No	Research Title	Abstract (no more than 100 words)	No. of Students needed	Principal Applicant	Dept.	Other Applicants, if any
1	**Typologies of the contemporary heritage conservation practice in rural villages of China**	This proposed research project will focus on the conservation practice on village level in China. Vernacular architecture is the main body for the traditional built environment in China, however it is facing the tragic deterioration within the rapid urbanization process in China. The conservation of rural heritage have been considered as an effective method to revitalize the rural villages. There are different approaches of village conservations have been undertaken in China recently. Architects, artists, historian, NGOs, local villagers and head, all these kinds of internal and external stakeholders and other efforts have been involved in these practices. This research will try to identify and map the different typologies of the contemporary heritage conservation practices in China, which will be a data foundation for the further research.	3	Yiping Dong	Architecture	
2	**Housing Density, Investigating three dimensional development.**	Accelerating urban development has been one of the key strategic plans of China in increasing its economic development. This strategy has worked well as a development tool but has also driven a market for monotonous, vertical, repeated- tower arrangements for housing. These towers are essentially two dimensional. The exploitation of the third dimension for the required increase of density is very low. At the same time, the acceleration of construction of housing for urban population has eroded the agricultural land use in the area of Suzhou to about 1.5% while the need for growth has not subsided. This conflict between the need to contain cities to their current footprint and also increase housing growth, could be resolved by increasing the density of housing. To implement this without touching the green and planted areas of Suzhou Industrial Park the exploitation of the third dimension has to increase. The project will examine two case studies of monotonous tower housing development and will speculate on the increase of density in these developments, either with the addition of new building mass, or the creation of new, increased density housing developments, in the same sites. The project will employ architectural computational techniques to investigate the qualitative and quantitative effects the increase of density will have to the quality of life of residents.	2	Theodoros Dounas	Architecture	

3	**Instrumentation and testing of UHPFRC composite slab containing recycled aggregates.**	Ultra-high performance fibre reinforced concrete (UHPFRC) achieves high strength and ductility. However, due to the high cement usage and the inclusion of micro-fibres, the material cost is much higher than conventional solutions. By adding recycled aggregates (RA) and use it with normal strength concrete, the material cost can be reduced. UHPFRC slab will be tested in the structure's laboratory to exam its structural behaviour. Besides the testing itself, this project also includes the development of the instrumentations, such as installation of various sensors and creation of data acquisition program using Labview® software. Research	2	Jun Xia	Civil Engneering	
4	**Repair and strengthening of Reinforced concrete beams with the use of Textile Reinforced mortars(TRM's)**	A total of seven reinforced concrete beams divided into two groups are going to be repaired and subsequently strengthened with the use of Textile Reinforced Mortars (TRM's). All beams prior to strengthening have had been loaded up to failure. Three parameters will be considered, namely the increase both of the flexural and the shear strength of the beams, the number of TRM layers and the type of the anchorage system. All beams will be repaired with the use of high strength mortars and epoxy resin injections. One additional beam will be tested without strengthening, as a control specimen.	1	Theofanis Krevaikas	Civil Engneering	
5	**Textile reinforced mortar as a strengthening composite for reinforced concrete structures**	In recent years, fibre reinforced polymer (FRP) has successfully been used to repair and strengthen deficient reinforced concrete structures. Typically, FRP utilises a fabric permeated in a polymer matrix before being applied on the concrete surface. However, depending on the polymer matrix utilised and the environmental condition, the durability of the FRP can be undermined. Unlike FRP, textile reinforced mortar (TRM) utilises larger mesh textile fabrics and cement mortar as the binding material. Although TRM is more resistant to environmental conditions, research in this area is still lacking. Hence, this project proposes to investigate the performance of TRM as a strengthening composite. Particularly, the use of basalt fibre fabric will be used as reinforcement since basalt fibre offers better cost to performance benefits compared to other fibres such as Carbon or Glass.	3	Charles Kwet Shin Loo Chin Moy	Civil Engneering	

6	**An exploration of collaborative community planning in SIP**	Since 1994, Suzhou Industrial Park (SIP) has relocated about 170,000 original rural population (data from 6th National Census). By 2015, there are 37 resettled community of 95 resettlement neighbourhoods, which accommodate 50,000 resettled households. Recent research found migrant workers have become the dominant resident group of these neighbourhoos, about four times of local population (findings from XJTLU RDF 2011-03-11). From 2012 to 2015, SIP has invested 1.78 billion Yuan to upgrade these deteriorating neighbourhoods. However, to which extent this heavy investment has met the local needs? More importantly, can local enterprises contribute to local neighbourhoods where the primary locations of their employees are? Any social obligation for local entrepreneurs in local community development?	3	Ying Chang	Urban Planning and Design	Xuanwei Cao
7	**Discursive imagery of urban residency: A study of policy and media texts**	Urbanisation is a dominant theme in what is written and spoken about contemporary China. How do discussions about Chinese cities vary in terms of content, style and setting along with the introduction of new policies, and further, with the responses to such policies in mass media? Focusing on publicly available policy and media texts, this project is an attempt to compare representations of cities with a focus upon residency. How, for instance, is the status of being a local resident, migrant worker, or newly-registered resident portrayed in these texts at the same time as policies are drafted, launched and revised?	3	Paul Cheung	English Culture and Communication	Dr Ying Chang, UPD
8	**Performance management frameworks in higher education in multicultural contexts: cultural dimensions models and behavioral preferences towards the design of performance indicators**	A large number of institutions in higher education sector have designed performance measures and monitoring systems. However, there is a large diversity in those measures and great variability in the way those measures are used to monitor performance. Performance measures can differ greatly on a number of attributes like long-term versus short-term orientation of indicators, future versus external orientation, or linking indicators to individual or team performance. By demonstrating that cultural orientations can determine the attitudes of participants in performance management in the higher education sector, the research will provide useful guidance to administrators of those institutions in the higher education sector worldwide in successfully designing and implementing performance management systems.	2	JeanYves LeCorre	International Business School Suzhou	

9	**How Chinese Innovative Enterprises are digitalizing their value chain**	Digitalization of the value chain is a trend in most of the business industries and it is becoming an area of interest for researchers and practitioners. Chinese enterprises are innovating a lot trying to adopt the digital technologies implementing new business models. The project aims to analyze a few real cases (5/6) to determine if there are common factors in this process and also it is possible to deduct a prescriptive model from these cases. The project combines an academic research (digitalization, business models, value chain) with a field activity to study and analyze the selected case studies.	3	Roberto Dona	International Business School Suzhou	
10	**A comparative study of expatriate cross-cultural adjustment in China**	International assignments can be a challenge for expatriates when they work in different social, economic, cultural, and institutional contexts compared to their home countries. Expatriates may experience anxiety, stress, and face uncertainties when conducting international assignments in a new environment. The international human resource literature highlights the importance of expatriate cross-cultural adjustment, which helps expatriates reduce the level of uncertainties and adjust to the local environment. This project aims to explore expatriate cross-cultural adjustment issues when they conduct international assignments in China.	3	Ying Guo	International Business School Suzhou	
11	**Visualisation and pollution prediction for a remote monitoring network of water quality**	Water quality is affected by complex anthropogenic activities as well as natural environmental factors. Remote sensor-based networks can provide effective monitoring of water quality and predict potation events. The cost of such systems can be very high whilst computer simulation and visualisation can be utilised in the deployment of the remote monitoring network and data analysis before a real system is built. This project investigates computer simulations and visualisation for the analysis of water quality data. Two modules will be built for an integrated system: 1) visualisation of a remote monitoring network of water quality, and 2) prediction and modelling of water pollution events.	2	Yong Yue	Computer Science and Software Engineering	

12	**Development of next generation input devices for enhanced gameplay in virtual reality handheld systems**	Gaming technologies is a new research and teaching direction within CSSE. A number of students have expressed strong interest in projects in this area. This project is, on the one hand, in response to this growing interest and, on the other, because of the growing emphasis in research and industry about virtual reality and games. This project links games and virtual reality (VR) devices, the next frontier of entertainment technologies. Input devices are the most challenging aspects of VR devices, especially for enhanced gameplay. The focus of this project is to design and develop the next generation of input devices for enhanced gameplay. This project is established in collaboration with a local computer games company.	2	Hai-Ning Liang	Computer Science and Software Engineering	
13	**Design and Development of Data Mining Methodology and Effective Algorithms for Audit Process**	Data analysis technologies are computer programs/software the auditor uses as part of the audit to process data of audit significance to improve the effectiveness and efficiency of the audit process. A number of specific analytical techniques (e.g. digital analysis using Benford's Law, duplicate testing, gap testing, etc) have been proven useful in analyzing data for audit purposes. As data size growth has continued to outpace the growth of memory capacities, more efficient and effective management data analysis techniques are needed. On the other hand, Data Mining is a multidisciplinary field, drawing work from areas including database technology, machine learning, statistics, pattern recognition, information retrieval, neural networks, knowledge-based systems, artificial intelligence, high-performance computing, and data visualization. This project investigates the applicability of Data Mining methodology and algorithms to audit process.	1	Ka Lok Man	Computer Science and Software Engineering	JeanYves LeCorre (IBSS)
14	**An ethnographic evaluation of mobile fisheye maps**	This project will evaluate a new mobile map interface using a fish-eye lens type distortion effect (see figure 1). The interface is designed to minimize the requirement for user interaction by distorting the display to give more space to the geographic area around the user and less to more distant areas. This reduces the need for the user to zoom in and out of their map and makes it easier to use (especially in situations where the user might have a hand already occupied or be otherwise distracted). The objective of this project is to finalize the interface and conduct a full ethnographic evaluation to properly quantify the benefits of the interface in practical situations.	2	Paul Craig	Computer Science and Software Engineering	Xin Huang Chris Trathen

15	**Scene recognition by Deep Convolutional Neural Network**	Humans have a remarkable ability to categorize complex scenes very accurately and rapidly. This ability is important for the inference of situations and to navigate the environment [1]. Computer scene recognition and understanding aims at imitating this human ability by using algorithms to analyze and subsequently understand input images. A major task of scene understanding is how to distinguish objects in a scene, similar to the way people understand them. This is a fundamental problem in computer vision, and plays a crucial role on the success of numerous application areas. For instance, image retrieval, robot navigation and 3D reconstruction. This project will enable scene recognition based on the deep learning model of Convolutional Neural Network.	2	Wenjin Lu	Computer Science and Software Engineering	
16	**Hand Detection by Deep Convolutional Neural Network**	Improvement of road safety is one of the most important goals for Intelligent Transportation, which becomes increasingly more urgent with the expected increase in the number of personal vehicles. Most of the traffic accidents are, at least in part, due to human error. For example, it has been confirmed that driving while talking on cell phones increases risks of injury, property damage or crashes by fourfold [1]. As the position and action of a person's hands provide critical information about the state of attentiveness of the driver, it is of great significance to construct robust, vision-based tools for studying drivers' hand motions under realistic driving conditions. Hand detection is not only important to vision-based driver assistance systems, but also instrumental to many other computer vision applications, for example, human-machine interaction [2].	2	Bailing Zhang	Computer Science and Software Engineering	
17	**Traffic Detection Resilient Virtual Private Networks**	Virtual private networks (VPNs) provide a secure method for method for users to communicate on the internet without allowing intermediates to eavesdrop or modify communications. VPNs, however, have traditionally been designed for corporate environments, for example to allow secure communication between two branches of a company office. Because of this, while they are secure, they are detectable, meaning a router that is examining network traffic can determine that network stream is a VPN connection. Once detected, these types of streams can be blocked by simply discarding the packets. The goal of this work is to develop a VPN protocol that is both secure and undetectable.	2	Charles Fleming	Computer Science and Software Engineering	

18	**The effects of various visualisations of real time passenger information on public transport travel behaviour**	Mobile real time passenger information (RTPI) systems are becoming ubiquitous in public transport. The transport community has studied them extensively from various perspectives, and a plethora of studies have explored the effects they have on passengers. The passenger reactions and attitudes towards the RTPI systems are generally very positive. Numerous studies have been conducted on various RTPI systems (mobile, at stop, web, etc.), and almost all report that they significantly affect the passengers. Unfortunately, the literature does not usually provide sufficiently complete information about methods employed in studies conducted to allow an overall valid investigative framework on how to improve the passenger experience. Previous research from the author (Papangelis 2016a, 2016b) has illustrated that different visualization can potentially affect in different ways the travel behaviour. As such the aim of this project is to explore the interplay between visualisations of intelligent public transport real time information, travel behaviour and passenger experience.	2	K. Papangelis	Computer Science and Software Engineering	
19	**Development of Electronic Gaseous Formaldehyde Detection & Monitoring Systems**	Volatile organic compounds (VOCs) present indoors or in automobiles can be a health hazard. Formaldehyde is of particular health concern among VOCs because of its wide use for the production of various materials such as paints and adhesives commonly used in furniture and building manufacturing. Exposure to even low concentrations of gaseous formaldehyde can cause headaches, irritations of eyes and other symptoms. This project explores the development of electronic detection and monitoring of gaseous formaldehyde. Polymer material coated on glass by screen printing will be used for formaldehyde gas sensing. The electrical properties of the sensing material will be measured and detection circuits as well as monitoring systems can also be developed.	3	Sang Lam	Electrical and Electronic Engineering	Kim K. T. Lau (Chemistry)

20	**Tube antennas for small quadrotor UAVs**	Quad-rotor UAVs are common as toys and are used for professional photography. These UAVs can fly for 10 to 40 minutes and could be used for building and construction site inspection. At present, precision flying around buildings is prone to accidents because the operator is typically 30 to 50 metres from the UAV. There are no sensors to measure distance to wall, and the ultrasonic sensors used to measure altitude can be adversely affected by rain. The tube-arms of these UAVs are approximately the same size as 10GHz and 24GHz waveguide tube radar antennas, which are made by cutting slots in metal tubes. Radar sensors could potentially be added to quad-rotor UAVs without adding weight and decreasing flight time. The objective of this project is to investigate the strength of aluminum tubes that have had holes cut in them to form radar antennas.	1	Derek Gray	Electrical and Electronic Engineering	Ominda Nanayakkara
21	**Modeling and Control of Solid State Transformer in the Smart Grid Power System**	Solid state transformer (SST) is the power electronic transformer or intelligent universal transformer which can replace the traditional 50/60 Hz power transformer. It has caught much attention especially in the distributed power system. Fig. 1 shows the basic Dual-Active-Bridge (DAB) based topology of SST.DAB converters are usually controlled by the conventional phase-shift (CPS) technique. However, CPS might result in low conversion efficiency due to the loss of the soft-switching capability and the produce of high reactive power and circulating current. Methods to improve the efficiency of the converter over the whole operating range are the main research subject.	3	Huiqing Wen	Electrical and Electronic Engineering	
22	**Nature-inspired Molecular Diffusion Communication Test-bed**	Chemical molecules have been shown as an effective alternative for carrying information across a wide range of propagation environments. However, the stochastic motion of molecules in gas- and fluid-mediums means the channel noise and capacity is poorly understood. The project aims to build a functional communications test-bed that allows data to be reliably communicated using the diffusion of modulated molecules over air. It is envisaged that the diffusion process can effectively propagate through complex structures and subterranean terrains, with extremely low transmission energy.	2	Siyi Wang	Electrical and Electronic Engineering	

23	**Coined Scaffold Fabrication for 3D Cell Culture Using Near-field Electrohydrodynamic Jetting**	To fabricate micro/nano structures for soft tissue repair and 3D cell culture in regenerative medicine, tremendous efforts have been made to improve fiber based scaffold fabrication. Traditional fiber fabrication methods, such as fused deposition modelling method and extrusion method, are only capable to produce low resolution and large diameter ranging from 180-1000 µm. In our research, we aim to use novel near-field electrospinning (EHD-jetting) process to revolutionize the current scaffold fabrication process by creating coiled scaffold structure. The EHD-jetting system presents a significant advantage of patterning and orientating fibers in a controllable manner. We can adopt this methods to fabricate self-similar coiled structures that are used in stretchable structures, which will increase the stretchability significantly, provide larger tensile force, larger contact area compared with the grid scaffold structure at the same size. That would be useful to improve the current soft tissue design with improved mechanical strength and prompt cell-scaffold interaction.	2	Jie Sun	Industrial Design	
24	**Language Learner Autonomy in EAP programs**	Autonomous learners are usually described as those are the “decision makers” in their learning activities. They generally demonstrate stronger motivation and tend to engage more actively in classrooms. Learner autonomy is particularly crucial in language learning, as it is related with effective communication, a fundamental component of language use. The aim of the current project is to examine how autonomous XJTLU students are in their EAP studies. A survey research will be conducted to look into EAP learning behaviors of Year 1 and Year 2 students and explore potential pedagogical implications.	3	Ling Xia	Language Centre	
25	**Algorithmic Portfolio Management (Trading Robot) on Cryptocurrencies**	A cryptocurrency (CC) is a digital currency using cryptography to secure transitions and control creation of new units, with Bitcoin being the most well-known example in markets (https://en.wikipedia.org/wiki/Cryptocurrency). There are more than 200 CCs available for trading, most of which have very volatile values. The aim of the project is to develop a profitable algorithm automatically managing a portfolio consisting of a dynamic choice of several CCs, and performing the actual trading without human intervention. The project requires some programming experience.	3	Jinjun Liang	Mathematics	

26	**Raman scattering spectrum measurements of different types of InPBi alloys**	Raman scattering spectrum is a technique used broadly in fields like biology, chemistry, and material sciences, for measuring the vibrating behaviors of lattice (a large group of small atoms or molecules), large molecules in a chemical compound or biological sample. Indium Phosphor Bismuth (InPBi) is one of the most promising narrow band gap semiconductors for industry with applications in infrared light devices and detectors. In this project, Raman spectrum of InPBi alloys with different concentrations of Bi component will be measured and compared for investigating the strain and crystal quality.	1	Changcheng Zheng	Mathematics	
27	**The profinite completion of Z and primes**	The set of integers Z is usually regarded as a discrete subset of the real line. Much less known is the fact that Z can be also considered as a dense subset of its profinite completion $\hat{Z}$ (i.e., every point in $\hat{Z}$ can be approximated by integers). The goal of the project is to study the subset of elements in $\hat{Z}$ which can be obtained as limits of sequences consisting only of prime numbers and investigate what new information on primes can be discovered by this approach (which seems to have never been systematically developed before).	2	Ignazio Longhi	Mathematics	
28	**Feynman-Kac Formula and Valuation of Options**	The Black-Scholes-Merton model for valuation of options has been widely used by theoretical analyst and financial practitioners. In this project we will review the setting-up of this model, derive the Black-Scholes-Merton formula via Feynman-Kac formula, and perform simulations by Monte Carlo methods. Also we will give a survey of other approaches for the Black-Scholes-Merton formula, including the original ideas in the papers of Black, Scholes, and Merton; the approximation of binomial tree model; the method of stochastic differential equations and equivalent martingale measure; the delta hedging and partial differential equation method with transform to heat equation, etc. Further, if possible the method of backward stochastic differential equation will be studied.	1	Fajin Wei	Mathematics	

29	**Antibiotic resistance in environmental mycobacteria isolated in the Suzhou area.**	In China, antibiotic use in both hospitals and agriculture is high. This practice puts evolutionary pressure on bacteria to become resistant against such drugs when waste is not properly treated before disposal into the surrounding environment. This could lead to enhanced antibiotic resistance in bacteria that can cause disease in humans or in animals that are meant for human consumption, as harmless environmental bacteria have the capacity to exchange antibiotic resistance traits via horizontal gene transfer. In this project, environmental mycobacteria species will be isolated from sites near hospitals and farms and examined for their sensitivity towards several different antibiotics.	2	Boris Tefsen	Biological Science	
30	**Surface enhanced Raman scattering on titanate nanotubes**	Surface enhanced Raman scattering (SERS) is a powerful analytical technique for chemical sensing of trace amounts of analyte, providing in-depth structural information. Once the molecule has been analysed, in order to be reused, the surface molecule must be removed. Self-cleaning under UV or visible light is a promising method for this. Continuing on from last years successful SURF project (G. Dawson, Oral presentation, WCSM 2016 Singapore) we aim to incorporate photocatalytically active titanate nanotubes, with high surface area, and silver nanoparticles, which should render it SERS active, thus creating a self-regenerating SERS active nanocomposite material.	1	Graham Dawson	Chemistry	
31	**A new approach to prepare BDT based polymer**	Organic semiconductor based photovoltaic technology has been considered as the next generation renewable energy technology for the advantages of low cost, light weight, and easy of large area fabrication. The optical active layer in organic solar cell is composed of two types of organic semiconductor: donor materials and acceptor materials. Most of the donor materials are conjugated polymer and one of the common preparation is via metal catalyzed cross-coupling reaction. Trace amount of metal catalyst might still presents even after excessive purification and this may have a negative effect on the performance of final solar cell. To address to this issue, we propose a new approach to prepare the conjugated polymers via condensation reaction which is catalyzed by organic base. We hope to find an optimal polymerization condition which can lead to conjugated polymers with molecular weight higher than 100 KDa thus better stability.	2	Yi Lin	Chemistry	

32	**Length dependence of molecular wires on graphene-gold hybrid single molecule junctions**	By wiring a single molecule to two electrodes, direct measurement of charge transport through the molecule can be made with a scanning tunneling microscope (STM). The STM measures the current which flows through the junction in the single molecule analogue of an ammeter. This offers an exciting opportunity to understand charge transfer and towards the goal of building electronic devices using single molecules. The aim of this project is to measure single molecules conductance by the use of graphene contact other than gold for single molecule electronic devices with different length of molecular wires.	2	Li Yang	Chemistry	Cezhou Zhao (EEE)
33	**Lithium-doped COF impregnated with lithium-coated fullerenes for methane storage**	Natural gas is a potential vehicular fuel attracting more and more research interest. Compared to conventional petroleum-based gasoline or diesel fuel, Natural gas is cheaper and cleaner. The only bottle neck of the use of natural gas for on-board application is its storage. Conventional compressed natural gas (CNG) is cost-intensive as well as is associated with safety concern. Adsorption natural gas (ANG) is one approach to store natural gas under ambient conditions. In this project, we use computational modelling method to study and develop new materials for ANG application.	1	Lifeng Ding	Chemistry	
34	**How Sustainable is Our Campus? The Gap, the Goal, and toward Cogent Design of a Sustainable University**	Many top universities and organisations internationally are responding to increasing social and economic pressures to shape a sustainable future. This is a proposed applied research project that will support three undergraduates to help answer questions about the position of external stakeholders dealing with XJTLU, the status of XJTLU students' sustainability literacy, and opportunities and barriers that exist with respect to XJTLU's becoming a "Sustainable University". The project plan will run over 8 weeks, with four phases (external stakeholder engagement, student questionnaires, Senior Management Team consultation, and internal stakeholder engagement). The project will offer participants diverse skills acquisition benefits, and outcomes will contribute to subsequent development of a Sustainability Road Map for XJTLU.	3	Mona Wells	Environmental Science	Xuanwei Cao (IBSS)

35	**Effects of Land Use on Aquatic Biodiversity and Ecosystem Functioning**	Freshwaters are increasingly impacted by land use. However, understanding of the impact of land use change on benthic invertebrate community composition and ecosystem functioning such as leaf little breakdown is limited. This subject will examine the effects of land use change on aquatic benthic biodiversity and ecosystem functioning. We will select 6 streams with high, medium and low human influences to sample macroinvertebrates and measure a local leaf little decomposition rate. Through observing macroinvertebrate composition and leaf little breakdown rate, we can uncover the impact of land use on stream macroinvertebrate biodiversity and ecosystem functioning. This project will narrow the knowledge gap on how macroinvertebrate community and ecosystem function respond to land use change.	3	Yixin Zhang	Environmental Science	Eduardo Medina-Roldan, Bailiang Li
36	**Active contour based automatic tongue image segmentation**	For more than two thousand years, tongue inspection has been part of the routine examinations in diagnosing diseases in Traditional Chinese Medicine (TCM). Conventionally and even today, the traditional Chinese clinical doctors inspect tongue by looking carefully at the tongue to try to capture signs of diseases or status of health of human body. Developing automatic computer algorithms to aid the tongue inspection is currently a popular research area. This proposed project is one step toward automatic computer aided tongue diagnosis. This project aims at developing computer algorithms for automatic separation of tongue from tongue image. With an initial boundary obtained from a previous research, this project proposes to develop an active contour model (snake model) to further improve the tongue boundary.	2	Fei Ma	Mathematics	