

# Massimiliano Pedone

## Curriculum Vitae

InfoSapienza ICT Center  
Sapienza University of Rome  
P.le Aldo Moro, 5 Roma, 00185, Italy

### Personal Information

Nationality Italian

### Habilitation

- May 2019 Eligible at ssd A5 Mat 08, Numerical Analysis Researcher Position type A. SBAI Department Engineering Faculty, Sapienza University, Italy. [web.uniroma1.it/trasparenza/sites/default/files/Bando202820\\_201820RTDA20MAT0820Verbalecolloquio.pdf](http://web.uniroma1.it/trasparenza/sites/default/files/Bando202820_201820RTDA20MAT0820Verbalecolloquio.pdf)
- Oct. 2015 Eligible at Mat 08, Numerical Analysis Researcher Position. Mathematics Department, University of Bari, Italy. [reclutamento.ict.uniba.it/settore1/selezioni-ric/541-15](http://reclutamento.ict.uniba.it/settore1/selezioni-ric/541-15)

### Present employment

- 2019 – now Contract Professor Mathematics, Chemicals and Pharmaceutical technology Departments, Medicine and Pharmaceutics Faculty; Sapienza University of Rome.
- 2008 – now Working at ICT coordination and project Office. InfoSapienza ICT Center, of Sapienza University of Rome Italy. ICT Architectural design and control for enterprise solutions

### Previous employment

- 2001 – 2004 I worked as technologist at INFN, National Institute of Matter Physics in Phys Dept. of Sapienza University of Rome. Buildings computer cluster for scheduled job of calculus. Mail server administration, web design, network maintenance.
- 1995 – 2002 System manager and network administrator at Legambiente National office, Via Salaria, 403 - 00199 Roma. Project design and realization of service for IT on LAN connectivity by 2Mbit Telecom data line, internal service of file sharing, printing, scanning, fax on LAN, and mobile data connection. Supervision to technical assistants.

### Teaching

- 2020 – 2021 Contract Professor, Mathematics and Computer Science elements; channel A-D 3 CFU, Pharmacy and Medicine Sapienza University of Rome.
- 2020 – 2021 Contract Professor, Mathematics and Computer Science elements; channel E-O 8 CFU, Pharmacy and Medicine Sapienza University of Rome.
- 2019 – 2020 Contract, Professor Mathematics, Pharmacy and Medicine Sapienza University of Rome.
- 2007 – 2008 Teaching Tutor at University of Rome Sapienza, Engineer Aerospace course. Differential Calculus, Prof. M.R. Martinelli
- 2006 – 2007 Teaching Tutor at University of Rome Sapienza Engineer Building and Architecture course. Analysis I, Prof. A. Bersani
- 2006 – 2007 Teaching Tutor at University of Rome Sapienza Engineer Building and Architecture course. Analysis I, Prof. C. Cerqueti

### Education

- 2010 **PhD in Mathematical Method and Model for Technologies and Society**, *Department of Mathematical Model and Methods for Applied Science*, Sapienza University of Rome, Italy.  
 PHD THESIS  
 title *Analysis of echocardiographic movies by variational methods*  
 description A newer dynamic approach to the well-known static variational method for the time-series medical echocardiographic images is presented, and MATLAB graphic software applications for synchronization between cardiac movement and electric signals (ECG) are developed.
- 2004 **M.Sc. in Scientific Calculus**, *Department of Mathematics*, Sapienza University of Rome, Italy.  
 MASTER THESIS  
 title *Some Algorithms for Image Processing using PDE*  
 supervisors Professor Maurizio Falcone  
 description Algorithms for numerical solving of Eikonal equation for segmentation, applied to ancient book of music to recover ink oxidation and a shape from shading to obtain 3D surface from planar images. An implementation of H-J solver by CASPUR on OpenMP multiprocessor F90 code.
- 2001 **Mathematics**, *Department of Mathematics*, Sapienza University of Rome, Italy.  
 UNDERGRADUATE THESIS  
 title *Oriented Graph Automatic Optimization*  
 supervisors Professor Sergio Camiz  
 description Automatic graph optimization, algorithm implementation, visualization and possible manual graphic refinement.  
 high school **Computer Sciences**, *technical, Antonio Meucci Rome*, Italy.  
 description Real time application in system control and electronics devices A/D, D/A low level assembler programming microprocessors; Motorola 6502 and Intel Z80, Z8000.

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## Publications, Communications and Articles

- May, 2019 *Analysis of high frame-rate movies by variational methods*. article in *Mathematics for Applications*; Massimiliano Pedone, Silvia Carosio, Giancarlo Ruocco, Zaccaria Del Prete, Vol 8, pp 59-77, DOI: 10.13164/ma.2019.05
- Oct, 2018 *A Novel Approach for Secure In-class Delivery of Educational Content via Mobile Routers with Functionally Enhanced Firmware; 2018 International Conference on Interactive Mobile Communication Technologies and Learning (IMCL)* Kamen Kanev, Federico Gelsomini, Paolo Bottoni, Massimiliano Pedone, Patrick Hung, Francesco Ficarola, Domenico Vitali
- Jan, 2018 *Firmware Enhancements for BYOD-Aware Network Security* Chapter in book: *Recent Advances in Technology Research and Education*, pp.273-280, DOI: 10.1007/978-3-319-67459-9\_34; Massimiliano Pedone, Kamen Kanev, Paolo Bottoni, Domenico Vitali, Alessandro Mei
- Nov, 2016 *New Software for Valutation of Uterine Septum* Article: *Journal of Minimally Invasive Gynecology* 23(7):S194; Massimiliano Marziali, Massimiliano Pedone, R. Vicario, (contribute for 3d image reconstruction)
- Sept, 2016 *Analysis of high frame-rate movies by 3D variational methods for tracking biomechanical properties of Muscle Engineered Tissue*. Conference paper at: *ComplImage2016*, At Niagara FALLS, NY, USA; Massimiliano Pedone, Silvia Carosio, Giancarlo Ruocco, Zaccaria Del Prete, article submitted
- Apr, 2016 *Assessment of indoor climate of Mogiła Abbey in Kraków (Poland) and the application of the Analogues Method to predict microclimate indoor conditions*, Accepted Article: *Environmental Science and Pollution Research*. Francesca Frasca, M.D.; Anna Maria Siani; Giuseppe Rocco Casale; Massimiliano Pedone; Lukasz Bratasz; Marcin Strojceki; Agata Mleczkowska. DOI: 10.1007/s11356-016-6504-9 (contribute for big data analysis).
- Jan, 2016 *Total ozone measurements at Italian Brewer stations (Rome and Aosta)*. Poster At: *Edinburgh, Conference: Quadrennial Ozone Symposium*; Anna Maria Siani, Giuseppe Rocco Casale, Massimiliano Pedone, Henri DiÁlmoz (contribute for big data analysis)

- 2014 *Echocardiographic Image Processing*, Chapter in Book: Computational Modeling of Objects Presented in Images. Series: Lecture Notes in Computational Vision and Biomechanics Vol. 15. Di Giamberardino, P.; Iacoviello, D.; Natal Jorge, R.; Tavares, J.M.R.S. (Eds.) ISBN 978-3-319-04038-7 <http://link.springer.com/book/10.1007/978-3-319-04039-4>
- 2012 ComplImage2012 3rd edition, Roma 5-7/9/2012 Sapienza Engineering Department. Talk in section MEDICAL IMAGE ANALYSIS II Article in Book: *Analysis of left ventricle echocardiographic movies by variational methods: dedicated software for cardiac ECG and ECHO synchronizations*. Pag 267-272 Computational Modeling of Objects Represented in Images: Fundamentals, Methods and Applications III ISBN 9780415621342 CRC Press Taylor and Francis Group, <http://www.crcpress.com/product/isbn/9780415621342>, <http://www.dis.uniroma1.it/compimage2012/cms/>
- 2010 Talk and Abstract in congress acts. *Variational Method in Image Processing, Analysis of left ventricle echocardiographic movies by variational methods: a dedicated software for ECG and ECHO synchronizations during cardiac cycles.*, M. Pedone. 70<sup>th</sup> SIMAI 2010. Available at <http://openconference.simai.eu/index.php/sc/2010/paper/download/94/50> <http://pedoneweb.phys.uniroma1.it/max/phd/abstract/MSP46-Pedone.pdf> <http://pedoneweb.phys.uniroma1.it/max/phd/tesi/phdslide.pdf>
- 2010 Abstract in congress acts and Seminar at Summer school *New vistas in Image Processing*, CNA Summer School Carnegie Mellon University Pittsburgh PA USA. Homepage <http://www.math.cmu.edu/cna/Summer10/>
- 2009 e-abstract in Cardiovascular Imaging *Continuous analysis of echocardiographic movies of left ventricle during cardiac cycle by variational methods: a dedicated software for QRS-T and ECHO beat-to-beat correlations.*, M. Pedone, C. Cammarota, M. Curione. 70<sup>th</sup> Cardiologist Italian Society Congress Dec 2009. Available at <http://www2.sicardiologia.it/wsc2009/eabstract/html/981.htm>

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## Scientific Activities

- 2014 – now IIT@Sapienza Center for Life NanoScience Prof. Giancarlo Ruocco. Scientific Collaborations: Images and Movies analysis: -Tracking of object movements in eX vivo-vascularized Muscle Engineered Tissue (X-MET), S. Carosio et all -CElegans, in vivo frame analysis for tracking and assisted Matlab control of Thorlabs APT Brushless motor driver. XY stages automatic control and time triggering the stimulation for neural response analysis. V. Folli et all
- 2014 – now Atmospheric big data analysis of ozone and UVI data between terrain and satellite samples. A. Siani Physics Dep. Sapienza University of Rome.
- 2004 – 2010 INDAM GNCS membership (National Institute of High Mathematics FRANCESCO SEVERI Group of Scientific Calculus), on Numerical Analysis. Homepage: <http://gruppi.altamatematica.it/gnacs/>
- 2006 – 2010 Collaboration in signal analysis and graphic Matlab software implementation to research on arrhythmical disease. Joint with Prof. C. Cammarota Mathematical Dept. and cardiologist Prof. M. Curione Clinical Sciences Dept. of Umberto I Hospital, Sapienza University of Rome.
- 2009 – 2010 Collaboration for 2D fit polynomial spline for Magnetic Resonance Dosimetry. Prof. A. Piermattei, Sanitary Physics Laboratory team, Gemelli hospital of Rome.
- 2004 – 2006 Collaboration for planning and building system server architecture to organize genetic virus database and application for querying. Virology team, University of Rome II Tor Vergata.
- 2002 Written the protocol for digitalization of cultural heritage collection of Cesare Bazzani historical operas (5.587 operas) by introducing newer principles of microscopic-knowledge for non-invasive analysis over cultural heritage. Prof. G. Gigante, Phys Dept. and Historic Archive of Department of Cultural Heritage and Environmental Conservation, Sapienza University of Rome.
- 1998 – 2004 Scientific collaboration for laser light scattering Laboratory, system administration and optical instruments adjusting. Dott. G. Briganti, Laboratory of matter structure, Phys Dept., Sapienza University of Rome.
- 1997 – 1999 Scientific collaboration to realize a computer software interface to retrieve data from scientific instruments over biological molecular solution at different temperatures. Prof. A. Bonincontro, Laboratory of Biologic Solution, Physics Dept., Sapienza University of Rome.

- 1996 Consulting collaboration MERISTEM Biotechnology srl for Robotized Aided Micro-Propagation project, automatic visual recognition of micro-propagated plants production for robotic manipulation

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## Research skills

- Medical Movie and Image processing PDE and Functional dynamic minimization, application to vessel retinal analysis and echocardiographic ventricular recognition. X-MET high rate frame analysis. CElegans tracking stages control.
- Variational Methods Minimization of Mumford-Shah functional for segmentation of images. Refinement for movie processing to enhance moving edges by adding a time-dependent gradient term.
- Eikonal PDE Numerical solving on lattice domain for image segmentation and shape from shading. Code adapting of Fortran 90 OpenMp cycle optimization.
- Graphics User Interface Matlab assisted GUI programming for synchronization between ECHO and ECG signal and real-time visualization.
- Calculus and big data Linux DB and Matlab, Large data files analysis of meteorological instruments. Python and C# for stepper motor driver velocity test.

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## Summer School

- June 2010 *New vistas in Image Processing*, 2010 CNA Summer School, Center for Nonlinear Analysis Carnegie Mellon University Pittsburgh PA USA. Algorithms for variational models involving interfaces in image processing Regularity of optimal mappings Non local means, compressive sensing, L1 optimization, PDE based imaging, level set methods Variational Models in Shape Space and Links to Continuum Mechanics Applications of optimal transport to evolutionary PDEs Personal oral communication: Analysis of left ventricle echocardiographic movies by variational methods. <http://www.math.cmu.edu/cna/Summer10/>.
- July 2009 *Multiscale and Adaptivity: Modeling, Numeric and Applications Adaptive wavelet methods* Multiscale Modeling Convergence and Complexity of Adaptive Finite Elements Adaptivity in Mathematical Modeling Implementation of Adaptive Finite Element Methods CIME-EMS Summer School in applied mathematics Homepage: <http://php.math.unifi.it/users/cime/Courses/2009/course.php?codice=20094>
- Sept 2008 *Level Set and PDE based Reconstruction Methods: Applications to Inverse Problems and Image Processing*, Martin Burger (Mönster, Germany), Prof. Stanley Osher (UCLA, USA) Total variation and related methods Metrics of curves in shape optimization and analysis Computational Methods for Level Set and Nonlinear PDE Techniques Variational Methods in Image Matching and Motion Extraction: Medical and Biological Applications The Use of Level Set Methods in Inverse Problems C.I.M.E International Mathematical Summer Center Homepage: <http://php.math.unifi.it/users/cime/Courses/2008/course.php?codice=20082>
- July 2005 *Mathematical Models in Life Science: Theory and Simulation Mathematical modeling of epidemics (Mimmo Iannelli) Mathematical modeling of the cardiovascular system: theory, algorithms, applications (Alfio Quarteroni)* Mathematics department of the University of Trieste and the Institut für Technische Mathematik, Geometrie und Bauinformatik of the University of Innsbruck. INDAM GNCS Homepage: <http://www.dmi.units.it/torelli/scuola2005.html>

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## Workshop participation

- September 2012 ComplImage2012 3rd edition, Roma 5-7/9/2012 Sapienza Engineering Department. <http://www.dis.uniroma1.it/compimage2012/cms/> Talk in section MEDICAL IMAGE ANALYSIS II
- May 2007 Scale Space and Variational Methods in Computer Vision, First International Conference, Ischia, Italy; Homepage: <http://www.informatik.uni-trier.de/ley/db/journals/lncs.html>
- June 2006 Innovative Methods for Solving Evolutionary problems with memory, Anacapri Italy
- June 2004 Workshop on Net and calculus Problem of INFN, <http://www.infn.it/CCR/workshop/ccr2003/agenda.htm>
- June 2002 INFM Meeting National Conference on Physics of Matter, Bari, Italy

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## Languages

Italian mother tongue  
English intermediate written and fluent spoken. Completed in 2009 ITC "English FOR" course, I and II level  
Spanish spoken

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## Scientific Interests

- Image Processing
- Numerical Analysis
- Variational Methods
- Parallel Scientific Calculus
- Distributed computational resources
- Dynamic Programming
- General Public License Software

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## Programming experience

### Operating Systems

Linux, Mac OS™, All Microsoft™ operating systems, AIX™ Unix, experts skill

### Programming Languages

Procedural Fortran 90 (OpenMP), C, knowledge of library for education program and function for numerical applications

Object-Oriented MATLAB™ optimal knowledge for script and GUI, high knowledge for educational program

Visual Visual C++, C#, base for dll and big data file analysis

Libs ffmpeg, blas, good for video and image format exchange, base for scientific calculus and multimedia applications

Interpreted Python, Perl, base for big data file and strings analysis

Functional Mathematica™ Matlab™ good for symbolic calculus and educational program

Shells-Scripts bash, JavaScript

Web HTML, php, good for publishing

Server Web: Apache, IIS, Mail, DB: MySQL, Oracle, PostgreSQL, also on Cluster. File: AFS, NFS, Samba, Printing: CUPS.

Scientific Mathematica™, Maple™, MatLab™, GNUPlot

### Office Automation

TeX, LaTeX, OpenOffice, Microsoft Office™

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## Updated

July 28<sup>th</sup>, 2021