No.	Program	Supervisor	Degree Type	Project and its introduction	Student Requirement	Duration	Contacts

Current Ongoing Research Projects of Supervisors in IWHR
(for Master's Degree Candidates only)

Tips: all of the above doctoral supervisors in IWHR can also guide master students, If you have interest in their programs for your master degree, please contact them in advance.

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1	Geotechnical Engineering	ZHAO Yufei	MSc	1. Through various methods and means such as on-site geological radar, borehole images, acoustic waves, monitoring, theoretical analysis, and numerical simulation, conduct on-site seepage field analysis, geophysical exploration, and borehole leakage detection in the dam site area to identify potential leakage channels that may exist; 2.Based on the existing dam seepage pressure and seepage monitoring data supplemented in the later stage, through systematic seepage numerical inversion analysis, establish a seepage flow field around the dam and its spatiotemporal evolution model to assess the leakage risk and development trend; 3.Establish the overall three-dimensional geological model of the reservoir area, conduct numerical simulation analysis under various seepage control conditions, and propose measures and suggestions for seepage control treatment in the later stage of the dam to ensure the safety of the dam operation in the later stage.	BSc degree in Physics, mechanics or civil engineering, Geotechnical backgroud with experience in soil tests	As from now to 12-30-2024	zhaoyf@iwhr.com
2	Hydrology and Water Resources	ZHAO Hongli	MSc	**1. Remote sensing of agricultural irrigated area and calculation of irrigation water.** Introduction: Using multi-source data such as satellite remote sensing and ground monitoring and big data analysis technologies, to monitor agricultural irrigated areas and account total agricultural water use.	1) BSc degree in hydrology and water resources , remote sensing, or related areas; 2) Able to use remote sensing and GIS software, preferably have modelling experience and programming skills proven by previous studies and work; 3) Excellent spoken and written English.	As from now to 12-31-2024	zhaohl@iwhr.com
				2. Water related knowledge service system. Introduction: Research on the construction of water knowledge services based on natural language processing, knowledge graph, artificial intelligence and related technologies.		As from now to 12-31-2023	zhaohl@iwhr.com
3	Hydrology and Water Resources	LIU Jia	MSc	**1. Coupling mechanism and cooperative regulation of hydrological processes and carbon-nitrogen cycles in typical grassland watersheds of northern China** In the context of global climate change, the diversity, stability and sustainability of grassland ecosystem have been seriously affected, posing severe challenges to the construction of an ecological security barrier in northern China. Taking the coupling mechanism of the grassland eco-hydrological processes and its response and adaptation to climate change and human activities as the main line, this NSFC funded project aims to: 1) Identify the key eco-hydrological processes and reveal the mutual interactions among water-heat-carbon-nitrogen fluxes in typical grassland watersheds. 2) Explain the coupling mechanism between the hydrological processes and the carbon-nitrogen cycles, and define the instability threshold of the grassland eco-hydrological system. 3) Deduce the green and low-carbon development mode of animal husbandry and eco-environment coordination with different climate scenarios. 4) Propose an eco-hydrological suitability collaborative regulation method for a healthy and resilient watershed adapted to climate change.	1) BSc in Hydrology and Water Resources, Civil and Environmental Engineering, Earth Sciences or related areas; 2) Modelling experience and programming skills, proven by previous studies and work;	As from now to 12-31-2026	jia.liu@iwhr.com

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				2. Study on the impact of extreme climate change on ecosystem and climate change action plan preparation This is an international cooperation project for ecological conservation and restoration evaluation in a river basin of southwest China. The project aims to: 1) Identify the sensitive areas of biodiversity, by studying the impact of extreme climate on biodiversity and analyzing the vulnerability of ecosystem and the impact trend of climate change. This includes the introduction of the carbon sink coefficient, to understand the change of the carbon sink capacity and its future evolution, and to carry out an emission reduction study. 2) Develop action plans for adaptation and response to climate change based on the identification of sensitive and critical areas for biodiversity, through research on the impacts of the climate extremes on biodiversity, analysis of the vulnerability of ecosystems and the trends of climate change impacts.	previous studies and work; 3) Excellent spoken and written English.		
4	Hydraulics and River Dynamics	LIU Xiaoying	MSc	**Study on Soil Erosion, Soil Conservation, and Sedimentation** **1. Regulation effect and criticality of soil and conservation measures allocation on water and sediment process in river basin** ① Scale effect of soil and water conservation measures on the regulation of water and sediment processes in river basins; ② Regulation effect of water and soil conservation measures on water and sediment process. ③ Critical effect of water and soil conservation measures allocation on regulation and control of water and sediment processes in river basins. **2. Development and evaluation of ecological restoration technology at global and regional scales**	1)BSc degree in Soil and water conservation and river sedimentation, Mathematics, ecological environment or related areas; 2)Modelling experience and programming skills, proven by previous studies and work; 3)Excellent spoken and written English.	As from now to 12-30-2027	liuxy@iwhr.com
5	Hydraulics and River Dynamics	LIU Chunjing	MSc	**1. Study on the exchange and local transport characteristics of sediment on the bed surface** The statistical theory of sediment movement is a significant original innovation in the field of sediment research in China in recent years, with the particle motion state transfer and bed exchange process being the core concepts of the statistical theory of sediment movement. Due to limitations in experimental conditions, the existing bedload exchange intensity mainly relies on theoretical derivation, and the probabilities of sediment state transfer and specific parameters lack direct experimental verification. In this project, advanced technologies such as photogrammetry and digital image processing will be used to conduct flume experiments and obtain bedload exchange data under different conditions. This will establish a connection between the microscopic sediment motion and macroscopic riverbed evolution, which has important theoretical significance and practical value for further enriching and improving the statistical theory of sediment movement.	1) BSc(MSc)in Civil Engineering, Mathematics, Physics, Computer Science, or related areas; 2) Modelling experience and programming skills, preferably in Python, Matlab, proven by previous studies and work; 3) Excellent spoken and written English.	As from now to 12-30-2024	liucj@iwhr.com
				2. Study on the sediment impact of the Xiaolangdi Yellow River Water Diversion Project. The Xiaolangdi Yellow River Water Diversion Project is located in the Xiaolangdi Reservoir area, and has the characteristics of significant water level variations and complex hydrodynamic conditions of water and sediment movement. There is a significant difference in water level and sediment concentration at Xiaolangdi in the different operation stages, and as the reservoir sediment accumulates, the design water intake elevation gradually increases. This research project intends to collect information on the sedimentation process and water-sediment movement of the Xiaolangdi Reservoir, carry out on-site investigations, prototype river channel measurements, and sample measurements to obtain first-hand data. A numerical model for water and sediment movement will be established for the engineering section of the river, and simulation studies will be conducted on the water and sediment movement during the operation of the project under different water level conditions. The potential sediment accumulation situation will be analyzed, and necessary prevention and control measures will be proposed, providing theoretical and technical support for the safe and economical operation of the Xiaolangdi Yellow River Project.		As from now to 12-30-2024	liucj@iwhr.com

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6	Hydraulic Structure Engineering	ZHONG Hong	MSc, PhD	**Dynamic fracture of the mass concrete/foundation rock interface under compressive-shear loading** The interface between the concrete dam and the foundation rock is a weak link of the dam-foundation system when subjected to strong earthquake shocks. Dynamic fracture test of the mass concrete/rock interface subjected to compressive-shear load will be carried out. The influence of the strain rate and compressive stress on the fracture of the interface will be quantified, the relation between fracture behavior of the interface and the two parent materials will be investigated, and the dynamic fracture mechanism of the mass concrete/rock interface will be established. Furthermore, a numerical model for the dynamic interfacial fracture will be established in the framework of the scaled boundary finite element method. The propagation of the crack along the interface and kinking into the foundation will be traced, and the complete process of crack initiation, crack propagation and dam failure will be simulated.	1) MSc in Hydraulic Structure Engineering, or related areas 2) FEM Modelling experience and programming skills 3) Preferably interested in solid mechanics or fracture mechanics 4) Excellent spoken and written English.	As from now to 12-30-2026	zhonghong@iwhr.com
7	Hydraulic Structure Engineering	WANG Zhenhong	MSc, PhD	**Study on temperature control and crack prevention of thin-walled concrete structures** The temperature control and crack prevention of spillway, aqueduct, spillway tunnel, sluice, powerhouse, pump station, inverted siphon, etc. are different from those of dams. The volume of structures such as concrete dams is relatively small, but due to their unique functions and relatively complex structural forms and stress conditions, they are characterized by fast construction speed, high cement consumption, high slump, intense hydration reactions, large amounts of heat, and early concentrated release, large elastic modulus, and large volume deformation. These characteristics lead to higher temperature rise and faster temperature, resulting in more serious consequences after cracks occur. Therefore, temperature control and crack prevention are more difficult and require higher requirements, which is worth further study	1) BSc/Msc in Civil and Hydraulic Engineering or related fields; 2) Modeling experience and programming skills, proven through previous research and work; 3) Excellent oral and written English skills.	As from now to 12-30-2027	faithzhen@126.com
8	Hydraulic Structure Engineering	XIA Shifa	MSc	**1. Research on Concrete Crack Suppression of Hydraulic Tunnel Lining** During the construction period, hydraulic tunnels are prone to cracks, and it is necessary to systematically study the causes of cracks from the aspects of construction, structure, materials, and temperature control. According to the actual situation of the construction site, targeted crack suppression measures are put forward in order to reduce or even eliminate subsequent lining cracks.	1) BSc in Civil Engineering, Materials Science and Engineering, or related areas; 2) Modelling experience and programming skills; 3) Excellent spoken and written English.	As from now to 12-30-2026	xiasf@iwhr.com
				2. Research on prefabricated non-demolition multifunctional formwork for concrete dams in cold regions Most concrete dams in cold regions use polyurethane sprayed on the dam surface as the insulation material. After several years of operation, some or all of them will often peel off, making it difficult to achieve the original design of permanent insulation. This topic intends to study a composite multifunctional formwork integrating construction formwork, heat preservation, anti-ice pullout, anti-seepage and other functions, which can be prefabricated and assembled on site.		As from now to 12-30-2026	
				3. Risk Assessment of Large and Medium Water Conservancy Projects in Service Some water conservancy projects have experienced aging diseases such as leakage, cracks, carbonation of concrete, corrosion of steel bars, and erosion damage after many years of operation. Risk assessment studies reservoirs, dams, embankments, main canals, aqueducts and other hydraulic structures in service, and analyzes the possible damage caused by the damage of the structures.		As from now to 12-30-2023	
9	Hydraulic Structure Engineering	Cui Wei	MSc	1) Study on the stability of surrounding rock and the mechanical state of support-lining system of long and deep buried water conveyance tunnels; 2) Research on the mechanical mechanism and measures of joint bearing of high pressure penstock and surrounding structures; 3) Optimizations of the structure and the construction technology of gravity type foundation for land wind turbines; 4) Optimization study on the foundation and support system of photovoltaic in mudflat	BSc in Hydraulic structure, Structural Engineering, Civil Engineering or related areas; Excellent both in speaking and writing English	As from now to 12-30-2027	cuiwei@iwhr.com; 29754717@qq.com

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10	Hydraulic and Hydropower Engineering	Mu Jianxin	MSc	**Accelerating Carbon Neutrality: Actions for Sustainable Development** China's commitments to reach carbon peak by 2030 and carbon neutrality by 2060 have showed its firm determination and ambition to mitigate and adapt to climate change. However, in the area of climate change education to facilitate capacity-building and youth participation, China has not formulated practical action strategies and policies. The project seeks to facilitate sustainability science, education for sustainable development and capacity building, and provide stakeholders including youth with knowledge, skills, values and attitudes matching climate change response, including carbon footprint reduction, ecological protection and biodiversity conservation through "hand-in-hand action", "forest protection action", "partnership action" and " practical education base action" with the purpose to promote the practical action of ecological civilization and build a sustainable future for all.	1) BSc in, Civil Engineering, Environment Engineering, Climate Adaptation and Mitigation, or related areas; 2) Modelling experience and programming skills, preferably in Python, proven by previous studies and work; 3) Excellent spoken and written English.	As from now to 12-30-2024	mujx@iwhr.com
11	Hydraulic and Hydropower Engineering	Zhao Weixia	MSc	**Smart decision making method of sprinkler variable rate fertigation based on multi-parameter and machine learning** Introduction: The application of UAV remote sensing, machine learning, and sprinkler fertigation technology have become the main driving force for the development of smart decision-making for precise variable rate fertilization and irrigation. To solve the problems of low precision and consequently low yield increasing effect of variable rate irrigation management caused by single information of management zone and the lack of variable fertilization model of sprinkler, the delineation methods of dynamic management zone based on vegetation index and canopy temperature, vegetation index and leaf color will be studied for variable rate irrigation and variable rate fertilization, respectively. The calculation model of variable nitrogen application will be established for sprinkler irrigation, and the generation method of variable rate fertilization prescription map will be established based on nitrogen sufficiency index.	1) Graduate in Agricultural Water-Soil Engineering, Plant Nutrition, or related areas; 2) Modelling experience and programming skills, preferably in Python, proven by previous studies and work; 3) Excellent spoken and written English	As from now to 12-30-2025	zhaowx@iwhr.com
12	Hydro-environment	QU Xiaodong	MSc	**Study on Watershed ecology and Ecohydraulics** **Data and modelling for stream organisms responses to natural flood or low flow in the natural streams** 1). Data of aquatic organisms and flood collecting from the natural streams; 2). Data analysis to construct the modelling between the flood and aquatic organisms;	1) BSc in aquatic organisms, such as fish, macroinvertebrate; 2) With good background of Mathematics, statistics; 3) Modelling experience and programming skills; 4) Excellent spoken and written English.	As from now to 12-30-2025	quxiaodong@iwhr.com
13	Hydroinformatics	SONG Wenlong	MSc	**1. River hydrological dynamic monitoring twinning.** Study the satellite monitoring technology of digital elevation model, the monitoring model method of river channel change based on optical and topographic data, and the twin technology of river hydrological dynamic monitoring such as water surface - water level - velocity - discharge. **2. Rapid monitoring technology for flood disasters.** Study the rapid monitoring and publishing technology of flood inundation range and depth based on multi-source optical and radar data. **3. Drought monitoring and identification technology.** Study the UAV low altitude remote sensing rapid monitoring and recognition technology of drought of main grain crops; The rapid monitoring and identification model of drought.	1)Professional foundation of satellite remote sensing and geographic information system, proficient in satellite image processing technology. 2)Professional foundation of hydraulics and remote sensing hydrology, and the ability of water body evolution, digital elevation model production and hydrological model modeling.	As from now to 12-30-2027	songwl@iwhr.com

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14	Water Disaster and Security	JIANG Furen	MSc	**1. Urban flooding modelling and smart early-warning system in Kunming City of Yunnan province** is to develop flood risk mapping, and rapid judgment technology for heavy rainfall and waterlogging. Main task is the construction of real-time regulating model for riverine works covering surface hydrological runoff generation and concentration model based on small watershed/drainage zoning, one-dimensional river network hydrodynamic model, two-dimensional surface hydrodynamic model, one-dimensional pipe network hydrodynamic model, and water works regulating models for reservoirs, sluice dams, pumping stations, and storage tanks. **2.Urban flooding modelling in Luzhou City of Sichuan province** is to develop flood risk mapping. Main task is the construction of urban high-precision flood model including hydrological surface runoff generation model based on grids, two-dimensional surface hydrodynamic model, and one-dimensional river network hydrodynamic model.	1) Bachelor's degree or graduate students in hydraulic or civil Engineering, or related areas; 2) Modelling experience and programming skills, proven by previous studies and work; 3) Excellent spoken and written English.	As from now to 12-30-2024	jiang@iwhr.com