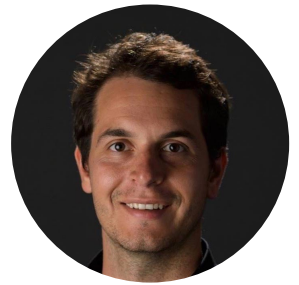


# Orestis Vardoulis

MECHANICAL & BIOMEDICAL ENGINEER · MEDICAL TECHNOLOGY INNOVATOR

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## Summary

I am currently a Researcher at Stanford School of Medicine. I also lead R&D at Zeit Medical, a Stanford-incubated, stroke diagnostics project. I have 8+ years experience in medical technology R&D with a focus on non invasive health monitoring. I have contributed to 20+ original scientific articles and 7 patent disclosures. I am a multifaceted engineer with strong communication skills, the ability to lead, and an expertise in delivering medical technology innovation.

## Experience

### Zeit Medical

CO-FOUNDER

- Lead the development of a medical device for early identification of cerebral ischemia to improve therapy outcomes
- Manage a team of four engineers and neuroscientists
- Design the signal processing strategy and develop EEG feature extraction (power metrics & symmetry)
- Develop event labeling tools (EEG, SSEP, MEP) in collaboration with the Stanford Intraoperative Neuromonitoring Unit

*Palo Alto, CA, U.S.A*

*Apr. 2018 - Present*

### UCSF-Stanford Pediatric Device Consortium

RESEARCHER AND ENGINEERING LEAD

- Manage engineering support for all incoming projects
- Coordinate the feedback and support sessions
- Develop new technologies for central line monitoring

*Stanford, CA, U.S.A*

*Sep. 2018 - Present*

### FIRE1

INNOVATION CONSULTANT

- Identified a new clinical space where existing, company-owned technology can be applied to address unmet needs
- Conducted competitive landscape and reimbursement pathway analysis

*Dublin, Ireland*

*Apr. 2017 - Jun. 2018*

### Stanford Byers Center for Biodesign

INNOVATION FELLOW

- Conducted clinical immersion with a variety of healthcare stakeholders including patients, physicians, nurses, and caregivers
- Identified an unmet need in the space of cerebral ischemia by applying the Biodesign methodology and reported design specifications
- Conducted market research and identified gaps in the current cycle of care
- Lead brainstorming sessions, generated solution concepts and conducted early prototype testing
- Developed a healthcare economic value model to assess the cost effectiveness of new solutions against the established cycle of care
- Lead the technical design of a minimally invasive monitoring device, including signal feature extraction, anomaly detection algorithm, and hardware prototyping

*Stanford, CA, U.S.A*

*Aug. 2017 - Jun. 2018*

### Stanford Chemical Engineering (Bao Research Group)

RESEARCH FELLOW

- Conceptualized and designed a stretchable, self-healing electromechanical interconnect that can support serial bus communication
- Wrote firmware to drive modular microcontrollers, sensors, display elements and communications using Arduino IDE for Simblee
- Developed damage-resistant, wearable EKG and strain monitoring sensors in collaboration with a team of chemists and material scientists
- Improved the performance of flexible, capacitive pressure sensors by introducing a new micro pattern of the sensor's dielectric and wrote a MATLAB script to automate the generation of the corresponding silicon wafer masks
- Established an in-house process to fabricate low-cost double-sided flexible PCBs
- Developed a flexible, wearable, arterial tonometer in collaboration with Bosch Research and Technology Center
- Collaborated with ORMCO to design dental health monitoring sensors

*Stanford, CA, U.S.A*

*Feb. 2016 - Jul. 2017*

### Advanced Sport Instruments

BIOMEDICAL ENGINEER

- Ported the data analytics back-end (speed, acceleration, position, sprints) from MATLAB into Python
- Developed a tool to export team and player-specific performance reports in a user friendly .xlsx format with Python
- Performed field testing with users and augmented the report according to user needs
- Integrated heart rate and heart rate variability metrics in the performance report

*Lausanne, VD, Switzerland*

*Aug. 2015 - Dec. 2015*

## Microsoft Research (Medical Devices Group)

Redmond, WA, U.S.A

RESEARCH CONSULTANT

Mar. 2015 - Jun. 2015

- Tested a wearable, vascular-health monitoring device
- Identified clinical stakeholders/users and collected feedback on the device design
- Compiled a technical report on usability and performance

## Microsoft Research (Medical Devices Group)

Redmond, WA, U.S.A

RESEARCH INTERN

Feb. 2014 - May 2014

- Developed and validated a wearable device for assessing vascular health (Augmentation Index, Pulse Transit Time)
- Sourced and tested critical hardware components
- Designed the pulse-wave signal processing algorithm in MATLAB and ported it to a real time system via C#
- Ran an in vivo sensor validation study against a commercially available vascular tonometer

## Skills

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**Programming** Matlab, Python, LaTeX, Git, HTML5, Javascript, C/C++

**Databases** Mongo

**CAD & Simulations** Fusion 360, Eagle PCB, Solidworks, Autocad, Rhino, Comsol, ANYS (Fluent, CFX)

**Prototyping** Wet-lab, Machine-shop, 3D printing, Electronics assembly

**Languages** Greek, English, German, French

## Education

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### École polytechnique fédérale de Lausanne

Lausanne, VD, Switzerland

PHD IN BIOTECHNOLOGY AND BIOENGINEERING

Sep. 2010 - Jun. 2015

- Worked at the Laboratory of Hemodynamics and Cardiovascular Technology. Doctoral thesis: "Novel non-invasive techniques for hemodynamic monitoring"

### Aristotle University Thessaloniki

Thessaloniki, Greece

DIPLOMA IN MECHANICAL ENGINEERING

Sep. 2004 - Jul. 2010

- Majored in Fluid Mechanics and Turbomachinery. I conducted research in biofluid mechanics. Diploma thesis: "Simulation of the fibrosis effects after a sub-scleral glaucoma drainage device implantation"

## Honors & Awards

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2018	<b>Grantee</b> , Biodesign Summer Extension Grant	U.S.A.
2018	<b>Grantee</b> , Coulter Seed Grant	U.S.A.
2018	<b>Grantee</b> , Precision Health and Integrated Diagnostics Center Seed Grant	U.S.A.
2018	<b>Awardee</b> , "Jack Perkins" Award, Institute of Engineering and Physics in Medicine	U.S.A.
2017	<b>Fellow</b> , Biodesign Innovation Fellowship	U.S.A.
2015	<b>Fellow</b> , Swiss National Science Foundation Early Mobility Fellowship	Switzerland
2014	<b>Awardee</b> , EPFL - "Chorafas Foundation" Award	Switzerland
2014	<b>Awardee</b> , Merit Award "Magna Cum Laude", ISMRM	Italy
2014	<b>2nd Place</b> , "Sotiris Papastamatis" Award, Athens Medical Society	Greece
2013	<b>1st Place</b> , "Sotiris Papastamatis" Award, Athens Medical Society	Greece

## Additional Contributions

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### Stanford Wearable Electronics Initiative (eWear PostDoc & Student committee)

Stanford, CA, U.S.A.

LEAD (INDUSTRY OUTREACH)

Jan. 2017 - Jan. 2018

- Founded the PostDoc and Student committee
- Organized a wearable technology mini lecture series with invited speakers from academic and industrial background
- Coordinated student visits to local companies that are actively pursuing wearable technology applications
- Assisted in organizing the annual eWear meeting

# Publications

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- A hierarchically patterned, bioinspired e-skin able to detect the direction of applied pressure for robotics  
Clementine M Boutry, Marc Negre, Mikael Jorda, **Orestis Vardoulis**, Alex Chortos, Oussama Khatib, Zhenan Bao  
*Science Robotics* 3.24 (2018) eaau6914. Science Robotics, 2018
- Modular and Reconfigurable Stretchable Electronic Systems  
Jiheong Kang, Donghee Son, **Orestis Vardoulis(co-first)**, Jaewan Mun, Naoji Matsuhisa, Yeongin Kim, Jaemin Kim, Jeffrey B-H Tok, Zhenan Bao  
*Advanced Materials Technologies* (2018) p. 1800417. 2018
- An integrated self-healable electronic skin system fabricated via dynamic reconstruction of a nanostructured conducting network  
Donghee Son, Jiheong Kang, **Orestis Vardoulis(co-first)**, Yeongin Kim, Naoji Matsuhisa, Jin Young Oh, John WF To, Jaewan Mun, Toru Katsumata, Yuxin Liu  
*Nature nanotechnology* 13.11 (2018) p. 1057. Nature Publishing Group, 2018
- Cardiovascular morphometry with high-resolution 3D magnetic resonance: First application to left ventricle diastolic dysfunction  
Diego Gallo, **Orestis Vardoulis(co-first)**, Pierre Monney, Davide Piccini, Panagiotis Antiochos, Juerg Schwitter, Nikolaos Stergiopoulos, Umberto Morbiducci  
*Medical engineering & physics* 47 (2017) pp. 64–71. Elsevier, 2017
- In vivo evaluation of a novel, wrist-mounted arterial pressure sensing device versus the traditional hand-held tonometer  
**Orestis Vardoulis**, T Scott Saponas, Dan Morris, Nicolas Villar, Greg Smith, Shwetak Patel, Desney Tan  
*Medical engineering & physics* 38.10 (2016) pp. 1063–1069. Elsevier, 2016
- Improved variational denoising of flow fields with application to phase-contrast MRI data  
Emrah Bostan, Stamatios Lefkimiatis, **Orestis Vardoulis**, Nikolaos Stergiopoulos, Michael Unser  
*IEEE Signal Processing Letters* 22.6 (2015) pp. 762–766. IEEE, 2015
- Single breath-hold 3D measurement of left atrial volume using compressed sensing cardiovascular magnetic resonance and a non-model-based reconstruction approach  
**Orestis Vardoulis**, Pierre Monney, Amit Bermanno, Amir Vaxman, Craig Gotsman, Janine Schwitter, Matthias Stuber, Nikolaos Stergiopoulos, Juerg Schwitter  
*Journal of Cardiovascular Magnetic Resonance* 17.1 (2015) p. 47. BioMed Central, 2015
- Prediction of all-cause mortality in the elderly using a novel method for the estimation of total arterial compliance.  
TG Papaioannou, AD Protogerou, N Stergiopoulos, **O Vardoulis**, M Safar, J Blacher, C Stefanadis  
*Archives of Hellenic Medicine/Arheia Ellenikes Iatrikes* 31.6 (2014). 2014
- Total arterial compliance estimated by a novel method and all-cause mortality in the elderly: the PROTEGER study  
Theodore G Papaioannou, Athanase D Protogerou, Nikolaos Stergiopoulos, **Orestis Vardoulis**, Christodoulos Stefanadis, Michel Safar, Jacques Blacher  
*Age* 36.3 (2014) p. 9661. Springer Netherlands, 2014
- First in vivo application and evaluation of a novel method for non-invasive estimation of cardiac output  
Theodore G Papaioannou, Dimitrios Soulis, **Orestis Vardoulis**, Athanase Protogerou, Petros P Sfikakis, Nikolaos Stergiopoulos, Christodoulos Stefanadis  
*Medical engineering & physics* 36.10 (2014) pp. 1352–1357. Elsevier, 2014
- In vivo evaluation of a novel ‘diastole-patching’ algorithm for the estimation of pulse transit time: advancing the precision in pulse wave velocity measurement  
Theodore G Papaioannou, **Orestis Vardoulis(co-first)**, Athanase Protogerou, George Konstantonis, Petros P Sfikakis, Christodoulos Stefanadis, Nikolaos Stergiopoulos  
*Physiological measurement* 36.1 (2014) p. 149. IOP Publishing, 2014
- Validation of algorithms for the estimation of pulse transit time: where do we stand today?  
Theodoros G Papaioannou, **Orestis Vardoulis**, Nikolaos Stergiopoulos  
*Annals of biomedical engineering* 42.6 (2014) p. 1143. Springer Science & Business Media, 2014
- Total arterial compliance estimated by a novel method and all-cause mortality in the elderly: The Proteger Study  
TG Papaioannou, AD Protogerou, N Stergiopoulos, **O Vardoulis**, C Stefanadis, M Safar, J Blacher  
*Artery Research* 3.7 (2013) p. 153. 2013
- Validation of a novel and existing algorithms for the estimation of pulse transit time: advancing the accuracy in pulse wave velocity measurement  
**Orestis Vardoulis**, Theodore G Papaioannou, Nikolaos Stergiopoulos  
*American Journal of Physiology-Heart and Circulatory Physiology* 304.11 (2013) H1558–H1567. American Physiological Society Bethesda, MD, 2013
- On the estimation of total arterial compliance from aortic pulse wave velocity  
**Orestis Vardoulis**, Theodore G Papaioannou, Nikolaos Stergiopoulos  
*Annals of biomedical engineering* 40.12 (2012) pp. 2619–2626. Springer US, 2012