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RESEARCH INTERESTS

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

TECHNICAL SKILLS

Image processing, feature extraction and matching, surface reconstruction, point cloud processing, semantic segmentation, neural rendering, calibration, optimization, SLAM, SfM
Python, C++, MATLAB, PyTorch, OpenCV, Open3D, 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 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
In submission, 2023

TAToo: 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
IPCAI, 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

IPCAI, 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

Robotics and Mixed Reality

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

IPCAI, 2023

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