-0528  
Email: santosa@math.umn.edu

**Dennis Cook** - Plan-B Project Advisor in Statistics, and Member of the Oral Preliminary Exam Committee  
Professor of Statistics  
School of Statistics  
University of Minnesota  
224 Church Street SE, 366 Ford Hall  
Minneapolis, MN 55455  
Phone: (612) 625-7732  
Email: dennis@stat.umn.edu

**Rick Chartrand** - Collaborator between May 2005 and August 2006  
Technical Staff Member  
Theoretical Division  
T-7, MS B284  
Los Alamos National Laboratory  
Los Alamos, NM 87545  
Phone: (505) 667-8093  
Email: rickc@lanl.gov