NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE | Graduate College

Joint PhD Program Description

The description for the Joint PhD program will be posted online as a sub-page to Joint PhD Programmes | Graduate College | NTU Singapore.

Name of Partner University	Shanghai Jiao Tong University
Country	China
Year of JPP Establishment	2022
Program	☒ Joint Degree ☐ Joint Supervision
Description of the Program (150-250 words)	The NTU-SJTU joint PhD degree program is newly launched in 2022 to provide students with an excellent opportunity to study in an interdisciplinary, international and multicultural environment. Areas of research include Science, Engineering, Management, Computing and Social Sciences. Students are expected to fulfil a residency or period of attachment between a minimum of 12 months to a maximum of 24 months at the Partner Institution.
Disciplines	All disciplines, but not limited to carbon utilization and sustainability, e.g., chemistry, chemical engineering, material science, environmental science and engineering, human-computer interaction, brain-computer interfaces, computer vision, visual analytics, medical computing, artificial intelligence, chemical biology, immunology, and microbiology.
PMC Names	NTU: K Jimmy Hsia, Liu Hong SJTU: Deng Tao, Xuemin (Lisa) Xu
PMC Emails	NTU: kjhsia@ntu.edu.sg; liuhong@ntu.edu.sg SJTU: dengtao@sjtu.edu.cn; lisaxu@sjtu.edu.cn

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE | Graduate College

Joint Projects

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE | Graduate College

1. Optical Computing For Artificial Intelligence Implementations

Date Posted	31 March 2025	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	Recent advances in photonic technologies bring the era of optical computing, where fast, efficient, and compact photonic structures are developed towards optical neural network, photonic logic, Ising machine, and so on. This project explores various opportunities on optical computing using time-varying media, time modulation, metasurface, where different degrees of freedom of light are considered to bring more flexible light manipulation. The student will be trained with necessary experience in the research activity, including basic photonic knowledge, photonic modelling and simulations, optical experimental skills, paper writing and oral presentations. The project can help the student become an independent researcher after the graduation, supporting the research career to the academic and to the growing market in Asia and beyond. Moreover, the student and supervisors are expected to make several achievements in the field of optical computing with papers published in high-impact journals. The success of this project can also promote further worldwide collaborations between NTU and SJTU.	
Program/Center Website(s)	NA	
Additional Information (e.g., files with project details)	NA	

2. Gaussian Splatting for Enhanced Surgical Video Analysis and Interpretation

Date Posted	21 March 2025	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	Surgical video analysis is becoming increasingly vital for enhancing surgical precision, providing real-time assistance, and supporting training efforts. However, interpreting the complex visual data from surgical videos—such as tool movement, anatomical structures, and surgical steps remains a challenging task due to high variability and noise in the video frames. The student will leverage Gaussian splatting to improve the analysis and understanding of surgical videos, and to enhance real-time decision-making, procedural monitoring, and post-operative evaluation. Gaussian splatting will be used in surgical videos to synthesize smooth, high-quality representations of critical surgical elements such as instruments, tissue, and anatomical landmarks. This technique uses Gaussian distributions to map regions of interest and synthesize continuous visual representations, which helps to refine segmentation and to track structures in surgical environments. This enhances video clarity, reduce noise, and allow for more accurate recognition and segmentation of dynamic and static elements of the surgery. The system will consist of different tasks, such as recognition and tracking of surgical tools, monitoring anatomical movements, and identifying important changes during the procedure. By the use of Gaussian splatting, the system can provide real-time feedback, offer suggestions, alerts for potential issues (eg. misalignment), and detailed insights for surgical teams. Challenges include real-time processing, increasing the efficiency of Gaussian splatting for dynamic video inputs, and system adaptation for diverse surgical scenarios with different techniques and anatomy. Furthermore, the system will integrate seamlessly into existing surgical environments and be interpretable to the surgical team. The student will work to enhance video quality, more precise tool and tissue tracking, and real-time decision support, improving surgical precision and training of the surgeons.	
Program/Center Website(s)	https://medvisailab.github.io/research/ https://zhijie-group.github.io/	
Additional Information (e.g., files with project details)	NA	

3. Efficient and complex reasoning of multi-modal large language models for Medicine

Date Posted	21 March 2025	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	The recent advancements in Chain-of-Thought based reasoning have significantly improved the logical capabilities of large language models (LLMs). However, complex reasoning across multiple modalities remains a significant challenge, particularly in the medical field. Multi-modal large language models (MLLMs) must simultaneously process diverse types of input, such as patient medical records, diagnostic images (e.g., X-ray, CT), lab test, and clinical notes. These models must establish meaningful connections between these modalities to perform accurate cross-modal reasoning and medical inference. This project focuses on developing an efficient system for reliable multi-modal reasoning tailored for medicine. The goal is to enhance MLLMs' ability to process, align, and reason across multiple modalities while maintaining computational efficiency. The challenges include improving the model's ability to correlate visual data with textual data (such as linking a radiological data with a patient's clinical history) and performing complex inferences for tasks i.e. diagnosis, treatment recommendation, and customized care. By developing new multi-modal reasoning paradigms and algorithms, this research will enable MLLMs to help healthcare professionals in clinical decision-making, enhance diagnostic accuracy, and support customized treatment planning. The anticipated outcomes will have significant implications for the integration of AI in healthcare, improving efficiency in medical analysis, aiding in disease detection, and supporting real-time, data-driven decision-making in clinical environments. The project will pave the way for more practical and robust use of MLLMs in the medical domain.	
Program/Center Website(s)	https://medvisailab.github.io/research/ https://zhijie-group.github.io/	
Additional Information (e.g., files with project details)	NA	

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4. Development of PCB-Based Hybrid Resonators for Emerging Industrial Applications with Wireless Charging Capabilities

Date Posted	21 March 2025	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	The development of silicon carbide (SiC) and gallium nitride (GaN) field-effect transistors (FETs) has expanded the potential of inductive power transfer (IPT) technologies, enabling high-power, high-frequency applications beyond traditional low-power high-frequency or high-power low-frequency systems. Printed circuit board (PCB)-based wireless power resonators, typically consisting of copper coils with self-resonant capacitors, have garnered significant attention. Over the past decade, research on coreless PCB winding structures has accelerated, particularly in applications such as medium- and high-voltage gate drives, isolation transformers for multi-megahertz power supplies, and domino resonators for both inductive power transfer (IPT) and capacitive power transfer (CPT). This project focuses on optimizing the key parameters of ultra-high-frequency PCB-based hybrid resonators to maximize efficiency. These hybrid resonators integrate both IPT and CPT technologies, representing cutting-edge designs recognized by the research community.	
Program/Center Website(s)	https://www.ntu.edu.sg/csie	
Additional Information (e.g., files with project details)	Please refer to the advanced coil designs we have developed, showcased on our website: https://www.cacalotoyangyun.com/wireless-power-transfer This project aims to further enhance and develop the next-generation versions.	

5. Similarity Search on High-Dimensional Vector Data

Date Posted	15 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	Large-scale high-dimensional vector data has become ubiquitous in contemporary times. For instance, various forms of unstructured data, such as images, videos, texts, and speeches, are typically transformed into vectors using deep learning techniques (e.g., word2vec, node2vec, item2vec, etc.). These vectors are subsequently employed in downstream analytical tasks. K nearest neighbor (KNN) search in high-dimensional vector space constitutes a fundamental problem with a wide array of applications in information retrieval, recommendations, and retrieval-based large language models. Due to the curse of dimensionality, exact KNN queries often result in unacceptable response times. In pursuit of a better balance between time and accuracy, many researchers have turned to its relaxed version, known as approximate K nearest neighbor (AKNN) search. Various algorithms have been proposed to address the AKNN problem, encompassing quantization-based, graph-based, hashing-based, and tree-based approaches. However, popular AKNN algorithms such as the quantization-based ones do not provide theoretical guarantees and may fail in some scenarios. In addition, most of these algorithms primarily focus on vector data and may fall short in real-life applications involving more than just vectors. This project aims to develop new quantization-based algorithms that provide theoretical guarantee as well as algorithms to address various AKNN problems, including the attribute-filtering AKNN problem, the AKNN problem for sparse vectors, and the multi-index AKNN problem. These would help to bridge the gap between AKNN solutions and real-world applications featuring diverse data types.	
Program/Center Website(s)	CCDS-NTU: https://www.ntu.edu.sg/computing CSE-SHJT: https://www.cs.sjtu.edu.cn/	
Additional Information (e.g., files with project details)	NA	

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6. Efficient Edge Intelligent Computing

Date Posted	2 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	The project is to explore the deployment of state-of-the-art AI technologies on the edge devices. It addresses the challenge of the increasing gap between the rapidly growing model size and the limited computing capabilities under tight processor, memory and power constraints. The targeted applications include the latest vision transformers and large language models, and the targeted hardware includes embedded CPUs/GPUs and customized AI accelerators of various types. The project will explore model design and optimization, hardware-software co-design, and energy-efficient computing techniques. The expected outcome is to be transformative to bring AI capabilities to lightweight devices without or with limited cloud support in diverse industry domains. Candidates interested in the joint programme are advised to contact either Dr. Weichen Liu (NTU, liu@ntu.edu.sg) or Dr. Yaoyao Ye (SJTU, yeyaoyao@sjtu.edu.cn) for more details on the project as well as admission requirements.	
Program/Center Website(s)	https://www.ntu.edu.sg/computing https://english.seiee.sjtu.edu.cn/english/index.htm	
Additional Information (e.g., files with project details)	NA	

7. Any-to-Any Large Multimodal Models

Date Posted	2 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	Large multimodal models (LMMs) have achieved substantial progress with the emergence of ChatGPT, GPT4-V and Sora. Yet, existing LMMs only focus on vision and language, neglecting other useful multimodal sensory inputs such as audio, speech and 3D information. This project aims to develop a new paradigm of generative AI, any-to-any large multimodal models (LMMs) that can comprehend, associate and integrate the rich information from multiple modalities in a holistic manner. Developing such a new paradigm of any-to-any LMMs requires the study of 1) novel theory on cross-modal information fusion, and 2) efficient design on neural network architecture. The outputs of this project would possess both scientific merit as well as industrial impact.	
Program/Center Website(s)	MMLab @ NTU: https://www.mmlab-ntu.com/ X-Lance @ SJTU: https://x-lance.sjtu.edu.cn/	
Additional Information (e.g., files with project details)	NA	

8. Adaptation of LLM for ASR for under-resource languages

Date Posted	2 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	In this research, we will examine how to adapt LLM for ASR speech recognition for under-resourced languages. One promising research direction is to apply strong pre-trained self-supervised speech representations to reduce speech training data. Additionally, we propose to explore text-only target language supervision by converting text to ARPA (pronunciation token) and enable LLM to learn new languages with minimal speech/text training data. This approach is akin to using text to speech (TTS) to generate target speech. That is, if we can train a single text to speech for the target language, then we can generate large variations of target speech from multiple speaker through text by having SOTA generative TTS approaches which dis-entangle context to speaker characteristics.	
Program/Center Website(s)	College of Computing and Data Science Speech Lab@NTU: https://aseschng.github.io/intro1.html	
Additional Information (e.g., files with project details)	NA	

9. Accelerating Dynamic Graph Embedding on GPU

Date Posted	2 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	Dynamic graphs, characterized by their evolving structure and node interactions over time, present unique challenges and opportunities in fields such as social network analysis, recommendation systems, and bioinformatics. The project aims to address the computational demands of dynamic graph embedding by leveraging GPU acceleration to achieve real-time performance and scalability. The primary goal of this project is to develop and implement a GPU-accelerated framework for dynamic graph embedding. This framework will utilize the parallel processing capabilities of GPUs to handle the iterative and computationally intensive nature of graph embedding algorithms, which often require frequent updates as the graph evolves. The project will focus on optimizing existing embedding techniques, such as DeepWalk, Node2Vec, and GraphSAGE, to efficiently run on GPU architectures. Key objectives include: 1. Algorithm Optimization: Adapting and optimizing dynamic graph embedding algorithms for parallel execution on GPUs, ensuring efficient memory usage and minimizing latency. 2. Scalability: Ensuring the framework can scale to accommodate large, real-world graphs with millions of nodes and edges, maintaining high performance as the graph dynamically changes. 3. Real-time Processing: Achieving real-time updates of graph embeddings to support applications requiring immediate insights from rapidly changing data. 4. Evaluation and Benchmarking: Conducting comprehensive evaluations and benchmarking against existing CPU-based implementations to demonstrate the performance gains and scalability of the GPU-accelerated framework. This project will significantly enhance the ability to process and analyze dynamic graphs in real-time, providing valuable insights	

	in various domains. By leveraging the computational power of GPUs, the proposed framework aims to set a new standard for dynamic graph embedding, facilitating advanced research and practical applications in data-intensive fields.
Program/Center Website(s)	NA.
Additional Information (e.g., files with project details)	Shuhao Zhang is an expert in big data stream processing, and Shixuan Sun is an expert in graph processing. Both have expertise in parallel computing, GPU programming. The proposed project leverages the expertise from both supervisors.

10. Enhancing Intelligent Marketing via Graph Models

Date Posted	2 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	Despite the digital economy's growth, many enterprises struggle to convert vast and increasingly complex marketing data interactions into effective business strategies, as precise intelligent marketing becomes ever more dependent on integrating and analyzing information from multiple sources. This project aims to enhance intelligent marketing by leveraging graph models to better extract valuable information that aids in marketing decisions. A prime example is the detection of fake reviews, which are increasingly difficult to identify solely through text analysis due to the advancement of Artificial Intelligence Generated Content (AIGC) like ChatGPT, while using Graph Neural Networks (GNNs) to analyze additional graph-structured information can improve the accuracy of detecting fake reviews by representing user community relationships and user-product evaluation relationships simultaneously to support marketing decisions. The project will focus on integrating and modelling multi-source heterogeneous graph data, designing efficient algorithms for large-scale data, and validating these models in practical applications.	
Program/Center Website(s)	NA	
Additional Information (e.g., files with project details)	NA	

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11. Vector Database Systems and its Applications in LLMs

Date Posted	2 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	This project aims at (1) developing effective and efficient core algorithms for supporting complicated approximate nearest neighbour search (ANNS) for vector database systems, and (2) exploring the applications of vector database systems to support Retrieval-augmented generation (RAG) in LLMs . The leading method for ANNS is the graph based indexes, which often outpaces other techniques in speed while maintaining comparable accuracy. However, graph-based indexes still face challenges in city applications, where queries frequently extend past the scope of standard ANNS. Consider a geographic search engine to handle a query that wants to find the most interesting coffee shop within a sightseeing place (POI). In this case, the objective is to find the ANNS of the vector corresponding to the POI while also adhering to the spatial range limitation. Handling such complex queries beyond ANNS is challenging for many current solutions, highlighting a pressing need for advancements. Another major innovation of this project is to develop techniques for RAG in LLMs, where vector database systems are expected to play a key role. This is a very important and promising research area.	

Program/Center Website(s)	NTU: CCDS & SCALE@NTU https://www.ntu.edu.sg/scale
Additional Information (e.g., files with project details)	Both professors are internationally renowned experts in their respective areas. NTU professor Cong Gao is known for data management research, and SJTU professor is known for machine learning applications. Their expertise is complementary, and is important for the project.

12. Deep learning assisted protein binding affinity prediction: towards next generation drug design using generative models

Date Posted	1 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	The quest for accelerated drug discovery has intensified the need for innovative computational methods that can predict protein-ligand interactions with high accuracy. Traditional computational approaches, such as molecular dynamics and Monte-Carlo simulations, are often hindered by their inefficiencies in exploring the vast, high-dimensional energy landscapes of multibody systems. These methods typically become trapped in local minima or require the construction of low-dimensional reaction coordinates, limiting their effectiveness in complex, multidimensional spaces without extensive expert input. In response to these challenges, our recent advancements have leveraged flow-based generative models to effectively sample the Boltzmann distribution and transition path distribution of molecular systems, achieving significant breakthroughs in the field. Building upon these successes, this project will further innovate by using deep learning to approximate energy fields, enhancing the sampling process without relying on predefined reaction coordinates. This approach integrates state-of-the-art techniques such as reinforcement learning, adversarial learning, and diffusion models to overcome typical shortcomings of deep learning models, such as missing critical conformational regions and over-reliance on pre-training. Additionally, the project will develop automated analysis methods to identify and interpret critical states such as metastable and transition states, utilizing graph neural networks to convert enhanced sampling data into accurate kinetic models. This comprehensive methodology aims to improve the efficiency and precision of modeling drug molecule interactions in complex multibody systems. The resulting method will be used to predict the binding affinity of proteins with small molecules and to accurately analyze the	

	binding process, thereby offering a paradigm-shifting approach for next-generation drug discovery. Candidates interested in the joint program are advised to contact either the SJTU (Dr Hao Wu, hwu81@sjtu.edu.cn) or NTU (Dr Ran Ni, r.ni@ntu.edu.sg) supervisors for additional information on the project as well as admission requirements.
Program/Center Website(s)	NA
Additional Information (e.g., files with project details)	NA

13. Low-speed Tidal Energy Harvesting through Oscillating Hydrofoils

Date Posted	1 July 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	The objective of this project is to design low-speed tidal energy harvesters for utility-scale power generation from coastal waters. The project will develop an oscillating hydrofoil array with low cut-in speed and short inter-foil spacing for harvesting sufficient tidal energy from low-speed tidal currents, thus enabling utility-scale power generation (e.g. in Singapore and China waters). Synergistic effects between two hydrofoils will be achieved to maximise total power generation. The system draws upon the fundamentals of fluid mechanics in constructive foil-foil and foil-wake interactions to enable sustained oscillating and low cut-in speeds. To meet the objective of this project, specific scopes are described below: 1. Investigations on flow physics and energy harvesting mechanism through numerical simulations to study the flow physics of the oscillating hydrofoils, including the mechanism of lift production, the foil-foil and foil-wake interactions. 2. Hydrofoil array and power generator design. 3. Lab Experiments in water tunnel The study will be carried out in both NTU and SJTU where there will be synergies to be derived. For experiments, NTU has a closed loop water tunnel for preliminary design testing, while SJTU possessed large towing tanks that better mimic actual operating conditions and for upscaling of concept.	
Program/Center Website(s)	School of Mechanical and Aerospace Engineering, NTU https://www.ntu.edu.sg/mae Energy Research Institute @ NTU https://www.ntu.edu.sg/erian	
Additional Information (e.g., files with project details)	NA	

14. Trustworthy Artificial Intelligence for Foundation Models

Date Posted	1 July 2024	
Home University	Nanyang Technological University, Singapore	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	As the integration of foundation models into various applications, including robotics, autonomous driving, and medical systems, continues to expand, ensuring the trustworthiness of these AI systems becomes essential. This project focuses on developing methodologies to enhance the privacy, robustness, reliability, and security of foundation models, ensuring their safe and trustworthy deployment. The primary research objective is to develop and advance related techniques that can boost the trustworthiness of foundation models. This includes exploring the better machine learning methods to improve robustness and reliability of foundation models as well as enhancing their security and privacy protection. The foundation models involved would primarily be low-level perception models (such as detection, segmentation, depth estimation, etc.) and their application to potential downstream tasks like navigation and human-robot interaction. The research directions could involve designing better foundation model architectures, training methods, and pipelines to improve model performance and generalization across various environments and complex tasks. Furthermore, the focus on security and privacy could be achieved by developing techniques in federated learning, watermarking, and image content protection. In summary, this project is dedicated to pioneering the development of trustworthy artificial intelligence for foundation models. By enhancing privacy, security, robustness, and reliability, we aim to ensure that these advanced AI systems can be trusted and relied upon across a wide range of critical applications.	

Program/Center Website(s)	NA
Additional Information (e.g., files with project details)	NA

15. Developing Low-Frequency Metamaterials for Wireless Power Transfer Systems

Date Posted	5 June 2024	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
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Project Description (200-300 words)	Metamaterials are artificial materials with negative permittivity and/or permeability that have not been founded in natural counterparts. The concept of metamaterial was initially proposed by J. B. Pendry in 1990s. Since then, high-frequency metamaterials have been extensively investigated and applied in the fields of electromagnetics, mechanics, and optics over the last two decades. Metamaterials consist of multiple unit cells with the same structure that are periodically arranged in a space to mimic the lattice structure in crystals. For high-frequency electromagnetic metamaterials, each unit cell comprise the inductances formed by the conductors and the stray capacitances formed between the conductors. The inductances and capacitances are in resonance at specific frequencies, thereby inducing large conductor currents which further strengthen the external magnetic fields. However, existing high-frequency metamaterials cannot be used for low-frequency (from power frequency to megahertz) high-power (>200W) electromagnetic devices, because of some technical bottlenecks. The objective of this project is to develop the unit cells of low-frequency metamaterials with negative magnetic resistances to acquire some basic design knowledge for future breakthroughs. The targeted application of the low-frequency metamaterials in this project is a three-dimensional wireless power transfer system. The success of this program would generate new basic knowledge for making world's 1st low-frequency metamaterials in the future.	
Program/Center Website(s)	https://www.ntu.edu.sg/csie	

Additional Information (e.g., files with project details)	This project will be conducted in align with the 2024 MTC YIRG project “Development of Low-Frequency Metamaterials with Negative Magnetic Resistances” (https://www.a-star.edu.sg/docs/librariesprovider1/default-document-library/research/funding-opportunities/ame-irg-yirg/list-of-awarded_projects_april-24.pdf?sfvrsn=8441f681_1).

16. Chemical Transformation of Waste Carbon Resources to Value-added Products

Date Posted	8 June 2023	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
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Website	https://personal.ntu.edu.sg/wenliu/	https://lcc.sjtu.edu.cn/En/Data/View/1097
Project Description (200-300 words)	Global warming is the greatest existential challenge of the present century. As part of the effort to mitigate global warming, the transition from conventional fossil-fuel based value chains to renewable and sustainable value chains is essential. To this end, this program aims for cutting-edge research on the utilisation of waste carbon resources (CO_2, biomass, etc.) to produce value-added functional products high potential for impact. Targeting at renewable fuels, chemicals and materials transformed from renewable, abundant and widely-available waste carbon resources, the program is dedicated to mitigating the carbon footprints and negative environmental impacts of the chemical industry, as well as to enhance the economic competitiveness of waste carbon valorisation processes through novel catalyst development and reaction design towards commercial viability. Candidates interested in the joint program are advised to contact either the SJTU (Dr Xi Chen, chenxi-lcc@sjtu.edu.cn) or NTU (Dr Wen Liu, wenliu@ntu.edu.sg) supervisors for additional information on the project as well as admission requirements.	
Program/Center Website(s)	https://lcc.sjtu.edu.cn/En https://www.ntu.edu.sg/cceb	
Additional Information (e.g., files with project details)	NA	

17. Impact of the Gut Microbiota on Host Gut Biology

Date Posted	5 June 2023	
Home University	Nanyang Technological University	
Partner University	Shanghai Jiao Tong University	
Supervisors	**Home**	**Partner**
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Project Description (200-300 words)	The Qiao lab (NTU) and Hu lab (SJTU) jointly explore the impact of gut microbiota composition and metabolites on host gut immunology. While numerous studies have demonstrated the essential roles of the gut microbiota on human health, the detailed mechanistic understanding of how the gut microbiota affects host health at the molecular level is far from clear. To answer such complex questions, the two labs will join forces to build a multidisciplinary program, where the Qiao lab focuses on the analytical and chemical microbiology aspects to elucidate the structures and develop chemical probes of the gut microbiota metabolites, and the Hu lab has expertise on gut immunology and animal models. The joint projects will elucidate mechanisms of gut microbiota metabolites on host gut immunology and function from both in vitro and in vivo aspects. The candidate will apply analytical chemistry and synthetic chemistry to study the gut microbiota-derived metabolites (Qiao lab), and specifically address the bioactivity and signalling pathways of such metabolites in vitro and in vivo in mice models (Qiao and Hu lab). The candidate will receive holistic training in chemical microbiology and immunology areas and have opportunities to work closely with both teams.	
Program/Center Website(s)	NA	
Additional Information (e.g., files with project details)	NA	