

# Rui Huang

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## CONTACT INFORMATION

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## EDUCATION

**Carnegie Mellon University**, Pittsburgh, Pennsylvania, USA  
Ph.D. Candidate in Chemical Engineering, August 2006 - August 2010 (expected)

- Research Areas: Mathematical modeling, dynamic real-time optimization, advanced process control, state and parameter estimation.
- Advisor: Dr. Lorenz T. Biegler.

**Zhejiang University**, Hangzhou, China  
M.S. (Honored), Control Science & Engineering, August 2004 - July 2006

- Thesis Topic: "Research on Material Flow Model in Petrochemical Industry and its Application in Engineering".
- Research Areas: Process modeling and simulation, parameter estimation, operation software development for petrochemical processes.
- Advisor: Dr. Gang Rong.

B.S. (Honored), Control Science & Engineering, August 2000 - July 2004

- Ranked the 3rd of 104 students.

MINOR (Honored), Chu Kechen Honors College, August 2001 - July 2004

- Honored Minor Program of Advanced Engineering Education.

## PROFESSIONAL EXPERIENCE

**Carnegie Mellon University**, Pittsburgh, Pennsylvania, USA  
*Graduate Student* **August 2006 - present**  
Fully funded project with U.S. Department of Energy to develop dynamic real-time optimization strategies with first principle models for the next generation power plants. Invited reviewer for several Academic Journals.

**Zhejiang University**, Hangzhou, China  
*Graduate Student* **August 2004 - July 2006**

- Leading a project with Maoming Petrochemical Co. to develop Key Performance Indicator (KPI) System. Work includes team organizing, client communication and software development using C# and Microsoft Access.
- Project with China Petroleum and Chemical Co. to develop Manufacturing Execution System. Work includes process simulation using AspenPlus, parameter estimation, oil blend scheduling.
- Project of Virtual Plant Laboratory in Zhejiang University to develop simulation platform for a petrochemical process. Work includes developing Matlab/Simulink interface that allows students to learn unit operations, process design and synthesis, and implement control strategies.

**China Petroleum and Chemical Co.**, Beijing, China  
*Engineering Intern* **August 2004 - February 2005**

**Zhejiang SUPCON software Co.**, Hangzhou, China  
*Engineering Intern* **November 2003 - May 2004**

## TEACHING EXPERIENCE

*Teaching Assistant*

- Special Topics: Metabolic Systems Engineering, Fall 2008.
- Process Design Project, Spring 2008 & 2007.
- Economics and Optimization, Spring 2008 & 2007.
- Chemical Reaction Engineering, Fall 2007.
- Automation Laboratory, Spring 2006.

JOURNAL  
PUBLICATIONS

1. R. Huang and L.T. Biegler. **Offset-free nonlinear model predictive control based on moving horizon estimation for an air separation unit.** In preparation, 2009.
2. R. Huang, S.C. Patwardhan, and L.T. Biegler. **Robust stability of nonlinear model predictive control with extended Kalman filter and target setting.** Submitted to Int. J. of Robust and Nonlinear Control, 2009.
3. S.C. Patwardhan, R. Huang and L.T. Biegler. **Stability of a class of discrete nonlinear observers.** Submitted to J. of Process Control, 2009.
4. R. Huang, S.C. Patwardhan and L.T. Biegler. **Robust nonlinear model predictive control based on discrete nonlinear recursive observers.** Submitted to Automatica, 2009.
5. R. Huang, V.M. Zavala and L.T. Biegler. **Advanced step nonlinear model predictive control for air separation units.** J. of Process Control,19(4) 678-685, 2009.
6. R. Huang, G. Rong. **Ontology-Based Method of Knowledge Abstraction and Management.** Control and Instruments in Chemical Industry. 33, 14-17, 2006.

CONFERENCE  
PROCEEDINGS AND  
BOOK CHAPTERS

All the conferences required peer reviewed papers for acceptance.

1. R. Huang, S.C. Patwardhan and L.T. Biegler. **Robust extended Kalman filter based nonlinear model predictive control formulation.** Accepted for publication in Proceedings of IEEE 47th Conference on Decision and Control, 2009.
2. R. Huang, S.C. Patwardhan and L.T. Biegler. **Multi-scenario based robust nonlinear model predictive control with first principle dynamic models.** In Computer-Aided Chemical Engineering, R. Alves, C. Nascimento and E. Biscaia Jr. (Editors), 1293-1298, Elsevier, 2009.
3. R. Huang, S.C. Patwardhan and L.T. Biegler. **Robust output-feedback nonlinear model predictive control using high-gain observers.** In Computer-Aided Chemical Engineering, R. Alves, C. Nascimento and E. Biscaia Jr. (Editors), 1611-1616, Elsevier, 2009.
4. R. Huang and L.T. Biegler. **Robust nonlinear model predictive controller design based on multi-scenario formulation.** In Proceedings of American Control Conference: 2341, 2009.
5. V.M Zavala, R. Huang, and L.T. Biegler. **Simultaneous Nonlinear Programming Strategies for Nonlinear Model Predictive Control Applications: Recent Advances and Future Directions.** In Proceedings of FOCAPO, 2008.

HONORS AND  
AFFILIATIONS

Student member in AIChE, SIAM, IEEE, IFAC.  
Honored Graduate Students for Outstanding Academic Performance, Zhejiang University, 2006.  
Honeywell scholarship with first prize (5 out of 1100), Zhejiang University, 2006.  
First prize scholarship of excellent student, Zhejiang University, 2005.  
Guanghua Fellowship, China, 2004.  
Honored Graduate from Advanced Class of Engineering Education in Chu kechen College, Zhejiang University, 2004.  
Honored Graduate from Zhejiang University, 2004.  
Honor of Excellent student, Zhejiang University, 2003.  
Scholarships of excellent student, Zhejiang University, 2001 - 2003.  
Third Price of Electronic Design Contest, (8 out of 30 teams) Zhejiang University, 2003.  
Second Price of Mathematical Modeling Contest, (5 out of 92 teams) Zhejiang University, 2003.

REFERENCES

References are available upon request.