Alberto Gomez, PhD

Research Fellow on Smart Ultrasound Imaging

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Alberto Gomez (Google Scholar)

Education

2009–2013 **PhD**, *King's College London*, UK, *Full 3D Blood Velocity Mapping and Flow Quantification from Doppler Echocardiographic Images.*
Part of the FP7 euHeart Project. Supervisor Dr Graeme Penney.

2008–2009 **MRes Signal and Image Processing**, *Université de Rennes I/ Télécom Bretagne*, France, *SISEA*.

2006–2009 **MSc Biomedical Engineering**, *Télécom Bretagne*, France.

2002–2007 **MSc Telecommunication Engineering**, *ETSIT, Technical University of Madrid*, Spain.

Experience

Since 2016 **Research Fellow**, *King's College London*, UK, *Smart Ultrasound Imaging.*

- 2019 – 2022 (Expected) Smart Ultrasound imaging for resource limited clinical settings within the Wellcome Trust Innovations Flagships program ICU Innovations
  I am a co-investigator and lead the ultrasound theme of this grant, focusing on investigation and clinical translation of real-time 2D ultrasound guided examinations for patient monitoring in the Intensive Care Unit (Supervising a PhD student and a Research Associate).
- 2014 – 2021 (Expected) Ultrasound image acquisition and computing for fetal imaging within the Wellcome Trust/EPSRC funded project: "Intelligent Fetal Imaging aNd Diagnosis (**IFIND**)"
  From a central position in the project, my role involves linking image analysis, machine learning, image engineering and robotics. This includes interfacing between groups and also having in-depth understanding of system engineering, image analysis, machine learning, robotics and clinical applications.
- 2017 – 2020 (Extended) Advanced ultrasound image visualization and interrogation for cardiac surgery planning, with the NIHR-i4i funded project: "**3D Heart**".
  I am a co-investigator and leader of the technical team (managing a team of 2 researchers) in this project where we are investigating the use of emerging virtual/augmented/mixed reality technology to improve surgery planning.
- Oct 2018 – Mar 2019; Oct 2020 – Feb 2021: *Career break: parental leaves*

2014–2016 **Research Associate**, *King's College London*, UK, *Ultrasound Imaging and SW Development.*
Ultrasound image acquisition and processing for foetal imaging within the **IFIND** project (as above).
During this period I set up enabling tools for the iFIND project and contributed to extended field-of-view ultrasound imaging.

2013–2014 **Research Associate**, *King's College London*, UK, *Ultrasound Image Computing.*
Ultrasound image processing for anatomical and functional analysis of the heart, funded by the EPSRC Intelligent Imaging Programme Grant - in collaboration with University College London and Imperial College London.
In this project I developed a novel flow reconstruction method to incorporate wall motion to cardiac flow measurements.

2009 **Research Intern**, *Philips Research*, Hamburg (Germany), *Digital Imaging* (6 months).
Curvature features in model-based image segmentation for radiotherapy planning (Masters Thesis).

2007–2008 **Intern**, *GE Healthcare*, Paris Region (France), *Advanced Medical Applications* (13 months).
Integration of an electromagnetic navigation system into an interventional environment.

2005–2006 **Intern**, *Telefónica R&D*, Madrid (Spain), *Advanced Networks* (12 months).
Next Generation Networks: advanced routing algorithms. Participation in European FP6 Projects: MUSE, AGAVE, MRDV

Pre-PhD Academic Projects

2008–2009 **Cartilage-add simulation in the joints of the forearm**, *Télécom Bretagne*, (90 h).
Reformulation of morphological operators on triangulated meshes for biomedical applications.

2007 **Aerial navigation system on a IBM Cell processor**, *THALES*, (60 h).
Project Manager for feasibility study: performance gain of a navigation system ported into a multi-core architecture

2006 **"Sea Safety System" GPRS-GPS localization device**, *Télécom Bretagne*, (60 h).

Commercial & IP

Industry Links

Since 2020 **Permanent Member of Technical Advisory Board**, *Ultromics Ltd, Oxford, UK*.

Patent Applications

2019 **"Method and Apparatus for Navigation and Display of 3D Image Data"**.
Inventors: **Alberto Gomez**, John M. Simpson, Kuberan Pushparajah, Gavin Wheeler, Shujie Deng, Nicolas Toussaint, Julia Schnabel
Applicants: Guy's and St Thomas' NHS Foundation Trust, King's College London
Status: patent pending

2019 **"Method and Apparatus for Coherent Multi-Transducer Ultrasound"**.
Inventors: Robert Eckersley, Jo V. Hajnal, **Alberto Gomez**, Laura Peralta Pereira
Applicant: King's College London
Status: patent pending

Open source

2019 **VTK-Unity**, *Integration of VTK into Unity for VR applications through native plug-ins.*
`https://gitlab.com/3dheart_public/vtktounity`

2012 **MATLAB**, *Medical Image Processing Toolbox (**10K+ downloads**).*
Generic, basic tools for medical image processing. Open source, available at MATLAB File Exchange.

Academia

Successful Grant Applications (**£1.2M total awarded**)

2019 **WT-Innovations Flagships**, ***£748K***, "Innovative biomedical engineering and computational science to improve the management of critical illness in resource-limited settings".
Co-investigator. Technical lead of the ultrasound programme.

2017 **NIHR-i4i**, ***£454K***, "Holographic interrogation of 3D live ultrasound".
Co-investigator to Prof. John Simpson (PI), Prof Julia Schnabel, Dr Nicolas Toussaint and Dr Kuberan Pushparajah. Technical lead of the grant and main contributor the original project, co-defendant in the final interview and main management of grant funds. This application was enabled by a prototype I developed with my student Albert Alises.

2014 **KCL Pump-Priming Grant**, ***£15K***, "Right Ventricular Analysis from Echo Images".
Co-investigator to Prof. John Simpson, co-defendant in the final interview and main management of grant funds.

Teaching

2017–2018 **Advanced topics in Medical Image Computing – Ultrasound imaging analysis - EPSRC Centre for Doctorali Training**, *KCL/ICL*.

2014–2016 **Image Guided Interventions - EPSRC Centre for Doctoral Training**, *KCL/ICL*.

Since 2016 **Computer Programming - BEng Biomedical Engineering**, *KCL*.

Since 2014 **Summer School in Biomedical Engineering**, *KCL*, Ultrasound Imaging.

2013–2014 **Image Processing - BEng Biomedical Engineering**, *KCL*.

Student Supervision - PhD

2020–2023 (Expected) **Nhat Phung Tran Huy**, *King's College London & OUCRU (Vietnam)* , PhD supervisor.
Clinical translation of smart ultrasound methods for non-expert ultrasound monitoring of critical patients in a resource limited setting

2020–2023 (Expected) **David Stojanovski**, *King's College London & Ultromics Ltd* , PhD co-supervisor.
3D reconstruction of volumetric ultrasound images from tracked 2D sequences

2019 **Jordina Torrents**, *Universitat Pompeu Fabra*, Co-supervisor during visiting stay at KCL.
Fetal cord segmentation from MRI and ultrasound images

2019 **Daniel Treceno**, *Universidad de Valladolid*, External Assessor to PhD Thesis.
A web based MRI simulator as an educational tool: design, immplementation and evaluation

2015 **Antonio Porras**, *Universitat Pompeu Fabra*, External Assessor to PhD Thesis.
Multi-cue image integration for cardiac tissue characterization

Student Supervision - MSc/Undergraduate

2019/2020 **Cesare Magnetti**, *King's College London*, BEng, 1st supervisor.
Advanced deep generative models for real-time simulation of ultrasound imaging (ongoing)

2019/2020 **Suryava Bhattacharya, Ei Lin, Lindsay Munroe and Gina Sajit**, *King's College London*, Group project, 2nd supervisor.
Integration of Deep Learning methods into a VR surgery planning application (ongoing)

2018/2019 **Simona Treivase**, *King's College London*, BEng, 2nd supervisor.
Real-time screen tracking for Clinical Translation of Deep US Analysis Methods using Augmented Reality.

2018/2019 **David Wilson**, *King's College London*, BEng, 2nd supervisor.
Multi-view ultrasound image fusion.

2018 **Hannes Griffith**, *Imperial College London/King's College London*, MEng, 2nd supervisor.
Saliency Detection using Deep Learning Networks for Fast Ultrasound Image Registration.

2017/2018 **Cornelia Schmitz**, *King's College London*, BEng, 1st supervisor.
Design and Development of a Passive Mechanism for Motion Imaging Phantoms. (completed)

2017 **Begonia Manso**, *King's College London*, Visiting medical trainee, 1st supervisor.
Registration and fusion of ultrasound and MR images of the heart.

2016/2017 **Sarjana Tharin**, *King's College London*, BEng, 1st supervisor.
Whole-body fetal imaging by 3D ultrasound image fusion.

2016/2017 **Zsofia Hegedus**, *King's College London*, BEng, 1st supervisor.
Patient-specific ultrasound-compatible imaging models using novel 3D printing methods.

2015/2016 **Andrew Higginson**, *King's College London/ Imperial College London*, MSc, 1st supervisor.
Streaming platform for live foetal imaging.

2015/2016 **Elizabeth Cotton**, *King's College London/ Imperial College London*, MSc, 2nd supervisor.
Deferred multi-cue foetal examination.

2015/2016 **Ivan Diaz-Rios**, *King's College London/ Imperial College London*, MSc, 2nd supervisor.
Mosaicing of ultrasound images.

2015 **Albert Alises**, *King's College London/ Universitat Pompeu Fabra*, BEng, 1st supervisor.
Holographic Display of Medical Images.

Conference Organisation and Program Committee Membership

2020 **Area chair for MICCAI 2020. Chair of one oral session (Ultrasound and fetal imaging)**.

2019 **Lead Organiser - 1st MICCAI Workshop on Smart Ultrasound Imaging (SUSI)**.

2018 **Associate to Program Chair for MICCAI**.

2016-2018 **PC member for the MICCAI-RAMBO workshop**.

2016 **PC assistant for the CVPR-WBIR workshop**.

Reviewer for International Grants and Fellowships

Since 2019 **Reviewer for NWO Domain Applied and Engineering Sciences Grant**, *The Netherlands*, `www.nwo.nl`.

Since 2020 **Reviewer for EPSRC Grants**, *UK*, `https://epsrc.ukri.org/`.

Reviewer for International Journals and Conferences

Since 2020 **Reviewer for Nature Communications**.

Since 2019 **Reviewer for Medical Image Analysis**.

Since 2015 **Reviewer for IEEE Transactions on Biomedical Engineering**.

Since 2014 **Reviewer for Medical Engineering & Physics**.

Since 2012 **Reviewer for IEEE Transactions on Medical Imaging**.

Since 2016 **Reviewer for IEEE Journal of Biomedical and Health Informatics**.

2017 **Reviewer for MICCAI conference**.

Since 2013 **Reviewer for various satellite events of the MICCAI conference**.

Since 2012 **Reviewer for IEEE International Symposium on Biomedical Imaging**.

Public and Patient Engagement and Involvement

Oct 2019 **New Scientist Live at ExCeL London**, Public engagement on one of the largest science exhibitions in the world, presenting iFIND and other School research..

Mar 2019 **Exhibition at Science Gallery**, Patient Involvement for the 3D Heart Project.

Jan 2019 **Training/workshop on PPI/E**, St Thomas' Hospital.

Jan 2018 **Meeting with Adult Imaging Advisory Group**, Presentation of the iFIND project.

Dec 2017 **Royal Opening of Medical Engineering Centre**, Presentation of the iFIND project to HRH The Princess Royal.

Dec 2017 **Native Scientists**, "Seeing through things with science".

May 2016 **International Clinical Trial Days**, "iFIND and fetal ultrasound".

Feb 2016 **Science Museum Lates**, "3D Printed Hearts".

Sep 2015 **Santander Red Box Event**, *BHF*, "Looking at the Heart with Ultrasound".

Aug 2015 **King's Health Partners Summer School**, *KCL*, "Engineering Ultrasound".

Since 2011 **Ultrasound hands-on demo**, *KCL*, (requested yearly).

Awards

2020 **Outstanding Paper Award**, *MICCAI AE-CAI workshop*, Lima, Peru-Virtual, *Winner (Senior co-author)*.

2018 **Outstanding Paper Award**, *MICCAI AE-CAI workshop*, Granada, Spain, *Winner (Senior author)*.

2015 **C Walton Lillehei Young Investigator's Award**, *European Association of Cardio Thoracic Surgery (EACTS) 2015*, Amsterdam, The Netherlands, *Winner (2nd author to P. Youssefi)*.

2015 **Best Paper Award**, *Functional Imaging and Modeling of the Heart (FIMH) 2015*, Maastrich, The Netherlands, *Winner (2nd author to O. Oktay)* .

2013 **Best Imaging Poster**, *Annual Wellcome Trust/EPSRC Medical Engineering Centres meeting*, Ascott (UK) .

2012 **Young Investigator Award**, *EuroEcho 2012*, Athens (Greece) .

Selected Technical Skills

Languages English (fluent), French (fluent), Spanish (mother tongue)

Software C++ (Expert – VTK, ITK, Qt), Matlab (Expert), Python (Advanced - PyTorch), bash, git

Academic Memberships and Society Affiliations

Commitee Member **EPSRC Medical Image Analysis - Early Career Researchers Network (MedIAN)**.

Member **MICCAI Society, European Association of Cardiovascular Imaging (EACVI)**.

Invited talks

2017 **2nd VPH Summer School, UPF**, *Barcelona, Spain*, May 22 – 26.
Flow imaging: from 1D Doppler measurements to 4D flow

2015 **NTNU**, *Trondheim, Norway*, Feb 10 – 13.
3D Ultrasound Image Analysis: cardiac shape, flow and function

2014 **TransCardio**, *Barcelona, Spain*, Nov 12–23.
Podium oral presentation, invited

2014 **Universidad Catolica**, *Santiago de Chile, Chile*, May 23.
4D Intracardiac Flow with Ultrasound

2010 **ICV Summer School**, *University of Catania, Italy*, Jul 12 – 17, *Invited poster.*

Participation in Conferences and Workshops

2020 **MICCAI**, *Lima, Peru (Virtual)*, Oct 4–8.
Area chair.

2019 **MICCAI**, *Shenzhen, China*, Oct 13–17.
Lead organiser of the first MICCAI workshop on Smart Ultrasound Imaging (SUSI), and Podium Oral Presentation at the MICCAI-MLMIR workshop.

2018 **MICCAI**, *Granada, Spain*, Sept 16–20.
Associate to Program Chair.

2017 **MICCAI**, *Quebec, Canada*, Sept 10–14.
Podium Oral Presentation at the MICCAI-FIFI workshop.

2016 **EuroEcho**, *Leipzig, Germany*, Dec 7-10.
Invited talk: multimodal image fusion.

2015 **EuroEcho**, *Sevile, Spain*, Dec 2-5.

2015 **MICCAI**, *Munich, Germany*, Oct 5–9.
Poster presenter at the Medical Image Computing and Computer-Assisted Intervention conference.

2014 **Bioengineering14**, *London, UK*, Sep 10–11.
Poster presentation at the meeting of the Bioengineering Society.

2013 **Plugin Development for the MedINRIA Platform**, *Nice, France*, Nov 18–22.
Development of a plugin for flow quantification.

2013 **MICCAI**, *Nagoya, Japan*, Sep 22 – 26.
Poster presenter at the Medical Image Computing and Computer-Assisted Intervention conference.

2013 **MEC**, *Ascot, UK*, Sep 3 – 4.
Poster presenter at the annual meeting of the Medical Engineering Council meeting. Winner of the Best Imaging Poster prize.

2013 **ASE**, *Minneapolis, USA*, Jun 29 – Jul 2.
Guest poster presenter at the 24th annual meeting of the American Society of Echocardiography.

2013 **AEPC**, *London, UK*, May 22 – 25.
Poster presenter at the 47th annual meeting of the Association for European Paediatric and Congenital Cardiology.

2012 **EuroEcho**, *Athens, Greece*, Dec 5 – 8.
Podium oral presentation at the EuroEcho and other modalities conference in the Young Investigator Award Session. Winner of the Young Investigator Award.

2012 **MICCAI**, *Nice, France*, Oct 1 – 5.
Podium oral presentation at the STACOM workshop within Medical Image Computing and Computer-Assisted Intervention conference.

2012 **Bioengineering**, *Oxford, UK*, Jul 27 – 28.
Podium oral presentation at the meeting of the Bioengineering Society.

2011 **MIUA**, *London, UK*, Jul 14 – 15.
Assistant in the conference organization at the Medical Image Understanding and Analysis.

2011 **ISBI**, *Chicago, USA*, Mar 30 – Apr 2.
Podium oral presentation at the IEEE International Symposium on Biomedical Imaging.

2010 **MIUA**, *Coventry, UK*, Jul 6 – 7.
Podium oral presentation at the Medical Image Understanding and Analysis conference.

Publications

*I have authored or co-authored over **70** publications (Google Scholar metrics: **h-index 13, i-10 index 19, 514 citations**), including **19 articles** in high-profile international journals with high impact factor (IF) such as IEEE Transactions on Medical Imaging (**IEEE-TMI**)(IF=7.816), IEEE Transactions on Biomedical Engineering (**IEEE-TBME**)(IF=4.288), Medical Image Analysis (**MedIA**) (IF=11.148), **Progress in Bio-***

physics and Molecular Biology *(IF=2.703) and* ***Hypertension*** *(IF=7.017); and* ***over 30 conference papers*** *in top technical conferences such as Medical Image Computing and Computer Assisted Interventions (**MICCAI**), Information Processing in Medical Imaging (**IPMI**), IEEE International Symposium on Biomedical Imaging (**ISBI**), IEEE Engineering in Medicine and Biology (**EMBC**), Functional Imaging and Modeling of the Heart (**FIMH**), Medical Image Understanding and Analysis (**MIUA**), IEEE International Ultrasonics Symposium (**IUS**), and other; and top clinical conferences such as **EuroEcho**, the meeting of the European Association of Cardio Thoracic Surgeons (**EACTS**), and the meeting of the Association for European Paediatric Cardiology (**AEPC**).*