



**University of
Nottingham**
UK | CHINA | MALAYSIA



UNNC-IGSNRR, CAS Doctoral Training Partnership

Available PhD topics

PhD topic 1	A comparative study on the response of zonal vegetation phenology to major climatic factors in different vegetation regions in China
IGSNRR Supervisors	Prof Junhu Dai
UNNC Supervisor(s)	Dr Tengwen Long
Short introduction & description of PhD	<p>Vegetation phenology is a sensitive indicator to climate change, and is crucial for evaluation of responses of ecosystem to climate change in recent year. Unlike phenological studies in the past, which mainly discussed plant and vegetation seasonal growing changes and relations with climatic factors in temperate regions, current phenology has greatly broadened its scope for studying plant and vegetation phenophases' shifts in various biomes, such as for evergreen forests, rainforests, as well as for mountain and alpine vegetations.</p> <p>In this study, by application of multi-source data, namely ground observation network data, phenological camera data and satellite remotely sensed materials, we plan to study phenological shifts for different spatial scales. After that, we will explore the different climatic factors that affect phenological changes, and then studies the mechanism for phenological changes under background of global change.</p> <p>So based on multi-source phenological data, the project will focus on two aspects: i) divergent phenological shifts for difference biomes, and ii) the main factors that affect the above phenological shifts and the driving factors, and the influence mechanism.</p>
Contact points	Informal inquiries may be addressed to Dr Tengwen LONG (Tengwen.Long@nottingham.edu.cn) and Prof Junhu DAI (daijh@igsnr.ac.cn), but formal applications should follow the instructions in ' How to apply ' section.
PhD topic 2	Analysis of the relationship between the impact of water resources on animal husbandry in the Selenga River Basin, Mongolia
IGSNRR Supervisor	Prof. Juanle WANG
UNNC Supervisor(s)	Dr Faith CHAN
Short introduction & description of PhD	The Selenga River Basin, originating in the Khangai Mountains, is the important dominated area of animal husbandry, population, and economic development in Mongolia. Water resources, water ecology, and increasingly serious land degradation problems not only break up the original ecology of the area but also cause severe impacts on the sustainable development of animal husbandry in the Mongolia Selenge River Basin. This study will explore the relationship between water resources and water environment change, and

	<p>animal husbandry to provide the scientific foundation for the animal husbandry regulation for precision control in Selenge River Basin, Mongolia.</p> <p>Water resources are vitally important for restricting the development of animal husbandry and are also the main reasons for the livestock movement. Based on the spatiotemporal variations of water resources (including relevant indices of precipitation, available surface water, groundwater, and riparian wetland ecosystems), and animal husbandry in the Selenge River Basin of Mongolia during 2000–2020, the quantitative relationship between the complex factors of “water resources–animal husbandry change” will be estimated through multivariate statistical methods (such as the grey relational analysis and structural equation model). It clarifies the relationship, direction and magnitude of the impact of water resources and aquatic ecology on animal husbandry. Quantitatively elucidate the relationship between water resources on animal husbandry in Mongolia Selenge River Basin in 2020, to more precisely understand the role and impact of water resources inputs in animal husbandry, and to provide references and lessons for coordinating sustainable development between animal husbandry economy, water resources and water ecology.</p> <p>The water footprint theory is used for the water capacity evaluation in the Selenge River Basin. It refers to the measurement of the regional water resources carrying a capacity based on the calculation of virtual water and the interplay between human production and consumption activities and the water resource system. Water footprint theories methods according to the current conditions of the water resources and the water ecology of Selenge River Basin of Mongolia during 2000–2020. The water footprint of animal husbandry in the basin will be evaluated. Estimate the hydrological discharge capacity in the Selenge River Basin of Mongolia. The impacts of animal husbandry on water resources and water ecology will be discussed. This discussion will yield further recommendations and insights to establish a more effective and sustainable utilization of river water resources of animal husbandry in the Selenge River Basin of Mongolia.</p>
Contact points	<p>Informal inquiries may be addressed to Dr Faith Chan (Faith.Chan@nottingham.edu.cn) and Prof Juanle WANG (wangjl@igsnr.ac.cn), but formal applications should follow the instructions in ‘How to apply’ section.</p>
PhD topic 3	Evaluation and application of resilient cities and human settlements toward sustainable development goals
IGSNRR Supervisor	Prof. Wenhui KUANG
UNNC Supervisor(s)	Dr Faith CHAN
Short introduction & description of PhD	<p>In recent years, the urban population has increased rapidly, accounting for 56% of the world's population. Energy consumption in urban areas accounts for 75% of global consumption. As a complex social-ecological system, the city suffers from various shocks and disturbances from the outside and itself. These disturbances include not only natural disasters such as earthquakes and hurricanes, and man-made disasters such as terrorist attacks and disease spread, but also cumulative shocks caused by factors such as energy shortages and climate change. Resilient city has become an important research content of SDG11 goals, and their essence lies in actively exploring adaptive adjustment methods and approaches for the uncertain disturbances faced by modern cities.</p> <p>Despite this, most researches focus on the basic connotation and evolution mechanism of resilient cities. The widely recognized adaptive cycle theory includes the exploitation phase, the conservation phase, the release phase and the reorganization phase. This project will focus on two major dimensions on (i) selection and empowerment of resilience</p>

	factors in resilient city research and (ii) resilient city planning (practical cases guided by urban resilience).
Contact points	Informal inquiries may be addressed to Dr Faith Chan (Faith.Chan@nottingham.edu.cn) and Prof Wenhui KUANG (kuangwh@igsnr.ac.cn), but formal applications should follow the instructions in the ' How to apply ' section.
PhD topic 4	Evaluation of effects of the “Sponge City” program for urban water disasters control in China
IGSNRR Supervisor	Prof Yanfang Sang
UNNC Supervisor(s)	Dr Faith CHAN
Short introduction & description of PhD	How to evaluate the risks of urban water disasters and further mitigate them is one key topic for urban stormwater management, which is also the foremost challenge for sustainable urban developments. The Chinese government proposed the concept of “Sponge City” in 2013 to handle the aggravating urban water disasters (i.e. urban surface water floods/waterlogging) over China. Over the last decade, many measures and technologies have been developed for guiding the designs and implementation of the “Sponge City” program (SCP) in the 30 pilot cities and also many other cities. However, there still have many challenges that prevent the positive feedback of the SCP, questioning its functions and effects. This project will focus on three major dimensions on (i) solve the key hydrology-related issues (e.g. estimation of proper rainfall threshold in the various magnitude of rainfall) for guiding the design of the SCP; (ii) evaluate the effects of SCP by considering the trade-off between the investment and its potential benefits and (iii) explore the projected changes of the SCP effects by considering the climate change impacts.
Contact points	Informal inquiries may be addressed to Dr Faith Chan (Faith.Chan@nottingham.edu.cn) and Prof Yanfang SANG (sangyf@igsnr.ac.cn), but formal applications should follow the instructions in the ' How to apply ' section.
PhD topic 5	Investigation into the sustainable development of wildlife tourism in China
IGSNRR Supervisor	Prof ZHONG Linsheng
UNNC Supervisor(s)	Dr Odette PARAMOR & Dr Yi WANG
Short introduction & description of PhD	<p>This research focuses on ecotourism and the development of a sustainable wildlife tourism industry in China. An interdisciplinary approach will be employed to analyse how wildlife, natural ecosystems and market demand affect the development of wildlife tourism. Management tools and mechanisms to support the healthy, sustainable and ethical development of wildlife tourism industry in China will be investigated.</p> <p>Humans have had a close relationship with wild animals throughout history. In recent decades, a tourism industry centred on wildlife has developed in China in order to meet demand for encounters with non-domesticated animals in both their natural habitats and in captivity. This wildlife tourism often focuses on providing opportunities for humans to observe, feed, touch and photograph wild animals and there is an urgent need to better understand how to support the development of this industry to ensure that it is sustainable, ethical and healthy.</p> <p>Research on wildlife tourism tends to focus how to provide satisfactory wildlife experiences for the tourists and is often part of a coordinated plan to develop a regional tourism industry. However, whilst tourist activities such as wildlife watching are considered to have a minimal impact on these animals, the tourism industry can have both positive and negative effects upon wildlife and natural landscapes.</p>

	<p>Thus far, there is a lack of comprehensive quantitative studies which aim to understand how factors such as natural resources, the environment and market demand influence wildlife tourism and the development of this industry. This project will focus on the development of wildlife tourism and its impacts from the three aspects of natural resources, environment and market demand. The purpose of this study is to better promote the development of wildlife tourism, better protect wildlife, and make wildlife tourism development sustainable and healthy.</p>
Contact points	<p>Informal inquiries may be addressed to Dr Odette PARAMOR (Odette.PARAMOR@nottingham.edu.cn) and Prof ZHONG Linsheng (zhongls@ignrr.ac.cn), but formal applications should follow the instructions in the 'How to apply' section.</p>
PhD topic 6	Multi-scale assessment and characteristic analysis of comprehensive risk of climate extreme events
IGSNRR Supervisor	Prof Erfu DAI
UNNC Supervisor(s)	Dr Faith Chan
Short introduction & description of PhD	<p>In the context of global change, climate extreme events occur frequently, and their probability and intensity show significant differences, causing a large number of human casualties and social and economic losses. According to the IPCC SREX Special Report and the 1.5°C Global Warming Special Report, the state, process and fluctuation of the climate system may have different responses under different temperature rise rates and ranges, leading to significant differences in the probability and intensity of climate extreme events. The risk may have nonlinear responses with the temperature rise rates and ranges of different scenarios.</p> <p>Climate extreme event risk assessment is an important basis and means for formulating disaster prevention and mitigation policies and measures. This project will focus on two major research contents on (i) Constructing an evaluation index system for the risk of climate extreme events, vulnerability and exposure of different risk carriers, and quantitatively evaluating the risk of multi-scale climate extreme events; (ii) Based on the combination matrix of SSPs and RCPs, simulating the risk of climate extreme events in the next 100 years, and identifying the high-risk regions and time periods of different climate extreme events in the future.</p>
Contact points	<p>Informal inquiries may be addressed to Dr Faith Chan (Faith.Chan@nottingham.edu.cn) and Prof Erfu DAI (daief@ignrr.ac.cn), but formal applications should follow the instructions in 'How to apply' section.</p>
PhD topic 7	Plant response and adaptation to environmental change
IGSNRR Supervisor	Prof Shuli Niu
UNNC Supervisor(s)	Dr Tengwen Long
Short introduction & description of PhD	<p>Applications are invited for a PhD scholarship majoring in Geography and focusing on the interdisciplinary field of Global Change Biology. The successful applicant will have the opportunity to carry out high-impact research in regional and global environmental changes and vegetation responses. Possible research topics may include but not limit to: (1) plant response to environmental change across different time scales; (2) the adaptation of vegetation traits to the change of environmental cues; and (3) prediction of vegetation response to future climate change.</p>
Contact points	<p>Informal inquiries may be addressed to Dr Tengwen LONG (Tengwen.Long@nottingham.edu.cn) and Prof Shuli NIU (sniu@ignrr.ac.cn), but formal applications should follow the instructions in 'How to apply' section.</p>

PhD topic 8	Regional ecological environment changes and climate resilience
IGSNRR Supervisor	Prof. Fenzhen SU
UNNC Supervisor(s)	Dr. Faith Chan
Short introduction & description of PhD	The project will focus on the regional ecological environmental changes of China and Southeast Asia coastal regions, multi-source remote sensing, GIS data will be applied for the research.
Contact points	Informal inquiries may be addressed to Dr Faith Chan (Faith.Chan@nottingham.edu.cn) and Prof Fenzhen SU (sufz@lreis.ac.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 9	The abundance of trace elements in typical regions in China: human health, geochemical characteristics, spatio-temporal distributions, and determining factors
IGSNRR Supervisor	Prof Kunli Luo
UNNC Supervisor(s)	Dr Tengwen Long
Short introduction & description of PhD	<p>The Earth surface is a heterogeneity composed by multi-stage strata and deposits with different physical and chemical compositions throughout the last 4.6 billion years. For individual human being's lifespan, the strata in a certain area of the Earth's surface can be considered as a stable and closed system.</p> <p>This project will be carried out through three stages: (1) Select typical regions defined by human health conditions (e.g. regions where the residents have a long life expectancy, or regions characterised by endemic diseases, such as Kashin-Beck disease or Keshan disease; (2) Collect and analyse samples of bedrock, soil, crop, water, human hair, etc. from these regions, focusing on the distribution and enrichment of trace elements; (3) Examine possible influences of background geology on Earth surface environment and human health from these cases and project such influences to the future for sustainable development considerations.</p> <p>This study will contribute to our understanding of geochemical characteristics of habitable environments on the Earth's surface, of the temporal and spatial distributions of these environments, and of possible factors that determine the distributions.</p>
Contact points	Informal inquiries may be addressed to Dr Tengwen LONG (Tengwen.Long@nottingham.edu.cn) and Prof Kunli LUO (luokl@igsnrr.ac.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 10	The distribution and enrichment of key life trace elements in Cenozoic coal-measure strata as an indicator of past environmental change
IGSNRR Supervisor	Prof Kunli Luo
UNNC Supervisor(s)	Dr Tengwen Long
Short introduction & description of PhD	Coal is a type of sedimentary organic mineral that slowly formed underground from burial plant remains dating to hundreds of millions of years Before Present. It is a mixture of various macromolecular compounds and minerals, and contains rich information on the changes of climate and environment in the geological history. The current project will focus on extracting such information from Cenozoic coal samples that have been collected throughout the last few decades, focusing on the distribution and enrichment of key life trace elements. Successful applicant is expected to analyse the coal samples using advanced geochemical techniques and compile data from his/her project for scientific publication.

Contact points	Informal inquiries may be addressed to Dr Tengwen LONG (Tengwen.Long@nottingham.edu.cn) and Prof Kunli LUO (luokl@igsnrr.ac.cn), but formal applications should follow the instructions in 'How to apply' section.
PhD topic 11	The underlying mechanism of the water-energy-food nexus and the evaluation of coupled nexus systems to support assessing trade-offs, predicting potential effects, and decision making
IGSNRR Supervisor	Prof Yujie LIU
UNNC Supervisor(s)	Dr Faith CHAN
Short introduction & description of PhD	<p>The water-energy-food nexus has received increasing attention in the research communities around the world as the security of water, energy, and food become a very high concern due to future uncertainties. Studies have been conducted to understand their interlinkages and develop management options through many ways, such as calculations of flows and dependencies between different resources, assessments of technology and policy applications, and quantifications of system performance.</p> <p>Currently, research challenges still exist although many previous signs of progress have been made in this study field, such as system boundary in nexus analysis, uncertainty in modelling and data, and so on.</p> <p>This project will focus on two major dimensions as here:</p> <ol style="list-style-type: none"> (1) Understanding of the underlying mechanism of the water-energy-food nexus by consideration of physical, biophysical, and chemical processes and characterizing the interlinkages among three nexus sectors; (2) Undertaking assessments of the resilience and sustainability of the coupled systems to better manage the water-energy-food system in order and promote sustainable development under changing environments.
Contact points	Informal inquiries may be addressed to Prof Yujie LIU (liuyujie@igsnrr.ac.cn) and Dr Faith Chan (Faith.Chan@nottingham.edu.cn), but formal applications should follow the instructions in the 'How to apply' section.
PhD topic 12	Variation of glacier/snow cover and its influences on the hydro-climatic process on Tibetan Plateau
IGSNRR Supervisor	Prof Yanfang SANG
UNNC Supervisor(s)	Dr Faith CHAN
Short introduction & description of PhD	<p>The Tibetan Plateau (TP) is well known as the "Asian water tower", being the origin of several Asian rivers, such as the Brahmaputra River, Salween River, Mekong River, Yangtze River, and Yellow River. They provide a massive amount of freshwater to the local inhabitants, agriculture, and industry over the TP and downstream areas. Besides, they also make the areas along the rivers highly prone to destructive natural hazards, which threaten the people's lives and properties in the region. Understanding the spatio-temporal variability of hydroclimatic processes and its underlying mechanisms, especially that of runoff, is critical for sustainable freshwater management and effective risk mitigation in this densely populated and ecologically vulnerable region. Differing from other regions where runoff is mainly generated by precipitation, the contributions from snow and glacier melting water to runoff cannot be ignored on TP. However, due to the high topography, long-term hydroclimatic observations are barely available over TP, our current understanding of the variation of glacier/snow cover and its influences on hydroclimatic process on TP remains inadequate and extraordinarily challenging. This project will focus on three major dimensions on (i) identify the temporal variations of glacier/snow cover and</p>

	their spatial difference on TP, and explore its response to the regional monsoon variability; (ii) quantify the contributions of the glacier/snow cover variations on the horological (especially runoff) variability in the major basins on TP and (iii) evaluate the influences of glacier/snow cover variations on the risks of mountain flooding hazards on TP especially the Himalaya Mountain region.
Contact points	Informal inquiries may be addressed to Dr Faith Chan (Faith.Chan@nottingham.edu.cn) and Prof Yanfang SANG (sangyf@igsnr.ac.cn), but formal applications should follow the instructions in the ' How to apply ' section.