Elizabeth Vargas

CONTACT INFORMATION

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PROFESSIONAL EXPERIENCE

Ouster Automotive Dec. 2020 - Present
Software Engineer Edinburgh, United Kingdom

- Ouster acquired *Sense Photonics* in 2021 and established *Ouster Automotive*.
- Perform statistical modelling and data analysis to support the design of 3D Flash LiDAR to be deployed within self-driving vehicles.
- Develop a simulation software employed to guide LiDAR design specifications that deliver optimised performance (Python, Scipy, C++).
- Define and perform experiments to test the performance boundaries of signal processing algorithms used to convert low- to mid-level data into 3D point clouds.

ORCA Hub Jan. 2019 - Nov. 2020
Research Associate Edinburgh, United Kingdom

- Developed a real-time computer vision system, deployed on a remotely operated underwater vehicle for the surveying and inspection of offshore assets (ROS, C++).
- Implemented Visual Simultaneous Localisation And Mapping (SLAM) solution for limited visibility environments, fusing data from acoustic and optical sensors.
- Employed stereo cameras for 3D reconstruction of submerged structures, enabling the offshore industry to inspect and certify their integrity.

Toshiba Medical Visualization Systems Jun. 2015 - Sep. 2015
Research Intern Edinburgh, United Kingdom

- Characterised Alzheimer using Magnetic Resonance Imaging (MRI), performing texture analysis in brain tissue enabling the early diagnose of the disease.
- Combined brain gyrus segmentation with regional texture metrics (Pandas).
- Applied machine learning to image texture, including feature selection, classification and regression techniques (Python, Scikit-Learn).

EDUCATION

Ph.D. Signal Processing Oct. 2015 - Sep. 2019
Heriot-Watt University, United Kingdom

- Advanced the state-of-the-art in acoustic source localisation in constrained environments through three major contributions (detailed below).
- Reduced computation six fold while maintaining localisation accuracy at state-of-the-art levels (Python, NumPy, SciPy).
- Implemented a signal sampling algorithm to achieve accurate localisation for a signal transmitted at a compression ratio of $40:1$ (MATLAB).
- Applied deep learning techniques to achieve a 20% improvement in localisation accuracy using data augmentation from a GAN (Ptyhon, Keras, TensorFlow).

M.Sc. Computer Vision and Robotics with Distinction Sep. 2013 - Jun. 2015
University of Burgundy, France GPA: 15.3/20

- Joint Erasmus Mundus Master Program with *University of Burgundy* (France), *University of Girona* (Spain) and *Heriot-Watt University* (United Kingdom).
- Basis of signal and image processing, medical image analysis (MATLAB).

- Segmentation, multi-view geometry, object recognition and tracking (OpenCV).
- Robot autonomy and intelligence, including SLAM and motion planning (ROS).

B.Sc. Computer Science Aug. 2006 - Aug. 2012
Universidad del Valle, Colombia GPA: 4.67/5.0

- Courses in algorithms, data structures, compilers and software engineering.
- Projects including image processing (C/C++), search algorithms, optimisation, evolutionary algorithms, software development (Java) and databases (MySQL).

Selected Publications

E. Vargas, R. Scona, J. Scharff Wilners, T. Luczynski, Y. Cao, S. Wang, Y. Petillot, *Robust Underwater Visual SLAM Fusing Acoustic Sensing*, in International Conference on Robotics and Automation **(ICRA)**, Xina, China, June 2021.

E. Vargas, J. R. Hopgood, K. Brown, K. Subr, *On Improved Training of CNN for Acoustic Source Localisation*, in Transactions on Audio, Speech, and Language Processing **(TASLP)**, 2021.

E. Vargas, K. Brown, K. Subr, *Impact of Microphone Array Configurations on Robust Indirect 3D Acoustic Source Localization*, in International Conference on Acoustics, Speech and Signal Processing **(ICASSP)**, Calgary, Canada, April 2018.

Distinctions

Erasmus Mundus Scholarship, *European Commission* Sep. 2013
Granted to 4 European students for academic and professional achievement to study a Master in Computer Vision and Robotics (ViBot) during the academic year 2013-2015.

Training

International Summer School on Deep Learning Jul. 2018
Research training event aiming at updating participants about the most recent advances in the critical and fast developing area of deep learning.

International Computer Vision Summer School (ICVSS) Jul. 2016
Provided an objective, clear, and in-depth summary of the state-of-the-art research in the areas of Computer Vision, Machine Learning and Artificial Intelligence.

Technical Skills

Operating Systems: Windows, Linux (Ubuntu)
Programming Languages: Python, MATLAB, C/C++
Robotics: Robotics Operating System (ROS)
Computer Vision: OpenCV
Machine Learning: Numpy, Scipy, Scikit-learn, Pandas
Version Control: Git/Github

Volunteer Experience

Edinburgh International Science Festival, *Student Helper* 2017 - 2018
Helper at the *"Marty: Activate!"* workshop that taught children (11+ years) to program a robot to interact with its surroundings using the programming language *Scratch*.

FIRST LEGO League (FLL), *Robot Game Judge* 2016-2018
Assess teams of young people (9-16 years) while solving a set of missions on a specialised field, using an autonomous robot built and programmed using LEGO MINDSTORMS

Academic Service

Organising Committee
- ECCV workshop on Women in Computer Vision **(WiCV)** 2020

Academic Reviewer
- Conference on Computer Vision and Pattern Recognition **(CVPR)** 2022
- International Conference on Robotics and Atuomation **(ICRA)** 2022