

Chi Zhou

Department of Industrial and Manufacturing Systems Engineering
Huazhong Univ. Sci. & Tech. Wuhan, China, 430074
Email:zhouchihust@gmail.com

Room 205, Dormitory D13
HUST, Wuhan, China, 430074
Phone: +86-13297972871

Education

- **Huazhong University of Science and Technology** (Expected) June, 2007
M.S in Department of Industrial and Manufacturing Systems Engineering
Thesis advisor: Liang Gao
- **Huazhong University of Science and Technology** June, 2004
Dual B.S. in Mechanical Engineering and Management Engineering

Research Interests

- Applied Operations Research
- Combinatorial Optimization
- Planning and Scheduling
- Mathematics Modeling

Publications:

1. **Chi Zhou**, Liang Gao, Haibing Gao, and Kun Zan, Particle Swarm Optimization for Simultaneous Optimization of Design and Machining Tolerances, *Lecture Notes in Computer Science*, 4247, pp,873-880, 2006
2. **Chi Zhou**, Liang Gao, Haibing Gao and Chuanyong Peng, Pattern Classification and Prediction of Water Quality by Neural Network with Particle Swarm Optimization, *Proceedings of IEEE the 6th World Congress on Intelligent Control and Automation*, June 21-23, 2006, Dalian, China, Vol,4, pp,2864-2868
3. **Chi Zhou**, Liang Gao, Haibing Gao, Particle Swarm Optimization Based Algorithm for Permutation Flow Shop Scheduling, *Acta Electronica Sinica*, *Acta Electronica Sinica*, 2006, 34(11): 2008-2011 (In Chinese)
4. **Chi Zhou**, Generic PSO Heuristic for Constrained Planning, *Doctoral Consortium at International Conference on Automated Planning & Scheduling*, Monterey, California, USA in June, 2005
5. **Chi Zhou**, Liang Gao, Haibing Gao, Particle Swarm Optimization based Algorithm for Constrained Layout Optimization, *Control and Decision*, 2005, 20(1): 36-40,(In Chinese, EI indexed 05118999714)
6. **Chi Zhou**, Hai-bing Gao, Liang Gao, Review of Particle Swarm Optimization (PSO) Algorithm, *Application Research of Computers*, 2003, 20(12): 7-11 (In Chinese)
7. Liang Gao, **Chi Zhou**, Hai-Bing Gao and YongRen Shi, Credit Scoring Model Based on Neural Network with Particle Swarm Optimization, *Lecture Notes in Computer Science*, 4221, pp,76-79, 2006,
8. Haibing Gao, **Chi Zhou**, Liang Gao, General Particle Swarm Optimization Model, *Chinese Journal of Computers*, 2005, 28(12): 1980-1987 (In Chinese)
9. Haibing Gao, **Chi Zhou**, Liang Gao, Particle Swarm Optimization based Algorithm for Economic Load Dispatch, *Progress in Intelligence Computation & Applications*, 2005, 594-599
10. Liang Gao, Haibing Gao, **Chi Zhou**, PSO based Scheduling Algorithm for Open Shop Scheduling Problem, *Chinese Journal of Mechanical Engineering*, 2006, 47(2): 129-134 (In Chinese)

11. Liang Gao, Haibing Gao, **Chi Zhou**, Daoyuan Yu, Acquisition of Pattern Classification Rule based on Particle Swarm Optimization, *Journal of Huazhong University of Science and Technology*, 2004, 11(32): 24-26 (In Chinese)
12. Haibing Gao, Liang Gao, **Chi Zhou**, Daoyuan Yu, Particle Swarm Optimization Based Algorithm for Neural Network Learning, *Acta Electronica Sinica*, 2004, 32(9): 1572-1574 (In Chinese)
13. Liang Gao, Haibing Gao, **Chi Zhou**, Particle Swarm Optimization based Algorithm for Cutting Parameter Optimization, *Proceedings of IEEE 5th World Congress on Intelligent Control and Automation*, 2004, 2867-2871 (In Chinese)

Working papers:

1. Particle Swarm Optimization based Algorithm for Constrained Nonlinear Programming Problems. (To be submitted)
2. Swarm Computation: A Generalized Optimization Framework under Information Sharing and Information Updating. (To be submitted)

Research Experiences:

- **Research Assistant** Sept. 2002 - June. 2004
Research assistant in Prof. Liang Gao's group, designing computer programs for optimizing real-world problems and developed a scheduling system based on some intelligent heuristics.

- **Leader** of National Natural Science Foundation of China (NSFC) project Sept. 2004 - Present
The project "*The Application in Job shop scheduling problem of Swarm Intelligence theory and Particle Swarm Optimization Algorithm (PSO)*" (50305008, RMB 210K) is concerned about using various optimization tool especially those based on swarm intelligence theory to solve some NP-hard combinatorial problems like scheduling problems. We conducted this project as follows:
 - Firstly, we applied PSO to some basic function optimization problems and further to data mining area.
 - Secondly, we proposed Structure-improving PSO (SPSO) for training artificial neural network (ANN). By tuning the connection structure and weights simultaneously, SPSO eliminates some ill effects introduced by redundant input features and the corresponding redundant structure of ANN.
 - Thirdly, we constructed constraint handling strategy for PSO and then combined it with local search scheme to solve many engineering optimization problems (cutting parameter optimization, layout optimization, tolerance allocation, etc.) which can be mathematically modeled as nonlinear programming problem.
 - We discussed the limitation of traditional PSO model in discrete and combinatorial optimization. Then, not limited to the traditional velocity-position model, the GPSO model is proposed and the corresponding algorithm for some NP hard problem like travel salesman problem is put forward.
 - Finally, considering the undesirable performance of GPSO, we investigated the limitation of information sharing mechanism of GPSO model. The improved information sharing mechanism for population based meta-heuristic algorithms is proposed. The new mechanism could easily be combined with specific population based meta-heuristic algorithm. Some jobshop, flowshop and openshop scheduling problems are used to validate its robustness.

This project was granted as "*Excellent Project*" by NSFC Committee.

- **Member** of Hi-Tech Research and Development Program of China project Sept. 2003 - May 2004
I worked part time in the project "*Research on Demand Chain Management and the system development*"

(2002AA413720, RMB 450K). This project is to investigate a new demand and supply marketing model called demand chain, which pays more attention to the requirement of consumers. I was in charge of analyzing the consumer behavior and constructed prediction modes and conducted some simulations.

- **Key member** of National Basic Research Program of China project Sept. 2005 - Present
The project “*Research on theories and methods of product collaborative design*” (2004CB719405, RMB 1,460K) aimed at designing and developing a new production platform based on collaborative strategy. In this project, I was a contributor in decision analysis and multiple disciplinary collaborative optimizations.
- **Key member** of the research group to write grant proposal on Hi-Tech Sept. 2006 - Oct. 2006
Research and Development Program of China (863 project)
This project “*Research on theories and methods of dynamic scheduling problem based on complexity theory*” has been approved (2006AA04Z131 RMB 800K). I wrote the part of complexity theory and landscape.
- **Key member** of the research group to write grant proposal Nov. 2005 - Dec. 2005
This project “*Research on rapid responded manufacturing in workshop and the system development*” was approved (RMB 1,000K). I wrote the part of dynamic scheduling and optimization methods.

Academic Activities:

- The Sixth International Conference on Simulated Evolution and Learning, Hefei, China. Oct. 2006
- International Conference on Natural Computation, Xian, China. Sept. 2006
- International Conference on Intelligent Computing, Anhui, China. Aug. 2006
- Workshop on Optimization Theory and Application, Tsinghua University, Beijing, China. July. 2006
- The 6th World Congress on Intelligent Control and Automation, Dalian, China. Jun. 2006
- Workshop on Scheduling Theory Research, Tsinghua University, Beijing, China. Jun. 2005
- The International Conference on Automated Planning & Scheduling 2005, Monterey, California, U.S.A. Jun. 2005
- International Workshop on Optimization, Shanghai, China. May 2005
- International Symposium on Intelligence Computation and Applications, Wuhan, China. Apr. 2004
- Referee of “*Control and Decision*” and “*Chinese Journal of Mechanical Engineering*”.

Teaching Experiences:

- **Teaching Assistant** Sept. 2004 - Nov. 2004
I was the teaching assistant of "*Operations Research*", a fundamental undergraduate level course.
- **Teaching Assistant** Jan. 2005 - Jun. 2005; Jan. 2006 - Jun. 2006
I was the teaching assistant to instruct the graduation projects for undergraduate students. The thesis titles are “*Research on Particle Swarm Optimization in data mining and its application in engineering problems*” and “*Research on the application of Particle Swarm Optimization in job shop scheduling*”
- **Chinese MCM Instructor** Apr. 2005 - Sept. 2005
I lead a group of undergraduate students to take part in “*China Undergraduate Mathematical Contest in Modeling*”. With 3 days of efforts and endeavors, we won the national first prize.

Awards and Honors

- Overseas Fellowship (\$50,000) granted by the Chiang Chen Industrial Charity Foundation, Dec, 2006.
- Scholarship (\$1,300) granted by AAAI for Doctoral Consortium, International Conference on Automated Planning & Scheduling, USA, June 2005.
- “*Excellent Academic Paper*” Award, School of Mechanical Engineering, HUST, Dec 2005.
- “*Excellent Paper*” Scholarship for 2 consecutive years, School of Mechanical Engineering, HUST, 2005-2006.
- “*Excellent graduate Student*” Award for 2 consecutive years, Department of Industrial and Manufacturing System Engineering, HUST, 2005-2006.
- “*Excellent thesis*” Award in Hubei province of China, Oct 2004.
- “*Excellent graduate student*” Award, School of Mechanical Engineering, HUST, June 2004.
- Award for “*TianYu*” Software Cup Science & Technology Paper Competition, HUST, Oct 2003.
- Award for the “*WenDa*” Cup Algorithm Design Competition, Department of Computer Science, HUST, Nov 2002.
- “*Sanhao*” Scholarship for 3 consecutive years, HUST, 2001-2003.

Mathematics and Computer Skills:

- Major mathematics courses: Advanced Mathematics, Linear Algebra, Probability and Mathematical Statistics, Computational Method, Operations Research
- Minor mathematics courses: Stochastic Process, Linear Programming, Nonlinear Programming, Integer Programming, Combinatorial Optimization, Dynamic Programming
- Programming Languages: C/C++, C#, Java, Basic
- Packages: Microsoft Excel(VBA), Matlab, Latex, Lindo, Lingo, CPLEX
- Development Environments: MS Visual C++/Basic 6.0, Jbuilder 9, MS Visual Studio.NET

References:

- Prof. Liang Gao
Department of Industrial and Manufacturing Systems Engineering,
University of Science & Technology.
Wuhan, China, 430074. 86-27-8754-3871
gaoliang@mail.hust.edu.cn