

---

# **Research Group of Signal and Information Processing**

Beijing University of Aeronautics and Astronautics

2008.6.20



# Introduction

---

- **Faculty**

Shiyi Mao, Full professor

Chenyang Yang, Full professor

Xiaojian Xu, Full professor

Wei Chen, Associate professor

Jun Wang, Associate professor

Wei Zhao, Associate professor

Yunneng Yuan, Associate professor

Jinping Sun, Associate professor

Fei Gao, Lecturer

Yafei Tian, Lecturer

Xia Bai, Postdoc

Wenguang Wang, Postdoc



---

- **Students**

- Around 50 PhD candidates have obtained PhD degree
- 46 PhD candidates are now in campus



---

- Publications ( Recent 5 years )

Journal Papers (In Chinese and English) > 60

International Conference Papers > 20



## Funding

---

- National Science Foundation of China 4
- Foundation of State Key Security 2
- Foundation from Chinese Industry Sections >10
- Foundation from Defence > 5
- Contracts with Institute of Industry Sections >10
- Projects of State 863 High Technology 3



## Teaching course for undergraduate and graduate students

---

- Digital Signal Processing
- Automatical Control
- Principle of Communication
- Principle of Radar
- Detection, Estimation, and Modulation Theory
- Radar Signals
- Time series and Spectrum Analysis
- Digital Image Processing
- Time-Varying Spectrum Analysis
- Space-Time Adaptive Processing



- **Signal processing in communications**
  - Signal processing for cognitive Radar
  - Signal processing for wireless sensor networks
  - Tranceiver design for multiple antenna systems
  - Tranceiver design for UWB wireless communication systems



- **Advanced Synthetic Aperture Radar imaging processing**
  - Spotlight mode
  - High squint mode
  - Bistatic
  - Multi channel
  - LFM CW SAR
  - Ultra high resolution SAR (0.1m res)



- **Adaptive Processing for AMTI and GMTI radar**
  - STAP simulation platform developing
  - STAP for inhomogeneous environment
  - Sum-Delta STAP processing
  - Real time STAP processor



- **Knowledge-based Radar signal processing**
  - Knowledge based STAP
  - Knowledge based image understanding
  - Knowledge based target detection and tracking
  - Data formation for KB radar signal processing



- **Image understanding**

- Image pre-processing including filtering, segmentation, contrast enhancement and so on
- Multi sensor image fusion
- Target detection, ATR
- Change detection
- Polarimetric SAR image processing
- 3D target reconstruction from SAR images



- **Signal Characteristic**
  - Electromagnetic scattering, radiation and propagation modeling
  - Advanced remote sensing system modeling
  - SAR/ISAR imagery
  - Information processing and exploitation



# Research Projects

---

- **FPGA+DSP**

- Reconfigurable real-time processing architecture research
- Real-time processing system based on DSP+FPGA architecture
- Multiprocessor parallel computing system architecture
- High speed interconnection for Multiprocessor system
- Signal processing IP designed for FPGA
- High speed signal acquisition and generating system
- Design and Implementation of soft defined radio system



## CV of Prof. Shiyi Mao

---



Shiyi Mao received diploma in Radio Engineering from Beijing University of Aeronautics and Astronautics (BUAA) in 1958. Since then he has been at EE of BUAA, advisor for PH.D. student programming, and the head of signal and information processing lab.

He held the position as Deputy Director of Department of Information Science, National Science Foundation of China in 1985-1995. He conducted research on Nonlinear Signal Modeling at Polytechnic Institute of New York under the supervision of professor A. Papoulis.

His present research focuses SAR Imaging and the Image Understanding, Tracking and Data Fusion, Space-time Adaptive Processing Algorithms and Application. He is the author of some 200 articles as well as several scientific books.

He is a fellow of Chinese Society of Electronic, vice-chairman on Signal Processing Group in CSE, and editor of several journals.



## CV of Prof. Chenyang Yang

---



Chenyang Yang received the MS and PhD degrees in 1989 and 1997 respectively in EE from BUAA. She has published over 80 papers, won four national level and ministry level awards of Science and Technology Progress and applied 23 patents. She has been supported by the 1st Teaching and Research Award Program for Outstanding Young Teachers of Higher Education Institutions in 1999. She is now the vice dean of the School of Electronics & Information Engineering and a key member of Academic Affairs Committee of Beihang University. She is a committee member of Chinese Signal Processing Society and Communications Society, and an associate chief editor of Chinese Journal of communications, an editor of Chinese Journal of Signal Processing. She is the chair of Beijing chapter of IEEE Communications Society and IEEE senior member. She has ever served as TPC members for many international conferences such as ICC, VTC, WCNC and PIMRC. Her recent research interests lie in signal processing in MIMO, UWB, Cognitive radio systems and wireless sensor networks.



## CV of Prof. Xiaojian Xu

---



Xiaojian Xu received his B.S. degree from Hefei University of Technology in July 1983, M.S. degree from Beijing Institute of Environmental Features, China, in 1986, and the PhD degree from University of Nebraska-Lincoln, USA, in 2002, respectively, all in Electrical Engineering. He had been with Beijing Institute of Environmental Features (BIEF) during 1986 to 1999, where he had been mainly involved in researches in electromagnetic scattering modeling and microwave imaging. He had been a visiting scholar in the Signal Processing Section, Department of Electrical and Electronic Engineering, Imperial College of Science, Technology and Medicine, London, UK, from May to November 1994, where he mainly involved in the development of 2-D IIR filters, fuzzy neural networks with applications to pattern recognition. From June 1999 to December 2002, he had been with the Environmental Remote Sensing Laboratory, University of Nebraska-Lincoln, USA. His research interests were ultra wideband random noise radar, synthetic aperture radar (SAR) imaging with emphasis on foliage and ground penetration applications. In January 2003, he joined the School of Electronic and Information Engineering, Beihang University, as a signal processing professor. Xiaojian Xu has published more than 100 papers on refereed journals and on international conferences.



## CV of Prof. Jun Wang

---



Jun Wang, he graduated from School of Electronic Engineering, Northwestern Polytechnical University, in 1995, and received the master and Ph.D. degrees in signals and information processing from Beijing University of Aeronautics and Astronautics (BUAA) in 1995 and 2001.

He is a associate professor now in School of EIE, BUAA. He studies on Real-time DSP System Design and Implementation, Wireless Communications, SAR Radar Signal Processing, Electronic Warfare and so on.

He masterminded and completed a number of researches in National Key Pre-Research Projects, 863 Projects, and National Natural Science Foundation Key Projects.



## CV of Prof. Jinping Sun

---



Jinping Sun, he graduated from School of Electronic Engineering, BUAA, in 1995, and received the master and Ph.D. degrees in signals and information processing from Beijing University of Aeronautics and Astronautics (BUAA) in 1995 and 2001.

He is a associate professor now in School of EIE, BUAA. He studies on high resolution and advance mode SAR signal processing, image understanding, pattern recognize and so on. He masterminded and completed a number of researches in National Key Pre-Research Projects, and Foundation from Defence and some Contracts with Institute of Industry Sections



---

*THANKS*

