I serve as Co-Investigator on the following funding schemes that are currently approved, pending results, or ready to submit. Funding sources include the Innovation and Technology Commission (ITC) of Hong Kong SAR and the Science, Technology and Innovation Commission (STIC) of Shenzhen Municipality.

- ITC MHKTCFS (Platform) in 2025 exercise, with project number *GHP/285/25GD* and funding amount of *~2m HKD*. The project is currently pending results. Participation details are available at ***Appendix A and F***.

- ITC MHKTCFS (Platform) in 2025 exercise, with project number *GHP/291/25GD* and funding amount of *~3.2m HKD*. The project is currently pending results. Participation details are available at ***Appendix B and F***.

- ITC ITSP (Seed) for 2024 exercise, with project number *ITS/362/24* and funding amount of *~1.4m HKD*. The project has been approved. Participation details are available at ***Appendix C and F***.

- ITC ITSP (Platform) for 2026 exercise, in collaboration with Prof. Pheng Ann Heng and Prof. Soung Chang Liew. This project seeks *~4.5m HKD* funding support and is ready for submission (pending the call announcement). Participation details are available at ***Appendix D***.

- STIC Shenzhen-Hong Kong Science and Technology Program (Type C) in 2023 exercise, with project number *SGDX20230821094359004* and funding amount of ~3.3m HKD. The project has been approved. Participation details are available at ***Appendix E and F***.

Meanwhile, I am also an indispensable contributor to the following funding schemes supported by Hong Kong University Grants Committee (UGC) and CUHK Research Committee:

- UGC General Research Fund (GRF) in 2025 exercise, with project number 14200626 and funding amount of ~930k HKD. The project is currently pending results. Participation details are available at ***Appendix F***.

- UGC Funding Scheme for Innovative Technology in Education (FITE) in 2024 exercise, with project number 34489 and funding amount of ~270k HKD. The project has been completed. Participation details are available at ***Appendix F***.

- CUHK Research Committee Direct Grant in 2024 exercise, with funding amount of ~50k HKD. The project has been completed. Participation details are available at ***Appendix F***.

I have also participated in the preparation of large-scale collaborative proposals for CRF 2024 and CRF 2025. Participation details are available at ***Appendix F***.

Note: Appendix A (for GHP/285/25GD)

# 有關支持香港中文大學「內地與香港科技合作資助計劃 ITF MHKTCFS 資助」項目事宜

劉紹強教授及杜玉洋博士：

香港中文大學與深圳大學聯合申報 2025 年度內地與香港聯合資助計劃「智聯工業 4.0：融合大模型、超可靠低時延無線網絡與區塊鏈的工業 4.0 可信協作系統」。該項目申報成功後，本公司承諾在不違反法律、法規、規範性文檔以及公司商業秘密保護的原則下，為項目的實地部署和技術演示提供力所能及的支持，用以實施獲批的 ITF MHKTCFS 項目。技術支持的提供形式和具體內容，待該專案立項後雙方再以書面協定的方式予以明確。

香港電訊 (HKT) 作為香港領先的綜合電信服務供應商，在推動智能製造和工業 4.0 數字化轉型方面擁有豐富經驗。本公司憑藉先進的 5G 網絡基礎設施、企業級 WiFi 解決方案、超可靠低時延通信技術(URLLC)，以及豐富的工業物聯網部署經驗，將為該專案提供全方位的網絡技術支持。我們的技術優勢特別體現在為智能工廠和柔性製造場景提供高速、穩定、低時延的無線連接，支持工業設備間的實時協同與動態調度。同時，本公司在企業數字化轉型、邊緣計算部署及工業數據安全等領域的專業能力，將有力支撐項目中 AI 驅動自動化、無線網絡優化及區塊鏈可信協作等關鍵技術的集成與驗證。我們相信，該專案對推動粵港澳大灣區製造業升級、提升工業生產效率與靈活性具有重要的戰略意義和廣闊的市場前景。

除了提供必要的技術支持和測試環境，本公司亦將積極參與該技術的市場評估與推廣，並助力其產業化進程，讓更多患者受益於先進科技帶來的高品質醫療服務。

特此證明！

Dr. Chung Ng

Head of Technology & Strategy, Hong Kong Telecommunications (HKT) Limited

HKT Limited
PO Box 9896 GPO Hong Kong T +852 2888 2888 F +852 2877 8877
www.hkt.com

Note: Appendix A (for GHP/285/25GD)

# 內地與香港科技合作資助計劃
# ITF MHKTCFS 資助項目贊助承諾函

劉紹強教授及杜玉洋博士:

香港中文大學與深圳大學聯合申報 2025 年度內地與香港聯合資助計劃「智聯工業 4.0：融合大模型、超可靠低時延無線網絡與區塊鏈的工業 4.0 可信協作系統」。本公司承諾於該項目申報成功後，為香港中文大學劉紹強教授團隊提供贊助資金 20 萬港幣，用以實施獲批的 ITF MHKTCFS 項目。

雲鏈網科技（廣東）有限公司　　是一家專注於工業物聯網高性能通信、存儲與計算解決方案及產品研發的創新型科技企業。公司由來自香港與廣東兩地的工業界及學術界專家共同創立，總部位於廣東佛山，客戶覆蓋粵港澳大灣區多家先進製造企業。公司認為該項目具備重要的技術意義與廣闊的市場前景，　　對其成功研發充滿信心　　。

除資金支援外，公司還將提供必要的技術支撐，並積極參與該技術的試點落地和產業化進程。在項目實施後期，公司將充分發揮產業資源優勢，協調安排合作製造業客戶的生產場地，為項目團隊提供真實工廠環境進行系統實地部署與試點驗證，推動研究成果在粵港澳大灣區先進製造業的落地應用。

特此證明！

雲鏈網科技（廣東）有限公司

項目負責人：吳國聲

二零二五年八月十八日

Note: Appendix B (for GHP/291/25GD)

# 內地與香港科技合作資助計劃
# ITF MHKTCFS 資助項目支持承諾函

劉紹強教授及杜玉洋博士：

香港中文大學與廈門大學深圳研究院聯合申報 2025 年度內地與香港聯合資助計劃「遠程手術數據高可靠傳輸與智能增強技術研究及驗證」。該項目申報成功後，本公司承諾在不違反法律、法規、規範性文檔以及公司商業秘密保護的原則下，提供項目技術研究和試點演示所需的技術支持和測試環境，用以實施獲批的 ITF MHKTCFS 項目。技術支持及測試環境的提供形式和具體內容，待該專案立項後雙方再以書面協定的方式予以明確。

康諾思騰（Cornerstone Robotics）是一家於 2019 年 9 月在香港成立的創新型醫療機器人公司，致力於開發、製造和銷售高端手術機器人。公司以臨床需求為導向，堅持自主創新，已掌握機械架構、電氣架構、軟件架構、複雜算法以及視覺影像等核心技術。康諾思騰的願景是「引領醫療創新，心繫天下健康」，旨在打造安全高效的手術機器人平台，提升中國乃至全球範圍內優質醫療資源的可及性，讓更多患者受益於高端醫療科技帶來的高品質醫療服務。公司已成功研發 Sentire 思騰腔鏡手術機器人，並已獲得中國國家藥品監督管理局批准上市。康諾思騰已與中國大陸、香港以及歐洲的頂尖醫療中心展開合作。

本公司認為該專案具有極高的社會意義和巨大的市場前景。除了提供必要的技術支持和測試環境，本公司亦將積極參與該技術的市場評估和產業化過程。

特此證明！

Cornerstone Robotics Limited

項目負責人：

鄭君樂博士 謹啓

二零二五年八月十五日

Note: Appendix B (for GHP/291/25GD)

# 內地與香港科技合作資助計劃
# ITF MHKTCFS 資助項目贊助承諾函

劉紹強教授及杜玉洋博士，

香港中文大學與廈門大學深圳研究院聯合申報 2025 年內地與香港聯合資助計劃「遠程手術數據高可靠傳輸與智能增強技術研究及驗證」。該項目申報成功後，本公司承諾為香港中文大學劉紹強教授團隊提供贊助資金 20 萬元港幣用以實施獲批的 ITF MHKTCFS 項目。此外，本公司承諾在該項目獲批後向香港中文大學劉紹強教授團隊捐贈四套 Xilinx ZCU102 開發套件及四張 FMC 接口千兆網口轉接卡用於實施獲批的 ITF MHKTCFS 項目。

深圳用好雲科技有限公司是一家專注於人工智能和機器學習技術的研發和應用，為廣大中小企業提供自動化的雲服務解決方案，幫助中小企業實現更大商業價值的人工智能雲服務公司。本公司認為該專案具有極高的社會意義和巨大的市場前景。除了資金資助，本公司亦將提供必要的技術支持，並將積極參與該技術的產業化過程。

特此證明！

深圳用好雲科技有限公司（蓋章）

法人或委托代理人（簽字）：

二零二五年八月十八日

Note: Appendix C (for ITS/362/24)

HKT

Feb 17, 2025

Professor Soung Chang LIEW
Department of Information Engineering
The Chinese University of Hong Kong

Mr. Yuyang DU
Department of Information Engineering
The Chinese University of Hong Kong

Dear Professor Liew and Mr. Du,

I am writing to express my enthusiastic support for your ITF seed project entitled "Multimodal LLM-Driven Semantic Communication for Low-Latency Vehicular Networks". The integration of generative Artificial Intelligence (AI) into vehicular applications represents a groundbreaking approach, and your focus on low-latency networks directly addresses a critical challenge in real-world transportation and smart city applications.

As a leader in information technology and smart IoT solutions, HKT and PCCW have successfully delivered on various smart city projects, including the smart parking system in Hong Kong and the track access management system for SMRT Train in Singapore.

I am particularly excited about the potential synergy between your project and our ongoing initiatives. Subject to company policies and relevant legal considerations, we are prepared to share our engineering expertise and industry insights with your team and provide necessary support in system implementation and testing. Upon the successful execution of the project, I look forward to engaging in in-depth discussions with you on potential commercialization.

It would be an honor to contribute to the profound impact your work will have on the future of wireless networks and smart transportation. I eagerly anticipate collaborating with you to bring this innovative project to fruition.

Sincerely,

Dr. Chung Ng
Head of Technology & Strategy, Hong Kong Telecommunications (HKT) Limited
pc.ng@pccw.com / +852 2888 3355

Note: Appendix C (for ITS/362/24)

HUAWEI

# 香港创新科技署创新及科技支援计划项目
# 支 持 函

香港中文大学刘绍强教授及杜玉洋博士：

本部门谨此确认已知悉贵团队正在申请的香港创新科技署创新及科技支援计划项目“面向低时延车联网的多模态大模型驱动语义通信技术”的相关内容。我们认为，该项目在创新性、技术可行性及商业化价值方面具有明显优势，特别是在提升车联网通信效率方面展现出重要的应用潜力。

海思无线终端芯片团队长期专注于移动终端芯片的创新研发及解决方案配套，并与华为智能汽车解决方案事业部在多项技术研发中保持紧密合作。贵团队在无线通信与人工智能领域的研究能力广受业内认可。我们期待贵团队在该项目上的研究能取得积极成果，为车联网技术的进一步发展提供助力。

未来，我们愿就该项目与贵团队进一步交流，共同探讨相关技术方向及合作可能。

特此支持，预祝项目申请顺利！

涂志国

华为技术有限公司

海思半导体有限公司

无线终端芯片解决方案部

硬件工程部部长 / 高级技术专家

2025年10月10日

智流形机器人
从制造到智造

Professor Pheng Ann Heng
Department of Computer Science and Engineering
The Chinese University of Hong Kong

Professor Soung Chang Liew
Department of Information Engineering
The Chinese University of Hong Kong

Doctor Yuyang Du
Department of Information Engineering
The Chinese University of Hong Kong

Note: Appendix D

Dear Prof. Heng, Prof. Liew and Dr. Du,

I am writing to express my enthusiastic support for your ITSP funding application, "AI-Empowered Self-Driving Labs for Automated Pharmaceutical Synthesis and Validations". The integration of AI and robotic automation into industrial manufacturing represents a groundbreaking approach, addressing practical challenges in pharmaceutical production while paving the way for next-generation smart factories.

As a leading provider of intelligent robotic solutions, Shenzhen iManifold Robotics Technology Co., Ltd. (iManifold) specializes in delivering advanced solutions that combine algorithms, hardware, and software to meet the demands of smart manufacturing. Since our founding, we have developed a range of products, including robotic control systems, edge computing platforms, and intelligent manufacturing solutions, which are widely applied across industries. With a core team of experts from top universities and leading companies, iManifold has over a decade of technical expertise and market insights, enabling us to deliver cutting-edge solutions tailored to diverse industrial needs.

iManifold has already built a strong collaboration with your CUHK team. Our joint efforts led to the development of IndusGCC, a groundbreaking paper recently accepted by NeurIPS 2025, one of the most prestigious international AI conferences. This work highlights key breakthroughs in LLM-driven automation and intelligent control for industry equipment. The proposed RIF project, with its focus on automated mechanical control in factories and labs, is a natural extension of this success. With this solid foundation of mutual collaboration, iManifold and your CUHK team are uniquely positioned to deliver impactful results through this funding initiative.

Building on the success of IndusGCC, iManifold will actively contribute to the design and implementation of next-generation industrial instrument control LLMs. We will also leverage our expertise in robotic arm control units and edge computing to provide necessary design input and hands-on support for deploying the automated systems highlighted in the proposed RIF project.

iManifold is fully committed to supporting this RIF proposal. We are confident this collaboration will drive significant advancements in AI-powered automation and set new standards for LLM-driven industrial control. Should you require further information or assistance, please feel free to contact me directly.

Sincerely,

Yue Liu
Chief Executive Officer & Legal Representative,
Shenzhen iManifold Robotics Technology Co., Ltd.
liu.yue@imanifold.cn / +86 13826566220

项 目 编 号：SGDX20230821094359004　　计 划 年 度：2024

项 目 类 别：深港澳科技计划（C类）　　计 划 类 别：协同创新专项

下 达 文 号：深科创资【2024】20号　　资 金 类 别：深圳市科技研发资金

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# 深圳市科技计划项目合同书
# （深港澳C类）

项 目 名 称：高性能物联网中的多数据流超高可靠组网与即时通信技术

实 施 期 间：2024-05-24至2026-05-23

管 理 单 位（甲 方）：深圳市科技创新局

承 担 单 位（乙 方）：香港中文大学　　（盖章）

通 讯 地 址：香港中文大学何善衡工程学大楼七楼709 室

项目负责人：刘绍强　　联系电话：[redacted]　　电邮：soung@ie.cuhk.edu.hk

行政联络人：邓秀君　　联系电话：[redacted]　　电邮：orkts_grants@cuhk.edu.hk



## 深圳市科技创新局制

## 二〇二四年一月

## 一、研究内容和任务（不超过5000字）

为了满足在新兴物联网应用中严格超高可靠性和低延迟要求，本项目提出了两种物联网技术范式：软源信息组合（SSIC）和即时通信（JIT）。SSIC通过在多个流中分配多个数据包的副本来增强数据包传递的可靠性，JIT则实现了具有严格请求-响应延迟要求的客户端-服务器物联网应用。该研究对深圳的物联网产业具有重要意义，可以促进无线网络领域的发展，弥合当前网络能力和未来物联网需求之间的差距。

从技术角度来看，根据我们的初步调查结果，本项目的研发内容具有很好的技术前景，并且成功的几率很高。本项目旨在开发新的无线网络框架，以满足分布式物联网应用对严格的超高可靠性和低延迟的要求。预期通过软源信息组合（SSIC）和即时通信（JIT）等新的技术框架，增强网络在这些应用中的可靠性和低延迟性能，从而提高其效率和效果。我们的初步调查集中在小规模的SSIC和JIT系统上，一些处理过程是实时的，一些是离线的。结果非常积极，表明有可能进一步扩展系统以实现更好的效果。本项目旨在构建可扩展的、具有更高可靠性和更低端到端延迟的SSIC和JIT系统。此外，需要将大部分所需的处理在线上并进行实时处理，以使系统更接近实际部署，以产生实际影响。

研究的第一阶段涉及开发和完善基于SSIC的多流网络范式，并以大规模和全面的方式实施，以为无线物联网应用提供额外可靠的数据包传递。该项目还将在多个Wi-Fi物理路径上实现SSIC系统，并将其扩展到超过两个物理路径及不同类型的网络（例如，在整个SSIC系统中包括5G网络），形成高度可靠的大规模异构网络。该阶段的目标结果是验证SSIC在降低数据包传递失败率方面的有效性，并为短距离物联网通信提供超可靠的数据包传递。

第二阶段涉及实现和完善即时通信（JIT）通信，这是另一种网络范式，能够支持具有严格请求-响应延迟要求的客户端-服务器物联网应用。在我们的初步调查中，我们在基于片上系统（SoC）平台上实现了基于时分多址（TDMA）网络的JIT系统。除了TDMA之外，本项目还将结合载波侦听多址（CSMA）网络，以使JIT系统能够支持大规模物联网应用场景。该阶段的目标结果是显著降低具有JIT支持的客户端-服务器物联网应用的请求-响应延迟。

本项目还提到了初步研究结果和支持数据，证明了项目的可行性。例如，申报书中提到了几个与无线网络和分布式物联网应用领域相关的参考文献，这些文献指出了改进可靠性和低延迟性能的需求。申报书中还提到了一个小规模的JIT系统，研究团队已经在SoC平台上实现了该系统，这为JIT通信的可行性提供了初步证据。申报书还提到了在测试平台上进行的实验，旨在验证SSIC在降低数据包传递失败率方面的有效性，并为短距离物联网通信提供超可靠的数据包传递。

总体而言，本项目概述了一个可行且有前途的研究和开发计划，可以导致开发新的无线网络框架，以满足分布式物联网应用对严格的超高可靠性和低延迟的要求。本项目确定了几个初步研究结果和支持数据，证明了该项目的可行性，而且所提出的研究和开发方法及责任方似乎是适当和合适的，能够实现项目的目标。

## 五、项目组成员

| 序号 | 角色 | 姓名 | 证件号码 | 职称 | 学历 | 工作方式 | 所在单位 | 签名 |
|---|---|---|---|---|---|---|---|---|
| 1 | 项目负责人 | 刘绍强 | [redacted] | 教授 | 博士 | 全职 | 香港中文大学 | |
| 2 | 主要成员 | 王滔滔 | [redacted] | 副教授 | 博士 | 全职 | 深圳大学 | |
| 3 | 主要成员 | 杨晴 | [redacted] | 副教授 | 博士 | 全职 | 深圳大学 | |
| 4 | 主要成员 | 杜玉洋 | [redacted] | 无 | 硕士 | 全职 | 香港中文大学 | |
| 5 | 主要成员 | 曹佳琪 | [redacted] | 无 | 博士 | 全职 | 深圳大学 | |

**说明：**

1. **项目负责人全职受聘于承担单位（全职是指从承担单位支取薪酬的人士，例如本地大学的现有教职员）。**

2.**主要成员最多4人。**

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Note: Appendix F

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November 23, 2025

**Re: Recommendation for Dr. Yuyang Du's Application to [redacted]**

Dear Sir/Madam,

I am writing to express my strongest support for Dr. Yuyang Du's application [redacted]. As Dr. Du's PhD thesis supervisor and postdoctoral advisor, I have had the privilege of working closely with him for over five years. During this time, I have observed his exceptional academic and professional growth, and I firmly believe he is an outstanding candidate for this program.

**Dr. Du has demonstrated exceptional research strengths in interdisciplinary fields, particularly at the intersection of advanced wireless networks and generative AI.** His research potential is evident in his publications across leading venues, including IEEE TWC, IEEE TCOM, and IEEE ComMag for wireless communications; NeurIPS, ICLR, and ICCV for AI; IEEE ICRA for robotics; and ACM Mobisys for networking systems. To date, Dr. Du has published 27 papers in top-tier journals and conferences, with 24 of them as the first/co-first author, corresponding author, or project lead. These accomplishments underscore his ability to tackle critical challenges with innovative, cross-disciplinary solutions.

**In addition to his research achievements, Dr. Du has been an indispensable contributor to grant applications and project management within my group.** Recognizing his interest in pursuing an academic career, I encouraged him to gain experience in grant applications under my guidance. He began contributing to major funding applications in 2022, during which he designed experiments and collected key data for a GRF application. Since then, he has played an integral role in supporting my group's grant applications, including FITE'24, CRF'24, and CRF'25. Most recently, for the GRF'25 application, he prepared an initial proposal draft and, together with me, completed a high-quality final submission, exemplifying his maturity and proficiency in preparing competitive funding proposals within the Hong Kong UGC system.

**Beyond UGC funding, Dr. Du has also served as a Co-Investigator for several ITC applications within my group**, including one ITSP project and two MHKTCFS projects (currently pending results), as well as his first ITSP submission in 2023. Alongside his extensive contributions to proposal preparation, Dr. Du plays a crucial role in project execution and completion once projects are accepted. Notably, as a project Co-Investigator, Dr. Du has made significant contributions to an ongoing Shenzhen-Hong Kong Science and Technology Program funded by STIC in Mainland China, where he supports the Hong Kong-side project execution and helps ensure the timely delivery of project milestones. These experiences have equipped him with the skills not only to secure

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competitive funding but also to manage and deliver complex, multi-stakeholder projects effectively.

**Dr. Du has also assisted me in mentoring junior PhD students in my group since the final year of his PhD.** Under my supervision, he has exhibited exceptional dedication and patience as a mentor, which has positively impacted his mentees' success. For instance, in the 2024 Fall PhD intake, the three students he helped mentor – despite joining without prior master's training – achieved remarkable research outcomes within their first year. Each of them submitted an IEEE Transactions-style paper and had multiple conference papers accepted. These results reflect both the collaborative mentoring environment I foster in my group and Dr. Du's contributions, highlighting his technical expertise and his supportive, detail-oriented approach to student development.

**In addition to his research and mentoring contributions, Dr. Du has demonstrated strong teaching skills.** He served as a Teaching Assistant for my Computer Networks course in Fall 2021 and Fall 2023, excelling in delivering tutorial sessions, answering student questions, and facilitating labs. His ability to clearly and effectively communicate complex technical concepts, combined with his strong sense of responsibility, earned him high praise from both students and colleagues. These experiences highlight his potential as a dedicated and effective educator, further supporting his readiness for a professorial role.

The above examples clearly illustrate Dr. Du's highly promising potential as an interdisciplinary researcher, his mature ability to lead and execute funded research projects, and his dedication to mentoring and teaching – all essential skills for a successful Principal Investigator.

If Dr. Du is granted the opportunity to join [redacted], I am confident that his skills and experience will allow him to quickly adapt to the responsibilities of a professor's role. While he is fully capable of thriving independently, I look forward to maintaining a professional collaboration with him on cross-institutional funding applications, leveraging our complementary expertise to secure impactful research grants and further advance his academic career.

Without hesitation, I wholeheartedly and unreservedly recommend Dr. Du for the [redacted]. I am confident that he is exceptionally well-qualified and will make significant contributions to HKU.

Truly yours,

Soung Chang LIEW
Choh-Ming Li Professor of Information Engineering
Co-Director, Institute of Network Coding
The Chinese University of Hong Kong