

# Yu Jiang

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## EXPERIENCE

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### The MathWorks Inc., Natick, MA

Software Engineer (Simulink Control Design)

July 2015 – Now

- Research and Development in the Control Systems Toolbox Team
- Responsible for maintaining and developing Simulink Control Design Toolbox.

Application Support Engineer

Jun 2014 – June 2015

- Providing solutions to MATLAB/Simulink users for technical issues.
- Tested features of the StateFlow product.
- Developed Simulink Structural Analysis Tools for the Simulink Solvers Team

### NYU School of Engineering, Brooklyn, NY

Research Assistant

Sep 2009 - May 2014

Research Projects

- Nonlinear Adaptive Optimal Control via Adaptive Dynamic Programming

Supported by NSF Grant ECCS 1101401

Collaborator: Prof. Zhong-Ping Jiang (NYU), Tao Bian (NYU)

- 1) Participated in drafting the proposal
- 2) Developed a new framework of robust adaptive dynamic programming, which integrates theories of nonlinear control, machine learning, optimization, and system identification
- 3) Studied its applications in energy systems (e.g. smart grids) and biological/biomedical systems (e.g. optimal glucose regulation, human motor control systems) through MATLAB-based simulations
- 4) Have published and/or submitted more than 20 papers on this topic

- Optimal Control Mechanism in Human Sensorimotor Control System

Supported by AFOSR grant FA9550-10-1-0370

Collaborators: Dr. Ning Qian (Columbia U), Dr. Pietro Mazzoni (Columbia U), and Prof. Zhong-Ping Jiang (NYU)

- 1) Applied an optimization theory to explain how sensorimotor systems are coordinated in the central nervous system of humans.
- 2) Published one Journal paper and several conference papers.

- Physiology Optimal Control Mechanism

Supported by NYU POLY Seed Grant

Collaborators: Srinivasa Chemudupati (NYU-POLY), Dr. Jan Morup Jorgensen (NYU-CIMS), Prof. Zhong-Ping Jiang (NYU-POLY), and Prof. Charles S. Peskin (NYU-CIMS)

- 1) Derived an optimal control module in a mathematical model for the optimal control mechanism involving the human kidney
- 2) Wrote a MATLAB-based GUI program to achieve good data fitting using experimental data
- 3) Published one paper in the Joint Conference on Decision and Control and European Control Conference, 2012.

Teaching Assistant for the lab session of EE3064: Feedback Control Design (Spring 2010 & Spring 2012)

- Responsible for one hour lecture and three hour laboratory supervision where undergraduate students design and implement standard feedback control algorithm including PID, Lead/Lag compensator and digital filter to control DC motor using MATLAB, C/C++ programming languages and DAQ board.

## **Mitsubishi Electric Research Laboratories (MERL), Cambridge, MA**

Summer Research Intern

Jun 2013 -Aug 2013

- Co-design of the dynamics system and its controller

Supported by Mitsubishi Electric

Collaborators: Dr. Yebin Wang (MERL), Dr. Scott Bortoff (MERL), and Prof. Zhong-Ping Jiang (NYU)

- 1) Developed new solutions to an optimization problem involved in the optimal design and control of some electromechanical device
- 2) Filed a patent and submitted/published two journal papers.

## **The Chinese University of Hong Kong, Hong Kong, China**

Research Assistant

Nov 2007- Dec 2007

- Nonlinear control theory and its applications

Supported by Research Grants Council of the Hong Kong (no. 412408)

Collaborator: Prof. Jie Huang (CUHK)

- 1) Worked on output regulation of nonlinear systems under unknown disturbances.
- 2) Published one paper in the 2009 American Control Conference.

## EDUCATION

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- **New York University, Brooklyn, NY** Aug 2009 – May 2014  
Ph.D. in Electrical Engineering, Polytechnic School of Engineering, GPA 3.9/4  
Top 1 in the ECE Department PhD Qualifying exam  
Minor in Mathematics
- **South China University of Technology**, Guangzhou, GD, China, Sep 2006 – Jun 2009  
M.Sc. in control theory and control engineering, GPA 88/100, Ranked Top 5%
- **Sun Yat-Sen (Zhongshan) University**, Guangzhou, GD, China, Sep 2002 – Jun 2006  
B.Sc. in Mathematics, GPA 85/100, Ranked Top 10%

## AWARDS

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- **Alexander Hessel Award**, for the Best Ph.D. Dissertation in Electrical Engineering, ECE Dept at NYU, 2015
- **Shimemura Young Author Award** (Best paper award with the first author under age 35), in the 9th Asian Control Conference, Istanbul, Turkey, 2013
- **Richard Rosenthal Award**, for the outstanding performance on the electrical engineering PhD Qualifying Examination, ECE Dept., NYU POLY, 2010. (Awarded to the **Top 1** candidate)
- **Huawei Scholarship for outstanding students**, South China University of Technology, 2008
- **National First Prize**, in the Chinese Graduate Mathematical Contest in Modeling, 2007
- **National First Prize**, in the Chinese Undergraduate Mathematical Contest in Modeling, 2005

## PATENT

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1. Yebin Wang, **Yu Jiang**, and Scott Bortoff, “Motion Control System for Performing Different Tasks”, US Patent Office , Patent Number: US20150115860 A1, Approved on 4/30/2015.

## PUBLICATIONS

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### Book

1. **Yu Jiang** and Zhong-Ping Jiang, “Robust Adaptive Dynamic Programming”, Wiley, 2017

### Book Chapter

1. **Yu Jiang** and Zhong-Ping Jiang, "Robust adaptive dynamic programming", in Reinforcement Learning and Approximate Dynamic Programming for Feedback Control, F. L. Lewis and D. Liu, Eds, John Wiley and Sons, 2013.

### Journal Papers

1. Weinan Gao, **Yu Jiang**, Zhong-Ping Jiang, and Tianyou Chai, "Output-feedback adaptive optimal control of interconnected systems based on robust adaptive dynamic programming", *Automatica*, vol. 72, no. 10, pp. 37-45, 2016.
2. Tao Bian, **Yu Jiang**, and Zhong-Ping Jiang, “Adaptive dynamic programming for stochastic systems with state and control dependent noise,” *IEEE Transactions on Automatic Control*, vol. 61, no. 12, pp. 4170-4175, 2016.
3. **Yu Jiang** and Zhong-Ping Jiang, “Global adaptive dynamic programming for continuous-time nonlinear systems,” *IEEE Transactions on Automatic Control*, vol. 60, no. 11, pp. 2917--2929, Nov 2015
4. **Yu Jiang**, Yebin Wang, Scott Bortoff, and Zhong-Ping Jiang, “Optimal Co-Design of Nonlinear Control Systems Based on A Modified Policy Iteration Method,” *IEEE Transactions on Neural Networks and Learning Systems*, vol 26, no. 2, 409 -414, 2015.
5. **Yu Jiang**, Yebin Wang, Scott Bortoff, and Zhong-Ping Jiang, “An Iterative Approach to the Optimal Co-Design of Linear Control System,” *International Journal of Control*, 2015, DOI:10.1080/00207179.2015.1091510.
6. Tao Bian, **Yu Jiang**, and Zhong-Ping Jiang, “Adaptive dynamic programming and optimal control of nonlinear nonaffine systems,” *Automatica*, vol. 50, no. 10, pp 2624-2632, Oct 2014.
7. **Yu Jiang** and Zhong-Ping Jiang, “A robust adaptive dynamic programming principle for sensorimotor control with signal-dependent noise,” *Journal of Systems Science and Complexity*, vol. 28, no. 2, pp. 261-288, 2015.
8. Tao Bian, **Yu Jiang**, and Zhong-Ping Jiang, “Decentralized and adaptive optimal control of large-scale systems with application to power systems”, *IEEE Transactions on Industrial Electronics*, vol 62, no 4, 2439-2447.

9. **Yu Jiang** and Zhong-Ping Jiang, "Adaptive dynamic programming as a theory of sensorimotor Control," *Biological Cybernetics*, vol. 108, no. 4, pp 459 -473.
10. **Yu Jiang** and Zhong-Ping Jiang, "Robust adaptive dynamic programming and feedback stabilization of Nonlinear Systems," *IEEE Transactions on Neural Networks and Learning Systems*, vol 5, no. 25, pp. 882-893, 2014.
11. Zhong-Ping Jiang and **Yu Jiang**, "Robust adaptive dynamic programming for linear and nonlinear systems: An overview", *European Journal of Control*, vol. 19, no. 5, pp. 417-425, 2013.
12. **Yu Jiang** and Zhong-Ping Jiang, "Robust adaptive dynamic programming with an application to power systems", *IEEE Transactions on Neural Networks and Learning Systems*, vol. 24, no.7, pp. 1150- 1156, 2013.
13. **Yu Jiang** and Zhong-Ping Jiang, "Robust adaptive dynamic programming for large-scale systems with an application to multimachine power systems," *IEEE Transactions on Circuits and Systems, Part II*, vol. 59, no. 10, pp. 693-697, 2012.
14. Ning Qian, **Yu Jiang**, Zhong-Ping Jiang, and Pietro Mazzoni, "Movement duration, Fitts's law, and an infinite-horizon optimal feedback control model for biological motor systems", *Neural Computation*, vol. 25, no. 3, pp. 697-724, 2012.
15. **Yu Jiang** and Zhong-Ping Jiang, "Computational adaptive optimal control for continuous-time linear systems with completely unknown system dynamics", *Automatica*, vol. 48, no. 10, pp. 2699-2704, Oct. 2012.
16. **Yu Jiang** and Zhong-Ping Jiang, "Approximate dynamic programming for optimal stationary control with control-dependent noise," *IEEE Transactions on Neural Networks*, vol. 22, no.12, 2392-2398, 2011.

## Conference Papers

1. **Yu Jiang** and Zhong-Ping Jiang, "Global adaptive dynamic programming and global optimal control for a class of nonlinear systems", 2014 IFAC World Congress, South Africa, 2014.
2. Weinan Gao, **Yu Jiang**, Zhong-Ping Jiang, and Tianyou Chai, "Adaptive and optimal output feedback control of linear systems: an adaptive dynamic programming approach," In proceedings of the 11th World Congress on Intelligent Control and Automation, Shenyang, China, pp. 2085-2090, June 2014.
3. **Yu Jiang**, Zhong-Ping Jiang, "Robust adaptive dynamic programming for sensorimotor control with signal-dependent noise," in *Proceedings of the 2013 IEEE Signal Processing in Medicine and Biology Symposium*, Brooklyn, NY, 2013.

4. Zhong-Ping Jiang and **Yu Jiang**, "Robust Adaptive Dynamic Programming: Recent results and applications", in Proceedings of the 32nd Chinese Control Conference, Xi'An, China, pp. 968-973, 2013.
5. **Yu Jiang** and Zhong-Ping Jiang, "Robust adaptive dynamic programming for optimal nonlinear control," in proceedings of the 9th Asian Control Conference. (**Shimemura Young Author Award**).
6. Zhong-Ping Jiang and **Yu Jiang**, "A new approach to robust and optimal nonlinear control design," the Third IASTED Asian Conference on Modeling, Identification and Control, Phuket, Thailand, 2013.
7. **Yu Jiang** and Zhong-Ping Jiang, "Adaptive dynamic programming as a theory of motor control", accepted in the 2012 IEEE Signal Processing in Medicine and Biology Symposium, New York, NY, 2012.
8. **Yu Jiang** and Zhong-Ping Jiang, "Robust adaptive dynamic programming for nonlinear control design," accepted in the 51st IEEE Conference on Decision and Control, Dec. 2012, Maui, Hawaii, USA.
9. **Yu Jiang** and Zhong-Ping Jiang, "Computational adaptive optimal control with an application to blood glucose regulation in type 1 diabetics," in Proceedings of the 31th Chinese Control Conference, Hefei, China, pp. 2938-2943, July, 2012.
10. **Yu Jiang** and Zhong-Ping Jiang, "Robust adaptive dynamic programming: An overview of recent results", in Proceedings of the 20th International Symposium on Mathematical Theory of Networks and Systems, Melbourne, Australia, 2012.
11. **Yu Jiang** and Zhong-Ping Jiang, "Robust approximate dynamic programming and global stabilization with nonlinear dynamic uncertainties," in Proceedings of the Joint IEEE Conference on Decision and Control and European Control Conference, Orlando, FL, USA, pp. 115-120, 2011.
12. **Yu Jiang**, Srinivasa Chemudupati, Jan Morup Jorgensen, Zhong-Ping Jiang, and Charles S. Peskin, "Optimal control mechanism involving the human kidney," in Proceedings of the Joint IEEE Conference on Decision and Control and European Control Conference, Orlando, FL, USA, pp. 3688-3693, 2011.
13. **Yu Jiang** and Zhong-Ping Jiang, "Approximate dynamic programming for stochastic systems with additive and multiplicative noise," in Proceedings of the IEEE Multi-Conference on Systems and Control, pp. 185-190, Denver, CO, 2011.
14. **Yu Jiang**, Zhong-Ping Jiang, and Ning Qian, "Optimal control mechanisms in human arm reaching movements," in Proceedings of the 30th Chinese Control Conference, pp. 1377-1382, Yantai, China, 2011.

15. **Yu Jiang** and Zhong-Ping Jiang, "Approximate dynamic programming for output feedback control," in Proceedings of Chinese Control Conference, pp. 5815-5820, Beijing, China, 2010.
16. **Yu Jiang** and Jie Huang, "Output regulation for a class of weakly minimum phase systems and its application to a nonlinear benchmark system," in Proceedings of American Control Conference, pp. 5321-5326, St. Louis, USA, 2009.