Wei Pan

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EDUCATION

University of Science and Technology of China (USTC) Sep 2008 – present
Department of Electronic Science and Technology
M.S., Biomedical Engineering. Overall GPA: 88.2/100

Harbin Institute of Technology (HIT) Sep 2004 - Jun 2008
Department of Control Science and Engineering
B.S., Automation. Overall GPA: 87.3/100, Major GPA: 91/100

SUMMARY OF TECHNICAL QUALIFICATIONS

- **Laboratory Skills**: DNA purification and isolation, DNA transformation, bacterial cloning, polymerase chain reaction, gel electrophoresis, DNA sequencing, fluorescence microscopy
- **Modeling**: State space model, nonlinear ordinary differential equations, stochastic differential equations
- **Analysis**: Linear Matrix Inequality; time-delay systems, switched systems, Lyapunov-Krasovskii functional theory; filter design method, neural network analysis, parameter estimation and system identification, local and global sensitivity analysis
- **Programming Languages**: C/C++, Matlab, XML (SBML)
- **Software**: Matlab, Simulink, LaTeX, Systems biology workbench

PROFESSIONAL & TEACHING EXPERIENCE

Start in Nov 2009:	Visiting graduate researcher, CAS-MPG Partner Institute for Computational Biology.
Sep 2009 – present:	Graduate principle investigator, Department of Electronic Science and Technology, USTC.
Jul 2009:	Summer school and international workshop on information processes in biological systems, Peking University.
Mar 2009 – Jul 2009:	Teaching assistant for Biochemistry, College of Life Science, USTC.
Dec 2008 – Nov 2009:	Captain for the international Genetically Engineered Machine competition (iGEM), USTC software team, College of Life Science, USTC.
Sep 2008 – present:	Master graduate student and research assistant in Prof. Huanqing Feng Group, Department of Electronic Science and Technology, USTC.
Jan 2007 – Jul 2008:	Undergraduate researcher in Prof. Huijun Gao Group, Space Control and Inertial Technology Research Center, HIT.

PROFESSIONAL ACTIVITIES

Reviewer for the following international journals:

- Neurocomputing
- Journal of Computational Biology
- International Journal of Systems Science
- IEEE Transactions on Systems, Man, and Cybernetics--Part B: Cybernetics

RESEARCH EXPERIENCE

CAS-MPG Partner Institute for Computational Biology Nov 2009 – present

Visiting Graduate Researcher

Advisor: Prof. Xinguang Zhu

Project: Engineer Alternative Gene Circuit to Improve Photosynthesis Efficiency

University of Science and Technology of China Sep 2009 - present

Graduate Principle Investigator

Project: Robust Control of Gene Circuit (Funding Agency: USTC Graduate School)

- Automatic tune strengthen of promoters in genetic regulatory networks to attenuate noise in gene expression
- Conceive a proportional-integral control strategy to genetic regulatory networks that can achieve perfect adaptation

University of Science and Technology of China Dec 2008 - Nov 2009

Chief Captain for iGEM USTC Software Team

Project: Automatic Biological Circuit Design[6,7]

- Conceive the whole project and lead the team
- Develop system identification method and optimization algorithm to search topology and kinetic parameters of biological circuit
- Apply local and global sensitivity analysis method to design robust biological circuit
- Write the Wiki and maintain the website.
- Help embed SBML compiler to make model input and output in a standard form.
- Help USTC wet team to perform simulation and modeling.

University of Science and Technology of China Sep 2008 –Dec 2008

Graduate Research Assistant

Project: Research on computer-aided diagnosis system for brain tumors and cerebral hemorrhage (Funding Agency: National Natural Science Foundation of China, Grant No. 60771007)

Advisors: Prof. Huanqing Feng.

- Study pattern recognition technique and relevant algorithm.
- Implement meanshift algorithm in C++.

Harbin Institute of Technology

Undergraduate <u>Independent</u> Researcher Sep 2007 - Jul 2008

Advisors: Prof. Huijun Gao

Project 1: Multistability of Genetic Regulatory Networks

- Apply switched system theory and multiple Lyapunov function to investigate multistability of genetic regulatory networks [1].
- Genetic Regulatory Networks are modeled as nonlinear differential equations with time delay. Both monostability and multistability are analyzed in a uniform framework [2].
- Multivariable regulation functions which different variables multiply together are considered in genetic regulatory networks. Apply Linear Matrix Inequality and Lyapunov-Krasovskii functional theory to investigate multistability of genetic regulatory networks [3].

Project 2: Robust Stability of Stochastic Genetic Regulatory Networks

- Both intrinsic and extrinsic noises are considered to model the uncertainty and fluctuation of kinetic parameters and time delays. A novel Lyapunov - Krasovskii functional has been proposed using the stochastic analysis approach. The theorem is formulated in the form of Linear Matrix Inequality [4].

Project 3: H_∞ Feedback Control for Genetic Regulatory Networks

- Noise is ubiquitous in gene expression and genetic regulatory networks are formulated as nonlinear stochastic differential equations with time delays. Robust synthetic gene circuits have been designed to attenuate the noise in genetic regulatory networks with time delays using H_∞ control theory [5].

PUBLICATIONS

[1]. W. Pan*, Z. Zhang and H. Liu, "Multistability of Genetic Regulatory Networks", *International Journal of Systems Science*. (In press, Corresponding author)

[2]. W. Pan, Z. Wang and H. Gao, "Monostability and Multistability of Genetic Regulatory Networks with Different Types of Regulation Functions". *Nonlinear Analysis: Real World Applications*. (Accepted for publication)

[3]. W. Pan, Z. Wang and H. Gao, "On Multistability of Delayed Genetic Regulatory Networks with Multivariable Regulation Functions". *Automatica*. (Submitted)

[4]. W. Pan, Z. Wang and H. Gao, "Robust Stability of Genetic Regulatory Networks with Stochastic Time Delays Under Intrinsic and Extrinsic Noise". *Neurocomputing*. (Submitted)

[5]. W. Pan, Z. Wang and H. Gao, "Robust H_∞ Feedback Control for Uncertain Stochastic Delayed Genetic Regulatory Networks with Additive and Multiplicative Noise", *International Journal of Robust and Nonlinear Control*. (Accepted for publication)

[6]. W. Pan, Y. Cui, Y. He, J. Li, X. Yao, B. Ding, "A Trade-off Design Scheme for Complex Biological Networks with Specific Functions". (In preparation)

[7]. W. Pan, Y. Cui, Y. He, J. Li, X. Yao, B. Ding, "ABCD: Automatic Biological Circuit Design Software Package". (In preparation)

HONORS & AWARDS

- *Gold medal*, international Genetically Engineered Machine competition (iGEM) *2009*
- *Recipient of Graduate Innovation Funding, USTC* *2009*
- *Eligible for the Graduate Program in USTC, free of admission test* *2008*
- *Excellent Basketball Referee, HIT* *2006*
- *Excellent Undergraduate Student, HIT* *2005*