Mishawaka, IN 46545
Phone: 5039708556
Email: chaliu@mtu.edu

Chang(Cathy) Liu

OBJECTIVE

- To obtain a full time position which provides opportunities to utilize my extensive academic background in mathematical and statistical analysis, apply my work and research experiences in modeling, data analysis and SAS programming (including SQL and Macro language)

SUMMERY OF QUALIFICATIONS

- Advanced knowledge and experience in Matlab and SAS programming
- Demonstrated analytical and problem solving skills
- Strong communication (oral and written), interpersonal, organizational and presentation skills (be able to explain topics to a non-technical audience)

EDUCATION

- **Ph.D. in Applied Mathematics (GPA 4.00/4.00),** Dec 2011
  Michigan Technological University, Houghton, MI
- **M.S. in Applied Mathematics (GPA 3.95/4.00),** Dec 2007
  Michigan Technological University, Houghton, MI
- **B.S. in Applied Mathematics (GPA 3.20/4.00),** Aug 2005
  University of Science and Technology, Beijing

WORKING EXPERIENCE

- **Tianjin Bureau of Statistics, Tianjin, China (**Summer Internship**)** May 2011-Jul 2011
  - Responsible for accessing, editing, validating accuracy and query of datasets including: employee data from all departments, and Tianjin economic data such as tourism revenues and GDP history. Organized datasets were prepared for reporting, trend analysis and forecasting.
  - Assisted with design and generation of reports on households, population density and GDP growth, etc to meet the requirements for directors of multi departments using SAS procedures. The reports allowed non-technical audiences to understand the information and relationships more clearly, also provided convenient reference frames for further analysis and decision making.
  - Actively participated in analysis of datasets with appropriate statistical methods to provide critical input into long-term strategic planning.
  - Gathered and produced the "Staff Contact List" for internal and external use. The list helped the staff to communicate more efficiently.

  Tools: SAS (including SQL and macro language), Matlab, Excel, Access

  Statistical methods: Hypothesis Testing, ANOVA, Regression, Time Series Forecasting
- **Mendoza College of Business, University of Notre Dame, IN (**Research Assistant for a project on "The Impact of ISP (Internet Service Provider) Competition on Net Neutrality") Dec 2010-May 2011

- Responsible for finding the optimal potential priority prices (per packet), fixed fees for end consumers and market shares for 16 outcomes caused by content providers' decision on whether to pay ISP/ISPs for preferential delivery fee. The solutions are used for determining the equilibrium price structure of the competition.
- Analyzed the feasibility of solutions obtained with business intuition and rules.

Tools: Matlab, Mathematica

Mathematical methods: Optimization, Linear algebra

- University of Science and Technology, Beijing, China (Summer Internship) July 2004-Aug 2004
  - Led and completed the project "Course Grades Searching Platform" which allowed students to query their courses scores and weighted average for each semester. Not only did this reduce the time needed for traditional paper-based query, but the automation processes removed the risk of human error seen with manual processes.

Tools: Visual Basic, SQL

RESEARCH EXPERIENCE

- **Nonlinear Programming for Numerical Optimization**
  - Built discretized mathematical models for "brachistocrone problem" subject to various constraints.
  - Designed practical line search algorithms to easily and precisely locate local/global solutions with good starting points. The algorithm was developed with a"safeguard" which ensures the iteration converges and the rate is at least super-linear.
  - Developed Matlab code and successfully tested suite of benchmark problems of finite-dimensional nonlinear programming involving line search iterations.

Tools: Matlab, Latex, Powerpoint

Mathematical methods: Finite Difference, Numerical Optimization, Cubic Spline

PUBLICATIONS

- M.S. Gockenbach and C. Liu, *Local Convergence of Newton's Method in the Classical Calculus Of Variations*, Submitted to *SIAM Journal on Optimization*.
- W. Hao and C. Liu, *High-Order Parallel Iterative Methods for the Heat Equation*, Published by *The proceeding of 2010 International Conference on Scientific Computing.*
- W. Hao and C. Liu, *Mathematical Modeling For the Biped Robot With High Degree of Freedom and Research On Its Gait Control*, Published by *Mechanic in Engineering*, 2006 Vol.28 No.6.

TEACHING EXPERIENCE (Highest Teaching Evaluation: 4.92/5 earned in Spring 2008)

- **Individual instructors for various math classes** (College Algebra I, College Algebra II with Trig and Calculus Plus w/ Technology I) Jan 2007- Apr 2011
  - Developed thematic units that incorporated real world examples to introduce new materials and encourage student learning.
  - Utilized discussion-based lessons and group works in order to promote a deeper understanding of the mathematical and statistical concepts.
  - Provided clear and consistent directions to keep the class focused and well organized.

Tools: matlab, mathematica, SAS, MS excel, word, powerpoint, etc.

- **Mathematical Computing Lab Consultant** Jan 2006 – Dec 2006
  - Assisted students with laboratory work (weekly calculus labs and quizzes) using Mathematica program.
  - Directly led and mentored team of lab consultants to give technical support to undergraduate students from different departments.

CERTIFICATIONS

- SAS Certified Base Programmer for SAS 9
- SAS Certified Advanced Programmer for SAS 9