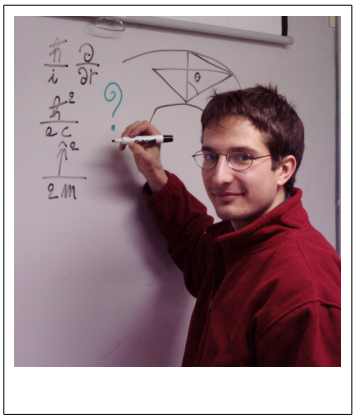
Michele Griffa
Extended *Curriculum Vitae et Studiorum*



Last update: June 23rd 2017

Personal information

Name/Surname	**Michele Griffa**
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Personal web site	http://www.calcolodistr.altervista.org/en/index_en.html
Blog dedicated to Scientific and High Performance Computing	http://www.scientificandhpcomputing.blogspot.ch
Birth date	November 5th 1979
Nationality	Italian
Civil state	Unmarried

Research interests

My current Research interests are mainly focused in three areas:

(1) **tomographic imaging of porous** (building) **materials**, e.g., cement-based materials, with **X-ray** and **neutron radiation**. The Research combines both **experimental activities** (at the laboratory scale and at synchrotron and neutron radiation facilities) and **instrument development/implementation**, e.g., the implementation at Empa of a **multi-contrast X-ray tomographic microscope** based upon a grating interferometer (Talbot-Lau interferometer), and **theoretical/computational activities**, consisting in developing **algorithms for 3D image processing/analysis** of the respective tomographic datasets;

(2) development of **non-destructive characterization** methods based upon linear, **nonlinear** and **diffuse ultrasonic waves** to be applied to cement-based materials;

(3) discrete element method (**DEM**) modeling and simulation of sheared granular materials, with specific application to a set of problems involving (a) granular friction and its role in several geophysical problems, e.g., dynamic earthquake triggering, and (b) gravitational consolidation and water evaporation, with corresponding shrinkage, leading to cracking.

I have developed and I'm administering a facility („platform“) for image analysis at Empa, to support users in the processing and analysis of their datasets obtained with a large variety of imaging methods (SEM, SEM + EDX, X-ray tomography, TOF-SIMS, AFM, FIB + SEM). Its name is the **E**mpa **P**latform for **I**mage **A**nalysis (**eπA**). This platform consists in hardware, software and knowledge base resources, in addition to direct support and consulting for image analysis tasks.

Education

- Date (from - to): January 7th 2004 – December 31st 2006
- Name and type of education: **Ph.D.** in **Physics**, Ph.D. School, Polytechnic Institute of Torino, Torino (Italy)
- Subjects of learning, topics, skills acquired:
  - Ph.D. Thesis title: *Modeling and Numerical Simulations of Elastic Wave Propagation for the characterization of complex heterogeneous materials*
  - Fields of interest: Continuum Mechanics (Elasticity Theory, Physics of Materials), Ultrasonic Imaging for the Non-Destructive Evaluation of materials, Inverse Problems Theory in Imaging, Ultrasonic Signal Processing, Scientific Computing, Parallel Computing; hysteretic systems mathematical modeling.
  - Acquired knowledge: non-linear elastic behaviour of consolidated/unconsolidated granular materials; Time Reversal Acoustics imaging methods and Non-Destructive evaluation of solid materials; finite differences methods for numerical simulations in Elastodynamics; development of computational codes for distributed-memory multi-processors supercomputers, such as Beowulf-like computing clusters, by MPI libraries; elastic hysteresis; Preisach-Mayergoyz's models of hysteretic systems;
  - Secondary scientific research activities: study of biomechanical and biophysical processes involved in tumor growth by mathematical models and numerical simulations.
- Title
  - **Ph.D.** in **Physics**

- Date (since - to): September 1998 – April 2003
- Name and type of education/formation activity: **Master** of **Science** (**MS**.) in **Physics**, Depts. of Physics, University of Torino, Torino (Italy).
- Issues, subjects of learning
  - Specialization fields: **Electronics** and **Cybernetics**
  - Specialization courses: **Microelectronics**, **Computational Physics**, **Cybernetics**, **Biological Physics**
  - Thesis Degree Title: *The Role of Mechanical Stress, Cellular Adhesion and Apoptosis in the Growth of Multicellular Tumor Spheroids: mathematical models and numerical simulations*
  - Fields of Research: Biophysics, Biomathematics, Scientific Computing, Mathematical Modeling, Tumor Biology, Cellular Biology

- Place of Thesis work: Dept. of Physics, Polytechnic of Torino and Research Unit of Torino-Polytecnic of the National Institute for Condensed Matter Physics (ex INFM-CNISM)

- Title: **MS.** (**Master** of **Science**, Italian “Laurea specialistica”) in **Physics**
- Final degree: **110**/**110** ***summa cum laude***

- Date (since - to): September 1993 – July 1998
- Name and type of education/formation activity: **Scientific *Gymnasium*** “Norberto Bobbio”, Carignano (Torino, Italy)
- Title: Scientific High School Diploma
- Evaluation degree: **60**/**60**

Professional appointments

- Date (since - to): January 1st 2014 – nowadays
- Employer/Institution: Empa (Swiss Federal Laboratories for Materials Science and Technology), ETH Domain, Center for X-ray Analytics and Concrete/Construction Chemistry Laboratory
- Type of job: Scientific Research
- Type of contract: **Senior Research Scientist, Group Leader for 3D image analysis and simulation**
- Research lines/topics/duties:

  (1) X-ray tomographic imaging for the characterization of materials

  (2) 3D image processing and analysis, including algorithm development.

  (3) Non-Destructive Evaluation of cement-based materials by ultrasounds.

  (4) Discrete Element Method modeling and simulation of granular media.

  (5) Development and administration of the Empa Platform for Image Analysis (eπA)

- Date (since - to): January 1st 2012 – December 31st 2013
- Employer/Institution: Empa (Swiss Federal Laboratories for Materials Science and Technology), ETH Domain, Concrete/Construction Chemistry Laboratory
- Type of job: Scientific Research
- Type of contract: **Research Scientist**
- Research lines/topics/duties: (1) 3D microscopy of cement-based materials (by multi-contrast X-ray tomographic microscopy and neutron radiography/tomography)

  (2) 3D image processing and analysis, including algorithm development.

  (3) Non-Destructive Evaluation of cement-based materials by ultrasounds.

  (4) Discrete Element Method modeling and simulation of granular media.

- Date (since - to): January 1st 2009 – December 31st 2011
- Employer/Institution: Empa (Swiss Federal Laboratories for Materials Science and Technology), ETH Domain, Laboratory for Building Science and Technology (now Laboratory for Multiscale Studies in Building Physics)
- Type of job: Scientific Research
- Type of contract: **Research Scientist**
- Research lines/topics/duties: (1) Modeling and simulation of stick-slip dynamics in sheared granular media by the Discrete Element Method (DEM).

  (2) Imaging and characterization of porous building materials by X-ray and neutron tomographic imaging methods.

  Responsible for the development of a computational laboratory for the Multiscale, Multiphysics of Building Materials Research Group (3D image processing and analysis of X-ray and neutron tomography datasets, scientific visualization).

- Date (since - to): July 2nd 2007 – December 15th 2008
- Employer/Institution: Los Alamos National Laboratory, Dept. of Energy, USA
- Type of job: Scientific Research
- Type of contract: **Post Doc Research Scholar**

• Research lines/topics/duties	(1) Development of ultrasonic and seismic imaging methods based on Time Reversal Acoustics techniques. (2) Applications of these methods for the Non-Destructive Evaluation (NDE) of solid materials and structures (imaging of cracks in solid consolidated granular media, like concrete, or structured materials).

• Date (since - to)	November 20th 2006 – June 29th 2007
• Employer/Institution	Los Alamos National Laboratory, National Nuclear Security Administration, USA Department of Energy
• Type of job	Scientific Research
• Type of contract	**Graduate Student Research Staff Assistant**
• Research lines/topics/duties	(1) Development of ultrasonic and seismic imaging methods based on Time Reversal Acoustics techniques. (2) Applications of these methods for the Non-Destructive Evaluation (NDE) of solid materials and structures (imaging of cracks in solid consolidated granular media, like concrete or structured materials).

• Date (since - to)	January – December 2004
• Employer/Institution	National Institute for Condensed Matter Physics (ex INFM-CNISM), Research Unit at the Polytechnic Institute of Torino
• Type of job	Scientific Research
• Type of contract	**Scientific Research Consultant**
• Research lines/topics/duties	Development of a computational code for the simulation of elastic wave propagation throughout specimens, with an extended surface damaged area, of structural/architectural/historical interest.

• Date (since - to)	April 15th 2003 – January 6th 2004
• Employer/Institution	National Institute for Condensed Matter Physics (ex INFM-CNISM), Research Unit at the Polytechnic Institute of Torino
• Type of job	Scientific Research
• Type of contract	**Scientific Research Fellow**
• Research lines/topics/duties	Project title: *Mathematical modeling and numerical simulations as support tools in the study of tumor growth*. Research activity in collaboration with the Nose and Throat Division of *Umberto I* Hospital (Torino) and Dept. of Genetics, Medical Chemistry and Biology, Medical Sciences Faculty, University of Torino.

Scientific publications

The full list of publications can be found at the end of this CV.

According to Web of Science(TM) calculations, my ***h*-index** is currently **10** and my **total number of citations** is 384 (since my first published article, in 2004).

The list of publications can also be found on my public Google Scholar profile.
According to Google Scholar's calculations, my ***h*-index** is currently equal to **13**, my ***i10*-index** is **21** and my **total number of citations** is **636** (since my first published article, in 2004).

Research project grants (in chronological descending order)

Standard projects

- Date (since - to): February 2016 – January 2017
- Title of the project: „Enhancing multi-contrast X-ray imaging of water and microstructure in cement-based materials by exploiting the dark-field channel and improving the temporal resolution“
- Type of Project/Funding: Swiss National Science Foundation (SNF) project n° 200020_162572. 57 kCHF.
- Roles in the project: PI

- Date (since - to): January 2015 – December 2015
- Title of the project: „MuScaT: Multiscale X-ray Computed Tomography“
- Type of Project/Funding: R-Equip Program. Swiss National Science Foundation (SNF) project n° 206021_157738. 350 kCHF.
- Roles in the project: Co-PI, with P. Schütz, R. Kaufmann, L. Poulikakos, G. Terrasi, D. Derome, A. Dommann (all EMPA)

- Date (since - to): October 2013
- Title of the project: „Thermal cracking in concrete characterized by nonlinear ultrasounds and X-ray Tomographic Microscopy“
- Type of Project/Funding: International Short Term Visit Grant, Swiss National Science Foundation (SNF). 2.72 kCHF.
- Roles in the project: Co-PI, with T.J. Ulrich (Los Alamos National Laboratory, USA). Host of T.J. Ulrich at EMPA during the joint experimental campaign.

- Date (since - to): October 2013 – December 2014
- Title of the project: Integrated, shared platform for Imaging/Image Analysis at EMPA
- Type of Project/Funding: EMPA inter-laboratory project. 231 kCHF.
- Roles in the project: Co-PI, with D. Derome, R. Erni, J. Whitby, R. Stämpfli. In charge of the hardware and software acquisition and installation.

- Date (since - to): February 2013 – January 2016
- Title of the project: Multi-contrast X-ray imaging of water and microstructure in cement-based materials
- Type of Project/Funding: Swiss National Science Foundation (SNF) project n° 200021-143782. 186.516 kCHF.
- Roles in the project: Principal Investigator. Co-PIs: P. Lura (Empa/ETHZ), R. Kaufmann (Empa).

- Date (since - to): May 2011 – April 2014
- Title of the project: Vibration-induced unjamming of sheared granular media: investigation by 3D Discrete Element Method modeling and simulation
- Type of Project/Funding: Swiss National Science Foundation (SNF) project n° 200021-135492. 159.482 kCHF.
- Roles in the project: Principal Investigator (PI). Co-PI: J. Carmeliet (ETHZ/Empa).

- Date (since - to): January 2012 – December 2014
- Title of the project: Development of Nonlinear Ultrasonics-based Non-Destructive Evaluation methods for micro-damage evolution in concrete (NONDEV)
- Type of Project/Funding: EMPA internal project/funding.
- Roles in the project: Principal investigator (PI). In collaboration with J. Neuenschwander, A. Leemann (Empa), P. Lura (Empa/ETHZ), G. Igarashi (Nagoya University, Japan), N. Toropovs (Technical University of Riga, Latvia), T.J. Ulrich (Los Alamos National Laboratory, USA) and C. Payan (Aix-Marseille Univ., LMA CNRS, France).

- Date (since - to): January 2012 – December 2013
- Title of the project: X-ray tomographic microscopy of concrete damaged by the Alkali-Aggregate Reaction (AAR)
- Type of Project/Funding: EMPA internal project/funding.
- Roles in the project: Principal investigator (PI). In collaboration with A. Leemann (Empa), P. Lura (Empa/ETHZ) and G. Igarashi (Nagoya University, Japan).

- Date (since - to): April 2013 – December 2013
- Title of the project: State of The Art Report (STAR) on the “Diagnosis of Alkali-Aggregate Reaction in dams”
- Type of Project/Funding: STAR commissioned by the Swiss Federal Office for Energy (BFE) – Division of dam engineering. 25 kCHF.
- Roles in the project: Co-PI. PI: A. Leemann (Empa)

- Date (since - to): January 2013 – April 2013
- Title of the project: TEOS-based architectural stone consolidants: transport and stone microstructural evolution studied by X-ray Tomographic Microscopy
- Type of Project/Funding: Master Thesis Project – ERASMUS Program. 2 kCHF.
- Roles in the project: Co-PI, with P. Lura (Empa/ETHZ) and E. Franzoni (Univ. of Bologna, Italy)

- Date (since - to): January 2010 – July 2011
- Title of the project: Imaging and micro-structural characterization of porous building materials using X-ray tomographic microscopy and neutron radiography/tomography
- Type of Project/Funding: Empa internal project/funding.
- Roles in the project: Development of algorithms and software for 3D image processing and analysis, mainly of tomographic datasets.

- Date (since - to): January 2009 – April 2011
- Title of the project: Modeling and simulation of stick-slip dynamics in sheared granular media
- Type of Project/Funding: Empa internal project/funding.
- Roles, duties in the project/knowledge acquired: Principal investigator. Development of Discrete Element Method (DEM)/Molecular Dynamics codes for modeling and simulation of granular materials. Application to studying the stick-slip dynamics in sheared granular media, like occurring in the Earth surface faults where earthquakes are nucleated.

Synchrotron radiation imaging beamtime projects

- Date (since - to): September 2015
- Title of the project: Advancing the visualization of pure water in porous building materials by fast, Talbot interferometry-based multi-contrast X-ray Tomographic Microscopy
- Type of Project/Funding: X-ray tomographic microscopy with synchrotron radiation beamtime, project n° I-20140385 EC. P07 beamline. Deutsches Elektronen-Synchrotron (DESY). Beamtime granted: 96 hours.
- Roles in the project: Principal Investigator (PI).

• Date (since - to)	February 2015
• Title of the project	Exploiting edge illumination dark-field imaging to assess the water distribution in porous building materials
• Type of Project/Funding	X-ray tomographic microscopy with synchrotron radiation beamtime, project n° MA-2396. ID-17 beamline. European Synchrotron Radiation Facility (ESRF). Beamtime granted: 72 hours.
• Roles in the project	Principal Investigator (PI). Co-PIs: P.C. Diemoz (UCL), A. Olivo (UCL), C. Payan (Uni Aix-Marseille), P. Lura (EMPA/ETHZ).

• Date (since - to)	September. 2014
• Title of the project	Drying of porous building materials: investigation by fast, in-line phase contrast X-ray Tomographic microscopy.
• Type of Project/Funding	X-ray tomographic microscopy with synchrotron radiation beamtime, project n° 20140234. TOMCAT beamline. Swiss Light Source (SLS), Paul Scherrer Institute (PSI). Beamtime granted: 24 hours.
• Roles in the project	Principal Investigator (PI). Co-PIs: P. Lura (EMPA/ETHZ), F. Yang and C. Di Bella (EMPA).

• Date (since - to)	September. 2013
• Title of the project	In situ imaging of early age tri-calcium silicate hydration by improved Zernike phase contrast X-ray Tomographic Nanoscopy and a customized hydration cell
• Type of Project/Funding	X-ray tomographic nanoscopy with synchrotron radiation beamtime, project n° 20130286. TOMCAT beamline. Swiss Light Source (SLS), Paul Scherrer Institute (PSI). Beamtime granted: 24 hours.
• Roles in the project	Principal Investigator (PI). Co-PIs: P. Lura (EMPA/ETHZ), F. Yang and B. Münch (EMPA), A. Bazzoni and K. Scrivener (EPFL), R. Mokso (SLS, PSI), M. Stampanoni (SLS, PSI, and ETHZ/UniZH).

• Date (since - to)	September. 2012
• Title of the project	Micro-scale damage in concrete by Alkali-Aggregate Reactions: 3D imaging and quantitative characterization
• Type of Project/Funding	X-ray tomographic microscopy (with synchrotron radiation) beamtime, project n° 20120164. TOMCAT beamline. Swiss Light Source (SLS), Paul Scherrer Institute (PSI). Beamtime granted: 16 hours.
• Roles in the project	Principal Investigator (PI). Co-PIs: P. Lura (EMPA/ETHZ), A. Leemann, M. Wyrzykowski and B. Münch (EMPA), P. Antonaci (Polytechnic Institute of Torino, Italy).

• Date (since - to)	November. 2011

- Title of the project: Three-dimensional measurements of ultra-cellular features of wood: bordered pits and middle lamella.
- Type of Project/Funding: X-ray tomographic nanoscopy (with synchrotron radiation) beamtime, project n° 20110114. TOMCAT beamline. Swiss Light Source (SLS), Paul Scherrer Institute (PSI). Beamtime granted: 24 hours.
- Roles in the project: Co-PI, together with J. Carmeliet (ETHZ/EMPA), A. Patera (EMPA/ETHZ), B. Blocken (Eindhoven Univ. of Technology, the Netherlands). PI: D. Derome (EMPA).

- Date (since - to): May 2011
- Title of the project: Quantitative 3D microstructural analysis of wood during moisture sorption: from green wood shrinkage to restrained swelling.
- Type of Project/Funding: X-ray tomographic microscopy (with synchrotron radiation) beamtime, project n° 20100795. TOMCAT beamline. Swiss Light Source (SLS), Paul Scherrer Institute (PSI). Beamtime granted: 64 hours.
- Roles in the project: Co-PI, together with J. Carmeliet (ETHZ/EMPA), A. Patera (EMPA/ETHZ), M. Sedighi-Gilani (EMPA). PI: D. Derome (EMPA).

Neutron imaging beamtime projects

- Date (since - to): May 2016
- Title of the project: Combined neutron and X-ray tomography study of plastic shrinkage in cement-based materials
- Type of Project/Funding: Neutron imaging beamtime. Project n° 20151868. ICON beamline. Swiss Neutron Spallation Source (SINQ), Paul Scherrer Institute (PSI). Beamtime granted: 72 hours.
- Roles in the project: Co-PI, together with P. Lura, M. Wyrzykowski and S. Ghourchian (Empa).

- Date (since - to): October 2013
- Title of the project: Dehydration and moisture transport in high-performance cementitious materials subjected to high temperatures
- Type of Project/Funding: Neutron imaging beamtime. Project n° 20130561. NEUTRA beamline. Swiss Neutron Spallation Source (SINQ), Paul Scherrer Institute (PSI). Beamtime granted: 120 hours.
- Roles in the project: Co-PI, together with M. Wyrzykowski and B. Weber (EMPA), N. Toropovs and G. Sahmenko (Tech. Univ. of Riga, Latvia).

- Date (since - to): October 2010
- Title of the project: Quantification of time-resolved moisture content and swelling strain distributions during dynamic vapor sorption in wood.

- Type of Project/Funding: Neutron imaging beamtime. Project n° 20100507. ICON beamline. Swiss Neutron Spallation Source (SINQ), Paul Scherrer Institute (PSI). Beamtime granted: 168 hours.
- Roles in the project: Co-PI, together with J. Carmeliet. PI: D. Derome.

- Date (since - to): August. 2010
- Title of the project: Quantification of moisture content variations during water uptake in wood
- Type of Project/Funding: Neutron imaging beamtime. Project n° 20091201. NEUTRA beamline. Swiss Neutron Spallation Source (SINQ), Paul Scherrer Institute (PSI). Beamtime granted: 144 hours.
- Roles in the project: Co-PI, together with J. Carmeliet (ETHZ/EMPA), M. Abuku (Kinki University, Japan). PI: D. Derome (EMPA).

Super-computing projects

- Date (since - to): April 2010 – March 2011
- Title of the project: UPgrade and full deployment of the Empa/Eawag computational cluster IPAZIA: towards an interdisciplinary on-site resource for computational sciences (UP-IPAZIA).
- Type of Project/Funding: R-Equip Program. Swiss National Science Foundation (SNF) project n° 206021_128754. 200 kCHF.
- Roles in the project: Co-PI, together with D. Passerone, C. Pignedoli, L. Holzer, J-M. Wunderli, R. Caputo, D. Brunner (all EMPA), H. Yang (EAWAG). PI: C. Bucher (EMPA).

- Date (since - to): February 2009 – January 2010
- Title of the project: Time Reversal Computational Imaging
- Type of Project/Funding: High Performance Computing Research project. Institutional Computing program, Los Alamos National Laboratory, US Department of Energy. Grant of computational time on the Turquoise Network Coyote compute cluster.
- Roles in the project: External collaborator. Implementation and deployment of ultrasound and seismic/seismological imaging techniques based upon Time Reversal Processing, for earthquake source location/characterization and imaging of highly heterogeneous media.

- Date (since - to): September 2008 – September 2009
- Title of the project: Hybrid numerical/experimental imaging using nonlinear Time Reversal Acoustics

- Type of Project/Funding: High Performance Computing Research project. Grant for the use of parallel super-computers at CINECA (Inter-University Consortium for High Performance Computing and Data Elaboration), Casalecchio di Reno (Bologna, Italy) – INFM/CINECA Parallel Computing Initiative
- Roles in the project: Co-PI. Test of imaging techniques combining Time Reversal Acoustics and Nonlinear Elasticity. PI: M. Scalerandi (Polytechnic Institute of Torino, Italy).

- Date (since - to): January 2004 – December 2006
- Title of the project: High Performance Computing Research project. Use of parallel super-computers for the simulation of elastic wave propagation through heterogeneous non-linear media
- Type of Project/Funding: Grant for the use of parallel super-computers at CINECA (Inter-University Consortium for High Performance Computing and Data Elaboration), Casalecchio di Reno (Bologna, Italy) – INFM/CINECA Parallel Computing Initiative
- Roles in the project: Systems administrator for the use of computation time, development of parallel elastodynamic simulation codes, code debugging and tuning, participation in the management of the project for the years 2004, 2005 and 2006.

Projects I've been involved in as employee or external collaborator (in chronological descending order)

- Date (since - to): October 2011 – September 2014
- Title of the project: Dynamic Earthquake Triggering, Granular Physics and Earthquake Forecasting: Determining the Physical Controls
- Type of Project/Funding: LDRD DR project n°20120007DR, Los Alamos National Laboratory, Dept. of Energy (USA). ≅ 2 M$.
- Roles in the project: External collaborator **only**. PI: P.A. Johnson (Los Alamos National Laboratory).

- Date (since - to): September 2009 – September 2012
- Title of the project: Multiscale analysis of coupled mechanical and moisture behavior of wood
- Type of Project/Funding: Sinergia program. Swiss National Science Foundation (SNF). 805.656 kCHF.
- Roles in the project: Leader of one module (4D experimental investigation of the hygro-mechanical behavior of wood at the cellular scale) of the project from Feb. 2010 to Aug. 2011, **in substitution** of the original module PI (P. Trtik, PSI). PI of the overall project (5 modules): D. Derome (EMPA).

- Date (since - to): November 2006 – June 2009
- Title of the project: Imaging by Time Reversal Mirrors

- Type of Project/Funding: Directed Research (DR) project, Los Alamos National Laboratory LDRD (Laboratory Directed Research&Development) Program, US Department of Energy.
- Roles in the project: Development of ultrasonic and seismic imaging methods based on Time Reversal Acoustics techniques, mathematical modeling and numerical simulations. Applications of these methods for the Non-Destructive Evaluation (NDE) of solid materials and structures (imaging of cracks in solids consolidate granular media, like concrete or structured materials).

- Date (since - to): March 2004 – March 2008
- Title of the project: AERONEWS (Non-linear Elastic Wave Spectroscopy for Health Monitoring of Aircraft Components)
- Type of Project/Funding: Specific Targeted Research Project (STREP): FP6-502927/ FP6 (VI European Union Research Framework)
- Roles in the project: Development of mathematical models and numerical simulation codes for the implementation of Imaging techniques based upon *Time Reversal Acoustics*, in order to investigate new methods of identification and non-destructive characterization of non-linear defects in materials and specimens of interest for aircraft components

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- Date (since - to): April 2004 – April 2008
- Title of the project: CViT (Center for the development of a Virtual Tumor)
- Type of Project/Funding: ICBP (Integrative Cancer Biology Program), National Cancer Institute-National Institutes of Health (NCI-NIH), USA
- Roles in the project: Participation in the development of a Web platform (http://www.cvit.org/) for the *social networking* and for the creation of a modular software toolkit in order to support the study of tumor growth by the use of mathematical models and computational codes.

- Date (since - to): January 2004 – December 2006
- Title of the project: Collaboration with the Bioindustry Park of Canavese (http://www.bioindustrypark.it/)
- Type of Project/Funding: Collaboration
- Roles in the project: Development of a Bioinformatics and High Performance Computing Lab based on a Beowulf-like cluster of Linux PCs for supporting activities in Computational Biology and Bioinformatics (have a look at the Web page http://www.calcolodistr.altervista.org/work/bioinfo_syst_biol.html). Management of the collaboration between Bioindustry Park of Canavese and the Dept. of Physics, Polytechnic of Torino. Collaboration with Aethia S.r.l., on the use of the cluster.

- Date (since - to): January 2004 – August 2005
- Title of the project: NATEMIS (Nonlinear Acoustics TEchniques for MIcro-Scale damage diagnostics)

- Type of Project/Funding: Researchers Mobility, development of a Research network / ESF (European Science Foundation)
- Roles in the project: I have been involved in the implementation of numerical Imaging techniques by numerical simulations and processing of ultrasound signals (visit to the Fraunhofer Institute for Non-Destructive Testing, Dresden branch, Dresden, Germany). I have participated in the development of software tools for the resolution of Inverse Problems by Genetic Algorithms (visit to the Institute of Thermomechanics, Czech Academy of Sciences, Prague, Czech Republic).

- Date (since - to): January 2003 – December 2005
- Title of the project: From Molecular Dynamics to Continuum Mechanics: a multi-scale description of mechanical properties of solids
- Type of Project/Funding: PRIN, 2002 call / MIUR (Italian Ministery of University and Research)
- Roles in the project: Development of mathematical models and numerical codes for the simulation of ultrasonic wave propagation throughout materials with mesoscopic grains (hundreds of microns), such as polycrystalline rocks. Involved also in the burocratic and financial management of the project

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- Date (since - to): 2002 - 2004
- Title of the project: Modelling of the impact of damage on dynamic and static behavior of Natural Building stones using the Local Interaction Simulation Approach (LISA)
- Type of Project/Funding: Module of the EU FP5 project n° EVK4-CT-2002-00080.
- Roles in the project: Numerical simulation of ultrasonic wave propagation in stones with shallow sub-surface micro-cracking.

Supervised PhD students

- F. Yang, Dept. of Civil, Environmental and Geomatic Engineering (D-BAUG), ETHZ. In co-supervision with Prof. Dr. P. Lura (EMPA/ETHZ). From Feb. 2013 till March 2017. Thesis title: "Multi-contrast X-ray imaging of water transport in cement-based materials". PhD Thesis defended successfully on February 22nd 2017.
  From April 2017, Postdoctoral Researcher at the Chair of X-ray Imaging, Institute for Biomedical Engineering, Swiss Federal Institute of Technology Zurich (ETHZ), Zürich (Switzerland) and X-ray Tomography Group, Laboratory for Macromolecules and Bioimaging, Paul Scherrer Institute (PSI), Villigen (Switzerland).

- B. Ferdowsi, Dept. of Civil, Environmental and Geomatic Engineering (D-BAUG), ETHZ. In co-supervision with Prof. Dr. J. Carmeliet (ETHZ/EMPA). From Feb. 2011 till May 2014. Thesis title: "Discrete element modeling of triggered slip in faults with granular gouge: application to dynamic earthquake triggering". PhD Thesis defended successfully on May 20th 2014.

- A. Patera, Dept. of Civil, Environmental and Geomatic Engineering (D-BAUG), ETHZ. In co-supervision with Prof. Dr. J. Carmeliet (ETHZ/EMPA) and Prof. Dr. D. Derome (EMPA). From Sept. 2010 till July 2011. Thesis title: “4D experimental investigation of the hygro-mechanical behavior of wood at the cellular scale”.

- Nikolajs Toropovs, Institute of Materials and Structures, Chair of Building Materials and Products, Riga Technical University (Latvia). From August 2013 to July 2014, visiting PhD student, FRESCO (FiRE Spalling of high performance and ultra-high performance COnrete) SCIEX project. In co-supervision with Prof. Dr. P. Lura (ETHZ/EMPA) and Dr. M. Wyrzykowski (EMPA).

- Go Igarashi, Concrete Engineering Lab, Graduate School of Environmental Studies, Nagoya University, Japan. From May till November 2012, visiting PhD student.

Supervised Master students

- G. Bacilieri, Dept. of Civil, Environmental and Materials Engineering, Univ. of Bologna (Italy). In co-supervision with Prof. Dr. E. Franzoni (Univ. of Bologna) and Prof. Dr. P. Lura (EMPA/ETHZ). From Jan. 2013 to April 2013. Thesis title: “TEOS-based consolidants for stone conservation: evaluation of the effects and testing by X-ray imaging”.

Academic teaching

- Lecturer in the course “Shrinkage and cracking of concrete: Mechanisms and impact on durability”, Master level, Dept. of Civil, Environmental and Geomatic Engineering, ETHZ, Zürich (Switzerland), 2015.

- Lecturer in the course “Shrinkage and cracking of concrete: Mechanisms and impact on durability”, Master level, Dept. of Civil, Environmental and Geomatic Engineering, ETHZ, Zürich (Switzerland), 2014.

- Lecturer in the course “Shrinkage and cracking of concrete: Mechanisms and impact on durability”, Master level, Dept. of Civil, Environmental and Geomatic Engineering, ETHZ, Zürich (Switzerland), 2013.

- Lecturer in the course “Shrinkage and cracking of concrete: Mechanisms and impact on durability”, Master level, Dept. of Civil, Environmental and Geomatic Engineering, ETHZ, Zuerich (Switzerland), 2012.

Scientific awards

- Recipient of the Soft Matter journal's Poster Prize at the "Micro-structure, setting and aging of cement: from Soft Matter Physics to sustainable materials" conference, August 12th - 16th 2012, Centro "Stefano Franscini" Monte Verità, Ascona, Switzerland. Picture. Soft Matter journal announcement.

- Recipient of the Los Alamos National Laboratory Achievement Award, for "methods and results using acoustic sensing and imaging", presented by the Associate Directorate for Chemistry, Life and Earth Sciences.

Professional activities/Services to the scientific community

- Member of the scientific advisory committee of the Swiss Neutron Spallation Source (SINQ), Paul Scherrer Institute (since Feb. 2016).

- Organizer of three Topical Days on Imaging/Image Analysis at Empa (2014-2016).

- From Sept. 2009 to Sept. 2014, organizer of the monthly PhD Seminar at the Dept. of Civil and Mechanical Engineering, Swiss Federal Laboratories for Materials Science and Technology (Empa).

- Co-organizer of the 14th International Conference on Nonlinear Elasticity in Materials (XIV ICNEM), June 1st - 5th 2009, Lisbon (Portugal).

- Reviewer for the following peer-reviewed international journals:

  - Physical Review Letters
  - Applied Physics Letters
  - Journal of Applied Physics
  - Journal of Physics D - Applied Physics
  - Physics Letters A
  - Journal of the Acoustical Society of America
  - IEEE Transactions on Ultrasounds, Ferroelectrics and Frequency Control
  - Wave Motion
  - Acta Acustica
  - Journal of Nondestructive Evaluation
  - Cement and Concrete Research
  - Cement and Concrete Composites
  - Materials and Structures
  - Material Characterization
  - Applied Clay Science
  - Frontiers in Materials – Mechanics of Materials Section

Invited talks

- *X-ray tomographic microscopy of accelerated alkali-silica reaction damage in mortars*, 16th Euroseminar on Microscopy Applied to Building Materials (EMABM 2017), May 14th – 17th 2017, Les Diablerets (Switzerland).

- *3D image analysis at the Center for X-ray Analytics of the Swiss Federal Laboratories for Materials Science and Technology (Empa)*, July 16th 2014. Center for X-ray Tomography (UGCT), University of Gent, Gent (Belgium). Host: Dr. H. Derluyn, Prof. Dr. Veerle Cnudde, Pore-scale Processes in Geomaterials Group, Dept. of Geology and UGCT, Univ. of Gent.

- *Recent developments in X-ray Imaging and what they can bring to the field of Nonlinear Elasticity of materials*, 19th International Conference on Nonlinear Elasticity in Materials (XIX ICNEM), June 22nd - 28th 2014, Fréjus (France).

- *Nonlinear mesoscopic elasticity of concrete: In search of the physical sources for improving the respective NDE methods*, January 20th 2014 (click here for the Abstract), Lehrstuhl für Zerstörungsfreie Prüfung und Qualitätssicherung, Universität des Saarlandes, Saarbrücken (Germany). Click here for the slides in PDF format and here in .ppt format. Host: PD Dr. Ute Rabe, Fraunhofer Institute for Non-Destructive Evaluation (IZFP) and Universität des Saarlandes, Saarbrücken (Germany).

- *Segmentation algorithms for porous (building) materials. An (incomplete and biased) overview*, April 24th 2013 (click here for the slides in PDF format), 3rd Topical Day on Imaging and Image Analysis , EMPA (Swiss Federal Laboratories for Materials Science and Technology) .
  Host: Prof. Dr. D. Derome, Dept. of Mechanical and Civil Engineering , EMPA (Swiss Federal Laboratories for Materials Science and Technology).

- *Characterization of cracks in cement-based materials by microscopy and image analysis*, October 30th 2012 (click here for the slides in PDF format), 2nd Topical Day on Imaging and Image Analysis, EMPA (Swiss Federal Laboratories for Materials Science and Technology).
  Host: Prof. Dr. D. Derome, Dept. of Mechanical and Civil Engineering, EMPA (Swiss Federal Laboratories for Materials Science and Technology).

- *Discrete Element Method modeling and simulation of granular stick-slip: insights into the micromechanics of dynamic earthquake triggering ?* , July 25th 2011(click here for the slides in MS PowerPoint 2010 format, .pptx), Institut des Sciences de la Terre , Université Joseph Fourier /CNRS, Grenoble (France).
  Host: Dr. A.P. Rathbun, Prof. F. Renard, Equipe Méchanique des Failles .

- *Grain by grain. Molecular Dynamics investigation of granular friction and stick-slip dynamics in granular layers* , June 17th 2010, Topical Day on Computational Modeling , EMPA (Swiss Federal Laboratories for Materials Science and Technology) .
  Host: Dr. D. Passerone, Atomistic Simulation Group, Dept. of Advanced Materials and Surfaces , EMPA (Swiss Federal Laboratories for Materials Science and Technology).

- *Nonlinear Elasticity and Time Reversal Acoustics for Damage Detection and Localization* , May 15th 2008, EMPA (Swiss Federal Laboratories for Materials Science and Technology) .
  Host: Prof. J. Carmeliet, Dr. P. Richner, Dept. of Civil and Mechanical Engineering
  Download the slides of the talk (.odp format, OpenOffice.org 2.3 , or .ppt format, Microsoft PowerPoint).

- *Exploiting Time Reversal Acoustics for the Development of New Ultrasonic and Seismic Imaging Techniques in Complex Solid Media* , June 1st 2007, CRS4 - Center for Advanced Studies, Research and Development in Sardinia
  Host: Dr. E. Bonomi - Energy and Environment Division
  Download the slides of the talk (.odp format, OpenOffice.org 2.0) and/or the abstract (.pdf format).

Oral presentations at international conferences

- **M. Griffa**, B. Münch, A. Leemann, R. Mokso, F. Marone, P. Lura, *X-ray tomographic microscopy of accelerated alkali-silica reaction damage in mortars*, 16th Euroseminar on Microscopy Applied to Building Materials (EMABM 2017), May 14th – 17th 2017, Les Diablerets (Switzerland).

- **M. Griffa**, *Recent developments in X-ray Imaging and what they can bring to the field of Nonlinear Elasticity of materials*, 19th International Conference on Nonlinear Elasticity in Materials (XIX ICNEM), June 22nd - 28th 2014, Fréjus (France).

- **M. Griffa**, G. Igarashi, J. Neuenschwander, B. Münch, A. Leemann, I. Jerjen, P. Schuetz, P. Lura, *Detection and characterization of Alkali-Aggregate Reaction damage in concrete by nonlinear elasticity measurements*, 18th International Conference on Nonlinear Elasticity in Materials (XVIII ICNEM), June 9th – June 15th 2013, Ascona (Switzerland).

- **M. Griffa**, B. Ferdowsi, J. Carmeliet, E.G. Daub, R.A. Guyer, P.A. Johnson, C. Marone, *Mesoscopic Scale Analysis of Deformation Patterns for Dynamically Triggered Slip in Sheared Granular Layers*, EGU General Assembly 2012, Session TS9.1-GD8.5 ("Recent advances in analogue and numerical modeling in tectonic processes"), April 22nd - April 27th 2012, Wien (Austria).

- **M. Griffa**, M. Scalerandi, P.A. Johnson, *Computational Time Reversal Imaging: Addressing the Medium Mismatch "Bottleneck"*, 14th International Conference on Nonlinear Elasticity in Materials (XIV ICNEM), June 1st – 5th 2009, Lisbon (Portugal).

- **M. Griffa**, J. Carmeliet, P.A. Johnson, *The Lattice Solid Model for simulating the nonlinear dynamics of sheared granular layers*, 14th International Conference on Nonlinear Elasticity in Materials (XIV ICNEM), June 1st – 5th 2009, Lisbon (Portugal).

- **M. Griffa**, B.E. Anderson, P-Y. Le Bas, T.J. Ulrich, P.A. Johnson, *Computational Time Reversal Acoustics Imaging of Embedded Defects in Solid Media*, Time Reversal Acoustics for Nonlinear Imaging (Physical Acoustics 09) Session, Acoustics'08 (155th Meeting of the

Acoustical Society of America, 2nd Joint Conference of the Acoustical Society of America and the European Acoustical Association), June 29th - July 4th 2008, Paris (France).

- **M. Griffa**, B.E. Anderson, P.A. Johnson, *Modeling and Simulations in Time Reversal Acoustics for Damage Localization*, XIII International Conference on Nonlinear Elasticity in Materials, June 23rd - 28th 2008, Aix-en-Provence (France).

- **M. Griffa**, P.A. Johnson, R.A. Guyer, T.J. Ulrich, B.E. Anderson, *Time Reversal Acoustics (TRA) Reconstruction of Symmetric-in-Time Sources in Solid Elastic Specimens. Investigation of the Effects of Finite Dimension Transducers on TRA in Solids*, XII International Workshop on Nonlinear Elasticity in Materials, June 3rd - 9th 2007, Ajaccio (France).

- **M. Griffa**, P.P. Delsanto, *Research Activities in Theoretical and Computational Biological Physics: Tumor Growth Modeling and Simulating*, Meeting with the ADEBAG association (Association pour le Devéloppement des Biotechnologies dans l'Agglomération Grenobloise) at the Bioindustry Park of Canavese, February 5th - 6th 2004, Colleretto Giacosa (Italy).

- **M. Griffa**, M. Scalerandi, *Modeling the growth of Multicellular Tumor Spheroids: role of stiffness, cellular adhesion and programmed cell death*, Session 4 (Colloids, Surfaces, Biophysics, Biophysical Chemistry), 1st International Meeting on Applied Physics (APHYS 2003), October 14th - 18th 2003, Badajoz (Spain).

Poster presentations at international conferences

- F. Yang, F. Prade, **M. Griffa**, I. Jerjen, C. Di Bella, J. Herzen, A. Sarapata, R. Kaufmann, F. Pfeiffer, P. Lura, *Phase and dark-field contrast X-ray imaging of liquids in porous building materials*, *International Workshop on Advances in X-ray Imaging*, December 11th - 12th 2014, International Center for Theoretical Physics (ICTP), Trieste (Italy).

- **M. Griffa**, B. Münch, G. Igarashi, A. Leemann, R. Mokso, I. Jerjen, P. Schuetz, P. Lura, *Damage in cement-based materials by the Alkali-Aggregate Reaction: Detection and characterization by X-ray Tomographic Microscopy*, Joint Users Meeting @ PSI, September 18th - 20th 2013, Villigen (Switzerland).

- **M. Griffa**, B. Münch, G. Igarashi, A. Leemann, R. Mokso, I. Jerjen, P. Schuetz, P. Lura, *Damage in cement-based materials by the Alkali-Aggregate Reaction: Detection and characterization by X-ray Tomographic Microscopy*, 1st International Conference on Tomography of Materials and Structures, July 1st – July 5th 2013, Ghent (Belgium).

- **M. Griffa**, G. Igarashi, J. Neuenschwander, P. Lura, A. Leemann, M. Wyrzykowski, P. Antonaci, M. Scalerandi, *Nonlinear Mesoscopic Elasticity and microstructural developments in cement-based materials due to micro-damage processes* , Micro-structure, setting and aging of cement: from soft-matter physics to sustainable materials , August 12th - August 16th 2012, Monte Verità, Ascona, Switzerland; poster. Recipient of the Soft Matter journal's Poster Prize (see the announcement on the Soft Matter journal blog).

- H. Denli, L. Huang, **M. Griffa**, *Elastic-Wave Reverse-Time Migration Imaging with a new Vector-Imaging Condition* , Acoustical Nondestructive Evaluation, Ultrasonics and Imaging (Signal Processing 00/2) Session, Acoustics'08 (155th Meeting of the Acoustical Society of America, 2nd Joint Conference of the Acoustical Society of America and the European Acoustical Association), June 29th - July 4th 2008, Paris (France).

- **M. Griffa**, B.E. Anderson, P.A. Johnson, *Numerical modeling of the effects of finite size transducers for Time Reversal Acoustics in solid media* , Overview of Time Reversal Acoustics (Signal Processing 01) Session, Acoustics'08 (155th Meeting of the Acoustical

Society of America, 2nd Joint Conference of the Acoustical Society of America and the European Acoustical Association), June 29th - July 4th 2008, Paris (France).

- **M. Griffa**, *Bridging the Gap between Mesoscopic and Macroscopic Models of Tumor Growth*, European Conference on Complex Systems, December 5th - 8th 2004, Villa Gualino, Torino (Italy).

- **M. Griffa**, M. Scalerandi, *Role of Physical modeling and Simulations in Tumor Biology: Angiogenesis as a Case Study*, Session 10 (Environmental, Computational and Non-linear Physics), 1st International Meeting on Applied Physics (APHYS 2003), October 14th - 18th 2003, Badajoz (Spain).

Oral presentations/posters as co-author

A full list is available here.

Current collaborations

- A. Bonnin and R. Mokso, TOMCAT beamline, Swiss Light Source (SLS), Paul Scherrer Institute (PSI), Villigen (Switzerland). Topics: phase contrast X-ray imaging of pure water in porous building materials.
- P. Diemoz, Dept. of Medical Physics and Bioengineering, University College London, London (UK). Topics: phase and dark-field contrast X-ray imaging of building materials.
- E. Franzoni, Dept. of Civil/Environmental/Materials Engineering, Univ. of Bologna (Italy). Topics: visualizing the spatial distribution of TEOS-based consolidants in architectural stones by X-ray imaging.
- Jan Carmeliet, Chair of Building Physics, Swiss Federal Institute of Technology in Zürich (ETHZ), Zürich (Switzerland), and Laboratory for Building Science and Technology, Swiss Federal Laboratories for Materials Science and Technology (EMPA), Dübendorf (Switzerland). Topics: DEM modeling of sheared granular media, dynamic earthquake triggering.
- P.A. Johnson, Nonlinear and Nonequilibrium Elasticity Group, Solid Earth Geophysics Group, Earth and Environmental Sciences Division, Los Alamos National Laboratory, Los Alamos (NM), USA. Topics: DEM modeling of sheared granular media, dynamic earthquake triggering.
- Chris Marone, Department of Geosciences, Pennsylvania State University, State College (PA), USA. Topics: DEM modeling of sheared granular media, dynamic earthquake triggering.
- R.A. Guyer, Nonlinear and Nonequilibrium Elasticity Group, Solid Earth Geophysics Group, Earth and Environmental Sciences Division, Los Alamos National Laboratory, Los Alamos (NM), and University of Nevada at Reno (NV), USA. Topics: DEM modeling of sheared granular media, dynamic earthquake triggering.
- M. Scalerandi, Institute for Condensed Matter Physics and Complex Systems, Polytechnic Institute of Torino, Torino (Italy). Topics: non-destructive evaluation of concrete by ultrasounds.
- P. Antonaci, Dept. of Structural, Geotechnics and Building Engineering, Polytechnic Institute of Torino, Torino (Italy). Topics: non-destructive evaluation of concrete by ultrasounds.
- T.J. Ulrich, Nonlinear and Nonequilibrium Elasticity Group, Solid Earth Geophysics Group, Earth and Environmental Sciences Division, Los Alamos National Laboratory, Los Alamos (NM), USA. Topics: non-destructive evaluation of concrete by ultrasounds.

- Cédric Payan, Laboratoire de Mécanique et d'Acoustique, Université Aix-Marseille, Aix-en-Provence, Marseille (France). Topics: non-destructive evaluation of concrete by ultrasounds.

Public outreach

- "Retrovision. Reversing Time to Find Wave Sources." Feature article in the Los Alamos National Laboratory magazine "1663. Los Alamos Science and Technology Magazine," August 2008, 14-19.

- "Faults may emit earthquake warning signs". Feature article in http://www.livescience.com/, Jan. 10th 2014.

- „About to crack." Feature article in the Los Alamos National Laboratory magazine "1663. Los Alamos Science and Technology Magazine," April 2014, 14-17.

Scientific/technical skills

- **Imaging**: tomographic imaging using X-rays (both from synchrotron radiation facilities and from laboratory-scale sources) and neutrons; multi-contrast X-ray imaging (attenuation-based, refraction-based and small angle scattering-based contrasts); diffractive imaging using ultrasounds; seismic and seismological imaging; probabilistic methods (Monte Carlo) for the solution of Inverse Problems in imaging; use of Genetic Algorithms in the solution of Inverse Problems; Inverse Scattering of elastic and electromagnetic waves with applications in subsurface imaging.

- **3D image processing and analysis**: segmentation of tomographic datasets of porous materials by machine learning-based algorithms; 3D registration (both affine and elastic) of tomographic datasets; morphological image analysis and processing. Algorithm development and implementation in the ImageJ environment.

- **Computational Physics and Materials Science**: Computational Elastodynamics (numerical simulation of elastic [acoustic, ultrasonic, seismic] wave propagation throughout heterogeneous materials); Monte Carlo methods in Materials Science; theory and Molecular Dynamics modeling and simulation of unconsolidated granular media.
- **Materials Science**: Continuum Mechanics, especially Elasticity Theory; basics in condensed matter Physics; porous media, with focus on cement-based materials.
- **Scientific Computing**: Finite Difference Methods; Finite Element Methods; Finite Volume Methods; Spectral Elements Methods; Pseudo-Spectral Methods; Molecular Dynamics simulations of granular media (Discrete Element Method); Parallel Computing on clusters (Beowulf-like clusters); Parallel Computing on Symmetric Multi-Processors (SMPs) or multicore architectures; optimization of both parallel and scalar scientific computing codes; Soft Computing methods (Artificial Neural Networks, Genetic Algorithms, Neuro-Fuzzy methods, Bayesian methods); methods for numerical processing of signals for Imaging purposes; development of GUIs (Graphical User Interfaces) to simulation codes for post-processing of output data.

- **Mathematical Modeling**: I have been involved in the development of mathematical models and subsequent numerical simulation codes and platforms for the study of complex adaptive artificial and natural systems. For example, I have developed mathematical models and codes for the investigation of processes involved in the growth of multicellular tumor spheroids (aggregate populations of cancer cells used *in vitro* as models of solid micro-tumors) in different micro-environmental conditions.

- **Ocean Acoustics**: array signal processing, in particular beamforming and matched-field processing.

- **Geophysics**: seismic imaging; theory of geophysical inverse problems; earthquake inverse source problems; physics of earthquakes.

- Basic skills in **Microelectronics** and Physics of Electronic Devices (6 months of experience in a Microelectronics Lab): bipolar logic devices (ECL, CMOS); combinatorial logic devices; sequential logic devices; PLCs; micro-controllers, micro-processors and DSPs; VLSI circuits; OPAmp; A/D and D/A converters; Assembly language for 68K architectures. Experience with Arduino-based platforms.

- **Cybernetics** and **Systems Theory**: dynamical systems characterization and analysis; Stochastic Processes Theory for signal processing and analysis, System Dynamics for modeling natural and socio-economic systems.

- **Web** and **Networking Technologies**: TCP/IP protocols, client-server architectures, static and dynamic HTML Web pages development, technologies based upon XML, database technologies (SQL language, server MySQL, development of graphical user interfaces to R-DBMS).

- **e-Science**: scientific databases and Web platforms for social networking; bibliographic databases; Grid Computing for the management of distributed heterogeneous databases.

- **Systems Administration** experience (since 2002): PC GNU/Linux; Beowulf-like computing clusters for parallel scientific computing. I contributed as consultant to the administration of the local compute cluster at the Nonlinear and Nonequilibrium Elasticity Group / Time Reversal Imaging Team at the Los Alamos National Laboratory, during my Post Doc. I've been responsible for the setup and administration of High Performance Computing resources for 3D image processing/analysis at the Laboratory for Building Science and Technology and at the Concrete and Construction Chemistry Laboratory, EMPA (Swiss Federal Laboratories for Materials Science and Technology).

- Experience in the financial/bureaucratic/logistic management of several national and international scientific Research projects (see here the list of the Research projects or above in this CV).

ICT skills

- **Scientific Computing environments**
  - Matlab (also development of GUIs)
  - Octave
  - Scilab

- **Image processing/analysis software**
  - ImageJ (Fiji)
  - ElastiX (for image registration only)
  - Octopus Reconstruction (for tomographic image reconstruction only)
  - Astra (toolbox for Matlab, for tomographic image reconstruction only)
  - Avizo 3D (3D image processing and analysis)
  - VG Studio Max (3D image processing and analysis)
  - Octopus Analysis (3D image processing and analysis)

- **Scientific visualization software**
  - Paraview
- **“High level” programming languages**
  - C (since 2000)
  - C++ (since 2002)
  - Pascal (basic level)
- **Scripting languages**
  - Python
- **“Low-level” languages**
  - Assembler Motorola 6800 (basic experience)
- **High Performance Computing/Parallel Computing**
  - Parallel programming of Beowulf computing clusters with the use of MPI (MPICH and OpenMPI implementations) (distributed-memory parallel systems)
  - Parallel programming of SMPs (Symmetric MultiProcessors) with the use of OpenMP
  - Parallel programming of multicore Intel architectures using the Intel optimized compilers
  - Optimization of scalar code on GNU/Linux platform with Intel processors (i486, i586, i686), by the with the use of Intel optimized compiler.
  - GNU/Linux clusters (Beowulf-like), Symmetric Multi-Processors (SMPs) and Computing Grids administration (OpenPBS, LSF, MAUI, TORQUE).
- **Networking technologies**
  - TCP/IP protocols
  - basic experience in the management of PC networks (LAN)
- **Markup languages/Web technologies**
  - TeX/LaTeX
  - HTML
  - XML
- **Relational databases**
  - SQL language
  - experience in the use of the R-DBMS MySQL and in the development of R-databases
- **Operative Systems (OSs)**
  - GNU/Linux OSs, especially CentOS, Ubuntu, Fedora, SuSE, Mandrake (since 2005, Mandriva) distributions
  - MS Windows (NT, 2K, XP, 7) Oss
- **Integrated Development Environments**

- KDevelop
- Eclipse
- MS Visual Studio

Languages

- **Italian** (mother language)
- **English**
  - **PET** certificate ("**Pass with Merit**" level), **University of Cambridge**
  - Kenilworth Language Institute certificate (Dublin, Ireland), General English Program, course attended from August 21st to September 18th 2004 by UGAF (Union of Fiat Group retired workers) type B fellowship (for the study of English language)
  - Language Centre of Ireland certificate, Advanced 2 level, type "English as a Foreign Language" course, July 25th – August 5th 2005, Dublin (Ireland)
- **French**: High School knowledge
- **German**: level A2.

Management and relational skills

- **Italian Red Cross Society volunteer** (October 2002 – October 2006)
- **Medical First Aid** (**paramedic**) **volunteer** at the **Piemonte Emergency Administration** (**118 Service**)
- **Local technical responsible** of the **Italian Red Cross Society**: **Public Relations**, **Press**, and **ICTs infrastructures** (since 2005)
- I have had several experiences in the management of scientific Research projects, both national and international, taking care of bureaucratic, logistic, relational, financial and scientific aspects (look at the Web page http://www.calcolodistr.altervista.org/work/work_mg.html for a complete list of projects I have been involved in or above in this CV), acquiring a significant knowledge of procedures and methods in proposals writing within the European Research framework, for the USA Department of Energy, the Swiss National Science Foundation and the Swiss Commission for Technology and Innovation.
- I collaborated with the Bioindustry Park of Canavese in the promotion and organization of meetings, workshops and activities in the fields of **Computational Biology**, **Bioinformatics** and **Systems Biology** (have a look at the Web pages http://www.calcolodistr.altervista.org/en/work/bioinfo_syst_biol_en.html and http://www.piemontelifesciences.org/documents.htm).

Other fellowships and awards

- UGAF (Union of Fiat Group retired workers) type A fellowships, years 1999, 2000, 2001 e 2002, for grades obtained during High School and University studies.
- UGAF (Union of Fiat Group retired workers) type B fellowship for the study of English as a foreign language, (Ireland, Dublin, August-September 2004).

- INFM-CNISM fellowship, Research Unit of Torino-Polytechnic, for the execution of the MS thesis, within the framework of the project *Mesoscopic simulations for bridging between the microscopic and macroscopic scales in Physics and Biophysics*, May 1st 2002 – January 31st 2003.

- First classified, fellowship for attending I level Master in Bioinformatics, Academic Year 2004, University of Torino, Mathematical, Physical and Natural Sciences Faculty.

- Winner of a fellowship for attending the XIII Summer School of Parallel Computing at CINECA, July 2004.

In red, PhD student authors/co-authors at the time of the publication.

Papers in SCI(E) Journals

PUBLISHED

1. S. Josset, L. Hansen, P. Orsolini, **M. Griffa**, O. Kuzior, B. Weisse, T. Zimmermannm, T. Geiger, *Microfibrillated cellulose foams obtained by a straightforward freeze-thawing-drying procedure*, Cellulose (June 2017). DOI: 10.1007/s10570-017-1377-8. **Abstract**.

2. B.W. Hailesilassie, I. Jerjen, **M. Griffa**, M. Partl, *A closer scientific look at foam bitumen*, Road Mat. Pav. Design 18(2), 362-375 (2017). DOI: 10.1080/14680629.2016.1213513. Abstract.

3. T.D. Lämmlein, F. Messina, **M. Griffa**, G.P. Terrasi, P. Lura, *Bond performance of sand coated UHM CFRP tendons in High Performance Concrete*, Polymers **9**(2), 78 (18 pages) (2017). DOI: 10.3390/polym9020078. Abstract.

4. C. Di Bella, **M. Griffa**, T.J. Ulrich, P. Lura, *Early-age elastic properties of cement-based materials as a function of decreasing moisture content*, Cem. Concr. Res. **89**, 87-96 (2016). DOI: 10.1016/j.cemconres.2016.08.001. Abstract.

5. M.C. Cavalli, **M. Griffa**, S. Bressi, M.N. Partl, G. Tebaldi, L. Poulikakos, *Multi-scale imaging and characterization of asphalt concrete with recycled asphalt*, J. of Microscopy **264**(1), 22-33 (2016). DOI: 10.1111/jmi.12412. Abstract.

6. F. Yang, **M. Griffa**, A. Bonnin, R. Mokso, C. Di Bella, B. Münch, R. Kaufmann, P. Lura, *Visualization of water drying in porous materials by X-ray phase contrast imaging*, J. Microscopy **261**(1), 88-104 (2016). DOI: 10.1111/jmi.12319. Abstract.

7. B. Ferdowsi, **M. Griffa**, R.A. Guyer, P.A. Johnson, C. Marone, J. Carmeliet, *Acoustically-induced slip in sheared granular layers: application to dynamic earthquake triggering*, Geophys. Res. Lett. **42**, 9750-9757 (2015). DOI: 10.1002/2015GL066096. Abstract.

8. E. Franzoni, G. Graziani, E. Sassoni, G. Bacilieri, **M. Griffa**, P. Lura, *Solvent-based ethyl silicate for stone consolidation: influence of the application technique on penetration depth, efficacy and pore occlusion*, Mat. Struct. **48**, 3503-3515 (2015). DOI: 10.1617/s11527-014-0417-1. Abstract.

9. C. Di Bella, M. Wyrzykowski, **M. Griffa**, P. Termkhajornkit, G. Chanvillard, H. Stang, A. Eberhardt, P. Lura, *Application of microstructurally-designed mortars for studying early-age properties: Microstructure and mechanical properties*, Cem. Concr. Res. **78**, 234-244 (2015). DOI: 10.1016/j.cemconres.2015.08.001. Abstract.

10. F. Yang, F. Prade, **M. Griffa**, I. Jerjen, C. Di Bella, J. Herzen, A. Sarapata, F. Pfeiffer, P. Lura, *Dark-field X-ray imaging of unsaturated water transport in porous materials*, Appl. Phys. Lett. **105**, 154105 (2014). DOI: 10.1063/1.4898783. Abstract.

11. B. Ferdowsi, **M. Griffa**, R.A. Guyer, P.A. Johnson, C. Marone, J. Carmeliet, *Three-dimensional discrete element modeling of triggered slip in sheared granular media*, Phys. Rev. E **89**, 042204 (2014). DOI: 10.1103/PhysRevE.89.042204. Abstract.

12. C. Payan, T.J. Ulrich, P-Y. Le Bas, **M. Griffa**, P. Schuetz, M.C. Remillieux, T.A. Saleh, *Probing material nonlinearity at various depths by the use of time reversal mirror and focal time delay analysis*, Appl. Phys. Lett. **104**, 144102 (2014). DOI: 10.1063/1.4871094.

13. P.A. Johnson, B. Ferdowsi, B. Kaproth, M. Scuderi, **M. Griffa**, J. Carmeliet, R.A. Guyer, P-Y. Le Bas, D.T. Trugman, C. Marone, *Acoustic emission and microslip precursors to stick-slip failure in sheared granular media*, *accepted for publication in* Geophys. Res. Lett **40**, 5627-5631 (2013). DOI: 10.1002/2013GL057848. Abstract. In the news: *Faults may emit earthquake warning signs*.

14. B. Ferdowsi, **M. Griffa**, R.A. Guyer, P.A. Johnson, C. Marone, J. Carmeliet, *Microslips as precursors of large slip events in the stick-slip dynamics of sheared granular layers: a discrete element model analysis*, Geophys. Res. Lett. **40**, 4194-4198 (2013). DOI: 10.1002/grl.50813. Abstract.

15. B. Ferdowsi, **M. Griffa**, R.A. Guyer, P.A. Johnson, J. Carmeliet, *Effect of boundary vibration on the frictional behavior of a dense sheared granular layer*, Acta Mech. **225**, 2227-2237 (2014). DOI: 10.1007/s00707-014-1136-y. Pre-print available at http://arxiv.org/abs/1401.6308. Abstract.

16. A. Patera, D. Derome, **M. Griffa**, J. Carmeliet, *Hysteresis in swelling and sorption of wood tissue*, J. Struct. Biol. **182**, 226-234 (2013). DOI: 10.1016/j.jsb.2013.03.003.

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