

# Long BAI

## PERSONAL INFORMATION

- ✦ **Email:** b.long@link.cuhk.edu.hk, b.long@ieee.org, bailong2021@outlook.com
- ✦ **Cell Phone:** (+86) 188-0013-9673, (+852) 5960-7217
- ✦ **Address:** Room 424, Ho Sin-Hang Engineering Building, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong SAR, China
- ✦ **Homepage:** [longbai-cuhk.github.io](http://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\*  
*International Conference on Computer Vision (ICCV), 2023. (CCF-A)*
- [2] **LLCaps: Learning to Illuminate Low-Light Capsule Endoscopy with Curved Wavelet Attention and Reverse Diffusion**  
Long Bai<sup>†</sup>, Tong Chen<sup>†</sup>, Yanan Wu, An Wang, Mobarakol Islam, Hongliang Ren\*  
*International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2023. (CCF-B)*  
**(Oral, Top 3%)**
- [3] **Revisiting Distillation for Continual Learning on Visual Question Localized-Answering in Robotic Surgery**  
Long Bai<sup>†</sup>, Mobarakol Islam<sup>†</sup>, Hongliang Ren\*  
*International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2023. (CCF-B)*
- [4] **Co-Attention Gated Vision-Language Embedding for Visual Question Localized-Answering in Robotic Surgery**  
Long Bai<sup>†</sup>, Mobarakol Islam<sup>†</sup>, Hongliang Ren\*  
*International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2023. (CCF-B)*
- [5] **Surgical-VQLA: Gated Vision-Language Embedding for Visual Question Localized-Answering in Robotic Surgery**  
Long Bai<sup>†</sup>, Mobarakol Islam<sup>†</sup>, Lalithkumar Seenivasan, Hongliang Ren\*  
*IEEE International Conference on Robotics and Automation (ICRA), 2023. (CCF-B)*  
**(RAS Travel Grants 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<sup>†</sup>, Long Bai<sup>†</sup>, Li Liu\*, Hongliang Ren\*, Max Q.-H. Meng  
*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<sup>\*</sup>, Sihang Chen<sup>†</sup>, Mingyang Gao<sup>†</sup>, Lelia Abdelrahman, Manal Al Ghamdi, Mohamed Abdel-Mottaleb  
*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<sup>†</sup>, Long Bai<sup>†</sup>, 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<sup>†</sup>, Ruijie Tang<sup>†</sup>, **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\*  
*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. (CCF-A)

**PREPRINT & UNDER REVIEW:**[1] **Surgical-VQLA++: Adversarial Contrastive Learning for Calibrated Robust Visual Question Localized-Answering in Robotic Surgery**

**Long Bai**<sup>†</sup>, Guankun Wang<sup>†</sup>, Mobarakol Islam<sup>†</sup>, Lalithkumar Seenivasan, An Wang, Hongliang Ren\*  
*Information Fusion*, Under Review. (IF: 18.6)

[2] **Revisiting Consistent and Contrastive Augmentations in Semi-supervised Skill Assessment in Robotic Surgery**

**Long Bai**<sup>†</sup>, Qiaozhi Tan<sup>†</sup>, Wenzhen Dong, Lalithkumar Seenivasan, Beilei Cui, An Wang, Mobarakol Islam, Hongliang Ren\*  
*International Journal for Computer Assisted Radiology and Surgery (IJCARs)-IPCAI 2024*, Under Review. (IF: 3.0)

[3] **Towards Open-Set Surgical Activity Recognition in Robot-assisted Surgery**

**Long Bai**<sup>†</sup>, Guankun Wang<sup>†</sup>, Jie Wang, Xiaoxiao Yang, Huxin Gao, Xin Liang, An Wang, Mobarakol Islam, and Hongliang Ren\*  
*IEEE International Conference on Robotics and Automation (ICRA)*, Under Review, 2023. (CCF-B)

[4] **Learning Monocular Depth and Ego-motion for Multimodal Wireless Capsule Endoscopy**

Liangyu Wang<sup>†</sup>, **Long Bai**<sup>†</sup>, 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. (IF: 7.5)

[5] **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 Nespola, ..., **Long Bai**, et al.  
*ArXiv Preprint ArXiv:2305.07152*.

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

Mengya Xu<sup>†</sup>, Mobarakol Islam<sup>†</sup>, **Long Bai**, Hongliang Ren\*  
*IEEE Transactions on Medical Imaging (T-MI)*, 2023, Under 2<sup>nd</sup> Review. (IF: 10.6)

[7] **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 3<sup>rd</sup> Review. (IF: 4.3)

**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

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|--|------|
| ★ 2 <sup>nd</sup> Runner-up, National Day Football Cup of Hong Kong Science, Technology, and Innovation Industry | 2023 |
| ★ 3 <sup>rd</sup> Runner-up, CUHK Alumni Football Cup  | 2022 |
| ★ Championship, BIT Super Football League  | 2021 |
| ★ 1 <sup>st</sup> 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 |