

CURRICULUM VITAE ET STUDIORUM

Francesco Marra, PhD

Personal details

- **Name:** Francesco Marra.
- **Date and place of birth:** Cosenza, January 26th, 1979.
- **Marital Status:** Married.
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Present position

- From 2014 contract researcher at Dept. of Chemical Engineering Materials Environment and at INSTM (Interuniversity National Consortium on Materials Science and Technology) research title: “Innovative materials for energy production in hostile environments”.

Education and training

- Ph.D. (2013) in Materials Engineering at Dept. of Chemical Engineering Materials Environment Sapienza – University of Rome. Thesis on “Thermal spray coatings development for new-gen thermal barriers”
- M.Sc. (5 years course) in Aerospace Engineering (2006) at Sapienza – University of Rome, Faculty of Civil & Industrial Engineering. Thesis on “Nanostructured coatings for anti-wear and thermal barrier applications” (101/110).

Work experience

- From 2006 to 2007 contract researcher at Dept. of Chemical Engineering Materials Environment and at INSTM (Interuniversity National Consortium on Materials Science and Technology) in the framework of “NANOKER” european FP6 project.
- From 2007 to 2008 winner of a grant for an education course for industrial researcher. MATRIS Consortium (Sapienza – Tor Vergata – RomaTre – Centro Sviluppo Materiali S.p.A.).

- From 2009 to 2011 non-tenure track research fellow at Dept. of Chemical Engineering Materials Environment Sapienza – University of Rome. Research title: “Wear resistant coatings from nanostructured precursors by traditional and liquid injection assisted thermal spray”.
- From 2011 to 2014 non-tenure Assistant Professor (Sapienza – University of Rome, Faculty of Civil & Industrial Engineering – Dept. of Chemical Engineering Materials Environment). The main research activity is related to the project: “Nanostructured composites materials for aerospace applications: development and study of production process and technologies for surface functionalization. Production of high performance ablative materials for control of fluid-structure interaction”.

Teaching activity

- Teaching activity at IFTS training course (ISCED 4) “Technician for aeronautical structures made by composite material” (2008 and 2010);
- From Academic Year 2012-2013 teacher of the course: “Surface and thin films engineering and nanostructured materials”. Surface and engineering module (6 CFU), Nanotechnologies Engineering (M. Sc), Sapienza – University of Rome
- Teaching activity (lectures and exercises) in the course: “Aerospace Materials”, Aerospace Engineering (B. Sc), Sapienza – University of Rome (2009 - today)
- Teaching activity (lectures and exercises) in the course: “Aerospace Materials”, Aeronautical Engineering (M. Sc), Sapienza – University of Rome (2009 - today)
- Teaching activity (lectures and exercises) in the course: “Materials science”, Chemical Engineering (B. Sc), Sapienza – University of Rome (2009 - today)
- Teaching activity in the course: “Non-metallic materials for high temperature aerospace applications”, Aerospace Engineering (B. Sc), Sapienza – University of Rome (2013 - today)
- Teaching activity in the course: “Non-metallic materials for engineering applications”, Mechanical Engineering (M. Sc), Sapienza – University of Rome (2013 - today)
- Supervision and tutoring of more than 50 Degree thesis (B. Sc and M. Sc) in Aerospace Engineering, Mechanical Engineering, Nanotechnologies Engineering, Chemical Engineering
- Supervision and tutoring of 4 PhD thesis (Materials Engineering and Nanotechnology)

Others education activities

- Participant at XIII AIMAT summer school: “Tecnologie innovative di superficie e loro applicazioni”, 13-17/07/2007, Ischia Porto (NA);
- Participant at XIII Material Science summer school: “Materiali nanostrutturati nelle strategie di sviluppo”, 30/09-09/10/2007, Bressanone (BZ);
- Participant at XIV AIMAT summer school: “Materiali innovativi e nanotecnologie per il made in Italy”, 16-20/07/2008, Ischia Porto (NA);
- Participant at XV AIMAT summer school: “Energia, Ambiente, Sostenibilità”, 15-19/07/2009, Ischia Porto (NA);
- Participant at XVI AIMAT-SIB summer school: “Bio- Nano- Meta-materiali: Le piattaforme tecnologiche disponibili”, 12-18/07/2010, Ischia Porto (NA);
- Participant at XVI Material Science summer school: “Materiali del futuro: dalla nanomedicina all’aerospaziale.”, 27/09-02/10/2010, Bressanone (BZ);
- Training course on FEM modeling of ablative materials: “Ablation and Pyrolysis Phenomenon using SAMCEF Bacon”, 21/07/2010, Rome.
- Attended (March-July 2012) the advanced training course RED, Research Enhancement and Development, Sapienza – University of Rome.

Awards

- Two times winner (2009 and 2010) of the AIMAT NETWORK COMPETITION grant during the XV and XVI AIMAT summer school.

Associations

- From 2006 affiliate of National Interuniversity Consortium of Materials Science and Technology (INSTM), Section 1: " Advanced mechanics, construction and transport".
- From 2006 associate of Italian Materials Engineering Society (AIMAT).
- From 2013 associate of Italian Metallurgy Society (AIM).
- From 2015 associate of American Society for Metals (ASM)
- From 2015 associate of Thermal Spray Society (TSS)

Research projects

- Integrated Project NANOKER (Structural ceramic nanocomposites for top end functional applications), WP5 “Surface functionality and composites” and SP10 “Aeroengines”, 2006 - 2009 (participant);
- Research project Sapienza – AST: “Wear resistant coatings from nanostructured precursors by traditional and liquid injection assisted thermal spray”, 2008 (participant);
- University research project: “Self-lubricating coatings obtained by liquid injection assisted thermal spray”, 2010 (participant);
- Research project funded by Italian Space Agency (ASI) ASA B2 “Advanced Structure Assembly” on the development of innovative thermal protection system in plasma sprayed ceramic coating for re-entry vehicles, 2010 (participant);
- ESA (European Space Agency) research project called CSTS2 (Crew Space Transportation Vehicle) on design and development of a European manned capsule for space exploration, 2011 (participant);
- Integrated University-Industry project STRALE “Materials and surface treatments for aerospace light-weight structures”, 2010 - 2013 (participant);
- Industrial R&D activities funded by primary industrial partner WARTSILA (marine engines) on development of thermally sprayed coatings against corrosion and wear in marine environments (principal investigator)
- Research project funded by European Space Agency BLAST on design and development of lightweight ablative thermal shields, 2012 – 2013 (participant)
- Research project funded by European Community / Regione Toscana ATENE (Advanced Technologies for Energy Efficiency). Development of innovative production technologies for components operating in hostile environments (participant)
- Research project funded by MIUR / CLUSTER AEROSPAZIO GREENING THE PROPULSION on the Development and testing of innovative coatings for oxidation protection of turbine blades in aeronautical engines (participant)
- Industrial R&D activities funded by primary industrial partner ZANZI (special engine valves). Development of coatings for protection of valves for diesel engines by hot corrosion attack (principal investigator)
- Industrial R&D activities funded by industrial partner BORGA (thermally sprayed coatings). Development of anti wear and anti corrosion coatings (principal investigator)
- Integrated University-Industry project “SmartDesign: smart and functional materials application in product design”, 2013 - 2014 (local coordinator);

- University research project AWARDS “High performance low cost sensorized composite structures”, 2013 - 2014 (participant);
- Research project funded by European Community / Regione Lazio MANUSPACE (Messa a punto di metodologie e sistemi per la realizzazione di componentistica speciale per applicazioni aerospaziali) (principal investigator)

The main research field concerns the development and characterization of protective coatings for wear and corrosion/oxidation protection and for very high temperature applications. Coatings are produced by means of thermal spray techniques (thick films) and physical/chemical vapour deposition process (thin films).

Research activities in the field of composite materials are focused on the development of materials for high temperature applications, particularly metal matrix composites and ablative materials for thermal protection systems of aerospace re-entry vehicles.

Main recent (last five years) publications:

L. Baiamonte, F. Marra, G. Pulci, J. Tirillò, F. Sarasini, T. Valente, C. Bartuli

High temperature mechanical characterization of plasma-sprayed zirconia-yttria from conventional and nanostructured powders

(2015) Surface and Coatings Technology, 277, pp. 289-298

A. Zuorro, R. Lavecchia, G. Maffei, F. Marra, S. Miglietta, A. Petrangeli, G. Familiari, T. Valente

Enhanced Lipid Extraction from Unbroken Microalgal Cells Using Enzymes

(2015) Chemical Engineering Transactions, 43, pp. 211-216

P. Palmero, G. Pulci, F. Marra, T. Valente, L. Montanaro

Al₂O₃/ZrO₂/Y₃Al₅O₁₂ Composites: A High-Temperature Mechanical Characterization

(2015) Materials, 8 (2), pp. 611-624

G. Di Girolamo, F. Marra, M. Schioppa, C. Blasi, G. Pulci, T. Valente

Evolution of microstructural and mechanical properties of lanthanum zirconate thermal barrier coatings at high temperature.

(2014) Surface and Coatings Technology, 268, pp. 298-302

G. Pulci, J. Tirillò, F. Marra, F. Sarasini, A. Bellucci, T. Valente, C. Bartuli

High temperature oxidation of MCrAlY coatings modified by Al₂O₃ PVD overlay.

(2014) Surface and Coatings Technology, 268, pp. 198-204

G. Di Girolamo, F. Marra, C. Blasi, M. Schioppa, G. Pulci, E. Serra, T. Valente

High-temperature mechanical behavior of plasma sprayed lanthanum zirconate coatings.

(2014) Ceramics International, 40 (7B), pp. 11433-11436.

L. Baiamonte, G. Pulci, E. Hlede, F. Marra, C. Bartuli

Thermal spray coatings for corrosion and wear protection of naval Diesel engines components.

(2014) Metallurgia Italiana, 6, pp. 9-13.

G. Sotgiu, M. Foderà, F. Marra, E. Petrucci

Production and characterization of manganese oxide-based electrodes for anodic oxidation of organic compounds.

(2014) Chemical Engineering Transactions, 41, pp. 115-120.

G. Pulci, J. Tirillò, F. Marra, F. Sarasini, A. Bellucci, T. Valente, C. Bartuli

High Temperature Oxidation and Microstructural Evolution of Modified MCrAlY Coatings.

(2014) Metallurgical and Materials transactions A, 45 (3), pp. 1401-1408.

G. Di Girolamo, F. Marra, L. Pilloni, G. Pulci, J. Tirillò, T. Valente

Microstructure and Wear Behavior of Plasma-Sprayed Nanostructured WC-Co Coatings

(2013) International Journal of Applied Ceramic Technology, 10 (1), pp. 60-71.

I.M. De Rosa, F. Marra, G. Pulci, C. Santulli, F. Sarasini, J. Tirillò, M. Valente

Post-Impact Mechanical Characterisation of Glass and Basalt Woven Fabric Laminates

(2012) Applied Composite Materials, 19 (9), pp. 475-490

G. Di Girolamo, F. Marra, C. Blasi, E. Serra, T. Valente

Microstructure, mechanical properties and thermal shock resistance of plasma sprayed nanostructured zirconia coatings.

(2011) *Ceramics International*, 37 (7), pp. 2711-2717.

I.M. De Rosa, F. Marra, G. Pulci, C. Santulli, F. Sarasini, J. Tirillò, M. Valente

Post-impact mechanical characterisation of E-glass/basalt woven fabric interply hybrid laminates

(2011) *Express Polymer Letters*, 5 (5), pp. 449-459.

M. Valente, F. Sarasini, F. Marra, J. Tirillò, G. Pulci

Hybrid recycled glass fiber/wood flour thermoplastic composites: Manufacturing and mechanical characterization.

(2011) *Composites Part A: Applied Science and Manufacturing*, 42 (6), pp. 649-657.

G. Pulci, M. Tului, J. Tirillò, F. Marra, S. Lionetti, T. Valente

High temperature mechanical behavior of UHTC coatings for thermal protection of re-entry vehicles.

(2011) *Journal of Thermal Spray Technology*, 20 (1-2), pp. 139-144.

F. Marra, G. Pulci, J. Tirillò, C. Bartuli, T. Valente

Numerical simulation of oxy-acetylene testing procedure of ablative materials for re-entry space vehicles.

(2011) *Proceedings of the Institution of Mechanical Engineers Part L-Journal of Materials*, 225 (1), pp. 32-40.