

# VIRILIO MATTOLI, PHD - CURRICULUM VITAE

(Last Update 20/02/2024)

## GENERAL INFORMATION

---

**Name:** Virgilio Mattoli

**eMail:** virgilio.mattoli@iit.it , virgilio.mattoli@santannapisa.it

**Telephone:** +39 050 883417; **Fax:** +39 050 883402

**Web Profile:** <https://www.iit.it/people/virgilio-mattoli>

**ORCID:** 0000-0002-4715-8353 | **ResearcherID:** A-6744-2017 | **Scopus Author ID:** 9844469700

## SHORT SUMMARY

---

Virgilio Mattoli received his Laurea degree in chemistry (with honours) from the University of Pisa and the Diploma in Chemistry from the Scuola Normale Superiore of Pisa in 2000. In 2005 he received his PhD in bio-engineering (with honours) from Scuola Superiore Sant'Anna, with a thesis focused on the control and integration of miniaturized devices for environmental application. In 2004 he was visiting researcher at the University of Stanford, Center for Design Research, where he focused his activity on sensors and controls modules for biomimetic robotics applications. In 2005 and 2008 he was a short term visiting researcher at Waseda University (Tokyo, Japan) working on a bio-inspired mini-robot and on development of ultra-conformable polymeric films. From June 2008 to October 2009 he obtained a temporary position of Assistant Professor of bioengineer engineering at the Scuola Superiore Sant'Anna (SSSA). From November 2009 to July 2015, he has been a Team Leader of the Smart Materials Platform in the Center for Micro-BioRobotics @SSSA of the Istituto Italiano di Tecnologia. In August 2015, he obtained a permanent position of Senior Researcher Technologist at the Center for Micro-BioRobotics @SSSA of the Istituto Italiano di Tecnologia.

His main research interests include: smart and bio-inspired materials, soft electronics, tattoo electronics, nanomaterials, ultra-thin polymeric films, thin film sensors, sensor conditioning, miniaturised acquisition system and biorobotics. He is currently involved in several research projects on these topics. He is author or co-author of more than hundred fifty articles on ISI journals, of about fifty full papers published in peer-reviewed international conferences proceedings and of several deposited patents. In summary:

International Journal Papers: **186** [173 ISI]

International Journal Papers Under Evaluation: **1**

International Conference Papers/Abstracts: **151** [49 p.r.p.]

Invited Talks: **45**

H Index by Scopus [by Scholar]: **54** [59]

H<sub>10</sub> Index by Scopus [by Scholar]: **155** [169]

Citations by Scopus [by Scholar]: **8890** [11235]

Impact Factor: **>1450**

Average IF: **> 8.8** (ISI Journal Only)

## EDUCATION

---

**May 2005 | Ph.D., Bio-Engineering, Scuola Superiore Sant'Anna, Pisa, Italy.** Title of the Thesis "Study and development of control systems and integration technologies for innovative miniaturised devices for environmental monitoring". Supervisors: Prof. P. Dario. Score: *100/100 cum laude*.

**June 2000 | Diploma of Scuola Normale Superiore, Pisa, Italy.** Title of the Thesis: "Tecniche di Risonanza Magnetica Nucleare di stato solido per lo studio di proprietà dinamiche e strutturali su materiali polimerici". Supervisors: Prof. A. Veracini. Score: 70/70.

**May 2000 | Master of Science in Chemistry, University of Pisa, Italy.** Title of the Thesis: "Tecniche di Risonanza Magnetica Nucleare di stato solido per lo studio di proprietà dinamiche e strutturali su materiali polimerici". Supervisor: Prof. A. Veracini. Score: 110/110 cum laude.

**1993-2000 | Chemistry studies at the Scuola Normale Superiore of Pisa.**

**June 1993 | High school diploma, Liceo Scientifico Statale "G. Marconi" di Foligno (PG);** Score: 60/60.

## POST-GRADUATED TRAINING AND ACADEMIC APPOINTMENTS

---

**August 2015 - Today | Senior Researcher Technologist** - Permant position at Center for Micro-BioRobotics, Istituto Italiano di Tecnologia, Pontedera, Italy. Topic: Smart Functional Materials & interfaces

**November 2009 - July 2015 | Researcher/Team Leader** at Center for Micro-BioRobotics, Istituto Italiano di Tecnologia, Pontedera, Italy. Topic: Smart Functional Materials & interfaces

**2008 –2009 | Assistant Professor,** Biomedical Engineering, Scuola Superiore Sant'Anna, Pisa, Italy. Topic: Smart materials for biomedical applications; ultrathin functional polymeric films.

**2005 –2008 | Post-doc Research Assistant.** Recipient of a research appointments in the biomedical engineering sector at Center for Microengineering (CRIM) Lab of the Scuola Superiore Sant'Anna of Pisa, Italy. Topic: bio-inspired robotics; soft actuators; smart and distributed sensors. Advisor: Prof. Paolo Dario; Dr. Barbara Mazzolai.

**November - December 2008 | Visiting researcher** at Takeoka - Lab, Waseda University, Tokyo, Japan. Topic: Development of nanofilm for biomedical applications. Advisor: Shinji Takeoka.

**October-November 2005 | Visiting researcher** at Takanishi-Lab, Waseda University, Tokyo, Japan. Topic: Study and development of bio-inspired mini-robots and integrated controllers. Advisor: Prof. Atsuo Takanishi.

**2001 –2005 | Research Assistant.** Recipient of 6 research appointments in the biomedical engineering sector at Center for Microengineering (CRIM) Lab of the Scuola Superiore Sant'Anna of Pisa, Italy. Topic: Miniaturised devices for monitoring applications; micro-fabricated gas sensors; sensor conditioning and integration. Advisor: Prof. Paolo Dario; Dr. Barbara Mazzolai.

**May- September 2004 | Visiting researcher** at BDML, Stanford Center for Design Research - Department of Mechanical Engineering, Stanford University, (CA) USA. Topic: Sensors and integrated control modules for biomimetic robotic applications. Advisor: prof. Mark Cutkosky.

**2000 | Research appointments.** Recipient of 2 research appointments in physical chemistry sector at University of Pisa, Italy. Topic: Solid state NMR spectroscopy of polymeric materials: correlation of relaxation times with structural/dynamical properties. Advisor: Prof. Carlo Alberto Veracini.

## EXPERIENCE IN RESEARCH PROJECTS

---

### Activities within National, European and International projects:

- Regional Project (Toscana) "EOLO - EOLO – Sistemi innovativi per la Captazione e lo Sfruttamento dell'Energia Mini-Eolica in differenti contesti ambientali Antropizzati: efficienza, sostenibilità e rivalorizzazione territoriale " (2017-2019) [Partner: IstitutoItaliano di Tecnologia - IIT] (Role: technical responsible for IIT)

- Regional Project (Toscana) "ALMA - Analisi Laser di Metalli preziosi ed Ambre" (2010-2011) [Partner: Forsense Technology - FST] (Role: PI for FST)
- Regional Project (Toscana) "SAVIA - Sistema di Alimentazione per Veicoli ad Idrogeno ed Ammoniaca" (2010-2011) [partner: Scuola Superiore Sant'Anna -SSSA] (Role: technical responsible for SSSA)
- Regional Project (Toscana) "Filiera idrogeno" (2006-2010) [Partner: Scuola Superiore Sant'Anna -SSSA] (Role: technical responsible for SSSA)
- European Project FP6-045299 DUSTBOT "Networked and Cooperating Robots for Urban Hygiene" (2006-2009) [Coordinator: Scuola Superiore Sant'Anna -SSSA] (role: technical responsible of the project)
- European Project IST-FET508774 GOODFOOD "Food Safety and Quality Monitoring with Microsystems" (2004-2007) [Partner: Scuola Superiore Sant'Anna -SSSA] (role: technical responsible for SSSA)
- European Project QLK4-2000-00489 EMECAP "European Mercury Emission from Chlor-Alkali Plants" (2001-2004) [Coordinator: Scuola Superiore Sant'Anna -SSSA] (role: technical responsible of the project)

Activities within Industrial projects:

- Research project funded by the "Duca di Salaparuta" company, focused on development of remote monitoring systems for light spectral intensity in vineyard applications. [Project of Scuola Superiore Sant'Anna -SSSA] (V.M. Role: technical responsible)
- Research project funded by the "Cassa di Risparmio di Massa", focused on development of wireless sensor network technology for intelligent urban garbage collection. [Project of Scuola Superiore Sant'Anna -SSSA] (V.M. Role: technical responsible)
- Research project funded by the "Istituto Superiore di Ricerca e Formazione sui Materiali e Per le Tecnologie Avanzate (ISRIM)", focused on production engineering of a portable fluorimeter. [Project of Scuola Superiore Sant'Anna -SSSA] (V.M. Role: technical responsible)
- Research project funded by the "Istituto Superiore di Ricerca e Formazione sui Materiali e Per le Tecnologie Avanzate (ISRIM)", focused on design and development of a portable fluorimeter. [Project of Scuola Superiore Sant'Anna -SSSA] (V.M. Role: technical responsible)

## **FUND RAISING**

---

Obtained Grants:

- HORIZON-EIC-2022-PATHFINDERCHALLENGES project: IV\_LAB "In-vessel implantable smart sensing device for personalised medicine" (2023-2027) [Coordinator: IstitutoItaliano di Tecnologia - IIT] Project Budget: € 4,158,610 (€ 4,158,610 EU Contribution); IIT: Budget 1,295,906€ (1,295,906€ EU Contribution) Project Start: September 2023 (4 years lasting). (Personal involvement: PI and Coordinator) Grant Number: 101115545
- H2020-MSCA-IF-2019 Marie Skłodowska-Curie Individual Fellowships: Multi-Potent Polymer Precursor approach for novel conjugated polymers – MP3 [Starting February 2020] (IIT Budget: ~171k€). Ruolo V. Mattoli: Researcher's Supervisor. Grant Number: 885881
- H2020 FET Open Project: 5D Nanoprinting " Functional & Dynamic 3D Nano- MicroDevices by Direct Multi-Photon Lithography " (2020-2024) [Coordinator: IstitutoItaliano di Tecnologia - IIT] Project Budget: € 3,583,800 (€ 3,583,800 EU Contribution); IIT: Budget 997,833€ (997,833€ EU Contribution) Project Start: September 2020 (4 years lasting). (Personal involvement: PI and Coordinator) Grant Number: 899349
- Industrial project type (Research Project): " Werable Sensors for Smart Injections" funded by an External Company, March 2020 - March 2023; Personal involvement: PI
- Industrial project type (Research Project): " Sonde di nuova generazione per sistemi tipo probe card per i test su wafer semiconduttori" funded by Scuola Normale Superiore, December 2019 - March 2020; Personal involvement: PI
- Industrial project type (Research Project): " BioImpedance Temporary Tattoo Electrodes (BITTE)" funded by MED-EL GmbH (Austria) December 2016 - June 2019; Personal involvement: Co-PI

- FP7 FET OPEN STREP Project: " Innovative Robotic Artefacts Inspired by Plant Roots for Soil Monitoring (PLANTOID)". Project Budget: 2,091,888€ (1,619,925€ EU Contribution); IIT: Budget 667,400€ (533,600€ EU Contribution) Project Start: May 2012. PI: B. Mazzolai; Personal involvement on the project: Participation in writing the proposal; Working in the project; WP Leader.
- Industrial Project (Feasibility Study): "Smart Materials e soluzioni tecnologiche per l'energy harvesting in calzature" funded by VIBRAM S.p.A. [April- October 2011]; PI: V. Mattoli, CoPI: F. Greco.
- IIT Interdepartmental Project: "ALL POLYMER ULTRATHIN CONFORMABLE AND STRETCHABLE LARGE AREA EPICORTICAL ELECTRODE ARRAYS" Project Budget: ~120,000€. Project start: September 2013. PI: V. Mattoli; CoPI: D. Ricci.
- Industrial project type (Research Project): "Smart Power Soles: Harvesting Energy in Rubber Outsoles (HERO)" funded by VIBRAM S.p.A. September 2012 - July 2014; PI: V. Mattoli
- Project Ministero della Salute (BANDO 2011-2012 Progetti Ordinari RF): "New self-powered devices for cochlear stimulation based on piezoelectric nanomaterials". Project coordinated by Azienda Ospedaliero-Universitaria Pisana; Project Budget: 794,391 € (450,000 € Contribution) IIT: Budget 248,000€ (125,000,00€ Contribution). November 2014-October 2016. Personal involvement on the project: Participation in writing the proposal (CoPI for CMBR); Working in the project.
- Industrial project type (Research Project): " Smart Power Soles: Harvesting Energy in Rubber Outsoles - Phase II" funded by VIBRAM S.p.A.; January - December 2015; PI: V. Mattoli.

## **MENTORING ACTIVITIES**

---

8 Master Students Thesis (as tutor or co-tutor) [Master course in Biomedical Engineering, University of Pisa]

16 Graduated PhD students (as tutor or co-tutor)

15 Postdoctoral Fellows supervised (from 2010 to now)

## **ACADEMIC TEACHING ACTIVITIES**

---

- *PhD program in MicroBioRobotics, SSSA/IIT* - Full Course on "Biological Materials: structure and mechanical properties" (2010).
- *PhD program in BioRobotics, SSSA* - Didactic modules in "Micro and Nano Robotics for Biomedical Applications" course (2010).
- *Engineering, Biorobotic sector, SSSA* - Didactic module "Physical sensors for humanoid robotics" (2008-2009).
- *Bioroborobotics Engineering, Univ. of Pisa* - Didactic modules in "Bionics" course (2014/2015 -2019).
- *Biomedical Engineering, Univ. of Pisa* - Didactic modules in "Medical Robotics" course (2007-2013).
- *Biomedical Engineering, Univ. of Pisa* - Didactic modules in "Biomechatronics" course (2003-2005, 2007-2009).
- *Computer Science, Univ. of Pisa* - Didactic modules in "Robotic perception " course (2007-2009)
- *IMT School (Institutions Markets Technologies), Lucca* - Didactic modules in PhD program in "Biorobotics Science and Engineering" (2005).
- Lecture at Zeijang university, China: "Examples of biorobotic system and applications" (Dic. 2007)

## **PROFESSIONAL SOCIETIES**

---

- IEEE Member ([www.ieee.org](http://www.ieee.org)) (2005-2013)
- Member of the IEEE Robotics & Automation Society (<http://www.ncsu.edu/IEEE-RAS/>) (2005-Now)

- Member of the IEEE Engineering in Medicine and Biology Society ([www.embs.org](http://www.embs.org)) (2007-Now)
- Member of the Materials Research Society – MRS (<http://www.mrs.org>) (2011-Now)

## REVIEWING ACTIVITY

---

International Journals reviewing activity: Science Robotics; ACS Applied Materials & Interfaces; Nature Electronics; Nature Communications; Nano Letters; Advanced Materials; Advanced Energy Materials; Advanced Functional Materials; Advanced Healthcare Materials; Advanced Materials Interfaces; Advanced Materials Technologies; Scientific Reports; Smart Materials and Interfaces; Smart Materials and Structures; Journal of Physics D: Applied Physics; Applied Surface Science; Biomacromolecules; Biomaterials; Polymer International; NPG Asia Materials; Science Robotics; Nanomedicine UK; Journal of Biomedical Nanotechnology; Measurement Science and Technology; Pharmaceutical Nanotechnology; Langmuir; Nanotechnology; RSC Advances; Synthetic Metals; Colloids and Surfaces B: Biointerfaces; Advanced Biosystems; Nanomedicine; Nanotechnology, Biology, and Medicine; IEEE Sensors, Sensors, Sensors and Actuators A; Microelectronic Engineering, Nanotoxicology, IEEE Transactions on Robotics; Journal of Micromechanics and Microengineering; Computer and Electronics in Agriculture; Journal of Micro-Nano Mechatronics; Environmental Science and Technology; Mechanism and Machine Theory; Frontiers in Bioengineering and Biotechnology; Applied Surface Science, Bioinspiration and Biomimetics, International Journal of Metallurgy and Metal Physics.

Publons profile: <https://publons.com/author/1391322/virgilio-mattoli#profile>

International Conferences reviewing activity: BIORB, IROS, IROS, AIM, ICRA, ICAR, EMBC, ICAR, ...

Funded Project reviewing activity:

- o Evaluator and rapporteur of several grant proposals for Central Finance and Contracting Agency (CFCA) of the Republic of Latvia (November 2019-2020-2022-2023-2024)
- o Evaluator for EU ERC starting grant proposals (May 2018, July 2022, May 2023)
- o Evaluator of a grant proposal for Irish Research Council Laureate Awards (February 2022)
- o Evaluator of a grant proposal for Excellence Hubs (Bridge Programmes), Research and Innovation Foundation, Cyprus (September 2021)
- o Evaluator of a grant proposal for HES-SO - Haute Ecole Spécialisée de Suisse occidentale, CH (July 2021)
- o Evaluator of a grant proposal for Office of Sponsored Research, KAUST, Saudi Arabia (July 2020)
- o Evaluator of 1 grant proposal for German Research Foundation, DFG (March 2020)
- o Evaluator of a grant proposal for Domain Science of the Netherlands Organisation for Scientific Research (NWO) (April 2018)

## ACCADEMIC RESULTS

---

National Scientific Qualification:

- Professore I Fascia Fisica Sperimentale della Materia [Settore 02-B1] (2018-2029)
- Professore I Fascia Ingegneria Biomedica [Settore 09-G2] (2021-2032)
- Professore I Fascia Fondamenti Chimici delle Tecnologie [Settore 03-B2] (2018-2029)
- Professore I Fascia Chimica Industriale [Settore 03/C2] (2019-2030)

## EDITORIAL ACTIVITIES

---

- From 2023 member of **Executive Advisory Board** of Advanced Electronic Materials (Wiley ISI journal)
- From 2023 member of Editorial Board of Alexandria Engineering (Elsevier ISI journal)

- From 2021 member of Editorial Board of Chip journal (Elsevier ISI journal)
- From 2018 Accademic Editor of PLOS ONE journal (ISI journal)
- From 2018 Associated Editor of Frontiers in Bioengineering and Biotechnology (ISI journal)
- From 2017 member of Editorial board of MDPI *Sensors* (ISI journal); Section Associate Editor of Sensor Materials Section.

--- Special Issues ---

2023 – Advanced Electronic Materials | Special Issue – “Recent advances in Ultra-thin Electronics” (Eds. Fabrizio Viola; Virgilio Mattoli)

2023 – Advanced Functional Materials | Special Issue – “Functional Materials for two-photon polymerization” (Eds. Virgilio Mattoli; Larisa Florea; Eva Blasco)

2022 – Nano-Biomedicine | Special Topic Issue– “Nano-Biomedicine” (Eds. Pooyan Makvandy; Virgilio Mattoli; Guojun Chen)

2019 – MDPI Polymers | Special Issue – “Functional Polymers in Additive Manufacturing” (Eds. Eva Blasco; Virgilio Mattoli)

#### Conference organiser member:

- Member of program committee of “Advanced Fabrication Technologies for Micro/Nano Optics” at the Photonic West 2023, 28 January - 2 February 2023, San Francisco, California, United States.
- Organiser of Symposium SF14 “Novel frontiers in 3D/4D multi-photon micro-fabrication: materials, methods and applications” at MRS Spring Meeting 2022, May 8/13, 2022 Honolulu, Hawaii, US.
- Member of Advisory Board of international conference CIMTEC 2022, 9th Forum on New Materials, Symposium FA " Flexible and Stretchable Electronics: Materials, Devices and Applications", 25-29/06/2022, Montecatini.
- Member of Advisory Board of international conference CIMTEC 2018, 8th Forum on New Materials, Symposium FA "Materials Issues in Flexible and Stretchable Electronics", 10-14/06/2018, Perugia (da 22 Feb 2017).
- Member of Meeting Committee of international conference NGPT2016, 3rd International Conference on Nanogenerators and Piezotronics, 15-17/06/2016, Roma.
- Member of Scientific Committee of Nanotech Italy 2014, 26-28 Novembre 2014, Venezia.

#### **OTHER ACTIVITIES (SCIENTIFIC SERVICES)**

---

- Tutor of several theses on Bioengineering and Smart Materials topics (15 PhD and 9 MD theses).
- Support for undergraduates and PhD courses related to, Biomedical Robotics
- ICT contact point (ICO) for the CMBR (2009-now)
- CMBR Intranet and CMBR WEB Site Supervisor (2009-2013)
- Responsible for CMBR Publication Database (2009-2018)
- Member of several Committees for selection of graduate programme students of Scuola Superiore Sant’Anna, Engineering sector (2008 – 2012, 2014-2015,2016)
- Member of several Committees for selection of PhD students of Scuola Superiore Sant’Anna, Engineering sector (2009, 2011 – 2014-2019)
- Since 2010 V.M. served as a member of Evaluating Committees in call for tenders for the purchase of several technical equipments (SEM, Dual-Beam FIB-SEM, Optical Profilometer, NMR, Cytofluorimeter, etc.) at IIT. On

this assignment he was in charge of identifying technical specifications and selection criteria to be inserted in call for tenders, evaluating technical offers, supervising installation and acceptance tests.

- Session chair at IEEE BioRob 2012 Conference, Rome, Italy
- Session chair at IEEE Robio 2007 Conference, Sanya, Cina
- Collaboration within the "Olimpiadi della matematica" project, organized by Scuola Normale Superiore of Pisa (1994-1995, 1997).

## **AWARDS AND OTHER ACHIEVEMENTS**

---

- Winner of Beyond Science Photo Contest (2013) (first place) with the picture "Kanagawa - Oki Nami Ura, The great wave off Kanagawa (top view)"
- Front Cover image of issue 9(9), September (2023) of Advanced Electronic Materials
- Front Cover image of volume 33(39), September (2023) of Advanced Functional Materials
- Inner Cover image of volume 47, July–August (2021) of Materials Today
- Inside Front Cover image of issue 13(6), June (2021) of Nano-Micro Letters
- Back Cover image of issue 6(4), April (2021) of Advanced Materials Technologies (No personally produced)
- Inside Front Cover image of issue 2(6), March (2021) of Materials Advances
- Front Cover image of issue 9(1), January (2021) of Chemosensors MDPI
- Inside Front Cover image of issue 1(6), October (2019) of Advanced Intelligent system (Only Cover - No involvement on paper)
- Front Cover image of issue 4(10), October (2018) of Advanced Electronic Materials
- Inside Front Cover image of issue 14(6), February (2018) of Small
- Back Cover image of issue 13(12), December (2016), of Plasma Processes and Polymers
- Back Cover image of issue 4(11), August (2015), of Advanced Healthcare Materials
- Front Cover image of issue 4(7), May (2015), of Advanced Healthcare Materials
- Front Cover image of issue 27(10), March (2015), of Advanced Materials
- Inside Front Cover image of issue 7(7), February (2015) of Nanoscale
- Front Cover image of issue 31(11), November (2014), of Pharmaceutical Research
- Front Cover image of issue 4(12), September (2014), of Advanced Energy Materials
- Inside Front Cover image of issue 26(17), May (2014), of Advanced Materials
- Front Cover image of issue 14(5), May 2014, of Macromolecular Bioscience
- Front Cover image of issue 114(1), July 2012, of the Journal of Bioscience and Bioengineering
- Best Poster Award at EuroEAP 2014, International conference on Electromechanically Active Polymer (EAP) transducers & artificial muscles, Linköping, Sweden, 10-11 June 2014, with the work " Shaping and patterning of electrically driven soft PEDOT:PSS bilayer actuators " by S. Taccola, F. Greco, A. Mondini, B. Mazzolai, V. Mattoli.
- Best Poster Award at EuroEAP 2013, International conference on Electromechanically Active Polymer (EAP) transducers & artificial muscles, Duebendorf, 25-26 June, 2013, with the work " Electrically driven dry state actuators based on PEDOT:PSS nanofilms " by S. Taccola, A. Zucca, F. Greco, B. Mazzolai, V. Mattoli.
- 2012 TMECH Best Paper Award with the work "A Miniaturized Mechatronic System Inspired by Plant Roots", IEEE Transaction on Mechatronics, vol 16(2), pp. 201-212, 2011. by B. Mazzolai, A. Mondini, P. Corradi, C. Laschi, V. Mattoli, E. Sinibaldi and P. Dario
- Best Paper Award at RoBio 2007, IEEE International Conference on Robotics and Biomimetics, 15-18 December, 2007 Sanya, with the work "Biomechatronic Design and Development of a Legged Rat Robot", Proceedings of" by China F. Patanè, V. Mattoli, C. Laschi, B. Mazzolai and P. Dario, H. Ishii, A. Takanishi
- Winner of the Best Student Paper Award and finalist for Best Paper Award (3 papers selected on about 800 papers) at ICRA'07, the 2007 IEEE International Conference on Robotics and Automation, Rome, Italy, 10-14

April 2007, with the work “Whole body adhesion: hierarchical, directional and distributed control of adhesive forces for a climbing robot”, by S. Kim, M. Spenko, S. Trujillo, B. Heyneman, V. Mattoli, M. Cutkosky

## INVITED TALKS AT WORKSHOPS AND SIMPOSIA

---

### International

- A. Ottomaniello, V. Mattoli, “Two photon polymerization on ultrathin polymeric films: a route toward conformable optical meta-surfaces and sensors”, *Photonics West 2024, San Francisco, 27 Jan– 1 Feb 2024.*
- V. Mattoli, “Ultrathin Conformable Tattoos for On-Skin Sensing and Tactile Stimulation”, *Webinar Wiley, On Line, 08 Nov 2023.*- V. Mattoli, “2 Photon Lithography for Plastic Micro Devices”, *Seminar at Graz University of Technology - Graz, AT, May 17, 2023*
- V. Mattoli, “2 photon lithography and ultrathin films for plastic micro-electronics manufacturing and assembly”, *IMAPS “Additive manufacturing for Microelectronics”, workshop organised by “International Microelectronics and Packaging Society”, held at Polytechnic University of Milan - Bovisa, IT, April 2, 2023*
- V. Mattoli, “Soft Micro-Electronics & plastic MEMS”, *Seminar at CNR-IMIM, Parma, IT, March 20, 2023*
- V. Mattoli, “Soft Micro-Electronics & Micro-Devices”, *Storm-Bots Boot Camp, Pontedera, IT, March 2, 2023*
- V. Mattoli, “Soft Micro-Electronics Materials”, *Max Planck Institute for Intelligent Systems, Stuttgart, DE, November 11-11, 2022*
- V. Mattoli, “Nanometric-thin freestanding polymeric films for soft micro-electronics”, *Trends in Nanotechnology International Conference (TNT2022 nanoBalkan), Tirana, AL, October 03-07, 2022*
- V. Mattoli, “Soft micro-electronics and plastic MEMS”, *Training event of SAMRT Project “Training Network on Soft, Self-responsive, Smart MAterials for RoboTs”, 29 August-01 September 2022, Pontedera (PI), Italy*
- V. Mattoli, “Soft micro-electronics: From 2D to 3D”, *2nd IIT – SSSA DAY connect the dots, Polo Sant’Anna Valdera – May 16-17, 2022*
- V. Mattoli, “Toward MEMS direct fabrication by two photon lithography”, “3D Nano- and Micro-Manufacturing: Technology & Technical Applications” by Excellence Cluster “3D Matter Made to Order” ([www.3DMM2O.de](http://www.3DMM2O.de)), *April 3-8, 2022, Schöntal Monastery, DE.*
- V. Mattoli, “Toward rapid prototyping of MEMS by two photon lithography: An overview of 5D NanoPrinting project” *Seminar at Dept. Chemical & Process Engineering, Leeds University, UK. 14th March 2022*
- V. Mattoli, “Soft Microelectronics, from ultrathin organic electronics to plastic MEMS”, *Seminar at CRANN, Trinity College Dublin, Ireland. 11th March 2022* V. Mattoli, “Conducting Polymers for Soft Bio-Electronic Interfaces”, *Advanced Functional Polymers for Medicine meeting 2021, 13-16th of July, Online Only*
- V. Mattoli, “Soft and conformable electronics based on ultra-thin freestanding polymeric films” *E-MRS 2021 Spring Meeting (<http://www.european-mrs.com>), May 31 - June 4, 2021, Online Only*
- V. Mattoli, “Soft ultra-conformable electronics and beyond”, *Bio-Nano Cross-Over International Workshop, May 25th, 2021, Online Only*
- O. Tricinci, M. Carlotti, A. Desii, F. Meder, V. Mattoli, *Two-step MEMS microfabrication via 3D direct laser lithography, Advanced Fabrication Technologies for Micro/Nano Optics and Photonics XIV; 116960J (2021) SPIE OPTO, 2021, Online Only*
- V. Mattoli, “Ultra-thin freestanding polymeric films technologies for soft and conformable electronics”, *Hamlyn Symposium on Medical Robotics 2019, Workshop “Bionic Technologies & Implantable Robots” London, UK, 26 June 2019*
- V. Mattoli, “Conducting Polymers for Soft Robotics & Electronics”, *Robotics Science and Systems (RSS 2019), Workshop “ Generation GrowBots: materials, mechanisms and systems design for adaptable and growing robots inspired by plants” Freiburg, DE, 22 June 2019*



- V. Mattoli, *Ultra-thin freestanding polymeric films for temporary tattoo electronics*, Seminar at Dept. of Department of Chemical Engineering - Product Technology ENTEG Institute, Faculty of Science and Engineering, University of Groningen, Groningen, The Netherlands, 7 May 2019
- V. Mattoli, *Nanofilm and tattoo technologies for conformable electronics*, 5th Core-to-Core International Symposium "3D Lab-Exchange Program" Okinawa, Japan, 25 – 27 February 2019 (Keynote Speech)
- V. Mattoli, *Ultrathin Films and Tattoo Technologies for Conformable Electronics*, IIT-CNST winter workshop, Bormio, Italy, 17 December, 2018 (Guest Speech)-
- V. Mattoli, *Conducting Polymer for Soft Electronics and Robotics*, European Conference on thermally and electrically Conductive Polymers and composites ECCP 2018, Torino, 23 October, 2018
- V. Mattoli, *Ultrathin and ultra-conformable films for (bio)electronic applications*, International Union of Materials Research Societies - International Conference on Electronic Materials 2018 (IUMRS-ICEM 2018) Daejeon, Korea, 20 August, 2018 (Keynote Speech)
- V. Mattoli, *Ultraconformable (bio)-electronic technologies*, 4th Core-to-Core International Symposium "3D Lab-Exchange Program" Bonn, Germany, 06 - 08 March, 2018 (Keynote Speech)
- V. Mattoli, *Freestanding Ultrathin Film Technologies for Ultraconformable (Bio)-Electronics*, OrBIItaly 2017 - Organic Bioelectronics in Italy, Cagliari, Italy, October 25-27, 2017
- V. Mattoli, *Freestanding nanofilm technologies for biomedical applications*, Photonic Devices for Bio-Components, International Workshop, 5–6 June 2017 Dipartimento di ingegneria dell'informazione, Università di Pisa, Pisa, Italy
- V. Mattoli, *Ultra-conformable systems and bio-mimetic nano-structured surfaces*, The 3D Lab-Exchange Symposium, September 22, 2016, Pisa, Italy.
- V. Mattoli, *"Ultra-conformable systems and bio-mimetic nano-structured surfaces."*, Seminar at London Centre for Nanotechnology - University College London, June 24, 2016, London, UK.
- *Soft Actuation Inspired by Plants*, Workshop: "From Plants and Animals to robots: Movements sensing and control. Two worlds in comparison." IROS 2015, September 28, 2015, Hamburg Germany.
- *Ultra-conformable systems and bio-mimetic nano-structured surfaces*, The 3D Lab-Exchange Symposium, September 8, 2015, Singapore.
- *Functional freestanding nanofilms and micro-structured functional surfaces*. Seminar at Dept. of Bioelectronics (BEL) - Center of Microelectronics in Provence, École des Mines de Saint-Étienne, May 26, 2015, Gardanne (France).
- *Plant inspired technologies for sensing and actuation*, PLEASED satellite workshop on Bio-inspired ICT, ECCS'14, European Conference on Complex Systems, September 24, 2014, Institute for Advanced Studies, Lucca, Italy;
- *Plant inspired technologies for sensing and actuation*, Smart solutions from the plant kingdom: beyond the animal model - Second edition, June 9, 2014, Accademia dei Georgofili, Florence, Italy;
- *Nanofilm technologies for Bio-Robotics*, NanotechItaly, 27-29 November 2013, Venice, Italy;
- *Plant Inspired Actuators*, Workshop on Learning from the Plant Kingdom to Invent Smart Artificial Solutions - Living Machines 2013, Natural History Museum, 29 July-2 August, London, UK ;
- *Smart Materials for Soft/Micro Actuation*, 2012 OCTOPUS-EVRYON & WSK-TNg Summer School, June 24-29, 2012, Rome, Italy;
- *Smart Material for Micro-Actuation*, The 11th Joint Symposium between the University of Bonn and Waseda University: Health Span Dynamics, Waseda University, Tokyo, JP, February 21 2012.
- *Soft Actuation in Micro-BioRobotics*, Workshop on Soft Robotics, The 15th International Conference on Advanced Robotics ICAR2011, June 20-23 2011, Tallin, Estonia;
- *Mercury pollution monitoring by microsystems*, Sino-German-Italy Hi-tech forum in Environmental Monitoring Micorosystem, 16 April 2008, Chongqing, China;

- *From Sensor Networks to Autonomous Networked and Cooperating Platforms for Environmental Monitoring*, Workshop on Robotic olfaction: towards real world applications at ICRA'07, the 2007 IEEE International Conference on Robotics and Automation, 10-14 April 2007, Rome, Italy

#### National

- V. Mattoli, *"Soft Micro-Electronics & Plastic MEMS for HealthCare"*, University Roma Tor Vergata, Roma, IT, February 20, 2023

- V. Mattoli, *Ultrathin Films and Tattoo Technologies for Conformable Electronics*, IIT-CNST winter workshop, Bormio, Italy, 17 December, 2018 (Guest Speech)

- V. Mattoli, *Nanomaterials, a key enabling technology for the future of medicine: a cardiovascular prospective*, 21° Congresso Nazionale Società Italiana di Ricerche Cardiovascolari SIRC 2017, Imola, Novembre 16-18, 2017

- *Ultra-conformable systems and bio-mimetic nano-structured surfaces*, Seminar at Dep. of Chemistry, University of Bari, May 19, 2015, Bari (Italy).

- *Functional Printable Materials & Functional Surfaces*, Workshop: "UNiverso ->VIRTUAL, DIGITAL E ADDITIVE MANUFACTURING -> I RICERCATORI UNIVERSITARI INCONTRANO -> LE AZIENDE", 27 March 2015, Parma, Italy

- *Functionalized Polymeric Nanofilms for Biomedical Applications* Seminario del Direttore: Il nanomondo in cardiologia ed in neurologia IFC-CNR 21 ottobre 2010 Pisa, Italy.

#### **TECHNOLOGY TRANSFER AND RELATED ACTIVITIES**

---

V.M. has been partner of the company Marwan Technology s.r.l. (2015-2021), a spin-off of the University of Pisa.

V.M. has been founder and CEO of Forsense Technology s.r.l. (2007-2014), a spin-off company of Scuola Superiore Sant'Anna: ForSense Technology srl, operating in the sector of electronic systems, sensors and systems for environmental monitoring, agro-food applications and biomedical applications ([www.forsense-tech.com](http://www.forsense-tech.com)).

As researcher assistant at Scuola Superiore Sant'Anna, V.M. carried out several activities on technology transfer at regional, national and European level. Due to the acquired experience he has been consultant in technological due diligence in biomedical engineering sector for a private organization (2002, 2004).

## PATENTS

- M. Carlotti, V. Mattoli, "Strato organico comprendente regioni aventi proprietà elettroniche differenti", Application number IT 102022000017577, Application Date August 25, 2022
- M. Carlotti, O. Tricinci, V. Mattoli, "Formulazioni di fotoresist per tecniche di microstampa 3D", Application number IT 102021000013421, Application Date May 24, 2021. PCT extension deposited.
- Patent Application: Daniele Santonocito, Christian Denk, Alessandro Noriaki Ide, Francesca Maule, Pedro Marquez, Christiane Poschl, Francesco Greco, Virgilio Mattoli, Aliria Poliziani, Silvia Taccola, "Printed Tattoo Electrode Respiration Sensor for Laryngeal" Pacemakers, US Application deposited July 31 2019, Application Number 62/880,745
- F. Greco, A. Zucca, B. Mazzolai, S. Takeoka, K. Yamagishi, T. Fujie, V. Mattoli, "Processo per preparare film auto-supportanti di polimeri conduttori", Deposited 09/03/2015; Protocol Number FI2015A000065.
- Krupenkin, T.; Taylor, A. J.; Mattoli, V.; Greco, F.; Mazzolai, B.; Mondini, A., "Suola per calzatura in grado di recuperare parte dell'energia prodotta durante la deambulazione" - Italian application deposited on May 9 2014, Protocol Number VR2014A000127. International application deposited on February 2 2015, Protocol Number PCT/IB2015/050777.
- M. Taghavi, V. Mattoli, L. Beccai, B. Mazzolai, "Composito Tiboelettrico per raccolta di energia meccanica e rilevazione", Deposited 18/03/2014; Protocol Number TO2014A000218. International application deposited on March 17 2015. , Protocol Number PCT/IB2015/051945.
- Mattoli, V.; Greco, F.; Beccai, L.; Dario, P., "Sensing Moisture Level of Human Skin", US Patent No.US 8,652,042 (accepted on February 18 2014).
- Nationalization JP2013-540476 - Application Date May 24, 2013; Title: Process for the preparation of biocompatible, freestanding nanofilms of conductive polymers; Inventors: F. Greco, V. Mattoli, P. Dario, A. Menciassi, A. Zucca
- Nationalization EP11804805.7 - Application Date May 24, 2013; Title: Process for the preparation of biocompatible, freestanding nanofilms of conductive polymers; Inventors: F. Greco, V. Mattoli, P. Dario, A. Menciassi, A. Zucca (Publication EP2643395 in date October 2, 2013)
- F. Greco, V. Mattoli, P. Dario, A. Menciassi, A. Zucca, Process for Preparation Of Biocompatible, Free-Standing Nanofilms Of Conductive Polymers By Way Of A Supporting Layer, US patent application nr. US 2012/0306114, deposited in date 20/06/2012 (IIT Owner 100%).
- V. Mattoli, F. Greco, L. Beccai, P. Dario, A human skin moisture measuring device and method, US patent application nr. US 13/637347 deposited in date 29/10/2012 (IIT Owner 50%); European Patent Application nr. EP 2552311, deposited in date 29/10/2012 (IIT Owner 50%).
- F. Greco, V. Mattoli, P. Dario, A. Menciassi, A. Zucca, Processo per preparare nanofilm biocompatibili auto-supportanti di polimeri conduttori mediante strato di supporto, International Patent PCT/IB2011/055288
- V. Mattoli, F. Greco, L. Beccai, P. Dario, A human skin moisture measurin device and method, International Patent PCT/IB2011/051299
- F. Greco, V. Mattoli, P. Dario, A. Menciassi, A. Zucca, "Processo per preparare nanofilm biocompatibili autosupportanti di polimeri conduttori mediante strato di supporto" - Deposited 24/11/2010, Protocol Number FI2010A000231
- F. Greco, V. Mattoli, P. Dario, A. Menciassi, A. Zucca, "Processo per preparare nanofilm biocompatibili autosupportanti di polimeri conduttori mediante strato sacrificale" - Deposited 24/11/2010, Protocol Number FI2010A000230
- V. Mattoli, F. Greco, L. Beccai, P. Dario, "Metodo e dispositivo per la misura del grado di umidità della pelle umana", – Deposited 29/03/2010, Protocol Number FI2010A000053
- P. Dario, C. Laschi, B. Mazzolai, V. Mattoli, G. Ferri, A. Manzi, M. Gabelletti; "Sistema robotico per l'esecuzione di task in ambienti urbani, non strutturati e/o parzialmente strutturati" – Deposited 07/05/2009, Protocol Number FI2009A000096
- I. Mannari, P. Salvini, F. Pantaloni, C. Laschi, B. Mazzolai, V. Mattoli, P. Dario; "Design Comunitario "DustBot - Networked and Cooperating Robots for Urban Hygiene" - Deposited to European Patent Office 01/01/2008, Protocol Number 000980966.

- B. Mazzolai, V. Mattoli, A. Mondini, P. Dario, I. Elmi, S. Zampolli, A. Zani; "Sistema per il monitoraggio della qualità e della sicurezza di prodotti alimentari" – Deposited 13/07/2007, Protocol Number FI2007A000160.

## **TECHNICAL COMPETENCIES**

---

Experience in spectroscopy and analysis techniques (NMR, IR, UV-Vis, fluorescence, etc.).

Knowledge of main aspects and procedures of chemistry laboratory.

Wide experience on clean room equipments, micro/nanofabrication process and characterization tools (lithography, sputtering, FIB, SEM, AFM, etc.),

Deep knowledge of main aspects of analogical/digital electronics

Wide experience on using materials and instruments for electronic circuit development.

Extensive experience in use of development tools for microcontrollers and programmable logic (Microchip, Texas Instruments, Cypress, Freescale, Altera, Xilinx).

Deep experience in using instrumentation for measures, signal acquisition and debugging of electronic boards (oscilloscopes, logic state analysers, LCR meters, signal generators, etc.).

20-years experience on microcontroller systems design & development

## **ICT COMPETENCIES**

---

Knowledge of main operative systems: DOS, WINDOWS 9x/2000/XP/7/8/10, MAC-OS, LINUX.

Extensive experience in using office suites (Microsoft Word, Excel, Power Point, LaTeX, etc.), HTTP, FTP, e-mail server, browser and clients.

Deep knowledge of program for raster / vector graphics (Photoshop, CorelDraw, Paint Shop Pro, Illustrator, etc.), 3D graphics (Cinema4D, Blender, etc.), chemical drawing (Chemdraw, Chemwindows), video editing (Adobe Premiere, Virtual Dub, Moviemaker, etc.).

Competencies in using numerical analysis / FEM programs (Mathematica, Kaleidagraph, Matlab, Comsol Multiphysics ecc.) and CAD for electronics development (ORCAD, EAGLES, etc.).

Knowledge of several programming languages for PC (C/C++, Visual Basic, .NET framework) and embedded systems.

## **PERSONAL SKILLS**

---

Excellent aptitude to collaborative work in multicultural environment

Great predisposition to teamwork coordination and project management

Excellent skills on artistic and technical drawing (included 3D modelling and rendering)

Proficient in English, basic knowledge of French

**DICHIARAZIONE SOSTITUTIVA DI CERTIFICAZIONI**  
**(ART. 46 D.P.R. 445 DEL 28 DICEMBRE 2000)**

Il sottoscritto Virgilio Mattoli, nato a Foligno il 13 aprile 1974 e residente a Pisa in via Narciso Favilli n. 3, consapevole delle sanzioni penali, nel caso di dichiarazioni non veritiere, di formazione o uso di atti falsi, richiamate dall'art. 76 del D.P.R. 445 del 28 dicembre 2000

DICHIARA

che tutto quanto sopra riportato corrisponde a verità.

Dichiaro inoltre di essere informato, ai sensi e per gli effetti del Decreto legislativo 196/2003, che i dati personali raccolti saranno trattati, anche con strumenti informatici, esclusivamente nell'ambito del procedimento per il quale la presente dichiarazione viene resa.

Pontedera, 20 October 2023  
Virgilio Mattoli