

Jhacson Meza

Cartagena, Colombia

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Education

M.Sc. in Engineering

Cartagena, Colombia

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

2019 - 2021

- GPA: 4.89/5.0
- Thesis: 3D Multimodal Medical Imaging System Based on Freehand Ultrasound, Structured Light, and Stereo Vision Tracking, 5.0/5.0

B.Sc. in Mechatronic Engineering

Cartagena, Colombia

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

2014 - 2018

- GPA: 4.61/5.0
- Thesis: Generation of Digital Elevation Models with Unmanned Aerial Vehicles employing 3D Photogrammetry Techniques on Open Source Software, 5.0/5.0

Research Interests

Computer Vision, 3D Reconstruction, Deep Learning, Image Processing, Medical Imaging, and Optical Metrology.

Experience

Adjunct Professor

Cartagena, Colombia

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

Feb 2020 - Dec 2021

Department of Basic Sciences and Department of Engineering

Courses: mechanical physics lab, electromagnetism lab, signals and systems lab

Research Assistant

Cartagena, Colombia

GROUP OF APPLIED PHYSICS AND IMAGE AND SIGNAL PROCESSING, UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

Aug 2018 - Dec 2021

- Robust, real-time pose estimation system based on a planar marker and sub-pixel keypoint detection with deep nets.
- Image segmentation of corneal endothelium and corneal guttata, using GANs for data augmentation.
- Development of a 3D multimodal medical imaging technique by combining 3D freehand ultrasound and structured light.
- Development of a high-speed digital fringe projection system for the automatic reading of the skin prick test.
- Analysis of different triangulation methods and their relationship with phase-depth sensitivity in structured light systems.
- Development of different phase unwrapping strategies robust to noise and phase dislocations.

Research Assistant

Cartagena, Colombia

OPTICS AND IMAGE PROCESSING LABORATORY, UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

Sep 2018 - Mar 2019

- Structure-from-Motion (SfM) pipeline reconstruction based on the OpenSfM and OpenDroneMap libraries.
- DTM pipeline generation from a SfM point cloud for terrain analysis.
- Surface-runoff analysis of a neighborhood in the municipality of Turbaco, Colombia with flood problems due to rainfall.

Undergraduate Teaching Assistant

Cartagena, Colombia

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

Feb 2018 - Jun 2018

Department of Engineering: Analogue Electronics

Undergraduate Teaching Assistant

Cartagena, Colombia

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

Feb 2015 - Dec 2016

Department of Basic Sciences: Calculus I, Calculus II, Calculus III, Differential Equations

Selected Publications

JOURNAL ARTICLES

- [Three-dimensional multimodal medical imaging system based on freehand ultrasound and structured light.](#) Jhacson Meza, Sonia H. Contreras-Ortiz, Lenny A. Romero, Andres G. Marrugo. *Optical Engineering*, 60(5), 054106, 2021.
- [SPUD: simultaneous phase unwrapping and denoising algorithm for phase imaging.](#) Jesus Pineda, Jorge Bacca, Jhacson Meza, Lenny A. Romero, Henry Arguello, and Andres G. Marrugo. *Applied Optics*, 59(13), D81-D88, 2020.

PEER REVIEWED CONFERENCE PROCEEDINGS

- **MarkerPose: Robust Real-time Planar Target Tracking for Accurate Stereo Pose Estimation.** **Jhacson Meza**, Lenny A. Romero, Andres G. Marrugo. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, 2021. **[Oral Presentation, Runner-up Best Paper Award]**
- **What is the best triangulation approach for a structured light system?** **Jhacson Meza**, Raul Vargas, Lenny A. Romero, Song Zhang, Andres G. Marrugo. *Dimensional Optical Metrology and Inspection for Practical Applications IX*, SPIE, 2020.
- **A low-cost multi-modal medical imaging system with fringe projection profilometry and 3D freehand ultrasound.** **Jhacson Meza**, Pedro Simarra, Sara Contreras-Ojeda, Lenny A. Romero, Sonia H. Contreras-Ortiz, Fernando Arámbula Cosío, Andrés G. Marrugo. *15th International Symposium on Medical Information Processing and Analysis*, SPIE, 2020.
- **A Structure-from-Motion Pipeline for Generating Digital Elevation Models for Surface-Runoff Analysis.** **Jhacson Meza**, Andres G. Marrugo, Gabriel Ospina, Milton Guerrero and Lenny A. Romero. *Journal of Physics: Conference Series*, Vol. 1247, No. 1, IOP Publishing, 2019.
- **Noise-Robust Processing of Phase Dislocations using Combined Unwrapping and Sparse Inpainting with Dictionary Learning.** Jesus Pineda, **Jhacson Meza**, Erik M. Barrios, Lenny A. Romero and Andres G. Marrugo. *XXII Symposium on Image, Signal Processing and Artificial Vision (STSIVA)*, IEEE, 2019. **[Best Paper Award]**.
- **A Structure-from-Motion Pipeline for Topographic Reconstructions using Unmanned Aerial Vehicles and Open Source Software.** **Jhacson Meza**, Andrés G. Marrugo, Enrique Sierra, Milton Guerrero, Jaime Meneses and Lenny A. Romero. *Colombian Conference on Computing*, Springer, Cham, 2018.

Participation in Projects

Development of a computational strategy for the automatic reading of the skin test used in the diagnosis of allergies using the device SPT 3D Scan

Funded by Ministry of Health and Ministry of Science of Colombia

Colombia

Feb 2020 – Feb 2021

Multimodal 3D medical imaging system using fringe projection and ultrasound

Funded by Universidad Tecnológica de Bolívar

Colombia

Sep 2018 – Jun 2019

3D photogrammetry using unmanned aerial vehicles for drain analysis

Funded by Universidad Tecnológica de Bolívar

Colombia

Jun 2017 – Mar 2018

Honors & Awards

2022	Laureate Master's Thesis Award , Universidad Tecnológica de Bolívar	Cartagena, Colombia
2021	Runner-up Best Paper Award , LXCW Workshop at CVPR 2021	Virtual
2020	"Joven Talento" Scholarship , Ministry of Science and Ministry of Health of Colombia	Colombia
2019	Best Paper Award on Machine Learning and Pattern Recognition , STSIVA 2019	Bucaramanga, Colombia
2019	Masters Scholarship , Universidad Tecnológica de Bolívar	Cartagena, Colombia
2019	Summa Cum Laude , Universidad Tecnológica de Bolívar	Cartagena, Colombia
2019	Laureate Undergraduate Thesis Award , Universidad Tecnológica de Bolívar	Cartagena, Colombia
2015-2016	"Matrícula de Honor" (Best GPA) , Universidad Tecnológica de Bolívar	Cartagena, Colombia
2014	"Premio Liderazgo Caribe" (undergraduate scholarship) , Universidad Tecnológica de Bolívar	Cartagena, Colombia


Open Source Projects

- **MarkerPose**: PyTorch and LibTorch implementation of the paper "MarkerPose: Robust Real-time Planar Target Tracking for Accurate Stereo Pose Estimation."
- **SL+3DUS**: implementation of the paper "Three-dimensional multimodal medical imaging system based on freehand ultrasound and structured light."
- **3D freehand ultrasound calibration**: Python implementation for calibration of a 3D freehand ultrasound system using a stereo vision system and a planar marker.

Academic Service

Peer reviewer for Journal of Applied Remote Sensing (2020), Engineering Science and Technology, an International Journal (2020), Optical Engineering (2021).

Skills

Programming	C/C++, Python, CUDA C++ (beginner).
Frameworks	OpenCV, PyTorch, LibTorch, TensorFlow/Keras.
Tools	Git, CMake,  .