



Matteo Sambucci

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About me:

MSc in Science and Technology of Materials PhD candidate in Chemical and Materials Engineering

WORK EXPERIENCE

09/2020 - 06/2021 - Marino (Rome), Italy

TECHNOLOGY TEACHER MIDDLE SCHOOL - ISTITUTO COMPRENSIVO "PRIMO LEVI"

https://www.primolevimarino.edu.it/ | Via Palaverta, 69, 00046, Marino (Rome), Italy

09/2019 - 06/2020 - Pomezia (Rome), Italy

MATERIAL CHEMISTRY TEACHER SECONDARY SCHOOL – LICEO ARTISTICO LINGUISTICO "PABLO PICASSO"

https://www.liceopablopicasso.edu.it/ | Via Cavour, 5, 00071, Pomezia (Rome), Italy

11/2018 - 06/2019 - Pomezia (Rome), Italy

MATERIAL CHEMISTRY TEACHER SECONDARY SCHOOL – LICEO ARTISTICO LINGUISTICO "PABLO PICASSO"

https://www.liceopablopicasso.edu.it/ | Via Cavour, 5, 00071, Pomezia (Rome), Italy

11/2018 - 06/2019 - Velletri (Rome), Italy

LABORATORY OF PHYSICS TEACHER SECONDARY SCHOOL – ISTITUTO DI ISTRUZIONE SUPERIORE "CESARE BATTISTI"

http://www.iisbattistivelletri.gov.it/ | Via dei Lauri, 1, 00049, Velletri (Rome), Italy

03/2018 - 06/2018 - Velletri (Rome), Italy

LABORATORY OF PHYSICS TEACHER SECONDARY SCHOOL – ISTITUTO DI ISTRUZIONE SUPERIORE "CESARE BATTISTI"

http://www.iisbattistivelletri.gov.it/ | Via dei Lauri, 1, 00049, Velletri (Rome), Italy

05/2017 - 12/2017 - Rome, Italy

UNDERGRADUATE INTERNSHIP - "TOR VERGATA" UNIVERSITY OF ROME

Research work

Design, modeling, production and characterization of Helmholtz resonator-based acoustic systems as sound-absorbing solutions aimed to minimize the Tire Cavity Noise

Additive manufacturing (Fused Deposition Modeling process) and physical-acoustic characterization of porous filters to improve the damping performance of Helmholtz resonator-based acoustic systems

Production and thermal analysis of 3D printable polymer filaments (PLA) reinforced with carbon-based nanofillers (GnP) to improve the thermo-mechanical properties of the prototypes

Department of Industrial Engineering | Professional, scientific and technical activities |

http://ingegneriaindustriale.uniroma2.it/ | Via del Politecnico,1, 00133, Rome, Italy

02/2017 - 02/2017 - Rome, Italy

LABORATORY OF ELECTRICAL AND ELECTRONIC SCIENCE AND TECHNOLOGY TEACHER SECONDARY SCHOOL – ISTITUTO TECNICO INDUSTRIALE STATALE "HEINRICH HERTZ"

04/2016 - 06/2016 - Frascati (Rome), Italy

LABORATORY OF ELECTRICAL AND ELECTRONIC SCIENCE AND TECHNOLOGY TEACHER SECONDARY SCHOOL – ISTITUTO TECNICO TECNICO TECNICO FERMI"

https://www.fermifrascati.edu.it/ | Via Cesare Minardi, 14, 00044, Frascati (Rome), Italy

04/2016 - 06/2016 - Rome, Italy

LABORATORY OF ELECTRICAL AND ELECTRONIC SCIENCE AND TECHNOLOGY TEACHER SECONDARY SCHOOL – ISTITUTO TECNICO INDUSTRIALE STATALE "GIOVANNI GIORGI"

https://www.iisgiorgiwoolf.edu.it/ | Viale Palmiro Togliatti, 1161, 00155, Rome

02/2013 - 02/2014 - Rome, Italy

UNDERGRADUATE INTERNSHIP – ENEA, ITALIAN NATIONAL AGENCY FOR NEW TECHNOLOGIES, ENERGY AND SUSTAINABLE ECONOMIC DEVELOPMENT

Research work

Physical-mechanical characterization of Ni-Ti shape memory alloys

Vickers Micro-hardness test and evaluation of the shape recovery mechanisms as a function of thermal cycling

Surface micro-analysis by Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM)

Materials Technologies Technical Unit | Professional, scientific and technical activities |

https://www.enea.it/it/centro-ricerche-casaccia | Via Anguillarese, 301, 00123, Rome, Italy

EDUCATION AND TRAINING

2018 - 31/01/2022 - Via Eudossiana 18, Rome, Italy

PHD IN ELECTRICAL, MATERIALS AND NANOTECHNOLOGY ENGINEERING – Department Chemical Engineering Materials Environment (DICMA), "Sapienza" University of Rome

Research project

Development and physical, mechanical, acoustic and thermal characterization of 3D printable cement-based compounds and alkali-activated materials modified with rubber aggregates deriving from end-of-life tires.

Field(s) of study

• Engineering, manufacturing and construction

Thesis: Additive manufacturing technology and materials optimization for civil engineering applications: eco-sustainability approach in materials and process

PhD | EQF level 8 | http://dicma.ing.uniroma1.it/

2014 - 2017 - Via della Ricerca Scientifica, 1, Rome, Italy

MSC IN SCIENCE AND TECHNOLOGY OF MATERIALS – Faculty of Mathematical, Physical and Natural Sciences, "Tor Vergata" University of Rome

Thesis title: Prototyping and physical-acoustic analysis of sound absorbing metamaterials for interventions in

the automotive sector

Final degree mark: 110/110 cum laude

Master's Degree | EQF level 7 | http://www.scienze.uniroma2.it/

2009 - 2014 - Via della Ricerca Scientifica, 1, Rome, Italy

BACHELOR IN MATERIALS SCIENCE – Faculty of Mathematical, Physical and Natural Sciences,

"Tor Vergata" University of Rome

Thesis title: Nitinol: Triaxial recovery mechanisms and surface characterization

Final degree mark: 102/110

Bachelor's degree | EQF level 6 | http://www.scienze.uniroma2.it/

2003 - 2008 - Via Walter Procaccini, 70, Rome, Italy

SECONDARY SCHOOL TECHNICAL DIPLOMA IN "ENVIRONMENTAL AND HEALTH PHYSICS" - IS

tituto Tecnico Industriale Statale "Heinrich Hertz"

08/07/2019 - Via Clauzetto 12, Rome, Italy

SAFETY TRAINING COURSE FOR WORKERS (4 HOURS) - Informa Formazione&Consulenza

The course aims to provide information and methods essential to gain knowledge of specific workplace hazards, the use of individual safety devices, and regulatory framework for safety and health at work, in accordance with the Italian State-Regions agreement being in force since 26 January 2012.

https://www.istitutoinforma.it/

14/04/2020 - 21/04/2020 - Pomezia (Rome), Italy

GSUITE FOR EDUCATION ONLINE TRAINING COURSE (6 HOURS) – Liceo Artistico Linguistico "Pablo Picasso"

Online training course on the use of Google Gsuite platform for the management of distance learning activities in secondary school.

2017 – Via della Ricerca Scientifica, 1, Rome, Italy

ENGLISH LANGUAGE COURSE (LEVEL E3) - "Tor Vergata" University of Rome - School of Science

English language course with final proficiency exam for the students enrolled in Master's and/or Single-Cycle Degree Courses.

Result of final exam according to CEFR Levels:

Reading: **B2** - Speaking: **B2** - Listening: **B2**

http://cla.uniroma2.it/language-centre-of-the-university-of-rome-tor-vergata/

01/2018 - 09/2018 - Via Cracovia, Rome, Italy

"24 CFU" TRAINING COURSE FOR TEACHING IN SECONDARY SCHOOL – "Tor Vergata" University of Rome

Training course aimed to acquire university educational credits (CFU) in the following subject areas: Pedagogy - Special pedagogy and inclusive didactics - Psychology - Anthropology - Didactic methodologies and technologies

"24 CFU" are required to participate in the national public competition for teaching qualification in secondary school

http://formazione.insegnanti.uniroma2.it/percorso-di-formazione-24-cfu/

02/09/2019 – 06/09/2019 – Department of Basic and Applied Sciences for Engineering, "Sapienza" University of Roma, Via Antonio Scarpa, 16, Rome, Italy

SHORT-CYCLE TRAINING COURSES ON THERMAL ANALYSIS IN MATERIAL SCIENCE – ThAnMa Consortium

The project is aiming at spreading thermal analysis as a technique for the study and characterization of materials.

The course is related to an Erasmus project attended by the University of Thessaloniki (AUTh), University of Cyprus, Sapienza University of Rome, Slovak University of Technology in Bratislava (STUBA) and University of Milan (UMIL).

http://thanma.web.auth.gr/

17/05/2021 - 19/05/2021

VIRTUAL 10TH EPF SUMMER SCHOOL 2021 POLYMERS AND CIRCULAR ECONOMY – Associazio ne Italiana di Scienza e Tecnologia delle Macromolecole (AIM)

The 2021 EPF Summer School will be devoted to the hottest topic concerning synthetic polymers: improving their capability to fit within the needs of circular technologies for more sustainable models of the economy and society.

The school will be somewhat shorter than usual, due to the boundaries of on-line events with respect to residential ones. However the program has been designed to cover many decisive issues: market situation and recycling targets within the EU, different technological options and scientific routes to re-use plastic wastes, comparison of fossil and bio-based feedstocks, evaluation of life cycle assessment.

https://www.aim.it/

19/07/2021 - 21/07/2021

LIFE CYCLE ASSESSMENT AND SIMAPRO ONLINE COURSE - 2B Srl

The course addresses all the fundamentals of LCA analysis:

- objective and data inventory
- creation of a model
- o management of LCA data
- ecoinvent database
- disposal scenarios
- impact assessment
- interpretation

https://www.to-be.it/

LANGUAGE SKILLS

Mother tongue(s): ITALIAN

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	B2	B2	B2	B2	B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Microsoft Office apps

Microsoft Office (Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Microsoft Access)

Data Analysis

OriginLab | Room EQ Wizard Acoustic Software | C-Therm Software | TestXpert Mechanical Testing Software | Temp Monitor S2 Software

Imaging Analysis

Image] | Lucia Laboratory Imaging Software

3D Design

Solidworks (academic experience)

Finite Element Analysis (FEA)

Comsol Multiphysics

Cloud computing apps

Google GSuite

Browser

Internet Explorer | Chrome | Microsoft Edge

TECHNICAL SKILLS

Mechanical testing of materials and data analysis

- $\,^\circ\,$ Tensile test
- Uniaxial compressive test
- Bending test
- Vickers micro-hardness test

Microscopy techniques and digital image processing

- Scanning Electron Microscopy (SEM)
- Atomic Force Microscopy (AFM)
- Optical Microscopy

Acoustic testing of materials and data analysis

- Sound absorption coefficient and acoustic impedance measurements by using impedance tube method
- Sound transmission loss measurements by using impedance tube method
- Acoustic flow resistivity measurements by using impedance tube method

Thermal analysis

- Thermal conductivity measurements by using Modified Transient Plane Source (MTPS) technique
- Dynamic Mechanical Thermal Analysis (DMTA)
- Differential Scanning Calorimetry (DSC)

3D printing machine management

- FDM (Fused Deposition Modeling) technology for polymer materials
- Clay 3D printing

Physical and chemical characterization of materials

- Porosimetry
- Laser diffraction granulometric analysis
- Particle size sieving
- X-ray diffraction (XRD)
- Fourier-transform infrared spectroscopy (FTIR)
- Energy Dispersive X-ray Spectrometry

PUBBLICATIONS

Journal and conference papers-2021

- "Reducing the emission of climate-altering substances in cementitious materials: A comparison between alkali-activated materials and Portland cement-based composites incorporating recycled tire rubber". Valente, M., Sambucci, M., Chougan, M., & Ghaffar, S. H. *Journal of Cleaner Production*, 2022, 333, 130013. (DOI: https://doi.org/10.1016/j.jclepro.2021.130013)
- "Acoustic behaviour of 3d-printable cement mortars functionalized with recycled tire rubber aggregates". Sambucci, M.; Valente, M. Advances in Acoustics, Noise and Vibration - 2021" Proceedings of the 27th International Congress on Sound and Vibration, ICSV 2021, 2021.
- "Commercial Bio-Packaging to Preserve the Quality and Extend the Shelf-Life of Vegetables: The Case-Study of Pumpkin Samples Studied by a Multimethodological Approach". Di Matteo, G.; Di Matteo, P.; Sambucci, M.; Tirillò, J.; Giusti, A.M.; Vinci, G.; Gobbi, L.; Prencipe, S.A.; Salvo, A.; Ingallina, C.; Spano, M.; Sobolev, A.P.; Proietti, N.; Di Tullio, V.; Russo, P.; Mannina, L.; Valente, M. *Foods*, 2021, 1 0, 2440. (DOI: https://doi.org/10.3390/foods10102440).
- "Geopolymers vs. Cement Matrix Materials: How Nanofiller Can Help a Sustainability Approach for Smart Construction Applications—A Review". Valente, M.; Sambucci, M.; Sibai, A. *Nanomaterials*, 2021, 11, 2007. (DOI: https://doi.org/10.3390/nano11082007)
- "Recent Advances in Geopolymer Technology. A Potential Eco-Friendly Solution in the Construction Materials Industry: A Review". Sambucci, M.; Sibai, A.; Valente, M. J. Compos. Sci., 2021, 5, 109. (DOI: https://doi.org/10.3390/jcs5040109)
- "Recycled Porcine Bone Powder as Filler in Thermoplastic Composite Materials Enriched with Chitosan for a Bone Scaffold Application". Valente, M.; Puiggalí, J.; del Valle, L.J.; Titolo, G.; Sambucci, M. *Polymers*, 2021, 13, 2751. (DOI: https://doi.org/10.3390/polym13162751)
- "Influence of waste tire rubber particles size on the microstructural, mechanical, and acoustic insulation properties of 3D-printable cement mortars". Sambucci, M; Valente, M. Civil Engineering Journal, 2021, 7(6), 937-952. (DOI:https://doi.org/10.28991/cej-2021-03091701)
- "Thermal insulation performance optimization of hollow bricks made up of 3D printable rubber-cement mortars. Material properties and FEM-based modelling". Sambucci, M.; Valente, M. *IOP Conference Series: Materials Science and Engineering*, 2021, 1044, 012001. (DOI: https://doi.org/10.1088/1757-899X/1044/1/012001)

- "Preliminary Mechanical Analysis of Rubber-Cement Composites Suitable for Additive Process Construction". Sambucci, M.; Marini, D.; Sibai, A.; Valente, M. J. Compos. Sci., 2020, 4(3), 120. (DOI: https://doi.org/10.3390/jcs4030120)
- "Multi-Physics Analysis for Rubber-Cement Applications in Building and Architectural Fields: A Preliminary Analysis". Valente, M.; Sambucci, M.; Sibai, A.; Musacchi, E. Sustainaibility, 2020, 12(15), 5993. (DOI: https://doi.org/10.3390/su12155993)
- "Rubber-Cement Composites for Additive Manufacturing: Physical, Mechanical and Thermo-Acoustic Characterization". Sambucci, M.; Valente, M.; Sibai, A.; Marini, D.; Quitadamo, A.; Musacchi, E. *In: Bos F., Lucas S., Wolfs R., Salet T. (eds) Second RILEM International Conference on Concrete and Digital Fabrication. DC 2020. RILEM Bookseries, vol 28. Springer, Cham.* (DOI: https://doi.org/10.1007/978-3-030-49916-7 12)
- "Tire Recycled Rubber for More Eco-Sustainable Advanced Cementitious Aggregate". Sambucci, M.; Marini, D.; Valente, M. *Recycling*, 2020, 5(2), 11. (DOI: https://doi.org/10.3390/recycling5020011)
- "Metamateriali Fonoassorbenti Sviluppati Via 3d Printing per Interventi Acustici nel Settore
 Automotive". Sambucci, M.; Cecchini, F.; Nanni, F.; Pucacco, G.; Valente, M. Rivista Italiana di Acustica ,
 2020, 44, 1-23. (DOI: https://www.acustica-aia.it/ria/index.php?journal=ERIA&page=article&op=view&path%5B%5D=150)
- "Extrusion-Based Additive Manufacturing of Concrete Products: Revolutionizing and Remodeling the Construction Industry". Valente, M.; Sibai, A.; Sambucci, M. J. Compos. Sci., 2019, 3(3), 88. (DOI: https://doi.org/10.3390/jcs3030088)

Conference proceedings

- "Novel cement-based sandwich composites engineered with ground waste tire rubber: Design, production, and preliminary results". Sambucci, M.; Sibai, A.; Iannone, A.; Valente, M. Proceedings of the XIII National Interuniversity Consortium of Materials Science and Technology (INSTM) Congress on Materials Science and Technology, Sestriere (IT), 23-26 January 2022.
- "Eco-sustainable approach for cementitious mix construction materials: A preliminary comparison between geopolymer and cement based matrices incorporating Tire recycled rubber". Sambucci, M.; Valente, M.; Sibai, A.; Chougan, M.; Ghaffar, S.H.; Musacchi, E. *Book of Abstract of Engineered Materials* for Sustainable Structures (EM4SS'21) International online workshop, 26-28 April 2021.
- "Waste Polymer Addition for 3D Cementitious Printing Materials". Valente, M.; Sambucci, M. *Online summit on Recycling and Waste Management (RWM-2021) conference proceedings*, 21 January 2021.
- "Green cement-based materials for 3D printing: preliminary tests and characterization". Sambucci,
 M.; Merlonetti, G.; Sibai, A.; Corinaldesi, V.; Valente, M. Proceedings of the XII National Interuniversity
 Consortium of Materials Science and Technology (INSTM) Conference, Ischia (IT), 21-24 July 2019.
- "Study of chemical-physical parameters and optimization of zeolite-type materials for potential biomedical application in intollerance to heavy metals". Quitadamo, A.; Marini, D.; Sambucci, M.; Ronci, S.; Ahaliabadeh, Z.; Saviano, G.; Santonicola, MG.; Bracciale, MP.; Santarelli, ML.; Scoppettuolo, A.; Manni, A.; Valente, M. *Proceedings of the XII National Interuniversity Consortium of Materials Science and Technology (INSTM) Conference*, Ischia (IT), 21-24 July 2019.
- "Injection reactive PA6 moulding: effect of mould temperature on polymer". Marini, D.; Quitadamo, A.; Sambucci, M.; Lucignani, V.; Bracciale, MP.; Santarelli, ML; Valente, M. Proceedings of the XII National Interuniversity Consortium of Materials Science and Technology (INSTM) Conference, Ischia (IT), 21-24 July 2019.
- "Metamateriali fonoassorbenti sviluppati via 3d printing per interventi di correzione acustica nel settore automotive". Sambucci, M. Proceedings of the 46th Acoustic Society of Italy (AIA) Conference, Pes aro (IT), 29-31 May 2019.

CONFERENCES AND SEMINARS

Conference Presentations

- 27th International congress on sound and vibration (ICSV 27); Online; 11-16 July 2021. "Acoustic behaviour of 3D-printable cement mortars functionalized with recycled tire rubber aggregates"
- Engineered Materials for Sustainable Structures (EM4SS'21) International online workshop; Online; 26-28 April 2021. "Eco-sustainable approach for cementitious mix construction materials: A preliminary comparison between geopolymer and cement based matrices incorporating Tire recycled rubber".
- Online Summit on Recycling and Waste Management (RWM-2021); Online; 21 January 2021. "Waste Polymer Addition for 3D Cementitious Printing Materials" (invited speaker).
- Fifth International Online Conference on Reuse and Recycling of Materials (Polymers, Wood, Paper, Leather, Glass, Metals, Ceramics, Semi Conductors, Water etc) and their products (ICRM – 2020); Online; 11-13 December 2020. "Influence of waste tire rubber particles size on the microstructural, mechanical, and acoustic insulation properties of 3D-printable cement mortars"
- 2020 6th International Conference on Architecture, Materials and Construction (ICAMC2020); Online;
 27-29 October 2020. "Thermal insulation performance optimization of hollow bricks made up of 3D printable rubber-cement mortars. Material properties and FEM-based modelling"
- Digital Concrete 2020 2nd RILEM International Conference on Concrete and Digital Fabrication; Online;
 6-9 July 2020. "Rubber-Cement Composites for Additive Manufacturing: Physical, Mechanical and Thermo-Acoustic Characterization"
- Horizon ETRA (European Tyre Recycling Association) Webinar; Online; 4 June 2020. "Possible use of different tyre ground fractions to functionalize cementitious matrices".
- XII National Interuniversity Consortium of Materials Science and Technology (INSTM) Conference; Ischia (IT); 21-24 July 2019. "Green cement-based materials for 3D printing: preliminary tests and characterization".
- YMSE 2019 Young Materials & Surface Engineers Workshop; Rome (IT); 2-3 May 2019. "Composites Materials: smart technologies for innovative and eco-sustainable solutions"
- Innovazioni Concrete Convention ATECAP; Gaeta (IT); 26 April 2019. "3D Printing con malte cementizie: tecnologia innovativa e funzionalizzante"
- 26th European Tyre Recycling Conference ETRA; Brussels (BE); 20-22 March 2019. "3D concrete printing: Developing a premixing Rubber/Crete aggregate for a possible application"

Conference Posters

- XIII National Interuniversity Consortium of Materials Science and Technology (INSTM) Congress on Materials Science and Technology; Sestriere (IT); 23-26 January 2022. "Novel cement-based sandwich composites engineered with ground waste tire rubber: Design, production, and preliminary results".
- XVI AIMAT (Associazione Italiana d'Ingegneria dei Materiali) conference; Cagliari (IT); 15-18 September 2021. "Novel hollow bricks designs as possible applications for rubber-cement mortars: preiminary mechanical, thermal, and acoustic analysis by finite element method (FEM)".
- 46th Acoustic Society of Italy (AIA) Conference; Pesaro (IT); 29-31 May 2019. "Metamateriali fonoassorbenti sviluppati via 3d printing per interventi di correzione acustica nel settore automotive".

Seminars

 Potential in the management of Electrical and Electronic waste (E-waste) as a source of critical and strategic materials. Seminar for the course: Sustainable design of materials (Prof. Marco Valente); Sapienza University of Rome; 23 April 2021

HONOURS AND AWARDS

30/05/2019

"Italo Barducci" award - Acoustic Society of Italy (AIA)

Award for the best poster communication in acoustic field presented at 46th AIA National Conference (Pesaro, 29-31 May 2019).

Poster communication title:

Sound absorbing metamaterials developed via 3D printing for acoustic correction interventions in the automotive sector

The award consists in an economic contribution of 600€ for the participation to an international event on acoustic (conference, seminar, course, etc.) scheduled within the calendar year following the award edition.

30/10/2019

"Avvio alla Ricerca" research grant - "Sapienza" University of Rome

Academic funding (1000 €) to support research projects of significant technological and scientific interest *Research project*:

Study and optimization of rubber-concrete mixtures additives with recycled rubber usable in Additive Manufacturing: optimization of thermo-acoustic, rheological and mechanical properties.

OTHER EXPERIENCE AND PROFESSIONAL MEMBERSHIPS

Reviewer for scientific journals

- o Sustainability (ISSN 2071-1050) Editor: MDPI
- o Coatings (ISSN 2079-6412) Editor: MDPI
- o Materials (ISSN1996-1944) Editor: MDPI
- o Applied Sciences (ISSN 2076-3417) Editor: MDPI
- o Energies (ISSN 1996-1073) Editor: MDPI
- o Processes (ISSN 2227-9717) Editor: MDPI
- Atmosphere (ISSN 2073-4433) Editor: MDPI
- e-Polymers (ISSN 1618-7229) Editor: De Gruyter
- ∘ Journal of cleaner production (ISSN 0959-6526) Editor: Elsevier

Professional events organization

 Member of the organizing committee in YMSE 2019 - Young Materials & Surface Engineers Workshop. Ro me (IT); 2-3 May 2019

Professional Membership

- · Associazione Italiana d'Ingegneria dei Materiali (AIMAT), 2021-present
- Associazione Italiana Macromolecole (AIM), 2021-present
- National Interuniversity Consortium of Materials Science and Technology (INSTM), 2019 present
- Acoustic Society of Italy (AIA), 2019 2021