



Project Activities

2015 – 2016

Ecole Centrale de Pékin

Content

1.	Designing and developing the Information management System(SI) in ECPk (Song Meng)	1
2.	Find out the smallest unknown Hadamard matrices with language C or C++ (Zhang Xinting)	2
3.	Study on influence factors of near-exit obstacles on pedestrian flow behavior (Fang Le)	3
4.	Real-time human body joints recognition based on machine learning (Yu Lei)	4
5.	Multiple Aerial Robots Cooperative Control Based on Wolf Swarm Intelligence (Duan Haibin)	5
6.	Applications of Big Data Technology in Earthquake Prediction (Niu Wei)	6
7.	Virtual test of hydraulic piston pump (Ma Jiming)	7
8.	Development of High-speed icing wind tunnel for assessment of anti-icing coating (Chen Huawei).....	8
9.	Fabrication and characterization of electrorheological fluids (Tang Hongzhe)	9
10.	Affect and Depression Recognition via Combining Facial, Visual and Audio Modalities (Huang Di)	10
11.	Bionic giant cuttlefish for space debris catching (Zhan Qiang)	11
12.	Fault tolerant control and reliability assessment of flight control system (Wang Shaoping)	12
13.	Prediction of Fatigue residual life of aluminum alloy (Zhang Zheng)	13
14.	Deep Learning Architectures for Sentimental Analysis (Rong Wenge).....	14
15.	A simulation platform for implementing and verifying the on-line monitoring and the air-land health management system of the aircraft (Yu Jinsong).....	15
16.	Research on quantum inference model (Shang Tao)	16
17.	Research on multidimensional & multivariant data visualization techniques of large commercial aircraft (Luo Mingqiang).....	17
18.	Smart Learning : Learning Styles Recognition Based on Data Mining (Yin Chuantao)	18
19.	Embedded picture display system based on MRAM (Zhao Weisheng)	19
20.	Bionic construction of new oil / water separation material (Liu Kesong).....	20


1. Designing and developing the Information management System(SI) in ECPk
(Song Meng)

Disciplin / General field Computer Science		Project number 01
Project title Designing and developing the Information management System(SI) in ECPk		
Project description Introduction: <p>This project is triggered by the real requirement in the department of ECPK. The lack of information system which make it more difficult to manage the increasing huge of information about students, from the moment when they entering into the university until their graduation. Designing and developing such information system may help us to follow students' in term of their life status and their study situation in an efficient ways.</p> Object: <p>Analyse different requirement of the SI in ECPk Design the system through function design and architecture design. Software development, coding to realize this system. Testing and deployment. Write a final research report.</p> Requirement: <p>Following characters are precious for the student in this project. Be interest in computing science, programming and software design. Self-learning ability, creativeness and discipline. Good collaboration in group.</p>		
Contact person in the client company Song Meng Songment.buaa@gmail.com 82316629	Project coach Song Meng 宋萌	Scientific referent (to be completed by ECPk)
Client company ECPk		Logo of the company

2. Find out the smallest unknown Hadamard matrices with language C or C++
(Zhang Xinting)

Disciplin / General field Computational mathematics		Project number 02
Project title Find out the smallest unknown Hadamard matrices with language C or C++		
Project description <p>A Hadamard matrix is a square matrix with entries equal to ± 1 whose rows and hence columns are mutually orthogonal. In other words, a Hadamard matrix of order n is a $\{1, -1\}$-matrix A satisfying</p> $AA^t = nI$ <p>where I is the identity matrix. In 1867 Sylvester proposed a recurrent method for construction of Hadamard matrices of order 2^k: In 1893, Hadamard proved his famous determinantal inequality for a positive semidefinite matrix A :</p> $\det A \leq h(A)$ <p>where $h(A)$ is the product of the diagonal entries of A: It follows from this inequality that if $A = (a_{ij})$ is a real matrix of order n with $a_{ij} \leq 1$ then</p> $ \det A \leq n^{n/2};$ <p>equality occurs if and only if A is a Hadamard matrix. This result gives rise to the term "Hadamard matrix". In 1898 Scarpis proved that if $p \equiv 3 \pmod{4}$ or $p \equiv 1 \pmod{4}$ is a prime number then there is a Hadamard matrix of order $p + 1$ and $p + 3$ respectively.</p> <p>In 1933 Paley stated that the order n ($n \geq 4$) of any Hadamard matrix is divisible by 4: This is easy to prove. The converse has been a long-standing conjecture.</p> <p>Conjecture : <i>For every positive integer n, there exists a Hadamard matrix of order $4n$:</i></p> <p>Conjecture has been proved for $4n = 2^k m$ with $m^2 \leq 2k$: the smallest unknown case is now $4n = 764$ (in 2007 by DRAGOMIRZ. DOKOVIC)</p>		
Contact person in the client company Zhang Xinting	Project coach Zhang Xinting 张心婷	Scientific referent (to be completed by ECPk)
Client company ECPk		Logo of the company

3. Study on influence factors of near-exit obstacles on pedestrian flow behavior (Fang Le)

Disciplin / General field Public Safety / Pedestrian flow		Project number 03
Project title Study on influence factors of near-exit obstacles on pedestrian flow behavior		
Project description <p>It was found by chance that it may take less time for pedestrians to evacuate from a room with obstacles near the exit than keeping clear at the exit, as we always do. IPSR (Institute for Public Safety Research) in Tsinghua University is planning to investigate the influence factors of near-exit obstacles on pedestrian flow behavior. Several groups of experimental and numerical studies will be conducted by varying geometrical and locational parameters.</p> <p>It is expected to conclude a general mechanism based on experimental and numerical results analysis.</p> <p>Pedestrian simulating programs are needed in the project. Application of SPH method is strongly recommended.</p> <p>The project is structured as follows:</p> <ul style="list-style-type: none"> - Learn the pedestrian simulating methods from the literatures - Design the experiments and choose a computation program - Conduct the experimental and numerical studies - Results analysis and conclusion 		
Contact person in the client company Zhou Rui zhour@tsinghua.edu.cn	Project coach Fang Le 方乐 le.fang@buaa.edu.cn	Scientific referent (to be completed by ECPk)
Client company Tsinghua University / ECPk		Logo of the company 

4. Real-time human body joints recognition based on machine learning (Yu Lei)

Disciplin / General field Computer Sciences		Project number 04
Project title Real-time human body joints recognition based on machine learning		
<div>Project description</div> <p>Robust interactive human body tracking has applications including gaming, human-computer interaction, security, telepresence, and even health-care. But approaches which can run at interactive rates on consumer hardware while handling a full range of human body shapes and sizes undergoing general body motions are rarely introduced.</p> <p>Recently, new works which segments the human body in an input depth image into labeling body parts show their computational efficiency and robustness. With each part distribution of human body, we thus generate proposals for each skeletal joint. Microsoft Kinect Sensor is an example. It recognizes the 3D position of every joint that the program uses to estimate the action of player.</p> <p>Objective of this project is to label body parts from input depth images and compute the 3D positions of joints by using machine learning methods, such as: deep learning or neural networks, to achieve human action recognition in real-time.</p> <p>This project requires just some basic knowledge in computer science and some programming skills (C/C++ or Matlab, one is enough).</p> <div>References:</div> <ul style="list-style-type: none">• Zhang Z. Microsoft kinect sensor and its effect[J]. MultiMedia, IEEE, 2012, 19(2): 4-10.• Shotton J, Sharp T, Kipman A, et al. Real-time human pose recognition in parts from single depth images[J]. Communications of the ACM, 2013, 56(1): 116-124.		
Contact person in the client company Yu Lei yulei@buaa.edu.cn	Project coach Yu Lei 于雷	Scientific referent (to be completed by ECPk) Yu Lei
Client company ECPk		Logo of the company

5. Multiple Aerial Robots Cooperative Control Based on Wolf Swarm Intelligence (Duan Haibin)

Disciplin / General field Control Science and Control Engineering		Project number 05
Project title Multiple Aerial Robots Cooperative Control Based on Wolf Swarm Intelligence		
Project description Aerial Robots cooperative control is an important issue. This project mainly focused on multiple aerial robots based on natural wolf swarm intelligence. Theoretical analysis and realization are also needed.		
Contact person in the client company	Project coach Duan Haibin 段海滨	Scientific referent (to be completed by ECPk)
Client company New building E709, 82317318-802		Logo of the company

6. Applications of Big Data Technology in Earthquake Prediction (Niu Wei)

Disciplin / General field Big Data Application / Crisis Prediction		Project number 06
Project title Applications of Big Data Technology in Earthquake Prediction		
Project description <p>Recent years, the developing technologies of big data provide a new approach to make crisis prediction. In this project we will make use of varieties of seismic monitoring data, like infrasonic wave, stress wave, budgerigar beating, etc., to pursue the time correlations between abnormal signals of these seismic monitoring data and the occurrence of earthquakes, with applications of big data analysis.</p> <p>It is expected to create a database of seismic monitoring data, which should be easily expanded for further more data.</p> <p>Data analysis programs are needed in the project. Fortran, C or C++ program languages may be adopted. All the data are provided by the Earthquake Research Institute of Beijing University of Technology.</p> <p>The project is structured as follows:</p> <ul style="list-style-type: none"> - Learn the big data technologies from the literatures - Choose a main method and use/write a proper program - Conduct data analsis to pursue the time correlations - Make predictions and reliability assessments 		
Contact person in the client company Niu Wei Wei.Niu@buaa.edu.cn	Project coach Niu Wei 牛薇	Scientific referent <i>(to be completed by ECPk)</i>
Client company ECPk		Logo of the company

7. Virtual test of hydraulic piston pump (Ma Jiming)

Disciplin / General field Mechanical/ Fluid transmission and control		Project number 07
Project title Virtual test of hydraulic piston pump		
Project description <p>Hydraulic piston pump is one kind of important component in aircraft hydraulic system. Long time real rig test costs too much to be afforded for the manufacturer. Virtual test is a feasible way to validate the performance and reliability when designing and optimization the pump.</p> <p>This project cover multi-disciplinary field, including mechanics, hydraulics, fluid mechanics, kinematics/dynamics, software, and so on. Some software, such as AMESim (hydraulics), mechanics (UG), Kinematics (ADAMS), mathematics (Matlab), Software (VB) need be utilized along with the project.</p> <p>This project come from AVIC, is a real engineering problem, which is fitable for the people who are interesting in mechanical problem and field engineering.</p>		
Contact person in the client company Li Qilin	Project coach Ma Jiming 马纪明	Scientific referent (to be completed by ECPk)
Client company ECPk		Logo of the company

8. Development of High-speed icing wind tunnel for assessment of anti-icing coating (Chen Huawei)

Disciplin / General field Biomimetic Surface/Nano fabrication		Project number 08
Project title Development of High-speed icing wind tunnel for assessment of anti-icing coating		
Project description <p>Anti-icing coating is a useful approach to prevent icing on surface of aircraft. However, the icing mechanism especially on the micro-scale or even molecular manner is till unclear. In order to investigate the effect of coating material, microscale surface structure on the icing mechanism, it becomes more necessary to study how to prepare the supercool water, control the icing conditions, test the anti-icing coating properties and even prepare the anti-icing coating. Finally, one icing wind tunnel will be designed and built to construct the base of anti-icing coating.</p> <p>The detailed study includes:</p> <ol style="list-style-type: none"> 1) Super cool water generation; 2) Icing wind tunnel design and construction; 3) Test of anti-icing coating; 4) Development of anti-icing coating. 		
Contact person in the client company	Project coach Chen Huawei 陈华伟	Scientific referent <i>(to be completed by ECPk)</i>
Client company School of Mechanical Engineering and Automation NEW Building A403, No.37 Xueyuan Road, Haidian District, Beijing		Logo of the company


9. Fabrication and characterization of electrorheological fluids (Tang Hongzhe)

Disciplin / General field Material/Material Science		Project number 09
Project title Fabrication and characterization of electrorheological fluids		
Project description <p>Electrorheological fluid is made of dielectric particles scaled in submicro-nanometer and insulation liquid. It can be used in electromechanical self adapting control. Unknown of their mechanics and lack of shear stress, this kind of smart material cannot be used widely in mechanical industry. Proposed of the mechanics research, the study are focused on the particles hierarchically structure, Such as stick, lamella and needle-like assembled on different size (sub-micro/nanometer). The charges which were polarized in the electrical field have concentrated at certain position of particles surface, so that these charges can be used efficaciously and the shear yield stress will be increased. By means of the optimum hierarchically structure combination, the high performance electrorheological fluid can be fabricated. With the characterization research, such as particles pattern, arrangement structure, surface/core dielectric properties and interface structure, etc., so that the electrorheological fluid can be widely used in different domains like aviation, noise control, automobile engineering, hydraulic engineering, etc.</p> <p>The purposes of this work :</p> <ol style="list-style-type: none"> 1. Use Maxwell Ansys software to choose the properties to calculate the shear stress. 2. Study the mechanics of electrorheological fluids, fabricate a device which can easily measure the yield stress. 3. Improve the electric source in laboratory, so that it can be used to measure the yield stress. 4. Try to find or fabricate a material, which particles can be fast polarized and provide high field stress on their surface. 5. If time enough, try to fabricate hierarchically structure on particles. 		
Contact person in the client company Tang Hongzhe	Project coach Tang Hongzhe 唐宏哲	Scientific referent (to be completed by ECPk) Tang Hongzhe
Client company ECPk		Logo of the company

10. Affect and Depression Recognition via Combining Facial, Visual and Audio Modalities (Huang Di)

Disciplin / General field Computer Science - Pattern Recognition, Computer Vision, and Image Processing.		Project number 10
Project title Affect and Depression Recognition via Combining Facial, Visual and Audio Modalities		
Project description <p>The democratization of digital cameras leads to a proliferation of video data all around us. Content-based access greatly facilitates navigation in huge video storage, and indexing and retrieving the large quantities of video data is an extremely challenging problem and has received increasing attention from both industry and academia.</p> <p>The issues of interest to users would cover not only the "objective" content of video data, but also their "emotional" content, which determines their potential impact. Compared with the studies on the former, the ones on the latter appear more recently and less progress has been made. However, many potential applications of such a technology are conceivable. One can for instance mention the video browser of YouTube allowing to search videos according to their emotional impact (sad videos, funny videos, terrible videos, ...), a tool allowing content designers to predict the impact of videos on users, or a tool that could be useful for parental control systems by detecting specific scenes, e.g. violence, in videos, either to tag the entire video as inappropriate, or to remove these scenes to make the video available to the public.</p> <p>The goal of this project is thus to move us a step closer in the generation of "intelligent" computers through providing them with the ability to automatically and comprehensively understand affect and depression concepts conveyed in videos by combining multiple clues achieved both in the visual and audio channels. Specifically, it aims at exploring, developing and experimenting new methods, techniques and tools to index and classify video data according to their affect and depression concepts, including the ones related to expressions of the faces detected in videos (especially the fear and disgust expression), to visual perception of the scenes (e.g. dark, fast moving, etc.), and to audio events such as applause, yelling, explosions or laughs. To sum up, multimodal video analysis is required based on visual and audio channels, as well as their efficient combination.</p>		
Contact person in the client company	Project coach Huang Di 黄迪	Scientific referent (to be completed by ECPk)
Client company School of Computer Science and Engineering		Logo of the company

11. Bionic giant cuttlefish for space debris catching (Zhan Qiang)

Disciplin / General field Bionic Robotics		Project number 11
Project title Bionic giant cuttlefish for space debris catching		
<div>Project description</div> <p>With the launching of space equipments, LEO has accumulated too much space debris which is a very dangerous threat to those working orbiters. How to remove those space bebris from LEO has attracted much interest of many countries and space agencies.</p> <p>In this project, regarding the Cubesat of Swiss Space Center as the target space debris we will design a space debris removing robot that mimics the tentacles of giant cuttlefish, and an experimental system should be implemented to realize the autonomous target catching aided by vision. The main tasks include:</p> <ul style="list-style-type: none">• Design a solution for the project• Mechanical design for the solution• Control hardware and software design for the solution• Develop a simulation environment for the simulation of the solution• Target detecting with vision• Prototype realization and experiments <p>Required skills:</p> <p>Some bakkground in one or more of the following areas is desired: robotics, computer vision, control sytems, signal processing, embedded system programming, mechanical design, mechanism simulation.</p>		
Contact person in the client company Yin Zhang	Project coach Zhan Qiang 战强	Scientific referent (to be completed by ECPk)
Client company School of Mechanical Engineering and Automation New Main Building		Logo of the company 

12. Fault tolerant control and reliability assessment of flight control system
(Wang Shaoping)

Disciplin / General field Mechatronic Engineering / Fault tolerant control and Fault diagnosis of aircraft		Project number 12
Project title Fault tolerant control and reliability assessment of flight control system		
Project description Directing to the dissimilar redundant actuation structure, this project focuses on the fault tolerant controller design, fault tolerant strategy generation and reliability evaluation for big flight control system based on hydraulic actuator (HA)/ Electro-hydraulic actuator (EHA).		
Contact person in the client company	Project coach Wang Shaoping 王少萍	Scientific referent (to be completed by ECPk)
Client company School of Automation Science and Electrical Engineering, Beihang University		Logo of the company

13. Prediction of Fatigue residual life of aluminum alloy (Zhang Zheng)

Disciplin / General field Fatigue, fracture and failure analysis		Project number 13
Project title Prediction of Fatigue residual life of aluminum alloy		
Project description Aluminum alloy will damage in service. The characterization of microstructure damage will be researched. The fatigue experiments under different loads will carry on with the damaged samples. The methods of residual life prediction will be established.		
Contact person in the client company Fu Chunjuan	Project coach Zhang Zheng 张峥	Scientific referent (to be completed by ECPk)
Client company School of Materials Science and Engineering, Building 4		Logo of the company

14. Deep Learning Architectures for Sentimental Analysis (Rong Wenge)

Disciplin / General field Computer Science		Project number 14
Project title Deep Learning Architectures for Sentimental Analysis		
Project description <p>With the proliferation of social network based services, a huge number of information has been accumulated on blogs, tweets or other social media expressing people's opinion and emotion. How to efficiently extract polarity orientation from these statements has become an essential challenge. As an important mechanism to study document's polarity, sentiment analysis has achieved increasing popularity among scientific and industrial researches and has been widely used to predict people's attitude in different domains.</p> <p>To better analyse sentimental polarity of online information, a lot of approaches have been proposed in the literature and can be roughly divided into two categories, i.e., linguistics oriented methods and machine learning oriented methods. Compared with linguistics methods which mainly employ individual word's pre-defined polarity scores to predict the document's overall polarity, machine learning based approaches mainly employ learning model and consider sentimental analysis as a binary classification task.</p> <p>In the machine learning oriented approaches, there are normally two main important tasks, i.e., how to efficiently represent the documents, and how to design a effective learning model. As to the document representation, traditional BoW has been widely employed due to its simpleness and robustness. However, BoW based approaches will suffer several problems such as difficulty in obtaining syntactic and semantic information of the words. To overcome the syntactic deficiency, several approaches have been proposed to employ parse trees or dependency tree for the syntactic structure analysis..</p> <p>In the process of developing sophisticated models, a lot of efforts have been devoted e.g., Maximum Entropy, Naive Bayes, SVM, and have been proven success in sentimental analysis. Recently, with the popularity of deep learning concept, several deep learning architectures have also been proposed in the literature, e.g., auto-encoder, recursive neural network and long short term memory network. These kind of methods tried to integrate the features extractor inherently and learn representations of profound complexity to undertake the complicated natural language processing tasks.</p> <p>In this research, we will study different deep architectures for sentimental analysis and try to empirically evaluate different approaches. Furthermore, it is also expected from this project we will design some enhanced deep architecture and tested them on public available testsets.</p>		
Contact person in the client company Rong Wenge	Project coach Rong Wenge 荣文戈	Scientific referent (to be completed by ECPk)
Client company School of Computer Science and Engineering, Beihang University		Logo of the company

15. A simulation platform for implementing and verifying the on-line monitoring and the air-land health management system of the aircraft (Yu Jinsong)

Disciplin / General field Automation / Intelligent diagnosis and health management		Project number 15
Project title A simulation platform for implementing and verifying the on-line monitoring and the air-land health management system of the aircraft		
Project description <p>The prognostic and health management system gives aircrafts the ability to monitor their systems and parts and to interactively troubleshoot issues while the aircraft is in flight. It becomes quite an important part in aircraft design and operation. This project takes the requirements of our national big plane as the backgroud, utilize the Boeing's airplane health management system as a reference, aims to develop a simulation platform to implement and verify the on-line monitoring and the health management of onboard systems, and tries to explore approaches and approach implementations for online diagnosis, prognosis and finally the support of maintenance decisions.</p> <p>This project will help students to be familiar with computer programming in C++ or C#, SQL server, computer network programming, Android or IOS – based app development, etc. Moreover, students will gain theoretical background in probabilistic graph models, optimization theory, data fussion methods, and etc.</p> <p>It is expected in this project that the final simulation platform is able to model the aircraft faults and troubles, to monitor the aircraft health status, to identify faults, to predict failures, and to provide maintenance suggestions. The overall functions of this simulation platform is distributed in computer network and enriched by smart terminals.</p>		
Contact person in the client company Yu Jinsong	Project coach Yu Jinsong 于劲松	Scientific referent (to be completed by ECPk)
Client company School of Automation and Electrical Engineering, E902 New Main Building		Logo of the company


16. Research on quantum inference model (Shang Tao)

Disciplin / General field Communication and information system		Project number 16
Project title Research on quantum inference model		
Project description <p>Until now quantum information and quantum computing have developed very quickly. With the implementation of micro quantum chip, quantum computer becomes more and more feasible in the near future, so the design of new computing model based on quantum computer becomes more important. Inference is an important direction of artificial intelligence. Compared with classical inference model, quantum inference model is still open. Therefore our objective is to design quantum inference model and related method. Such achievements will provide fundamental theory of quantum inference model and promote the development of artificial intelligence.</p>		
Contact person in the client company	Project coach Shang Tao 尚涛	Scientific referent (<i>to be completed by ECPk</i>)
Client company School of Electronic & Information Engineering F608, New building		Logo of the company


17. Research on multidimensional & multivariant data visualization techniques of large commercial aircraft (Luo Mingqiang)

Disciplin / General field Aircraft Design		Project number 17
Project title Research on multidimensional & multivariant data visualization techniques of large commercial aircraft		
Project description <p>Massive data is generated during the conceptual design process of large commercial aircrafts, upon which requirements are given respectively by engineers and managers for data application. On this basis, this project aims to determine the dimensions in which data is organized and the presentation forms of the design data, and to explore visualization techniques based on advanced data display hardware. Finally, a prototype of large-scale data visualization system is to be built for verification and practical testing.</p>		
Contact person in the client company Luo Mingqiang	Project coach Luo Mingqiang 罗明强	Scientific referent <i>(to be completed by ECPk)</i>
Client company School of Aeronautical Science and Engineering No. 37 XueYuan Road, Haidian District		Logo of the company

18. Smart Learning : Learning Styles Recognition Based on Data Mining (Yin Chuantao)

Disciplin / General field Computer Science		Project number 18
Project title Smart Learning : Learning Styles Recognition Based on Data Mining		
Project description <p>Learning style is the natural pattern of thinking, perceiving and problem solving when people learn something. Being clear of one's learning style could help individual to find the appropriate and effective approach to learn. If computer systems can recognize people's learning style automatically, learning systems (like MOOC, Coursera, 163 open courses, etc...) can offer people more personalized courses and teaching methods, thus to realize smart learning in the future.</p> <p>Individual learners have different learning styles. The first thing is to build models for learning style. An example of learning style model is proposed by Felder & Silverman's: Global/Sequential; Visual/ Auditory; Sensory/Intuitive; Active/Reflective. People's learning style can be reflected and recognized by mining people's data (SNS, pedagogical data, learning behaviors, etc.)</p> <p>This subject is to propose learning style models and design methods to recognize people's learning styles by data mining. Three main issues should be concerned:</p> <ol style="list-style-type: none"> 1. build learning style models 2. recognize people's learning style from data 3. build a system that can generate people's learning styles. 		
Contact person in the client company Yin Chuantao Associate Professor chuantao.yin@buaa.edu.cn	Project coach Yin Chuantao 殷传涛	Scientific referent (to be completed by ECPk)
Client company Ecole Centrale de Pekin Beihang University 37 Xueyuan Rd, Haidian Dist 100191, Beijing		Logo of the company 

19. Embedded picture display system based on MRAM (Zhao Weisheng)

Disciplin / General field Electronics, Information		Project number 19
Project title Embedded picture display system based on MRAM		
Project description <p>In 1980s, several great scientists came up with a totally new subject- the Spintronics. In the past 30 years, the Spintronics has greatly improved the life of human by inventing new applications. MRAM(magnetic random access memory) is one of these great applications. Compared with the traditional memory, MRAM possess some unique advantages: non-volatility, high read and write speed, etc. So the goal of this project is to demonstrate the advantages of MRAM by doing some comparisons with the traditional memories, like SRAM, Flash Memory, etc. We finally expect an embedded picture display system based on MRAM, allowing a visible demonstration with satisfying performance.</p>		
Contact person in the client company Zheng Zhenyi	Project coach Zhao Weisheng 赵巍胜 Zhang Yue 张悦	Scientific referent (to be completed by ECPk)
Client company Spintronics Interdisciplinary Center, School of Electronic and Information Engineering, Beihang University 37, Xueyuan Road, Haidian District, Beijing		Logo of the company 

20. Bionic construction of new oil / water separation material (Liu Kesong)

Disciplin / General field Biomimetic material science		Project number 20
Project title Bionic construction of new oil / water separation material		
Project description <p>In recent years, the frequent occurrence of oil spills and the discharge of oily waste water to the ecological environment has brought tremendous damage. Environmental pollution has become a major strategic issues of common concern in the world. Nature is a variety of human technology, engineering, and the source of major inventions. Inspired by the biological materials with ultra - invasive characteristics, and combined with the work in the field of biomimetic materials, a new type of oil - water separation materials was studied. By revealing the relationship between the surface microstructure and the special properties of the biological material, it can provide theoretical basis for designing and synthesizing high performance intelligent response and oil / water separation materials. By using physical or chemical method, the ultra wetting property of material surface and its potential in the field (electric, light, heat, pH value) are tested. The oil spill accident and the discharge of oily wastewater from industrial wastewater have brought great destruction to the ecological environment, and environmental pollution has become a major strategic issue of global common concern.</p>		
Contact person in the client company	Project coach Liu Kesong 刘克松	Scientific referent (to be completed by ECPk)
Client company School of Chemistry and Environment		Logo of the company