

SUMMARY

PhD Researcher in 3D Perception and Spatial AI at University College London | UKRI CDT Scholar in Foundational AI | Specializing in Multi-View Reconstruction, Novel View Synthesis, and Robotic Vision for Robot-Assisted Surgery

EDUCATION

Degree	Institute	Field of Study	Classification/Grade	Year
MPhil/PhD	AI Centre at University College London	Foundational Artificial Intelligence Surgical Vision	N/A	2023-2028
MSc	University College London	Biomedical Engineering and Medical Imaging	Distinction/A	2021-2022
BSc	University of Washington	Bioengineering and Mathematics	Honors/B+	2016-2020

EXPERIENCE

- Intuitive Surgical** 2025
AI Research Intern (9 months) Sunnyvale, CA
 - Engineered multi-endoscope acquisition system with custom hardware synchronization, multi-processing capture pipeline, and real-time visualization GUI
 - Created iMED dataset: 340 sequences ($\approx 170K$ frame pairs) across ex vivo, cadaveric, and live surgical scenes
 - Benchmarked 19 SOTA methods for surgical 3D reconstruction, exposing failure modes under constrained viewpoints
- University College London Hospitals NHS Foundation Trust** 2022 - 2024
Band 7 Clinical Scientist (Computational Scientist - Pre-Registered) London
 - Responsible for medical device IT, programming, SQL database management, AI integration in clinical settings
 - Improved efficiency through data cleaning, migration, and the development of an automatic ticket classifier
 - Implemented level of urgency analysis and automated responses
- Otonexus Medical Technologies** 2020 - 2021
Medical Device Design Engineer/Acoustic Engineer Seattle
 - Streamlined transducer calibration process, reducing time per device from 3 hours to 2 minutes using MATLAB, Python, and acoustic/electrical technology
- University of Washington** 2018 - 2020
Research Assistant & Teaching Assistant Seattle
 - Research Assistant: Conducted image optimization, CAD, and MATLAB simulations
 - Teaching Assistant: Instructed BIOEN 327 2019: Fluids & Materials Laboratory and BIOEN 420 2020: Medical Imaging
- University of Washington Medical Center** 2019
Full Stack Development Consultant Seattle
- Intellectual Ventures** 2016
Mechanical Engineer Intern Seattle

PUBLICATIONS & TALKS

- Peer-reviewed Conference Article (Under Review) 2025: Bonilla, Sierra, Fengyi Jiang, Chinedu Nwoye, Jingpei Lu, Kailey Reardon, Humphrey W Chow, Adam Schmidt, and Omid Mohareri.** (2025) "iMED: A Multi-Endoscope Dataset for Surgical 3D Perception."
Submitted to IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2025.
- Peer-reviewed Journal Article 2024: Saikia, Alexander, Chiara Di Vece, Bonilla, Sierra, Chloe He, Morenike Magbagbeola, Laurent Mennillo, Tobias Czempiel, Sophia Bano, and Danail Stoyanov.** (2024) "Robotic Arm Platform for Multi-View Image Acquisition and 3D Reconstruction in Minimally Invasive Surgery."
arXiv:2410.11703v1. IEEE Robotics and Automation Letters (RA-L). UCL Hawkes Institute, London, UK.
- Peer-reviewed Conference Article 2024: Bonilla, Sierra, Chiara Di Vece, Rema Daher, Xinwei Ju, Danail Stoyanov, Francisco Vasconcelos, and Sophia Bano.** (2024) "Mismatched: Evaluating the Limits of Image Matching Approaches and Benchmarks."
arXiv:2408.16445. Presentation at European Conference on Computer Vision 2024 in Milan, Italy.
- Peer-reviewed Conference Article 2024: Bonilla, Sierra, Shuai Zhang, Dimitrios Psychogyios, Danail Stoyanov, Francisco Vasconcelos, and Sophia Bano.** (2024) "Gaussian Pancakes: Geometrically-Regularized 3D Gaussian Splatting for Realistic Endoscopic Reconstruction."
DOI pending. Presentation at Medical Image Computing and Computer Assisted Intervention Conference 2024 in Marrakech, Morocco.
- Summer School Talk 2024: Bonilla, Sierra, Shuai Zhang, Dimitrios Psychogyios, Danail Stoyanov, Francisco Vasconcelos, and Sophia Bano.** (2024) "Gaussian Pancakes: Geometrically-Regularized 3D Gaussian Splatting for Realistic Endoscopic Reconstruction."
arXiv:2404.06128. Presentation at International Computer Vision Summer School 2024 in Sicily, Italy.

- **Keynote Talk 2024: Bonilla, Sierra** (2024) "3D Reconstruction in Medical Imaging."
Presentation to Medical Physics and Biomedical Engineering Department at University College London Hospitals.
- **Peer-reviewed Journal Article 2021:** Clark, Alicia, **Bonilla, Sierra**, Suo, Dingjie, Shapira, Yeruham, and Averkiou, Michalakis. 2021. "Microbubble-Enhanced Heating: Exploring the Effect of Microbubble Concentration and Pressure Amplitude on High-Intensity Focused Ultrasound Treatments."
doi:10.1016/j.ultrasmedbio.2021.03.035. Ultrasound in Medicine & Biology. England: Elsevier Inc.
- **Conference Contributed Talk 2020:** A. Clark, **S. Bonilla**, D. Suo, M. Averkiou (2020) "Enhanced Heating with Microbubbles in High Intensity Focused Ultrasound Applications"
The 25th European Symposium on Ultrasound Contrast Imaging, Rotterdam, The Netherlands.
- **Conference Contributed Talk 2019:** D. Suo, A. Clark, **S. Bonilla**, S. Keller, M. Averkiou (2019) "Controlled bubble-enhanced heating with added microbubbles"
International Society for Therapeutic Ultrasound, Barcelona, Spain.

TECHNICAL SKILLS

- **Programming Languages:** COLMAP, Python, CUDA, PowerShell, HTML & CSS, SQL
- **Tools and Frameworks:** Jupyter, PyTorch, Scikit-learn, VS Code, HPC

POSITIONS OF RESPONSIBILITY

- **Lead Team Organizer**, Image Matching Challenge 2024, CVPR Workshop 2024
- **Lead Organizer**, AI Journal Club, University College London Hospitals 2022-2023
- **Team Member**, Bioengineers Without Borders: Hydration Monitor Team, University of Washington 2019
- **President**, Research & Innovation Club, LWIT 2015-2016

AWARDS

- **G-Research Grant**, Monetary Grant for Presentation at ICVSS 2024 2024
- **Best Poster Award**, Foundational Artificial Intelligence CDT Summer Showcase 2024
- **UCL Research Studentship in Foundational Artificial Intelligence**, Full-time MPhil/PhD Scholarship 2023-2027
- **Dean's List**, University of Washington 2017-2020
- **Certificate of High Scholarship**, University of Washington 2018-2019
- **WASLA Merit Award**, University of Washington 2018

COMMUNITY INVOLVEMENT

- **Summer Showcase Organizer & Speaker**, Foundational Artificial Intelligence CDT Showcase 2024
- **UCLH Speaker**, Munch & Learn Talk 2024
- **ICVSS Attendance**, International Computer Vision Summer School 2024
- **MedICSS Volunteer**, Medical Image Computing Summer School 2024
- **Science of Surgery Volunteer**, Public Engagement Science of Surgery Day 2024
- **Academic Representative**, Biomedical Engineering MSc, University College London 2021-2022