

# Elizabeth Vargas

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CONTACT INFORMATION	Ocean Systems Laboratory Earl Mountbatten G.06 Heriot-Watt University Edinburgh, United Kingdom	Website: <a href="https://evargasv.github.io/">https://evargasv.github.io/</a> Email: <a href="mailto:elizabeth.vargas@hw.ac.uk">elizabeth.vargas@hw.ac.uk</a> LinkedIn: <a href="https://www.linkedin.com/in/evargasv/">https://www.linkedin.com/in/evargasv/</a> Portfolio: <a href="https://github.com/evargasv">https://github.com/evargasv</a>
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PROFESSIONAL EXPERIENCE	<b>ORCA Hub</b> <i>Research Associate</i>	Jan. 2019 - Present Edinburgh, United Kingdom
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- 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 underwater environments, based on data fusion from acoustic and optical sensors.
- Employed stereo cameras for 3D reconstruction of submerged structures, enabling the offshore industry to inspect and certify their integrity.
- Designed, set-up, and executed practical experiments and prototype systems relating to the demonstration of solution capabilities to industry representatives.

	<b>Toshiba Medical Visualization Systems</b> <i>Research Intern</i>	Jun. 2015 - Sep. 2015 Edinburgh, United Kingdom
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- Characterised Alzheimer disease using Magnetic Resonance Imaging (MRI), performing texture analysis in the hippocampus tissue enabling the diagnose the disease at various stages.
- 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).

	<b>Philips Research Aachen</b> <i>Research Intern</i>	Mar. 2011 - Jul. 2011 Aachen, Germany
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- Magnetic Resonance Imaging (MRI) applied to characterisation of liver diseases, by extraction of features relevant for disease diagnosis (MATLAB).
- Performed statistical analysis using linear regression on volume data sets to obtain parametric maps of apparent diffusion coefficients from diffusion-weighted MRI.
- Implemented image processing algorithms, including a gray level-based iterative segmentation that applies a threshold derived from histogram analysis.

EDUCATION	<b>Ph.D. Signal Processing</b> <i>Heriot-Watt University, United Kingdom</i>	Oct. 2015 - Sep. 2019
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- 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 by training a Convolutional Neural Network (CNN) using data augmentation from a Generative Adversarial Network (GAN) (Python, Keras, TensorFlow).

**M.Sc. Computer Vision and Robotics with Distinction** Sep. 2013 - Jun. 2015  
*University of Burgundy, France*

- 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*

- 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**, J. R. Hopgood, K. Brown, K. Subr, *A Compressed Encoding Scheme for Approximate TDOA Estimation*, in European Signal Processing Conference (**EU-SIPCO**), Rome, Italy, September 2018.

**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 **James Watt Scholarship**, *Heriot-Watt University* Oct. 2015  
Granted to 5 applicants for a Ph.D. position at the School of Engineering and Physical Sciences (EPS), awarding tuition fees and annual stipend to support studies for 3 years.

**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, C/C++  
**Robotics:** Robotics Operating System (ROS)  
**Computer Vision:** OpenCV  
**Machine Learning:** Scikit-Learn, NumPy, SciPy  
**Software Tools:** MATLAB  
**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*.

**Cracking the Code**, *Student Helper* Jun. 2017  
Introduce girls (9-11 years) to programming a robot using LEGO MINDSTORMS, as part of a Equality Challenge Units (ECU) project aimed at attracting under-represented groups into subjects they don’t traditionally apply for.