Jhacson **Meza**

Cartagena, Colombia

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Education

M.Sc. in Engineering
Cartagena, Colombia

Universidad Tecnológica de Bolívar
2019 - Present

- 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.E. 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 Imaging, Deep Learning, Machine Learning, Image Processing, Medical Imaging, and Optical Metrology

Honors & Awards

2021	**Runner-up Best Paper Award**, LXCV Workshop at CVPR 2021	
2020	**"Joven Talento" Scholarship**, Ministry of Science and Ministry of Health of Colombia	*Colombia*
2019	**Best Paper Award on Machine Learning and Pattern Recognition**, XXII Symposium on Image, Signal Processing and Artificial Vision (STSIVA)	*Bucaramanga, Colombia*
2019	**Masters Scholarship**, Universidad Tecnológica de Bolívar	*Cartagena, Colombia*
2019	**Laureate Undergraduate Thesis**, Universidad Tecnológica de Bolívar	*Cartagena, Colombia*
2016	**Matrícula de Honor (Best GPA)**, Universidad Tecnológica de Bolívar	*Cartagena, Colombia*
2015	**Matrícula de Honor (Best GPA)**, Universidad Tecnológica de Bolívar	*Cartagena, Colombia*
2014-2018	**Outstanding Student**, Universidad Tecnológica de Bolívar	*Cartagena, Colombia*
2014	**Premio Liderazgo Caribe (undergraduate scholarship)**, Universidad Tecnológica de Bolívar	*Cartagena, Colombia*

Experience

Adjunct Professor
Cartagena, Colombia

Universidad Tecnológica de Bolívar
Feb 2021 - Present

Faculty of Basic Sciences, Faculty of Engineering

Adjunct Professor
Cartagena, Colombia

Universidad Tecnológica de Bolívar
Feb 2020 - Aug 2020

Faculty of Basic Sciences, mechanical physics laboratory

Research Assistant
Cartagena, Colombia

Group of Applied Physics and Image and Signal Processing, Universidad Tecnológica de Bolívar
Aug 2018 - Present

- MarkerPose: Robust, real-time pose estimation system based on a planar marker and Deep Learning.
- Image segmentation of corneal endothelium and corneal guttata with CNNs, 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

Faculty of Engineering, Analogue Electronics

Undergraduate Teaching Assistant *Cartagena, Colombia*

Universidad Tecnológica de Bolívar *Feb 2015 - Dec 2016*

Faculty of Basic Sciences: Differential Calculus, Integral Calculus, Vector Calculus, Differential and Difference Equations

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 *Colombia*

Feb 2020 – Feb 2021

Funded by Ministry of Health and Ministry of Science of Colombia

Multimodal 3D medical imaging system using fringe projection and ultrasound *Colombia*

Funded by Universidad Tecnológica de Bolívar *Sep 2018 – Jun 2019*

3D photogrammetry using unmanned aerial vehicles for drain analysis *Colombia*

Funded by Universidad Tecnológica de Bolívar *Jun 2017 – Mar 2018*

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.

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), MATLAB.

Frameworks OpenCV, PyTorch, LibTorch, TensorFlow/Keras.

Tools Git, CMake, LaTeX.