PERSONAL INFORMATION

WU DI

PhD in Automatic Control

Solveien 100B, 1162 OSLO, NORWAY.

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Sex Female | Date of birth 08/05/1982 | Nationality Chinese (entitled to work in Norway)

JOB APPLIED FOR

Application for Associate Professor in Big Data Cybernetics in NTNU

PERSONAL STATEMENT

Looking to exploit the synergy between system modeling and data analysis to foster the acceptance of intelligent systems across application domains.

ACADEMIC EXPERIENCE

Lecturer (02/2013 – Present)

University of Science and Technology (USTB), Beijing, CHINA.

Laboratory of Artificial Life and Intelligent Software, Department of Computer Science.

- Research Activities
  - Leader of research in intelligent software
    Co-supervising PhD and master students.
    Making research and publication plans
    Project collaboration with academic partners in areas such as steel processing, business intelligence, *etc*.
    Collaboration with industrial partners, such as UnionPay, Shengli oil and gas field, *etc*.
  - Research Work on artificial life, simulation modeling, and big data system.

Postdoctoral fellow (09/2010 –02/2013)

University of Science and Technology (USTB), Beijing, CHINA.

Laboratory of Artificial Life and Intelligent Software, Department of Computer Science.

- Collaborated Supervisor: Prof. BAN Xiaojuan.
- Research Activities
  - Proposed a framework for digital ocean modeling and simulation system.
  - Developed an animation generation platform for the ocean modeling.
  - Adapted the data modeling techniques with metadata, data analysis using unsupervised learning algorithms.
  - Application within the traffic signs design, iron ore mixing expert system, *etc*.

Research assistant (09/2007 –07/2010)

Beijing Institute of Technology (BIT), Beijing, CHINA.

Chinese National Key Laboratory of Complex System Intelligent Control and Decision

- Surveyed large-scale simulation system design process and optimization problems including multiple evolution algorithms.
- Proposed an optimization model for the distributed simulation system design, considering tasks, resources and services.
- Proposed a layered Model-Driven Engineering (MDE) based simulation system design methodology.
- Developed a platform to generate program code for system template.
- Applied the whole methods into a national 973 project and a HLA based gaming project.

Visiting Researcher
(01/2006 –08/2007)

University of South Brittany (UBS), Vannes, FRANCE.

IRISA-VALORIA, Department of Computer Science.

- Collaborated Supervisor: Prof. OQUENDO Flavio.
- This is a grant supported by the EU ASIA-LINK programme, STAFF (Selection, Training and Assessment of Future Faculty) project in Computer Science.
- Research Activities:
  - Designed a Domain Specific Language for the High Level Architecture (HLA) simulation applications.
  - Developed the architecture design platform based on Visual Studio Modeling SDK.
  - Studied the MDE and related architecture design methodologies to improve the software efficiency of simulation systems.

Application Developer
(from 09/2004 – to 12/2005)

DoD research institute, Beijing, CHINA.

Laboratory of Information Perception and Processing.

- Independently developed a complete simulation component based on parameter-similarity modeling techniques.
- This project was awarded for 3rd Ministry Prize for the Progress in Science and Technology.

EDUCATION

PhD
(09/2004 –07/2010)

Doctor Degree, Major in Automatic Control (Pattern Recognition and Intelligent Systems)

Beijing Institute of Technology (Beijing, China)

- Supervisor: Prof. CHEN Jie
- Thesis: Research on the Optimal Design of Composable Distributed Simulation System and its Application
- Recommended into the PhD degree program, with exemption from the entrance exam. (Top 5%).

Undergraduate
(09/2000 –07/2004)

Bachelor Degree, Major in Automatic Control

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Beijing Institute of Technology (Beijing, China)

- Supervisor: Prof. CAI Tao
- Thesis: Tracking Sensor Simulation based on HLA
- Recommended into the master degree program, with exemption from the entrance exam. (Ranking 7th /360 students).

RESEARCH GRANTS

01/2014– 12/2016
No. 61300074

Chinese National Nature Science Foundation of China Youth Grant

Project: Interactive Fluid Environment Modeling Research in Artificial Life Animation

I proposed an "interactive environment" modeling method to make the virtual lives and their environment exchange information directly in the animation system. Based on the typical fluid environment, I proposed the model of joint particle and surface particle in order to solve the interactive computation problem between the virtual life model based on visco-elastic and fluid model based on particles. For the fluid environment modeling, an ASPH method based on anisotropy kernel function is used. The virtual lives are modeled as joint particles and surface particles in order to communicate with the environment.

01/2011– 12/2012
No. 20100480199

China Postdoctoral Science Foundation Grant

Project: Composable DIS Optimal Design based on Quotient Space Theory

I proposed a composable modeling method on granular computing to foster the verification process of DIS system architecture. I analyzed the system design process from horizontal and vertical perspectives, and gave a 3-layer model to describe the relationship between tasks, resources and services. This model was formulated by a solution matrix. Considering the corresponding constraints and optimal objective, I adapted an evolutionary algorithm to solve this optimization problem.

01/2012– 12/2013
No. 2012190342900

Chinese Fundamental Research Funds for the Central Universities project

Research on Composable Digital Ocean Environment Simulation

I proposed an advanced physical model for the digital ocean fluid generalization process of animation. This model could balance the system fidelity and efficiency. Based on MDE paradigm, I built a framework for composable architecture design and, a warehouse of ocean related models in the animation system.

PROJECT EXPERIENCES

01/2013– 12/2016

Chinese National Nature Science Foundation of China Grant

Project: Motion Modeling and Behavior Understanding Towards Multidimensional Virtual Sensory.

I worked on animation system modeling and algorithm design. I proposed a multidimensional human mechanic model, created the corresponding action patterns and applied in the case study in office environment.

01/2010– 12/2014

Chinese National Key Research Project by DoD

Project: Large Scale Simulation Platform for Ground-based System Integrated Evaluation.

This project consists of 45 simulation nodes, including 78 simulation object types and over 200 instances. I worked to build 14 types of sensor models using the modeling methods as fuzzy theory, grey theory, expert system, *etc*. Furthermore, I designed the software architecture, developed the templates, integrated with HLA platform and worked with related tests. This project was awarded for 2nd Ministry Prize for the Progress in Science and Technology.

01/2009– 12/2012

Chinese National 863 Project

Project: Research on Key Technologies of Digital Oil and Gas Fields.

This project digitalizes most of the information from the oil and gas field in order to better manage and understand the collected data from the production line. I built a data management framework using a 3-layer (theme, business, and data) metadata model.

01/2007– 12/2011

Chinese National 973 Project

Project: Space-based System Information Perception, Transmission and Processing.

This is an interdisciplinary project which consists of 5 top research institutes, including Space-based system information perception, transmission, processing, application and simulation. I played a key role to the overall simulation system design, software framework program, system integration and test. This work was facing synchronization of 30 simulation nodes with multi-resolution, multi-dimensional environments. I used a scalable simulation method for the system implementation to solve the problem.

06/2003– 06/2006

European Commission Fifth Framework Program

Project: ArchWare.

I worked on the Domain Specific Language definition, design and application in distributed simulation (HLA system) using formal π-Languages. It included description, verification and refinement process of architecture design.

TEACHING EXPERIENCES

07/2010– 06/2016

University of Science and Technology.

Department of Computer Science.

- 100% Responsible Courses:
  - **Distributed System** (Master) 6 years

In this course, I used interactive teaching with the students. They were encouraged to survey the literature and share their findings with all the class. The students are graded by written examination and academic papers.

  - **Pattern Recognition** (Master) 4 years

I composed in the teaching a lot of cutting-edge methods, algorithms and application in the fields. I also add additional materials including videos, lectures and advanced experiments to inspire the students. The examination of this course is designed by me for written and orally.

  - **Virtual Reality** (Undergraduate – 3rd year) 4 years

I introduced many advanced VR tools such as VR helmets, glasses, Kinect, movies as well as explaining the methodologies behind them. In the lab assignments, I asked the students to design virtual models using popular platforms. The students are graded by written examination and lab works.

- Supervision of Bachelor thesis
  - LI Xian (score Excellent for defence).
  - CHEN Denghuang
  - JIN Jingzhen (student from North Korea)

- Co-supervision of Master thesis
  - LI Bin: UnionPay recommender system.
  - SUN Xiaobo: large scale simulation system.
  - CHANG Binghu and HE Li: iron ore mixing expert system
  - LIU Sa and SU Dan: simulation system based on game theory.
  - YANG Mingyuan: multi-dimensional virtual sensor.

- Co-supervision of PhD thesis
  - LIU Xu
  - CHANG Zheng

09/2007– 07/2010

Beijing Institute of Technology.

Department of Automatic Control.

- Teaching assistant:
  - **Operation Theory** (Undergraduate – 3rd year) 1 year

    In this course, we have 61 students. I helped the professor to design the programming 3 tasks of operation algorithms. Also I am in charge of explaining and grading the student assignments.

- Co-supervision of Master thesis

  GE Xiong, ZHU Yuhong and FANG Hua: Chinese national 973 project..

09/2006– 03/2007

University of South Brittany.

IRISA-VALORIA.

- Co-supervision of Master internship

  Domain Specific Language design tools review.

AWARDS & PATENTS

Beijing Institute of Technology.

- Awards:
  - Excellent student of BIT (4 years) in bachelor studies. (Top 5%)
  - Excellent student of BIT for master and PhD (Top 3%).
- Patents
  - Chinese software registration: 2008SR11447 (non-disclosure agreement).
  - Chinese software registration: 2008SR11448 (non-disclosure agreement).
  - Chinese patent registration: 201010047672.X (non-disclosure agreement).

TRANSFERABLE SKILLS

- Education, training, teaching, mentoring, meeting facilitation.
- Ideation, project application proposals, international collaboration, cross-disciplinary projects (animation, economical systems, oil & gas field, artificial life, macro/micro simulation).
- System modeling techniques (MAS, DIS, Composable modeling, FMI, UML, interactive modeling), simulation techniques (system identification, self-organization, network), programming languages (C++, C#, VRML, Python), tools (Hadoop, Mahout, HLA/RTI platforms, Modelica, Matlab, Simulink).

LANGUAGES

- Chinese (Mandarin) Native (C2)
- English Fluent (C2)
- French Basic Communications (B1)
- Norwegian Starter (A1)

PUBLICATIONS

- **Nivå 1 in NSD 2016:**
  - [1] **Wu Di**, and Ban Xiaojuan. An Architecture Model of Distributed Simulation System Based on Quotient Space. **Applied Mathematics & Information Sciences**, Jun. 2012 6.5S: 603S- 609S.
  - [2] **Wu Di**, Ban Xiao-Juan, Lei XueMei, Gao Pan, Jin Tian. Research on static global path- planning algorithm of virtual animal in the three-dimensional space. **Communications in Computer and Information Science**, 2011, 158: 327-333.
  - [3] **Wu Di**, Chen Jie, Oquendo Flavio. Optimal Design Model of Distributed Simulation System based on Quotient Space. **Journal of Central South University** (science and technology). 2009, 40 (1): 268-272.
  - [4] Chen Jie, **Wu Di**, Zhang Juan and Oquendo Flavio. Formal Modeling and Analysis of HLA Architectural Style. **International Journal of Modeling Identification and Control**. 2010, 9(1/2): 71-82. (Leading author),
  - [5] Gao, Bing-Zhi; **Wu Di**; Ge, Xiong; Ban, Xiao-Juan. Simulation scenario design method and its application based on conceptual models of mission space. **Journal of Central South University** (Science and Technology), 2012. 42(1): 096-110. (Corresponding author)
  - [6] **Wu Di**, Chen Jie, and Oquendo Flavio. Formal Model-Driven Engineering of Distributed Simulation Systems based on Architecture-Centric Domain-Specific Approach. **IEEE Proceedings of Asia Pacific Software Engineering Conference**. 5-7 Dec, 2007, Nagoya, Japan.

- **Journal Papers:**
  - [1] **Wu Di**, Ban Xiaojuan and Oquendo Flavio. A Formal Architecture Verification Approach for HLA System Model-Driven Development. **Advanced Science Letters.** Sep. 2012, 9: 742-747.
  - [2] **Wu Di,** Tang Wei, Miao Shangjie, Ban Xiaojuan, Liu Xu. Research on the perception model of artificial fish in dynamic environment. **Journal of Computational Information Systems**. Aug. 2012, 8(16): 6863-6870.
  - [3] **Wu, Di**, Chen Jie, Oquendo Flavio. A Formal Model-Driven Engineering Approach for Composable Simulations. **Journal of System Simulation**. 2009, 21(18): 5608-5613.
  - [4] Chen Jie, **Wu Di**, Zhang Juan. The Distributed Simulation System Hierarchical Design Model based on Quotient Space Granular Computation. **Acta Automatica Sinica**. 2010 36(7): 923-930. (Leading author).
  - [5] Ban Xiaojuan; **Wu Di**; Su, Dan; Lv Xiaolong. Multi-dimensional Model of the Missile Explosion Based on PSO. **Journal of Computational Information Systems,** 2012. 8(13): 5453-5460.
  - [6] Gao Bing-zhi, **Wu Di**, Ban Xiao-juan, and Qin Hui-yuan. Steel Enterprise Production Scheduling and Its Application. **Computer Engineering & Science.** 2011 Vol. 33 (9). pp: 157-163.

- **Conference and Workshop Papers:**
  - [1] **Wu Di,** and Oquendo Flavio. Formal Model-Driven Engineering Approach for Distributed-Interactive Simulation systems. **ICSSEA** 2007.
  - [2] Quayym Zawar, **Wu Di** and Oquendo Flavio. pi-ADL visual notation and its application to formally modeling the High Level Architecture. **ICSSEA** 2006.
  - [3] **Wu Di**, Chen Jie, and Oquendo Flavio. Formal Model-Driven Engineering for HLA systems. **SISO Simulation Interoperability Workshop Spring**, 4-18 April 2008, 08S-SIW-087, Providence, Rhode Islandm, USA.