

Dr. Fabio Sebastiano Pulvirenti

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Education

Master degree in Physics - Space Physics July 2006
Department of Physics and Astronomy-University of Catania, Italy.

PhD - Geodynamics and Seismotectonics (Finite element -Structural mechanics) Feb. 2010
University of Catania and National Institute of Geophysics and Volcanology (INGV), ITALY.

Summary of Competences

Computational Engineering

13-year experience in numerical modeling for:

- Linear and non linear structural mechanics analyses (elastomers, metals, rocks, soils);
- Contact analysis (with friction);
- Fluid-structure interaction;
- Eigenfrequency and frequency studies;
- Fatigue analyses (stress and strain based, energy based, cumulative-rainflow method);
- Fracture Mechanics;
- Optimization algorithms;
- Thermo-mechanical coupling;
- Particle tracing (including charged particle and particle-particle interaction);
- Advanced Tire mechanics (composites).

Project Management

Senior project leader for Oil & Gas and Marine/Defense companies.

- Leading front-end engineering and project planning (establishing contact with stakeholders and contractors, understand their needs and discussing possible solutions);
- Writing high-level technical proposals based on Engineering Critical Assessment;
- Preparing detailed cost estimates, (raw materials, plant workload, logistic and labor rates);
- Monitoring all the project phases (coordination with involved engineers and technicians and supervision of laboratory tests).

Qualification: Expert for Technical Ambient Monitoring

March-Oct. 2001 *E.F.A.L. Catania, Italy*

Measuring and monitoring of ground, water, acoustic and electromagnetic pollution.

Spoken Languages

Language	Italian	English	German	Chinese
Level	Native speaker	Proficient	Conversational	Basic

Career

Senior Research Fellow

Sept. 2018-Ongoing
NASA Jet Propulsion Laboratory (JPL), Pasadena, California, USA.



Job description: Finite element modelling and Geodetic Data Analysis.

Current Project: Investigating coseismic and postseismic deformation by Finite Element models using InSAR and GPS data.

Research Development and Quality Staff Engineer

March 2016-July 2018
Goodyear S.A.,
Goodyear Innovation Center-Luxembourg



Job description: perform finite element models of Passenger, Light Truck and Truck Tires.

- Footprint predictions
- Wear predictions
- Thermo-mechanical coupling
- Rolling Resistance
- Crown durability
- Ply ending durability
- Force and Moment (low slip)
- R&H (longitudinal, lateral, torsional spring rate)
- Comfort (vertical spring rate)
- Bead compression, and BOL analyses
- Braking performance
- Tread Groove Cracking.

Senior Fracture Mechanics Engineer/Senior Project Leader

Jan 2015-Sept 2015
TWI Ltd. Granta Park, Great Abington Cambridge UK



Job description: preparing technical proposals and cost estimates, supervising mechanical tests and leading projects for Oil & Gas, Naval and Transportation companies (e.g. Kuwait National Petroleum (KNPC), ExxonMobil, Shell, Navantia, EMAS, Abu Dhabi Gas (ADGAS), FMC Technologies, FRISA, PETROSA, ALSTOM, etc)

- Engineering Critical Assessment (ECA) of welded structures following the standard BS7910;
- Fitness for Service /Fitness for Purpose;
- Fracture Toughness Analysis (according to BS7448 standard).

Technical Support and Applications Engineer

July 2012-Dec 2014
COMSOL MULTIPHYSICS GmbH, Gottingen, Germany



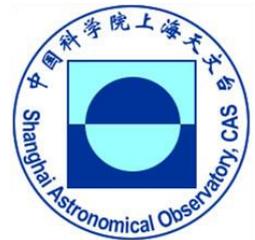
Job description: Professional consulting services for finite element modeling: CAD designing, defeaturing and repairing procedures, mesh settings, linear and non-linear approach with multiphysics coupling, solver tuning, postprocessing & visualization (graphics and data manipulation).

- Finite Element Modeling Support for several companies and research institutes: Siemens, Detectomat, V&M Tubes, SICO-Solutions, Infineon, Volkswagen, ABB, Micronas, Eaton, Daimler-Benz, Meyer, Fraunhofer Institute of Technology, Thyssen- Schachtbau, SGL-Carbon, Attocube, etc. The above tasks involved fully responsibility in developing numerical simulations for:
 - Thermal induced plasticity (tube bending)
 - Shell and tube heat exchangers;
 - Electro-thermo-mechanical contact (contact switch)
 - Multiple contact in snap hook systems (smoke sensor coverage)
 - Thermo-plastic material (medical devices)
 - Piezoelectric materials (sensors and actuators)
 - Automotive (vibrations, fatigue studies, sealing door systems etc.)
 - Geomechanics (tunnel excavations, footing, landslides)
 - Stress analyses and vibrations in welded and bolted structures (pressure vessels and containers).
- Speaker at workshops in Germany and Poland: Hamburg, Dresden (IFW), Hanau (Automotive CAE Grand Challenge), Hannover, Karlsruhe (KIT), Krakow etc.
- Responsible for training engineers in FEA for Structural Mechanics and Geomechanics applications;
- Responsible for preparing and leading courses in Structural Mechanics and Geomechanics for companies and research institutes.

Postdoctoral fellow

July 2011-July 2012

Shanghai Astronomical Observatory-SHAO, Chinese Academy of Science, Shanghai, China.



Job description: Perform numerical models for large scale tectonics (e.g. subduction processes),

- Supervisor and mentor of PhD students
- Presenter at conferences and workshops in China,
- First author in international peer reviewed papers.

Research fellow

Mar.2010-June 2011

National Institute of Geophysics and Volcanology-University of Catania- Italy



Job description: Perform structural mechanics and fluid-structure interaction models. Investigating the dynamics of volcanoes (creep phenomena and flank sliding).

- Speaker at national and international conferences.
- Author of international peer reviewed papers.

Mentoring, supervision and collaborations

External Advisor for the thesis "*Ocean Energy. Analisi Modellistica FEM di una turbina Kobold*". Author : Eng. Daniele Caruso. Università degli Studi Niccolò Cusano-Telematica Roma.

Peer-Reviewer for Earth Planets and Space (EPS)-Springer Open Journal. <https://earth-planets-space.springeropen.com/>

FEM consultant for: National Institute of Astrophysics (INAF-Italy), Institute of Astrophysics and Spatial Planetology (IAPS-Italy) and Thyssen Schachtbau GmbH (Germany).

Supervisor/mentor of engineers and PhD student at Shanghai Astronomical Observatory (China), Fraunhofer Institute of Technology (Germany) and at Goodyear Tire and Rubber Company (Luxembourg).

Project Leader: project supervisor and coordinator for stakeholders, contractors and internal staff (technicians and engineers).

Continual Professional Development Courses

Snakes on a Satellite: Using Python and Modern Tools for Research and Analysis of Satellite Data Products. Dec 2018

Grand Hyatt Convention Center, Washington DC (USA)

BS7910: Guide to methods for assessing the acceptability of flaws in metallic structures Feb 2015

TWI Ltd. Granta Park, Great Abington. Cambridge (UK)

Analytical and Numerical Problems in Fluid Dynamics and Applications June 2010

I.N.D.A.M. Istituto Nazionale di Alta Matematica-Collegio D'Aragona, Catania (Italy)

Neo-tectonic, morphology and ambient risks in the coastal areas Sept 2008

AIQUA-GIGS 2008 summer school-Department of Geological Sciences, Catania University (Italy)

Advanced Course to Finite Element Modeling April 2008

COMSOL MULTIPHYSICS Office, Brescia (Italy)

The finite Element method: fundamentals and advanced applications for engineering May 2007

Mox, Laboratory of modeling and scientific computation-

Department of Mathematics F.Brioschi, Milan Polytechnic- Milan (Italy)

Course of Grid Computing March -April 2007

European ICEAGE Project

University of Catania, Catania (Italy).

NOVICOSMO 2005 <i>The Dark and the Luminous Sides of the Formation of Structures</i> SISSA, OAT, University of Trieste, ICTP University of Udine, Novigrad/Cittanova, Istria (CRO)	September 2005
Second European Summer School on Experimental Nuclear Astrophysics Santa Tecla Palace Hotel, Santa Tecla (CT), Italy.	Sept.-Oct. 2003
First European Summer School on Experimental Nuclear Astrophysics Santa Tecla Palace Hotel, Santa Tecla (CT), Italy.	Oct 2001
Ambient Monitoring <i>Techniques for monitoring and measuring ground, water, acoustic and electromagnetic pollution</i> Ente di Formazione professionale E.C.A.P., Catania, Italy	March-Oct. 2000

Publications

Pulvirenti F., Liu Z., Aloisi M. A 3D finite element model to investigate elastic heterogeneity and topography effects on 2010 Mw 7.2 El-Mayor Cucapah Earthquake coseismic deformation using space geodetic data. (in preparation);

Aloisi M., Jin.S., **Pulvirenti F.**, Scaltrito A. The December 2015 Mount Etna eruption: An analysis of inflation/deflation phases and faulting processes, 2017. *Journal of Geodynamics*;

Orecchio B., Aloisi M., Cannavò F., Palano M., Presti D., **Pulvirenti F.**, Totaro C. Siligato G., Neri G. Present-day kinematics and deformation processes in the southern Tyrrhenian region: new insights on the northern Sicily extensional belt, 2017. *Italian Journal of Geosciences*;

Pulvirenti F., Aloisi M, Jin S. Time-dependent Coulomb stress changes induced by the 2002–2003 Etna magmatic intrusions and implications on following seismic activities, 2016. *Journal of Volcanology and Geothermal Research*;

Pulvirenti F., Jin S., Aloisi, M. An adjoint based FEM optimization of coseismic displacements following the 2011 Tohoku earthquake: new insights for the limits of the upper plate rebound, 2014. *Physics of Earth and Planetary Interiors (PEPI)*;

Aloisi M., Mattia M., Monaco C. **Pulvirenti F.** Magma, faults and gravitational loading at Mt. Etna: the 2002-2003 eruptive period. *J. Geophys. Res., (JGR)*, 2010. *Journal of Geophysical Research*;

Pulvirenti F., Scollo S., Ferlito C. Dynamics of volcano smoke rings: a FEM study (in submission);

Pulvirenti F., & Demyanov V. A combined GPS-FEM approach to improve the sensitivity of pre-earthquake ionospheric anomalies measurements through TEC response analysis (in preparation);

Najibi N., **Pulvirenti, F.**, Cannavò F. Superimposed decomposition of wavelet analysis for seismological investigations: validation on GPS stations displacements in central Alaska (2008-2012) (in preparation);

Pulvirenti F. Driving the propagation of a fracture crack front through smartly spaced dissimilar materials (in preparation).