Long BAI

PERSONAL INFORMATION

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- **Homepage:** longbai-cuhk.github.io

EDUCATION

Department of Electronic Engineering, The Chinese University of Hong Kong, China   **2021.08-2025.07**
- **Degree & Major:** Doctor of Philosophy, Electronic Engineering
- **Advisor:** Prof. Hongliang Ren, SMIEEE, RPAI (Robotics, Perception and AI) Group
- **CUHK Vice-Chancellor's Ph.D. Scholarship Scheme**

School of Optics and Photonics, Beijing Institute of Technology (BIT), China   **2017.09-2021.06**
- **Degree & Major:** Bachelor of Science, Opto-Electronics Information Science and Engineering
- **CGPA:** 3.55/4.0
- **Advisor:** Prof. Kun Gao

INTERNSHIP & VISITS

Department of Engineering, University of Cambridge, UK   **2021.12-2021.12**
- **Program:** Winter School in Smart Materials for Soft Robots
- **Activities & Societies:** Fundamentals of Smart (self-healing, sensing, actuating) Materials, Biology and Design, Actuation, Sensing and Control/AI in Soft Robotics

School of Information and Electronics, Beijing Institute of Technology, China   **2020.08-2020.11**
- **Position:** Research Intern in Digital Image Processing
- **Advisor:** Dr. Mingfeng Lu, Beijing Key Laboratory of Fractional Signals and Systems

Department of Electrical and Computer Engineering, University of Miami, USA   **2020.06-2020.08**
- **Position:** Research Intern in Medical Image Analysis
- **Advisor:** Prof. Mohamed Abdel-Mottaleb, FIEEE, Chair Professor

ACADEMIC AWARDS

- **CUHK Vice-Chancellor's Ph.D. Scholarship Scheme**   **2021.08-2025.07**
  Awarded to top applicants to the Ph.D. programme in CUHK. Eligibility: a clear record of academic and/or research achievements, a high degree of intellectual curiosity combined with creativity, and potential for academic/professional leadership.

- **Best Student Paper Award, ICBIR 2023**   **2023**
  *As the **presenting** author, awarded to student papers judged to be the best in ICBIR 2023. Awards are scored by the Award Committee Chairs.*

- **Best Poster Award, IEEE ICRA 2023 Workshop on Surgical Robotics**   **2023**
  *As the **presenting** author, awarded to top presenters among 30 groups in ICRA 2023 Workshop on New Evolutions in Surgical Robotics: Embracing Multimodal Imaging Guidance, Intelligence, and Bio-inspired Mechanisms. Awards are voted by the invited speakers/guests.*

- **IEEE ICRA 2023 RAS Travel Grants Award**   **2023**
  Awarded to participants who is going to present papers at ICRA 2023, applications are reviewed on a competitive basis.

- **Merit Award, The Engineering Medical Innovation Global Competition (EMedIC Global)**   **2021**
  Awarded to finalist teams in Medical Innovation Global Competition 2021.

- **BIT Academic Excellent Scholarship**   **2020**
  Awarded to top 5% undergraduate students in the university.

PUBLICATIONS

(† indicates equal contribution, * represents the corresponding authors.)

CONFERENCES:

[1] **Sample-adaptive Augmentation for Point Cloud Recognition Against Real-world Corruptions**
Jie Wang, Lihe Ding, Tingfa Xu, Shaocong Dong, Xinli Xu, **Long Bai**, Jianan Li*
*19th International Conference on Computer Vision (**ICCV**), 2023.*

[2] **LLCaps: Learning to Illuminate Low-Light Capsule Endoscopy with Curved Wavelet Attention and Reverse Diffusion**
Long Bai†, Tong Chen†, Yanan Wu, An Wang, Mobarakol Islam, Hongliang Ren*
*26th International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), 2023.*
(Oral, Top 3%)

[3] **Revisiting Distillation for Continual Learning on Visual Question Localized-Answering in Robotic Surgery**
Long Bai†, Mobarakol Islam†, Hongliang Ren*
*26th International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), 2023.*

[4] **Co-Attention Gated Vision-Language Embedding for Visual Question Localized-Answering in Robotic Surgery**
Long Bai†, Mobarakol Islam†, Hongliang Ren*
*26th International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), 2023.*

[5] **Surgical-VQLA: Gated Vision-Language Embedding for Visual Question Localized-Answering in Robotic Surgery**
Long Bai†, Mobarakol Islam†, Lalithkumar Seenivasan, Hongliang Ren*
*40th IEEE International Conference on Robotics and Automation (**ICRA**), 2023.*
(RAS Travel Grant Award)

[6] **Landmark Detection using Transformer Toward Robot-assisted Nasal Airway Intubation**
Tianhang Liu, Hechen Li, **Long Bai**, Yanan Wu, An Wang, Mobarakol Islam, Hongliang Ren
*International Conference on Biomimetic Intelligence and Robotics & Medical Robotics Forum (**ICBIR**), 2023.*
(Best Student Paper Award)

[7] **Semi-supervised Learning for Segmentation of Bleeding Regions in Video Capsule Endoscopy**
Hechen Li, Yanan Wu, **Long Bai**, An Wang, Tong Chen, Hongliang Ren
*International Conference on Biomimetic Intelligence and Robotics & Medical Robotics Forum (**ICBIR**), 2023*

[8] **Deep Reinforcement Learning-Based Control for Stomach Coverage Scanning of Wireless Capsule Endoscopy**
Yameng Zhang†, **Long Bai**†, Li Liu*, Hongliang Ren*, Max Q.-H. Meng
*18th IEEE International Conference on Robotics and Biomimetics (**ROBIO**), 2022.*

[9] **The Influence of Age and Gender Information on the Diagnosis of Diabetic Retinopathy: Based on Neural Network**
Long Bai†*, Sihang Chen†, Mingyang Gao†, Lelia Abdelrahman, Manal Al Ghamdi, Mohamed Abdel-Mottaleb
*43rd International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC**), 2021.*

JOURNALS:

[1] **Rethinking Exemplars for Continual Semantic Segmentation in Endoscopy Scenes: Entropy-based Mini-Batch Pseudo-Replay**
Guankun Wang†, **Long Bai**†, Yanan Wu, Tong Chen, Hongliang Ren*
*Computers in Biology and Medicine (**CBM**), 2023. (IF: 7.7)*

[2] **Rethinking Pain Communication for Dementia: Interaction Design using E-textile**
Yanheng Li, **Long Bai**, Yaxuan Mao, Hongliang Ren, Yu Qiao, Xin Tong, Ray LC*
Frontiers in Physiology, 2023. (IF: 4.0)

[3] **Two-stage Contextual Transformer-based Convolutional Neural Network for Airway Extraction from CT Images**
Yanan Wu, Shuiqing Zhao, Shouliang Qi*, Jie Feng, Haowen Pang, Runsheng Chang, **Long Bai**, Mengqi Li, Shuyue Xia, Wei Qian, Hongliang Ren*
Artificial Intelligence in Medicine, 2023. (IF: 7.5)

[4] **Domain Adaptive Sim-to-Real for Oropharyngeal Organs Segmentation**
Guankun Wang, Tian-Ao Ren, Jiewen Lai, **Long Bai**, Hongliang Ren*
*Medical & Biological Engineering & Computing (**MBEC**), 2023. (IF: 3.2)*

[5] **Transformer-based 3D U-Net for Pulmonary Vessel Segmentation and Artery-vein Separation from CT Images**
Yanan Wu, Shouliang Qi*, Meihuan Wang, Shuiqing Zhao, Haowen Pang, Jiaxuan Xu, **Long Bai**, Hongliang Ren*
*Medical & Biological Engineering & Computing (**MBEC**), 2023. (IF: 3.2)*

[6] **An RNN-LSTM Enhanced Compact and Affordable Micro Force Sensing System for Interventional Continuum Robots with Interchangeable End-Effector Instruments**
Shilong Yao[†], Ruijie Tang[†], **Long Bai**, Hong Yan, Hongliang Ren*, Li Liu*
*IEEE Transactions on Instrument & Measurement (**T-IM**), 2022. (IF: 5.6)*

[7] **Transformer-based Disease Identification for Small-scale Capsule Endoscopy Dataset**
Long Bai, Liangyu Wang, Tong Chen, Yuanhao Zhao, Hongliang Ren*
Electronics, 2022. (IF: 2.9)

WORKSHOPS & POSTERS:
[1] **Sim-to-Real Segmentation in Robot-assisted Transoral Tracheal Intubation**
Guankun Wang, Tian-Ao Ren, Jiewen Lai, **Long Bai**, Hongliang Ren*
40th IEEE International Conference on Robotics and Automation (ICRA), 2023, Workshop on New Evolutions in Surgical Robotics.
(Best Poster Award)

[2] **The Exploration and Evaluation of Using Neural Style Transfer in Generating Affective 360° Panoramic VR Environments**
Yanheng Li, **Long Bai**, Yaxuan Mao, Xuening Peng, Zehao Zhang, Xin Tong*, Ray LC*
30th IEEE Conference on Virtual Reality and 3D User Interfaces (VR), 2023, Poster.

PREPRINT & UNDER REVIEW:
[1] **Surgical Tool Classification and Localization: Results and Methods from the MICCAI 2022 SurgToolLoc Challenge**
Aneeq Zia, Kiran Bhattacharyya, Xi Liu, Max Berniker, Ziheng Wang, Rogerio Nespolo, …, **Long Bai**, et al.
ArXiv Preprint ArXiv:2305.07152.

[2] **Learning Monocular Depth and Ego-motion for Multimodal Wireless Capsule Endoscopy**
Liangyu Wang[†], **Long Bai**[†], Shilong Yao, Yanheng Li, Sishen Yuan, Yanan Wu, Yang Zhang, Max Q.-H. Meng, Zhen Li, Hongliang Ren*
Artificial Intelligence in Medicine, 2023, Under Review.

[3] **Revisiting Consistent and Contrastive Augmentations in Semi-supervised Skill Assessment in Robotic Surgery**
Long Bai[†], Qiaozhi Tan[†], Wenzhen Dong, Lalithkumar Seenivasan, Beilei Cui, An Wang, Mobarakol Islam, Hongliang Ren*
*International Journal for Computer Assisted Radiology and Surgery (**IJCARS**), IPCAI 2024 Special Issue, Under Review.*

[4] **Towards Open-Set Surgical Activity Recognition in Robot-assisted Surgery**
Long Bai[†], Guankun Wang[†], Jie Wang, Xiaoxiao Yang, Huxin Gao, Xin Liang, An Wang, Mobarakol Islam, and Hongliang Ren*
*40th IEEE International Conference on Robotics and Automation (**ICRA**), Under Review, 2023.*

[5] **Privacy-Preserving Synthetic Continual Semantic Segmentation for Robotic Surgery**

Mengya Xu[†], Mobarakol Islam[†], **Long Bai**, Hongliang Ren*
*IEEE Transactions on Medical Imaging (**T-MI**), 2023, Under 2nd Review.*

[6] **Joint Sparse Representations and Coupled Dictionary Learning in Multi-Source Heterogeneous Image Pseudo-color Fusion**
Long Bai, Shilong Yao, Kun Gao*, Yanjun Huang, Ruijie Tang, Hong Yan, Max Q.-H. Meng, Hongliang Ren*
IEEE Sensors Journal, 2023, Under 3rd Review.

PROFESSIONAL ACTIVITIES

✦ **Journal Reviews:**
IEEE Transactions on Medical Imaging (T-MI)
IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)
IEEE Transactions on Instrumentation and Measurement (T-IM)
Medical & Biological Engineering & Computing (MBEC)
IEEE Open Journal of Instrumentation & Measurement (OJIM)
Journal of Systems and Control Engineering (JSCE)
Journal of Medical Robotics Research (JMRR)

✦ **Conference Reviews:**
International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)
International Conference on Information Processing in Computer-Assisted Interventions (IPCAI)
ACM CHI Conference on Human Factors in Computing Systems (CHI)
IEEE Conference on Virtual Reality and 3D User Interfaces (VR)
ACM SIGCHI Conference on Computer-Supported Cooperative Work & Social Computing (CSCW)
ACM Symposium of Eye Tracking Research & Applications (ETRA)
ACM Conference on Intelligent User Interfaces (IUI)

✦ **Invited Talk**
2023, *Surgical Visual Question Localized-Answering*, Pre-ICRA Online
2022, *Lifelong Learning: Background, Methodology and Applications*, HKUST UG

TEACHING EXPERIENCE

✦ **Thesis/Final Year Project TA and Mentorship**
CUHK Graduates in 2023 (With Prof. Hongliang Ren):
Tianhang Liu, M.Sc. EE, *Airway Intubation Landmark Detection using Transformer*
Chung Hei Tse, B.Eng. EE, *Application of Web-based AR to Medical Education Through Three.js*
CUHK Graduates in 2022 (With Prof. Hongliang Ren):
Liangyu Wang, M.Sc. EE, *Endoscope Perception Algorithms based on Multimodal Fusion*
Yuanhao Zhao, M.Sc. EE, *Ultrasound Needle Segmentation*
Chi Hung Li, B.Eng. EE, *Develop Representative Image-guided Robotic Procedures with Virtual Reality Modules*

✦ **Teaching Assistant**

Intelligent Wearable Electronics (ELEG5757), CUHK, with Prof. Hongliang Ren	2023.01-2023.04
Robotic Perception and Intelligence (ELEG3103), CUHK, with Prof. Hongliang Ren	2023.01-2023.04
Probability for Engineers (ENGG2760), CUHK, with Prof. Hongliang Ren	2022.09-2022.12
Microelectronic Devices and Circuits (ELEG3201), CUHK, with Prof. Kong Pang Pun	2022.01-2022.04
Probability for Engineers (ENGG2760), CUHK, with Prof. Hongliang Ren	2021.09-2021.12

STANDARDIZED TEST SCORES

✦ **TOEFL iBT:** Total 117 (Reading 30, Listening 30, Speaking 27, Writing 30), 2020.09.16
✦ **GRE:** Verbal 168 (98%), Quantitative 170 (96%), Analytical Writing 4.0 (55%), 2020.10.11

SKILLS

✦ **Proficient:** Python, PyTorch, MATLAB, C/C++, LaTeX, Ubuntu
✦ **Skilled:** Adobe Premiere, Unity3D

SOCIAL WORKS AND HONORS

✦ 2nd Runner-up, National Day Football Cup of Hong Kong Science, Technology, and Innovation Industry	2023
✦ 3rd Runner-up, CUHK Alumni Football Cup	2022

✦   Championship, BIT Super Football League   2021
✦   1st Runner-up, Beijing Fangshan District Futsal Competition   2019
✦   Head, BIT Campus Broadcasting Department   2018
✦   Executive Head, BIT Campus Press Corps   2018
✦   BIT Outstanding Student Reporter   2018