



University of Nottingham
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UNNC - IUE, CAS Doctoral Training Partnership

Available PhD Topics

PhD topic 1	Anthropogenic cycles, trade, and sustainable management of materials
IUE Supervisor	Prof Wei-Qiang Chen (https://macycle.org)
UNNC Supervisor(s)	Dr Faith Chan Prof Hing Kai Chan
Short introduction & description of PhD	<p>Anthropogenic cycles, trade, and sustainable management of materials are vitally important for current and future developments in China, extensively worldwide.</p> <p>We expect to have 1-2 doctoral students working on the following aspects:</p> <p>(1) to build a database on material flows, trade, life cycle assessment of materials including chemicals, plastics, and critical metals;</p> <p>(2) to explore patterns of materials uses among countries and over time, and the risks of materials flow in the global supply chains;</p> <p>and (3) to identify priorities and policies for sustainable management of materials.</p>
Contact points	Informal inquiries may be addressed to Dr Faith Chan (Faith.Chan@nottingham.edu.cn), Prof. Hing Kai Chan (Hingkai.chan@nottingham.edu.cn) and Prof Weiqiang Chan (wqchen@iue.ac.cn), but formal applications should follow the instructions in ' How to apply ' section.
PhD topic 2	Efficient degradation of pollutants through microbial electrochemistry
IUE Supervisor	Prof Feng Zhao
UNNC Supervisor(s)	Prof Jun He
Short introduction & description of PhD	Microbes are found to play important roles in geochemical cycling of metals in environments and have considerable potential for the remediation of contaminated environments via redox reactions. This project will focus on electron transfer chain of microbial extracellular respiratory and the function of redox proteins, shuttles and electrode material on pollutants degradation. The results will provide useful insights about the application of microbial electrochemistry for the bioremediation pollutants-contaminated environments.
Contact points	Informal inquiries may be addressed to Prof Jun He (jun.he@nottingham.edu.cn) and Prof Feng ZHAO (fzhao@iue.ac.cn), but formal applications should follow the instructions in ' How to apply ' section.
PhD topic 3	High resolution and accuracy air pollution mapping using multi-source data

IUE Supervisor	Prof Yin Ren (www.iuecasforest.cn)
UNNC Supervisor(s)	Dr Nicholas Hamm
Short introduction & description of PhD	<p>Based on the weather, land use, satellite data, ground monitoring data, using spatial-temporal correlation and machine learning method to map the high resolution air pollution (e.g. PM, NO₂) distribution maps and evaluate the uncertainty of the maps.</p> <p>Along with the acceleration of global urbanization, the air pollution issues have attracted increasing attention. Concerning the mitigation measures, besides the source emission reductions, nowadays, promoting the absorption and circulation of pollutants through vegetation (e.g., trees) is also one of the main ways to deal with environmental pollution. A considerable volume of literature investigating the associations between green space and air pollution was carried out in different disciplines. Although the air regulation effect of green space received much attention, the influence mechanism among green space, air quality, and human health remain unclear.</p> <p>Studies have reported that urban vegetation would negatively affect urban residents under certain urban forms and plant configurations. The conventional wisdom deems that urban green space improves air quality by reducing gas pollution concentrations and PM, thereby reducing direct harm to human health. However, the actual impact of green space on air pollution remains uncertain. Therefore, this project plans to focus on (i) exploring the relationship between the air influences of green space and human health and (ii) optimizing the urban green space design for a healthier life.</p>
Contact points	Informal inquiries may be addressed to Dr Nicholas Hamm (nicholas.hamm@nottingham.edu.cn) and Prof Yin Ren (yren@iue.ac.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 4	Microfluidic fabrication of functional microparticles for removing heavy metal ions from waste water
IUE Supervisor	Prof. Shaohua Chen
UNNC Supervisor(s)	Dr Yong Ren
Short introduction & description of PhD	<p>The development of effective methods for low concentration heavy metal ion separation from waste water remains a challenge for industrial applications, especially the electroplating industries.</p> <p>This project aims to develop microfluidic systems for fabrication of microparticles for heavy metal ion treatment by two approaches: the microparticles will be functionalized with chelating agents and photocatalysts. We will investigate the ion capture and conversion mechanisms, and compare the treatment efficiency.</p>
Contact points	Informal inquiries may be addressed to Prof. Shaohua Chen (shchen@iue.ac.cn) and Dr. Yong Ren (yong.ren@nottingham.edu.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 5	One-Health for Antimicrobials and Resistance in the Environment
IUE Supervisor	Prof Shen YU
UNNC Supervisor(s)	Dr Meili FENG
Short introduction & description of PhD	Antimicrobials are vital to human health and food animal production but their residues in sharing environments pose high risks of pathogen resistance to both. To understand

	<p>environmental behaviours of antimicrobial residues and possible contribution to resistance will promote regulations in usage for the One-Health perspectives.</p> <p>This Ph.D. program is directed to explore source-sink patterns of antimicrobial residues in urban environments and possible contribution to resistance. The mission will identify and characterize sources and sinks of antimicrobial compounds and quantify abundance of resistance genes along both rural-urban and multi-city gradients to recognize their source-sink patterns and exposure risks.</p>
Contact points	Informal inquiries may be addressed to Prof Shen YU (syu@iue.ac.cn) and Dr Meili FENG (Meili.Feng@nottingham.edu.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 6	Remediation technology of contaminated soil with heavy metals
Supervisor	Prof Chao Cai
UNNC Supervisor(s)	Dr Yong Sun
Short introduction & description of PhD	Soil contamination with heavy metals is a serious environmental problem, and there is an urgent need to develop the remediation technology. The project will take contaminated soil with typical heavy metals, such as cadmium, lead, chromium and so on, as the target object, to explore the biogeochemical behaviour and effect of heavy metals in the soil environment, to develop efficient remediation materials, to elucidate the mechanism of interaction between the material and heavy metals, to construct a systematic and comprehensive remediation technology, which will provide scientific and technological support for soil pollution prevention and control.
Contact points	Informal inquiries may be addressed to Dr Yong Sun (Yong.Sun@nottingham.edu.cn) and Prof Chao Cai (ccai@iue.ac.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 7	Research on the pathway of carbon peak carbon neutrality for building sector
IUE Supervisor	Prof Jianyi Lin
UNNC Supervisor(s)	Dr Wu Deng
Short introduction & description of PhD	President Xi Jinping announced to achieve carbon peaks by 2030, and strive to achieve carbon neutrality by 2060 at the United Nations General Assembly on September 22, 2020. Carbon neutrality has become an important national strategy. The visions of 2030 and 2060 provide clear goals and specific timetables for the country's energy revolution aimed at energy transition. As one of the three energy-consuming sectors of industry, transportation, and buildings, the building sector is closely related to energy consumption and carbon emissions. Energy transition and carbon neutrality will inevitably have a huge impact on the development of this sector. How to achieve carbon peaking and carbon neutrality in the construction sector is not only an urgent problem faced by relevant government departments, but also a hot topic of current research.
Contact points	Informal inquiries may be addressed to Prof Jianyi Lin (jylin@iue.ac.cn) and Dr Wu Deng (wu.deng@nottingham.edu.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 8	Response of soil systems to urban development in a changing environment
IUE Supervisor	Prof Yong-Guan ZHU
UNNC Supervisor(s)	Dr Tengwen LONG

Short introduction & description of PhD	Applications are invited for a PhD scholarship in the interdisciplinary field of urban environmental health. The successful applicant will have the opportunity to carry out high-impact research in reconstructing the influence of expanding urban systems on the environment, notably on the soil biogeochemical processes in urban or peri-urban environments across different timescales, past, present, and future. Possible research topics may include but are not limit to: (1) soil pollution as a result of urban development; (2) soil-crop interactions in agriculture; (3) soil microbiomes in response to climate change and human activities.
Contact points	Informal inquiries may be addressed to Dr Tengwen Long (Tengwen.Long@nottingham.edu.cn) and Prof Yong-Guan ZHU (ygzhu@iue.ac.cn), but formal applications should follow the instructions in ' How to apply ' section.
PhD topic 9	Turning mine tailings into sustainable cementitious materials
IUE Supervisor	Prof Guangwei Yu
UNNC Supervisor(s)	Dr Bo Li
Short introduction & description of PhD	Construction industry is one of the main sources of global carbon emissions, particularly for cement production. Using less cement in concrete has therefore emerged as one of the most effective strategies to reduce the carbon emission in infrastructure construction. This project aims to turn mine tailings into eco-friendly cementitious materials as alternative to ordinary Portland cement. Several types of mine tailings will be first selected and characterized to explore their suitability as cement replacement. The treatment strategies will be subsequently proposed to enhance the properties of mine tailings. Afterwards, mix formulation of cement paste with the incorporation of treated mine tailings will be optimized. Finally, life cycle assessment of the developed sustainable cementitious materials or products will be conducted to highlight their environmental benefits.
Contact points	Informal inquiries may be addressed to Dr Bo Li (bo.li@nottingham.edu.cn) and Prof Guangwei Yu (gwyu@iue.ac.cn), but formal applications should follow the instructions in ' How to apply ' section.
PhD topic 10	Urban emerging contaminants and river ecosystem health
IUE Supervisor	Prof Yaoyang XU
UNNC Supervisor(s)	Dr Meili Feng Dr Faith Chan
Short introduction & description of PhD	<p>Urban emerging contaminants such as microplastics, antibiotics and pharmaceuticals have increasingly been recognized as an important threat to river ecosystem health. However, there is still a lack of data-supported evidence on how river ecosystem health is threatened worldwide by urban emerging contaminants. As such, we seek candidates for the DTP program to develop a systematic workflow of data mining that can be applied to quantify the pressure-state-response relationships between urban emerging contaminants and river ecosystem health across the world.</p> <p>Our research team is studying a wide range of research questions related to river ecosystem health by developing a set of meta-data tools and data products that are specified to freshwater biodiversity and emerging contaminants.</p> <p>Competitive candidates should be highly motivated. The ability to study both independently and collaboratively in a team environment is required.</p>

Contact points	Informal inquiries may be addressed to Dr Meili FENG (meili.feng@nottingham.edu.cn), Dr Faith Chan (Faith.Chan@nottingham.edu.cn) and Prof Yaoyang Xu (yxu@iue.ac.cn); but formal applications should follow the instructions in 'How to apply' section.
PhD topic 11	Urban Green Infrastructures for human health: Issues, Implications, and Optimal Solutions
IUE Supervisor	Prof Yin Ren (www.iuecasforest.cn)
UNNC Supervisor(s)	Prof Ali Cheshmehzangi
Short introduction & description of PhD	<p>Based on the high accuracy air pollution map to estimate the exposure risk and then explore the reasonable relation among the urban green infrastructures, air pollution and human health outcome.</p> <p>Along with the acceleration of global urbanization, the air pollution issues have attracted increasing attention. Concerning the mitigation measures, besides the source emission reductions, nowadays, promoting the absorption and circulation of pollutants through vegetation (e.g., trees) is also one of the main ways to deal with environmental pollution. A considerable volume of literature investigating the associations between green space and air pollution was carried out in different disciplines. Although the air regulation effect of green space received much attention, the influence mechanism among green space, air quality, and human health remain unclear.</p> <p>Studies have reported that urban vegetation would negatively affect urban residents under certain urban forms and plant configurations. The conventional wisdom deems that urban green space improves air quality by reducing gas pollution concentrations and PM, thereby reducing direct harm to human health. However, the actual impact of green space on air pollution remains uncertain. Therefore, this project plans to focus on (i) exploring the relationship between the air influences of green space and human health and (ii) optimizing the urban green space design for a healthier life.</p>
Contact points	Informal inquiries may be addressed to Prof Ali Cheshmehzangi (Ali.Cheshmehzangi@nottingham.edu.cn) and Prof Yin Ren (yren@iue.ac.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 12	Watershed flood events and urban green infrastructures
IUE Supervisor	Prof Yaoyang XU
UNNC Supervisor(s)	Dr Faith Chan Dr Meili Feng
Short introduction & description of PhD	<p>Green infrastructure is increasingly considered as a nature-based solution to address one of the urban environmental challenges associated with flood events at the watershed scale. However, there is still a lack of data-driven research to support the transformation of urban planning on green infrastructure for mitigating the environmental impacts of flood events. As such, we seek candidates for the DTP program to develop a systematic framework of flood-related data mining that can be applied to optimize urban green infrastructure.</p> <p>Our research team is studying a wide range of research questions related to urban green infrastructure by developing a set of meta-data tools and data products that are specified to urban flood events.</p>

	Competitive candidates should be highly motivated. The ability to study both independently and collaboratively in a team environment is required.
Contact points	Informal inquiries may be addressed to Dr Faith Chan (Faith.Chan@nottingham.edu.cn), Dr Meili FENG (meili.feng@nottingham.edu.cn), and Prof Yaoyang Xu (yyxu@iue.ac.cn); but formal applications should follow the instructions in ' How to apply ' section.