

Autorizzo il trattamento dei miei dati personali presenti nel curriculum vitae ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 e del GDPR (Regolamento UE 2016/679).

Il sottoscritto Emanuele Vignali codice fiscale _____ nato a _____ il _____ residente in _____, telefono _____, consapevole delle responsabilità penali cui può andare incontro in caso di dichiarazioni non veritiere, ai sensi e per gli effetti di cui all'art. 76 del D.P.R. 445/00 e sotto la propria personale responsabilità

DICHIARA

i seguenti stati, fatti e qualità personali:

Curriculum Vitae

Personal Information

Name Emanuele Vignali
Date of Birth _____
Address _____
Mobile _____
Email _____

Education

Jan 2017 – Apr 2020 **University of Pisa Pisa, Italy**
PhD degree in Information Engineering (excellent cum laude)
(Supervisors: Prof. Luigi Landini, Prof. Simona Celi (s.celi@ftgm.it))
Sept 2012 – Apr 2016 **University of Pisa Pisa, Italy**
Master of Science in Biomedical Engineering (110/110 magna cum laude)
Sep 2009 – Sept 2012 **University of Pisa Pisa, Italy**
Bachelor of Science in Biomedical Engineering (110/110 magna cum laude)

Current Position

Jan 2017 – Present **Fondazione Toscana Gabriele Monasterio Massa, Italy** – Research engineer

- Biological/cardiovascular tissue mechanical modeling
- Finite Element Model computation
- Design of experimental setup for in-vitro tests for endovascular devices validation
- Design of experimental setup for soft tissues opto-mechanical characterization
- Additive manufacturing for biomedical applications

Current Projects (Role)

- o **DIVINE - High-speed 3D-imaging of blood vessels based on optical signal processing** (Research engineer)
 - Development of mechanical / microstructural setup for evaluation of cardiovascular tissues
- o **MEDITATE - Horizon 2020** (Research engineer)
 - Development of mechanical / microstructural setup for evaluation of cardiovascular tissues
 - 3D printing manufacturing of heart structures models
 - Development of fluid dynamic setup for evaluation of cardiovascular devices

Past Projects (Role)

- o **VIVIR- Virtual and Augmented Reality Support for Transcatheter Valve Implantation by using Cardiovascular MRI project** (Research engineer)
 - Numerical simulations of cardiovascular structures in Finite Element environment
 - Segmentation of biomedical images
 - 3D printing manufacturing of heart structures models
 - Development of fluid dynamic setup for evaluation of cardiovascular devices
- o **4R Tender - Reviews on Non-animal Methods in Use for Biomedical Research** (Research engineer)
 - Investigation of non-animal methods for the research in the cardiovascular field
 - Evaluation of engineering techniques for the replacement of animal experimentation

Work Experience

- Aug 2015 – Feb 2016 **Rutgers University New Brunswick, New Jersey, USA**, – Master research student at Mechanical and Aerospace Engineering department.
- Fabrication and design of bio-inspired microneedle structures for biomedical applications
 - Finite Element simulations of swelling hydrogels

Awards

- Best Oral Presentation VIII Annual Meeting of the Italian Chapter of European Society of Biomechanics, September 30 – October 1, 2019, Bologna, Italy
- Student Travel Grant Award European Society of Cardiology Conference, August 26 - 30, 2017, Barcelona, Spain

Pubblications

International Journals

- [J1] **E. Vignali**, E. Gasparotti, L. Landini, S. Celi. "Development and realization of an experimental bench test for synchronized Small Angle Light Scattering and Biaxial Traction analysis of tissues", *MDPI Electronics*, (2021)
- [J2] F. di Bartolo, **E. Vignali**, E. Gasparotti, A. Malacarne, L. Landini, S. Celi. "Numerical simulations of light scattering in soft anisotropic fibrous structures and validation of a novel optical setup from fibrous media characterization", *MDPI Electronics*, (2021)
- [J3] **E. Vignali**, E. Gasparotti, K. Capellini, B.M. Fanni, L. Landini, V. Positano, S.Celi. "Modelling biomechanical interaction between soft tissue and soft robotic instruments: importance of constitutive anisotropic hyperelastic formulations", *The International Journal of Robotics Research*, (2020)
- [J4] **E. Vignali**, Z. Manigrasso, E. Gasparotti, B. Biffi, L. Landini, V. Positano, C. Capelli, S. Celi. "Design, simulation, and fabrication of a three-dimensional printed pump mimicking the left ventricle motion", *The International Journal of Artificial Organs*, (2019)
- [J5] **E. Vignali**, F. Di Bartolo, E. Gasparotti, A. Malacarne, G. Concistrè, F. Chiamonti, M. Murzi, V. Positano, L. Landini and S. Celi. "Correlation between micro and macrostructural biaxial behavior of aTAA: a novel experimental technique", *Medical Engineering & Physics*, (2020)
- [J6] E. Gasparotti, **E. Vignali**, P. Losi, M. Scatto, B. M. Fanni, G. Soldani, L. Landini, V. Positano, S. Celi. "A 3D printed melt-compounded antibiotic loaded thermoplastic polyurethane heart valve ring design: an integrated framework of experimental material tests and numerical simulations". *International Journal of Polymeric Materials & Polymeric Biomaterials* (2018)
- [J7] K. Capellini, **E. Vignali**, E. Costa, E. Gasparotti, M. E. Biancolini, L. Landini, V. Positano, S. Celi. "Computational fluid dynamic study for aTAA hemodynamics: an integrated imaged-based and RBF mesh morphing approach". *Journal of Biomechanical Engineering* (2018)

- [J8] D. Han, R. S. Morde, S. Mariani, A. A. La Mattina, **E. Vignali**, C. Yang, G. Barillaro, H. Lee. "4D Printing of a Bioinspired Microneedle Array with Backward-Facing Barbs for Enhanced Tissue Adhesion". *Advanced Functional Materials* (2020)
- [J9] A. Cavallo, E. Gasparotti, P. Losi, I. Foffa, T. Al Kayal, **E. Vignali**, S. Celi and G. Soldani. "Development of a Polymeric Valve for Minimally Invasive Aortic Valve Replacement". *Frontiers in Bioengineering and Biotechnology*, section Biomaterials (2020)
- [J10] S. Celi, E. Gasparotti, K. Capellini, **E. Vignali**, B. M. Fanni, L. Ait Ali, M. Cantinotti, M. Murzi, S. Berti, G. santoro and V. Positano. "3D printing in modern cardiology". *Current Pharmaceutical Design* (2020)

[International Conferences/Workshops with Peer Review](#)

- [I1] **E. Vignali**, S. Avril, S. Celi. "Fully-Coupled Fluid-Structure Interaction simulation of Ascending Thoracic Aorta based on the Small On Large Theory". *ParCFD 32nd International Conference on Parallel Computational Fluid Dynamics* (2021).
- [I2] **E. Vignali**, E. Gasparotti, A. Mariotti, M.V. Salvetti, S. Celi. "In-silico and In-vitro uncertainty quantification of inlet conditions of the aortic complex". *26th Congress of the European Society of Biomechanics* (2021)
- [I3] **E. Vignali**, S. Avril, S. Celi. "Patient-Specific linearization of anisotropic hyperelastic models for FSI analyses of Aortic Aneurysms". *26th Congress of the European Society of Biomechanics* (2021)
- [I4] **E. Vignali**, E. Gasparotti, A. Mariotti, K. Capellini, D. Haxhiademi, G. Bianchi, B. M. Fanni, V. Positano, L. Landini, M. V. Salvetti and S. Celi. "Development of a custom mock circulatory loop for in-vitro study of patient specific aortic branches". *International Society for Mechanical Circulatory Support -27th annual meeting* (2019)
- [I5] F. Di Bartolo, **E. Vignali**, A. Malacarne, E. Gasparotti, V. Positano, L. Landini, S. Celi. "Optomechanical characterization of soft biological tissues: an integration of biaxial test and sals technique". *Proceedings of European Society of Biomechanics* (2019)
- [I6] **E. Vignali**, E. Gasparotti, M. Scatto, P. Losi, B. M. Fanni, K. Capellini, L. Landini, V. Positano, S. Celi. "3D Printing of an antibiotic-loaded heart valve ring prosthesis in thermoplastic polyurethane: fabrication, testing and simulation". *Proceedings of IDBN* (2018)
- [I7] **E. Vignali**, E. Gasparotti, K. Capellini, P. Losi, M. Murzi, P. A. Farneti, L. Landini, V. Positano, S. Celi. "Ascending thoracic aortic FE simulation by integrating patient-specific data from imaging, mechanical properties and histological data". *Proceedings of World Congress of Biomechanics* (2018)
- [I8] **E. Vignali**, N. Martini, P. Losi, K. Capellini, D. Della Latta, F. Di Bartolo, L. Landini, V. Positano, S. Celi. "Towards non-invasive assessment of human aortic tissue microstructure: Diffusion Tensor Imaging for collagen fiber detection". *Proceedings of National Congress of Bioengineering GNB* (2018)
- [I9] **E. Vignali**, K. Capellini, P. Losi, M. Murzi, P. Farneti, V. Positano, L. Landini, S. Celi. "A morphological and histo-mechanical study for ascending aorta aneurysms in BAV and TAV patients". *Proceedings of 23rd Congress of European Society of Biomechanics* (2017)
- [I10] **E. Vignali**, K. Capellini, S. Celi, P. Losi, G. Vivoli, E. Cerone, V. Positano, L. Landini, M. Murzi, S. Berti. "A morphological and mechano-biological comparison between ascending thoracic aneurysms with bicuspid and tricuspid via in-vivo and ex-vivo investigation". *European Heart Journal* (2017);38(Suppl. 1):825-826 (P3975). (Awarded with the student travel grant at the ESC congress)
- [I11] E. Gasparotti, **E. Vignali**, E. Cerone, S. Berti, S. Celi. "Digital twin of the CardioBand procedure for mitral valve regurgitation: in silico approach and validation". *26th Congress of the European Society of Biomechanics* (2021)
- [I12] B.M. Fanni, E. Gasparotti, **E. Vignali**, C. Capelli, V. Positano, S. Celi. "A parametric equation for the non-invasive estimation of the elastic properties of materials". *26th Congress*

- [I13] E. Gasparotti, **E. Vignali**, M. Scolaro, P. A. Del Sarto, S. Celi, D. Haxhiademi. "In vitro study of effects of ECMO on patient specific aorta under cardiogenic shock conditions". 26th Congress of the European Society of Biomechanics (2021)
- [I14] F. Bardi, E. Gasparotti, **E. Vignali**, M. Aguirre, S. Avril, S. Celi. "A hardware-in-the-loop strategy for fluid dynamic characterization of cardiovascular systems". 26th Congress of the European Society of Biomechanics (2021)
- [I15] K. Capellini, E. Gasparotti, **E. Vignali**, L. Ait Ali, M. Cantinotti, P. Tripicchio, M. Murzi, S. Celi. "A clinical trial to assess the effectiveness of 3D models for complex cardiac surgical planning". 26th Congress of the European Society of Biomechanics (2021)
- [I16] K. Capellini, E. Gasparotti, **E. Vignali**, B. M. Fanni, U. Cella, E. Costa, M. E. Biancolini, S. Celi, Simona. "An image-based CFD and RBF morphing approach: an alternative for standard FSI technique". 26th Congress of the European Society of Biomechanics (2021)
- [I17] Z. Manigrasso, E. Gasparotti, B. Biffi, **E. Vignali**, S. Schievano, L. Landini, V. Positano, C. Capelli and S. Celi. "A novel 3D printed bioinspired cardiac pneumatic pump: from design to numerical and experimental study". Proceedings of Virtual Physiology Human Conference (2018)
- [I18] E. Gasparotti, **E. Vignali**, G. Vivoli, A. G. Cerillo, S. Berti, L. Landini, V. Positano, S. Celi. "Towards a patient-specific finite element simulation of Cardioband procedure for the treatment of mitral regurgitation". Proceedings of World Congress of Biomechanics (2018)
- [I19] K. Capellini, P. Tripicchio, **E. Vignali**, E. Gasparotti, L. Ait-Ali, M. Cantinotti, D. Federici, G. Santoro, F. Alfonzetti, C. Evangelista, C. Tanca and S. Celi. "3D Printing and 3D Virtual Models for Surgical and Percutaneous Planning of Congenital Heart Diseases". Proceedings of the 15th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (2020)
- [I20] B. M. Fanni, E. Gasparotti, **E. Vignali**, K. Capellini, G. Vivoli, M. Mariani, M. Rezzaghi, L. Landini, V. Positano, S. Celi, S. Berti. "Importance of left atrium fluid dynamics for the planning of LAA closure procedure: an integrated computational fluid dynamics and morphological study". European Heart Journal (2018). 39 (Issue Supplement 1):1290 (ESC Best Poster Awards)

National Congresses/Conferences and Others

- [N1] **E. Vignali**, F. Di Bartolo, E. Gasparotti, A. Malacarne, V. Positano, L. Landini and S. Celi. "In-silico evaluation of a patient-specific ATAA case through experimental mechano-microstructural characterization". CAE Conference (2019)
- [N2] **E. Vignali**, F. Poli, F. Di Bartolo, E. Gasparotti, A. Malacarne, V. Positano, L. Landini and S. Celi. "Biaxial and optomechanical characterization of soft tissues: a novel setup and experimental tests". Proceedings of the VIII Annual Meeting of the Italian Chapter of European Society of Biomechanics (2019) (awarded with the prize of Best Oral Presentation)
- [N3] **E. Vignali**, E. Gasparotti, B. M. Fanni, V. Positano, L. Landini and S. Celi. "Development of a fully controllable real-time pump to reproduce left ventricle physiological flow". Lecture Notes in Mechanical Engineering, pp 908-919 (2019)
- [N4] **E. Vignali**, E. Gasparotti, Z. Manigrasso. "A numerical and experimental approach for the design of a novel 3D printed bioinspired cardiac pneumatic pump". CAE Conference (2018)
- [N5] E. Gasparotti, **E. Vignali**, K. Capellini, G. Vivoli, A.G. Cerillo, V. Positano, S. Berti, L. Landini, S. Celi. "A FE tool to simulate a transcatheter anchor-based system for mitral valve regurgitation". Proceedings of the VII Annual Meeting of the Italian Chapter of European Society of Biomechanics. p. 57. (2017)
- [N6] K. Capellini, E. Costa, M. E. Biancolini, **E. Vignali**, V. Positano, L. Landini, S. Celi. "An image-based and RBF mesh morphing CFD simulation for a TAA hemodynamics". Proceedings of the VII Annual Meeting of the Italian Chapter of European Society of Biomechanics. p. 25. (2017)

- [N7] S. Celi, M. Conti, S. Marconi, **E. Vignali**, F. Auricchio, V. Positano, L. Landini. "Prototipazione rapida da immagini per una medicina personalizzata", *Book Chapter 18. Immagini biomediche: nuove tendenze in tecnologia, metodi e applicazioni*, Patron editore 2018:pp 223-234. (2018)
- [N8] A. Mariotti, **E. Vignali**, E. Gasparotti, K. Capellini, S. Celi and M. V. Salvetti. "Comparison Between Numerical and MRI Data of Ascending Aorta Hemodynamics in a Circulatory Mock Loop". *Lecture Notes in Mechanical Engineering*, pp 898-907 (2019)

Additional Research Activities

- Lecturer for the course "Strumenti di Analisi Numerica per l'Ingegneria Biomedica" at faculty of Biomedical Engineering, University of Pisa (2021)
- Research experience at SAINBIOSE Université Jean Monnet et Mines Saint-Étienne, under the tutorship of professor Stéphane Avril
- Supervisor for Master thesis in Biomedical Engineering at University of Pisa: "Development of an experimental fluid dynamic setup for the evaluation of valve prosthesis" (2018)
- Supervisor for Master thesis in Biomedical Engineering at University of Pisa: "Project and development of an experimental setup for the optomechanical characterization of vascular tissue" (2019)
- Supervisor for Master thesis in Biomedical Engineering at University of Pisa: "Study of a cohort of patients affected by Tetralogy of Fallot: an integrated approach between numerical simulations and experimental activities" (2020)
- Reviewer scientific journals (International Journal of Artificial Organs and International Journal of Robotics Research)
- Lecturer for the course "Principles for Diagnostic Methods" at faculty of Biomedical Engineering, University of Pisa (2019)

Skills & Background Knowledge

Technical skills

Ansys, Fluent, Python, Matlab, Labview, Office – *Advanced*
ANSA, Solidworks, C++, Java, FORTRAN – *Intermediate*

Personal skills

High level in communication skills

Sociable and proactive

High level in problem solving skills

MASSA 14/10/2021

Luogo e Data

Firma