

Jerrin Bright

3D Vision | Computer Graphics | Digital Humans

✉ jerrin.bright@uwaterloo.ca 📁 Portfolio 🎓 Google Scholar 🔗 LinkedIn

Education

University of Waterloo

PhD in Systems Design Engineering

Ontario, Canada

Sep 2024 - Present

- **Research:** Realistic 4D Human Modeling with Scene-aware Dynamics.
- **Supervisor:** Dr. John S Zelek.
- **Group:** Sports Analytics Research Group, Vision and Image Processing (VIP) Lab.

University of Waterloo

MASc in Systems Design Engineering

Ontario, Canada

Sep 2022 - Aug 2024

- **Research:** Monocular 3D Human Modeling and Analysis for Baseball Sports Analysis.
- **Supervisor:** Dr. John S Zelek.
- **Group:** Sports Analytics Research Group, Vision and Image Processing (VIP) Lab.
- **Courses:** Probabilistic Machine Learning, Graphical Deep Learning, Advanced and Statistical Image Processing.

Research Experiences

Baltimore Orioles

MITACS Accelerate Research Intern

Maryland, USA

Sep 2022 - Present

- Implementing end-to-end player kinematics estimation and analysis for baseball players from broadcast videos.
- Built novel transformer and temporal convolution networks to reconstruct and analyze baseball players.
- Utilized cutting-edge techniques including Gaussian Splatting to synthesize novel viewpoint 3D sequences using motion data generated from diffusion models and human deformations from 3D human prior models.

Indian Institute of Science

Research Intern, Conjunction with Artificial Intelligence and Robotics Lab & ARTPARK

Bangalore, India

Jul 2021 - Apr 2022

- Developed autonomous navigation for UAVs in unstructured environments using visual and event sensor data.
- Implemented transformer-based depth estimation and MPC with barrier functions for efficient UAV navigation.
- Gained hands-on experience with Jetson boards, RealSense cameras, Turtlebot, DJI M600, and custom UAVs.

McMaster University

MITACS Globalink Research Intern, Robotics and Manufacturing Automation Lab

Ontario, Canada

Jul 2021 - Sep 2021

- Built and simulated a 4-DoF soft robotic manipulator using PyBullet and the SoMo toolkit.
- Analyzed manipulator behavior by simulating actions with sinusoidal torques and visualizing the resulting motion.

Arizona State University

Summer Research Intern, Edifice Lab

Arizona, USA

May 2021 - Jul 2021

- Developed a digital environment capture system using laser scanning and photogrammetry.
- Fused sensor data into a unified 3D model for reliable visualization and analysis.
- Designed DL algorithms to automate environment analysis, providing valuable insights for builders and stewards.

Aero2Astro

Autonomous System Developer - Intern

Chennai, India

Oct 2020 - Apr 2021

- Built ROS-based autonomous navigation for indoor environments using Visual-Inertial SLAM.
- Developed an odometry toolkit with ORB detector, FLANN matcher, RANSAC, Optical Flow, and PnP algorithms.
- Leveraged sensor fusion with Extended Kalman Filters to eliminate reliance on GPS, enhancing system reliability.

Yuan-Ze University

Project Research Intern, Speech and Image Processing Lab

Taoyuan City, Taiwan

Apr 2020 - Jun 2020

- Developed a robust smart parking system using deep learning for accurate vehicle detection and localization.
- Employed semantic segmentation with convolutional conditional random field to enable reliable image recognition.

Technical Skills

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| Programming Tools | Python C++ Embedded System HTML CSS |
| ML & DL Tools | PyTorch TensorFlow OpenCV Matplotlib NumPy Keras |
| Autonomous Systems Tools | AirSim ArduPilot SimulationX Gazebo RViz |
| CAD & Analysis Tools | Autodesk Fusion 360 Dassault SolidWorks Ansys |
| Operating System | Ubuntu Linux ROS Raspbian OS Windows |
| Reviewer Experience | CVIS IROS CTIS ACM MMSports EAAI IEEE TCSVT IMAVIS |

Current Projects

Semisupervised Domain Adaptation for Egocentric 3D Human Modeling | *SMPL, Transformers, HMR 2.0*
Text-driven 4D Human Modeling with Context-aware Scene Generation | *SMPL, HUGS, 3DGS-Avatar, MDM*
Motion-aware Diffusion Models for 3D Human Pose Estimation | *MotionBert, D3DP, Transformers, ViTPose*

Relevant Publications

PitcherNet: Powering the Moneyball Evolution in Baseball Video Analytics
IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (ORAL)

Distribution and Depth-Aware Transformers for 3D Human Mesh Recovery
21st Conference on Robots and Vision (ORAL)

Domain-Guided Masked Autoencoders for Unique Player Identification
21st Conference on Robots and Vision (ORAL)

Mitigating Motion Blur for Robust 3D Baseball Player Pose Modeling for Pitch Analysis
6th International ACM Workshop on Multimedia Content Analysis in Sports

Jersey Number Recognition using Keyframe Identification from Low-Resolution Broadcast Videos
6th International ACM Workshop on Multimedia Content Analysis in Sports

ME-CapsNet: A Multi-Enhanced Capsule Networks with Routing Mechanism
8th IEEE International Conference on Electronics, Computing & Communication Technologies

Teaching Experiences

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| SYDE 461 & SYDE 462 <i>Systems Design Capstone Project 1 & 2</i> | University of Waterloo Sep 2023 - Apr 2024 Sep 2024 - Present |
| SYDE 361 <i>Systems Design Methods 1: Needs Analysis and Prototyping</i> | University of Waterloo May 2024 - Aug 2024 |
| BME 361 <i>Biomedical Engineering Design</i> | University of Waterloo Jan 2023 - Apr 2023 |
| BME 101L <i>Communications in Biomedical Engineering- Visualization</i> | University of Waterloo Sep 2022 - Dec 2022 |

Scholarship

International Doctoral Student Award, University of Waterloo, Ontario, Canada
MITACS Accelerate International Award, University of Waterloo, Ontario, Canada
Graduate Research Studentship, University of Waterloo, Canada
International Master's Award of Excellence, University of Waterloo, Canada
Graduate Research Fellowship, MITACS, Canada

Honors and Awards

Best Paper Award (Computer Vision), 21st Conference on Robots and Vision, 2024
Best Research Paper Award, RIACT International Conference, 2020
Technical Program Member, ACM Workshop on Multimedia Content Analysis in Sports, 2024
Best Outgoing Student, Atom Robotics, VIT Chennai, India, 2022
Top Ten Internationally, International Planetary Aerial Challenge, 2021
Runner-up, IEEE Hackathon on Autonomous Drone Applications, 2021
Best Club Award, Robotics Club, University Day 2021, VIT Chennai, India