

# *Master's Program in Computer Science & Technology*

**Title/degree:** Master of Engineering (M.E)

**Duration:** 2.5-3 years, full-time

**Start month:** September

**Language of instruction:** English

## **I. Program Description**

We have a solid, theoretical understanding of computer technology with plenty of attention for the wide range of its applications. With full consideration of our strength on data engineering and artificial intelligence and the urgent need of industry, special attentions are paid to the rapid growing Machine intelligence and Mobile computing area.

## **II. Why study Computer Science & Technology at Donghua University?**

The school of computer science and technology was founded in June 2004 at Donghua University. The history of this school can be dated back to 1983 when Computer application major was first established in Donghua University. The school started its master's degree program in computer application in 1986, and was one of the earliest.

In teaching process, we pay special emphasis on the comprehensive practice training of two major technologies in computer science: database and computer network. We attach great importance to practical skills training in database technique especially in Oracle database. We have professional teaching and practical bases with rich teaching power and teaching experience. The course Database Principles and Software Engineering have been listed as the excellent course in Shanghai. Recently with the course development and application extension, we incorporate computer network and embedded technique related contents into the major courses so that students have broad space to develop themselves and have better job opportunities.

Our global focus manifests itself in several ways: our active participation and hosting of international conferences and activities, our keep on growing internationally oriented academic programs, our overseas study programs in the U.S.A and in Austrilia, 50% of our faculty who have overseas education background, students and scholars who come here from many countries.

### III. Participating Professors and Junior Scientists

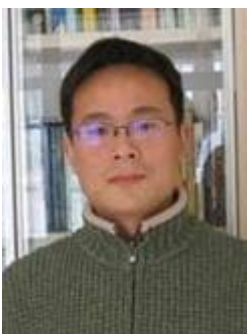
#### ACADEMIC LEADER



**Introduction to Dr. Guohua Liu (Doctoral Supervisor):** Dr. Guohua is a full professor of the department of Computer Science and Technology in Donghua university of China. He received his Ph.D in Computer Soft and Theory from Fudan university of China in 2001. His research interests include database, business process mangement and querying over big data.

Selected recent publications:

- (1) Liu Haibin, Liu Guohua, Huang Liming, Wang Ying, Mining method for service composition patterns based on artifact-aware, *Computer Integrated Manufacturing Systems*, 2016, 22(2)
- (2) Hou Shijiang, Liu Guohua, Hou Ying, Research on location privacy protection technology based on star-graph in road network environment, *Computer Engineering & Science*, 2015, 37(8)
- (3) Liu Haibin, Liu Guohua, Huang Liming, Song Jinling, Method for behavior conformance checking based on artifact snapshot sequences, *Journal of Software*, 2015, 26(3)



**Introduction to Dr. Hongya Wang (Doctoral Supervisor):** Dr. Wang is a full professor in School of computer science and technology at Donghua University. He received the BS and MS degrees in electrical engineering from Central China Normal University, Wuhan, Hubei, China, in 1998 and 2001, respectively, and the PhD degree in computer Science from Huazhong University of Science and Technology, Wuhan, Hubei, China, in 2005. His research interests include database systems, real-time computing and mobile computing. Dr. Wang has published more than 15 peer reviewed journal and conference papers.

Selected recent publications:

- (1) Hongya Wang, LihChyun Shu, "Hyperbolic Utilization Bounds for Rate Monotonic Scheduling on Homogeneous Multiprocessors," *IEEE Transactions on Parallel and Distributed Computing*, June, 2014.
- (2) Hongya Wang, Jiao Cao, LihChyun Shu, Davood Rafiei. Locality sensitive hashing revisited: filling the gap between theory and algorithm analysis, *CIKM2013*.
- (3) Hongya Wang, Yingyuan Xiao, LihChyun Shu, "Scheduling Periodic Continuous Queries in Real-Time Data Broadcast Environments," *IEEE Transactions on Computers*, Sept. 2012.



**Introduction to Dr. Li Jiyun (Master Supervisor):** Dr. Li, is a full professor in School of computer science and technology at Donghua University. Her research interests focus on machine learning, data engineering and application of artificial intelligence in fashion design. She has published over 40 papers in Expert System with Applications, International Journal of Clothing Science and Technology, Psychology Review, etc., and has been authorized 2 national invention patents.

Selected recent publications:

- (1) Jiyun Li, Yilei Li: Cognitive model based fashion style decision making. Expert Syst. Appl. 39(5): 4972-4977 (2012)
- (2) Jiyun Li, Xiaodong Zhong and Yilei Li, (2011), "A Psychological Decision Making Model Based Personal Fashion Style Recommendation System" Lecture Notes in Electrical Engineering 102, 57-64
- (3) Jiyun Li, Jiayun Chen, (2009) "A mannequin modeling method based on section templates and silhouette control", International Journal of Clothing Science and Technology, Vol. 21 No 5, pp.300 – 31



**Introduction to Dr. Song Hui:** Song Hui is a full professor of the school of Computer Science and Technology in Donghua University of China. She received her Ph.d in Computer Science from Shanghai Jiaotong University in 2004. Her research interests includes Machine learning, Data mining, Knowledge discovery and management, information extraction and information integration, and focuses on text mining and knowledge discovery in recent years.

Selected recent publications:

- (1) Shan Chang, Ting Lu, Hui Song, "SmartDog: Real-time Detection of Smartphone Theft", IEEE iThings 2016.
- (2) Yunjie Li, Hui Song, Applying Data Mining Techniques on Continuous Sensed Data for Daily Living Activity Recognition, Applied Mechanics & Materials, 2014, 738-739:191-196.
- (3) Hui Song, Jianfeng Chu, Semantic Analysis and Implicit Target Extraction of Comments from E-commerce Websites, The proceedings of 2013 4thWorld Congress on Software Engineering, 2013.



**Introduction to Mei Wang:** Dr. Wang is a full professor in School of computer science and technology at Donghua University. She graduated from Fudan University in June 6, 2008, majored in computer software and theory, achieved PHD degree. From 2008.9 to 2009.8 was the Post Doctor of School of Computing, National University of Singapore. Attended in Donghua University, School of computer science and technology in 2009.9. The research topics include multimedia and database. Have taken charge of and attended in multiple projects of natural science funding programs of nation's and Shanghai's. Have published more than thirty research papers now.



**Introduction to Dr. Cairong Yan:** Dr. Yan is an associate professor of the department of Computer Science and Technology in Donghua university of China. She received her Ph.D in Computer Science from Xi'an Jiaotong university of China in 2006. Her research interests include parallel and distributed computing, cloud computing, and big data processing. Now she is the leader of project "The research on entity resolution method and key techniques towards big data" granted by national natural science foundation of China and the project "The research of parallel programming framework and virtual cluster optimization in the cloud computing environment" supported by the fundamental research funds for the central Universities.

Selected recent publications:

- (1) Cairong Yan, Tie Li, Yongfeng Huang, Yanglan Gan. Efficient Support of Small Files Processing Over HDFS. In proceedings of ICA3PP, 2014.
- (2) Cairong Yan, Yongfeng Huang, Guangwei Xu, Runtimes and optimizations for mapreduce, IETE Technical Review, 2013, 30(6): 506-515.
- (3) Cairong Yan, Min Zhu, Xin Yang, Ze Yu, Min Li, Youqun Shi, Xiaolin Li, Affinity-aware virtual cluster optimization for mapreduce applications, In proceedings of IEEE Cluster, 2012, 63-71.



**Introduction to Dr. Yue Li:** Dr. Li is a Lecturer in College of Computer Science and Technology, Donghua University. He received his PhD of Electronic and Computer engineering from University of Limerick, Ireland in 2010. Dr. Li was a manager of Smart Home project in Ningbo Sanxing Electric Ltd in 2010. In 2011, Dr. Li start teaching in Donghua University. He gives lectures on following modules: Computer programming, Computer Network, Cryptography, Network security technology. His research interests focus on authentication protocol analysis in IoT, Big Data security and analysis, Mobile computing privacy protection technology.

Selected recent publications:

- (1) Yue Li\*, Dehua Chen, Wei Li, Gaoli Wang, Paul Smith. A Hybrid Authenticated Group Key Agreement Protocol in Wireless Sensor Networks. International Journal of Distributed Sensor Network. Hindawi. 2013
- (2) Yue Li\*, Design of a key establishment protocol for smart home energy management system, 5th International Conference on Computational Intelligence, Communication Systems, and Networks, CICSyN 2013, Madrid, Spain, pp 88-89, 2013.
- (3) Yue Li\*, Dehua Chen, Thomas Newe. Formal Verification of a Key Agreement Protocol for Wireless Sensor Networks, The 11th International Conference on Trust, Security and Privacy in Computing and Communications (TrustCom), 2012, pp1537-1542, Liverpool, 2012.



**Introduction to Dr. Ting Lu:** Dr. Lu is a Lecturer in College of Computer Science and Technology, Donghua University. She received the Ph.D. degree in electrical and electronic engineering from Shanghai Jiao Tong University in 2013. Her research interests include wireless network, Internet of Things.



**Introduction to Dr. Shan Chang:** Dr. Chang is an associate professor in the school of Computer Science and Technology, Donghua University. She received the Ph.D. degree in computer software and theory from the Xian Jiaotong University in 2013. From 2009 to 2010, she was a visiting scholar in the Department of Computer Science and Engineering, Hong Kong University of Science and Technology. She was also a visiting scholar with BBCR research lab, Electrical and Computer Engineering Department, University of Waterloo from 2010 to 2011. She is interested in designing, building, analyzing, and measuring networked systems that are composed of multiple autonomous, potentially untrusted entities. Especially, understand and address the various security challenges pertaining to wireless and mobile systems. She is a member of the IEEE Computer, Communication and Society.

Selected recent publications:

- (1) Shan Chang, Qi Yong, Qingsong Yao, Hui Song and Li Lu, "Random graph based benchmarking methodology for RFID security protocols", in Proceedings of the 10th IEEE International Conference on e-Business Engineering (IEEE ICEBE), pp. 184-191, Coventry, United Kingdom, 2013.
- (2) Shan Chang, Yong Qi, Hongzi Zhu, Jizhong Zhao, and Sherman Shen, "Footprint: Detecting Sybil Attacks in Urban Vehicular Networks", IEEE Transactions on Parallel and Distributed Systems (TPDS), Vol. 23, Issues 6, pp. 1103-1114, 2012.
- (3) Shan Chang, Qingxi Li, Yong Qi, Jizhong Zhao, Yuan He, and Xue Liu, "Demo Abstract: Safety Assurance for Archeologists Using Sensor Network", in Proceedings of the 6th ACM Conference on Embedded Networked Sensor Systems (SenSys), Raleigh, North Carolina, USA, pp. 359-360, 2008.

## IV. Modules

All students must complete a total of 34 credits which must include 10 credits from the compulsory general education courses, 12 credits from the major compulsory courses, and 12 credits from the elective courses.

### 1、 Main courses

#### (1) compulsory course (Total credits 12)

##### (a) Database System Implementation (credit 3)

**Course Description:** The main contents of this course are: 1) File organization and access, buffer management, performance analysis, and storage management; 2) Database system architecture, query optimization, transaction management, recovery, concurrency control; 3) Reliability, protection, and integrity.

Prerequisites: A basic background in database system principle and programming language is required.

##### (b) Analyzing Operating System (credit 3)

**Course Description:** The main contents of this course are: 1) understand Linux kernel architecture and Linux kernel source code, including system boot and initialization, file system, memory management, and device driver. 2) understand the characteristics of modern operating systems including embedded operating system, real-time operating system, distributed operating system, and virtual machine operating system.

Prerequisites: Principles of operating system and Linux system is require.

### **(c) Network Security (credit 3)**

**Course Description:** With the development of 4G technology popularization and deployment of Internet of things, The market and output value of the software,service and hardware for mobile internet are beyond those of ordinary PC, mobile devices are the major contributor of the internet traffic.Recently, Mobile security has been a hot topic,cyber crime has aimed on mobile devices, for example, mobile eavesdropping, mobile privacy leaking, mobile malwares spreading quickly and financial crime through mobile internet, etc. Therefore, Information security for mobile internet plays the key role in the development of the mobile internet. The main contents of this course include : Android system introduction and programming, Network Security Technology(VPN, SSL,IPSEC),Foundation of Cryptography,Authentication principle,Analysis of malwares in Android, Smart phone protector and security software development practice.

Prerequisites: Computer programming,Computer network, principles of computer organization.

### **(d) Introduction to Data Mining (credit 2)**

**Course Description:** The course is aimed to introduce students to the basic concepts and techniques of Data Mining, including classification, clustering, association rules mining and outlier analysis. Further, it will help students to develop skills of using recent data mining software for solving practical problems.

### **(e) Internet of Things**

**Course Description:** The term *Internet of Things* (often abbreviated *IoT*) was coined more than ten years ago by industry researchers but has emerged into mainstream public view only more recently. Internet of Things represents a general concept for the ability of network devices to sense and collect data from the world around us, and then share that data across the Internet where it can be processed and utilized for various interesting purposes. This course introduces many aspects include: what the IoT can do for us, network devices and the IoT, issues around IoT, etc.

### **(f) System Analysis and Verification**

**Course Description:** The course introduced the key concepts involved in system analysis and verification such as the correctness and safety of system, the semantics of programming language, program refinement, etc. The tools of system analysis and verification will be covered. Particular attention is focused on the application of innovative technology in the development of reliable system to improve the quality of software products.

Prerequisites: A basic background in discrete mathematics and mathematical logic is required. The students are expected but not required to have some basic knowledge of programming.

### **(g) Application of Privacy Protection Technology in Mobile Network (credit 3)**

**Course Description:** The major contents of this course are: 1) the introduction of the basic concept about privacy; 2) the introduction of the vulnerabilities of wireless communication; 3) smartphone security; 4) mobile

Internet privacy protection; 5) mobile location privacy protection; 6) ad hoc, mesh, and sensor network privacy issues; 7) privacy issues in Internet of Things; 8) privacy issues in cloud computing etc.

Prerequisites: A basic background in computer network, wireless communication, information security or cryptography is required.

### **(h) Business Intelligence**

**Course Description:** This course is a case based course. It will focus on the major technologies in business intelligence project development. The main purpose is to help the students get familiar with the core technology foundation of business intelligence including the basic concepts and methods of data warehouse building, OLAP and data mining, and build applications with what they learned.

### **(i) Theory of Computation and Algorithm Complexities**

**Course Description:** This course focuses on three traditionally central areas of the theory of computation: automata, computability, and complexity. Automata theory deals with the definitions and properties of mathematical models of computation. Automata theory is an excellent place to begin the study of the theory of computation. Computability theory deals with the methods for classifying problems according to their computational difficulty by theoretical models of computer. Complexity theory deals with the methods for classifying problems as easy ones and hard ones by actual computers. The theories of computability and complexity are closely related.

***In case you experience any problems throughout your studies, please contact student advisors. They are ready to help you personally for all situations you might encounter.***



***Xiaoxia Li***



***Qian Li***

### ***Application Details for international students***

***To be eligible for our Master program you are required to have completed a program of study equivalent to that required by the B.S. in computer science. Applicants from other disciplines are expected to have coursework (or equivalent experience) in intermediate programming (C++ and Java), data structures, computer system fundamentals, and principles of operating system.***