

# Jhacson Meza

Cartagena, Colombia

✉ jhacsonmeza@gmail.com | 🌐 <https://jhacsonmeza.github.io/> | 📧 jhacsonmeza | 🌐 jhacsonmeza | 🎓 Jhacson Meza

## Education

### M.Sc. in Engineering

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

- Current GPA: 4.87/5.0

Cartagena, Colombia

2019 - Present

### B.E. in Mechatronic Engineering

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

- 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

Cartagena, Colombia

2014 - 2018

## Research Interests

Computer Vision, 3D Reconstruction, Deep Learning, Image Processing, Optical Metrology, Medical Imaging, 3D Ultrasound, Digital Fringe Projection, Machine Learning.

## Honors & Awards

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

## Experience

### Adjunct Professor

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

Faculty of Basic Sciences, mechanical physics laboratory

Cartagena, Colombia

Feb 2020 - Aug 2020

### Research Assistant

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

- 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.

Cartagena, Colombia

Aug 2018 - Present

### Research Assistant

OPTICS AND IMAGE PROCESSING LABORATORY, UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

- 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.

Cartagena, Colombia

Sep 2018 - Mar 2019

### Undergraduate Teaching Assistant

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

Faculty of Engineering, Analogue Electronics

Cartagena, Colombia

Feb 2018 - Jun 2018

### Undergraduate Teaching Assistant

UNIVERSIDAD TECNOLÓGICA DE BOLÍVAR

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

Cartagena, Colombia

Feb 2015 - Dec 2016

## Participation in R+D Projects

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### 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

## Publications

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### JOURNAL ARTICLES

- Jhacson Meza, Sonia H. Contreras-Ortiz, Lenny A. Romero, Andres G. Marrugo. Three-dimensional multimodal medical imaging system based on freehand ultrasound and structured light. *Optical Engineering*, 60(5), 054106, 2021.
- Jesus Pineda, Jorge Bacca, Jhacson Meza, Lenny A. Romero, Henry Arguello, and Andres G. Marrugo. SPUD: simultaneous phase unwrapping and denoising algorithm for phase imaging. *Applied Optics*, 59(13), D81-D88, 2020.
- Jhacson Meza, Andrés G. Marrugo, Enrique Sierra, Milton Guerrero, Jaime Meneses and Lenny A. Romero. A Structure-from-Motion Pipeline for Topographic Reconstructions using Unmanned Aerial Vehicles and Open Source Software. *Communications in Computer and Information Science*, 885:213–225, 2018.

### PEER REVIEWED CONFERENCE PROCEEDINGS

- Jhacson Meza, Lenny A. Romero, Andres G. Marrugo. MarkerPose: Robust Real-time Planar Target Tracking for Accurate Stereo Pose Estimation. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, pp. 1282-1290, 2021. **[Oral Presentation, Runner-up Best Paper Award]**
- Jhacson Meza, Raul Vargas, Lenny A. Romero, Song Zhang, Andres G. Marrugo. What is the best triangulation approach for a structured light system? *Proc. SPIE 11397, Dimensional Optical Metrology and Inspection for Practical Applications IX*, 113970D, 2020.
- Jhacson Meza, Pedro Simarra, Sara Contreras-Ojeda, Lenny A. Romero, Sonia H. Contreras-Ortiz, Fernando Arámbula Cosío, Andrés G. Marrugo. A low-cost multi-modal medical imaging system with fringe projection profilometry and 3D freehand ultrasound. *Proc. SPIE 11330, 15th International Symposium on Medical Information Processing and Analysis*, 1133004, 2020.
- Jhacson Meza, Andres G. Marrugo, Gabriel Ospina, Milton Guerrero and Lenny A. Romero. A Structure-from-Motion Pipeline for Generating Digital Elevation Models for Surface-Runoff Analysis. *Journal of Physics: Conference Series*, Vol. 1247, No. 1, IOP Publishing, 2019.
- Jesus Pineda, Jhacson Meza, Erik M. Barrios, Lenny A. Romero and Andres G. Marrugo. Noise-Robust Processing of Phase Dislocations using Combined Unwrapping and Sparse Inpainting with Dictionary Learning. In *XXII Symposium on Image, Signal Processing and Artificial Vision (STSIVA)*, IEEE, 2019. **[Best Paper Award]**.

## Open Source Projects

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- **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

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

## Skills

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<b>Programming</b>	C/C++, Python, CUDA C++ (beginner), MATLAB.
<b>Frameworks</b>	OpenCV, PyTorch, LibTorch, TensorFlow/Keras.
<b>Tools</b>	Git, CMake, $\LaTeX$ .