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RESEARCH INTERESTS

My research focuses on vision navigation, 3D reconstruction and surgical robotics. I have strong interests in computer vision, graphics, deep learning, augmented/virtual reality and robotics.

SKILLS

Image processing, neural rendering, registration and calibration, Python, C++, PyTorch, Blender

EDUCATION

Johns Hopkins University 2018 - 2023 (expected)
Ph.D. Computer Science
Advised by Prof. Mathias Unberath, Prof. Russell H. Taylor

University of British Columbia 2013 - 2018
B.S. Robotics Engineering
Advised by Advised by Prof. Septimium E. Salcudean

SELECTED WORK

Neuralangelo: High-Fidelity Neural Surface Reconstruction
Zhaoshuo Li, Thomas Müller, Alex Evans, Russell H Taylor, Mathias Unberath, Ming-Yu Liu, Chen-Hsuan Lin
Arxiv, 2023

TATToo: Vision-based Joint Tracking of Anatomy and Tool for Skull-base Surgery
Zhaoshuo Li, Hongchao Shu, Ruixing Liang, Anna Goodridge, Manish Sahu, Francis X Creighton, Russell H Taylor, Mathias Unberath
Arxiv, 2023

Temporally Consistent Online Depth Estimation in Dynamic Scenes
Zhaoshuo Li, Wei Ye, Dilin Wang, Francis X Creighton, Russell H Taylor, Ganesh Venkatesh, Mathias Unberath
WACV, 2023

Revisiting stereo depth estimation from a sequence-to-sequence perspective with transformers
Zhaoshuo Li, Xingtong Liu, Nathan Drenkow, Andy Ding, Francis X Creighton, Russell H Taylor, Mathias Unberath
ICCV, 2021 (Oral)

Anatomical Mesh-Based Virtual Fixtures for Surgical Robots
Zhaoshuo Li, Alex Gordon, Thomas Looi, James Drake, Christopher Forrest, Russell H Taylor
IROS, 2020

WORK EXPERIENCE

Nvidia Research, Internship. Summer 2022

Reality Labs, Meta Inc., Internship. Summer 2021

Intuitive Inc., Internship. Summer 2019

PUBLICATIONS/PREPRINTS

Vision navigation and 3D Reconstruction

Rethinking Causality-driven Robot Tool Segmentation with Temporal Constraints

Hao Ding, Jie Ying Wu, **Zhaoshuo Li**, Mathias Unberath

Arxiv, 2022

Context-Enhanced Stereo Transformer

Weiyu Guo, **Zhaoshuo Li**, Yongkui Yang, Zheng Wang, Russell H Taylor, Mathias Unberath, Alan Yuille, Yingwei Li

ECCV, 2022

SAGE: SLAM with Appearance and Geometry Prior for Endoscopy

Xingtong Liu, **Zhaoshuo Li**, Masaru Ishii, Gregory D Hager, Russell H Taylor, Mathias Unberath

ICRA, 2022

E-DSSR: Efficient Dynamic Surgical Scene Reconstruction with Transformer-based Stereoscopic Depth Perception

Yonghao Long*, **Zhaoshuo Li***, Chi Hang Yee, Chi Fai Ng, Russell H Taylor, Mathias Unberath, Qi Dou

MICCAI, 2021

On the Sins of Image Synthesis Loss for Self-supervised Depth Estimation

Zhaoshuo Li, Nathan Drenkow, Hao Ding, Andy S. Ding, Alexander Lu, Francis X Creighton, Russell H Taylor, Mathias Unberath

Technical Report, 2021

Surgical Robotics

Twin-S: A Digital Twin for Skull-base Surgery

Hongchao Shu*, Ruixing Liang*, **Zhaoshuo Li***, Anna Goodridge, Xiangyu Zhang, Hao Ding, Nimesh Nagururu, Manish Sahu, Francis X Creighton, Russell H Taylor, Adnan Munawar, Mathias Unberath

Arxiv, 2022

Virtual reality for synergistic surgical training and data generation

Adnan Munawar, **Zhaoshuo Li**, Punit Kunjam, Nimesh Nagururu, Andy S. Ding, Peter Kazanzides, Thomas Looi, Francis X Creighton, Russell H Taylor, Mathias Unberath

AE-CAI, 2021 (Best paper award)

Evaluation of Hybrid Control and Palpation Assistance for Situational Awareness in Telemanipulated Task Execution

Rashid Yasin, Preetham Chalasani, Nicolas Zevallos, Mahya Shahbazi, **Zhaoshuo Li**, Anton Deguet, Peter Kazanzides, Howie Choset, Russell H Taylor, Nabil Simaan

TMRB, 2020

A Robotic 3D Perception System for Operating Room Environment Awareness

Zhaoshuo Li, Amirreza Shaban, Jean-Gabriel Simard, Dinesh Rabindran, Simon DiMaio, Omid Mohareri

IPCAI, 2020

Hybrid Robot-assisted Frameworks for Endomicroscopy Scanning in Retinal Surgeries

Zhaoshuo Li, Mahya Shahbazi, Niravkumar Patel, Eimear O' Sullivan, Haojie Zhang, Khushi Vyas, Preetham Chalasani, Anton Deguet, Peter L Gehlbach, Iulian Iordachita, Guang-Zhong Yang, Russell H Taylor

TMRB, 2020

A Novel Semi-Autonomous Control Framework for Retina Confocal Endomicroscopy Scanning

Zhaoshuo Li, Mahya Shahbazi, Niravkumar Patel, Eimear O'Sullivan, Haojie Zhang, Khushi Vyas, Preetham Chalasani, Peter L Gehlbach, Iulian Iordachita, Guang-Zhong Yang, Russell H Taylor

IROS, 2019

Free head movement eye gaze contingent ultrasound interfaces for the da vinci surgical system

Zhaoshuo Li, Irene Tong, Leo Metcalf, Craig Hennessey, Septimiu E Salcudean

ICRA, 2018

Eye Gaze Contingent Ultrasound Interfaces for the da Vinci Surgical System

Zhaoshuo Li, Irene Tong, Septimiu E Salcudean

IROS, 2017

Clinical Analysis

Statistical Shape Model of the Temporal Bone Using Segmentation Propagation

Andy S Ding, Alexander Lu, **Zhaoshuo Li**, Deepa Galaiya, Masaru Ishii, Jeffrey H Siewerdsen, Russell H Taylor, Francis X Creighton

Otology & Neurotology, 2022

Automated Extraction of Anatomical Measurements From Temporal Bone CT Imaging

Andy S Ding, Alexander Lu, **Zhaoshuo Li**, Deepa Galaiya, Masaru Ishii, Jeffrey H Siewerdsen, Russell H Taylor, Francis X Creighton

Otolaryngology–Head and Neck Surgery, 2022

Automated registration-based temporal bone computed tomography segmentation for applications in neurotologic surgery

Andy S Ding, Alexander Lu, **Zhaoshuo Li**, Deepa Galaiya, Jeffrey H Siewerdsen, Russell H Taylor, Francis X Creighton

Otolaryngology–Head and Neck Surgery, 2021

An Interpretable Approach to Automated Severity Scoring in Pelvic Trauma

Anna Zapaishchykova, David Dreizin, **Zhaoshuo Li**, Jie Ying Wu, Shahrooz Faghih Roohi, Mathias Unberath

MICCAI, 2021

Volumetric Accuracy Analysis of Virtual Safety Barriers for Cooperative-Control Robotic Mastoidectomy

Andy S Ding, Sarah Capostagno, Christopher R Razavi, **Zhaoshuo Li**, Russell H Taylor, John P Carey, Francis X Creighton

Otology & Neurotology, 2021