

PERSONAL INFORMATION

Francesco Maita

 CNR-IMM, Via Fosso del Cavaliere 100, 00133, Roma

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Sex Male | Date of birth 05/11/1984 | Nationality italiana

PREFERRED JOB

Research and Development

WORK EXPERIENCE

30/12/2016–Present

Researcher

Istituto per la Microelettronica e i Microsistemi, Roma

Sensoristics and Microelectronics

16/07/2012–29/12/2016

Post-doc

Istituto per la Microelettronica e i Microsistemi, Roma

Design, fabrication and electrical characterization of microelectronic circuits for sensor readout in robotics based on TFT Poly-Si on flexible substrate.

01/07/2009–01/07/2012

Scholarship

Istituto per la Microelettronica e i Microsistemi del CNR, Roma

Microelectronic fabrication processes, development of a platform for electrical characterization, sensoristics.

EDUCATION AND TRAINING

15/09/2013–21/09/2013

International School of Physics and Technology of Matter

Consiglio Nazionale delle Ricerche, Otranto

Smart sensing, technological process in materials and methods for new applications.

2009–2012

PhD in "Engineering of sensing and learning systems"

Università degli studi di Roma Tor Vergata, Roma (Italy)

PhD thesis in "Design and realization of a prototype of POSFET device based on LTPS technology on ultra-flexible substrate of PI for robotics applications" on 29/04/2013.

Scientific work based on design, fabrication and electro-mechanical characterization of microelectronic circuits for robotics applications.

2006–2008

Master's degree in Electronics Engineering - 110/110 cum laude

Università degli studi di Roma Tor Vergata

Title: "Development of a technology based on polycrystalline silicon on flexible substrate for the development of read-out electronics for sensors" on 09/05/2009.

Scientific work based on the design of low voltage electronic circuits. Micro/Nanoelectronics

2003–2006

Bachelor's degree in Electronic Engineering - 110/110 cum laude

Università degli studi di Roma Tor Vergata

Title: "Design of a biologically inspired circuit mixed analog-digital on 09/11/2006

Scientific work based on microelectronic fabrication processes, design of electronic circuits, modelling, numerical simulations of devices and circuits.

PERSONAL SKILLS

Mother tongue(s) Italian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	C1	B2	B2	B2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages - Self-assessment grid

Communication skills Multi-year experience in tutoring in private form of secondary school (mathematics) and undergraduate (electronics)

Organisational / managerial skills Since 2017, he's referent for the workgroup "**Multi-functional micro-nanosystems**" for the IMM Rome Unit.

Francesco Maita is actively participating as researcher in:

- "**PECSYS**" **European project** (Grant agreement n°: 735218) on technology demonstration of large-scale photo-electrochemical system for solar hydrogen production, where he is involved in the maximization of the water splitting efficiency through the optimization of the electrodes used in the electrolyser cells;

In the past years he actively worked on the following projects:

- "**Agridrone Vision**" **POR FESR** (2017-2019) on the creation of a smart and integrated system in the field of precision agriculture, where he is involved in the design and realization of a sensor network (~20 nodes) working on sub-GHz frequencies to acquire data from vines
- "**CORTICONIC**" **FP7 European Project** (2013-2015) - Computations and Organization of Retes Through the Interaction of Computational, Optical and Neurophysiological Investigations of the Cerebral cortex – he was involved in the design, fabrication and characterization of ultra-flexible microelectrode arrays for epicortical brain signal recording and stimulation;
- "**COSMIC**" **FP7 European Project** (2011-2014) - Complementary Organic Semiconductor and Metal Integrated Circuits – he was involved in the design and characterization of complementary organic-based circuits;
- "**PLAST_ICs**" **PON Project** (2008-2013) on the development of Electronics on Plastics for «Smart Disposable» Systems, where he was involved in the design, fabrication and characterization of front-end electronics for flexible sensors;
- Company funded project (2009-2012) on the development of an ultra-flexible electronic skin based on piezoelectric effect for robotics application.

Job-related skills

- **Circuit design:** microcontroller based devices, data protocols (Bluetooth, BLE, Wifi, LoRa), analog circuit design (amplifiers, oscillators), **electronic read-out for flexible sensors, packaging for flexible electronics**
- **PCB design and fabrication**
- **Software design** for equipment interface and data exchange
- Work experience in clean-room environment

- Work experience with equipment for microelectronic fabrication/characterization processes:

DEPOSITION

- a) spin-coating
- b) chemical vapour deposition (ECR - PECVD, PECVD)
- c) galvanic bath
- d) metal evaporation/sputtering

MICROFABBRICATION

- a) laser lithography for photolithographic mask fabrication
- b) mask-aligner
- c) etching dry (RIE) and wet
- d) laser annealing

CHARACTERIZATION

- a) dynamic and static electrical characterization
- b) electro-mechanical characterization of mini-shaker
- c) sensor characterization

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem-solving
Proficient user	Proficient user	Proficient user	Proficient user	Proficient user

Digital skills - Self-assessment grid

Advanced knowledge of Microsoft Office (Power Point, Word, Excel)

Basic programming skill in Visual Basic and Matlab.

Average programming skill in Php and MySQL.

Advanced programming skill in C, C++ and Arduino environment programming.

CLAD certification in LabVIEW programming environment.

CAD: Mask design (LASI), PCB (Altium), circuit simulation (Pspice, Cadence ORCAD), design 3D (SolidWorks)

ADDITIONAL INFORMATION

PRIZES:

(2015) **Best Poster Award** at international conference ITC2015

(2009) Winner of master's degree prize "Rita e Sebastiano Raeli" at University of Tor Vergata as 1st classified for Engineering

SCIENTIFIC PRODUCTION - JOURNAL PAPERS:

(2019) *Quarter-wave plate metasurfaces on electromagnetically thin polyimide substrates*, L. Maiolo, A. Ferraro, F. Maita, R. Beccherelli, E. E. Kriezis, T. V. Yioultis, D. C. Zografopoulos, Appl. Phys. Lett. 115, 241602, DOI: 10.1063/1.5132716

(2019) *Integrated 3D Microfluidic Device for Impedance Spectroscopy in Lab-on-Chip Systems*, A. Buzzin, L. Iannascoli, M. Muzi, A. Veroli, D. Caputo, G. de Cesare, L. Maiolo, F. Maita, G. Ricci, 2019 IEEE 8th International Workshop on Advances in Sensors and Interfaces (IWASI), DOI:10.1109/IWASI.2019.8791365

(2018) *An ultra-compact integrated system for brain activity recording and stimulation validated over cortical slow oscillations in vivo and in vitro*, L. Pazzini, D. Polese, J. F. Weinert, L. Maiolo, F. Maita, M. Marrani, A. Pecora, M.V. Sanchez-Vives and G. Fortunato, Scientific Reports, Vol. 8, Issue 1, n.

16717, DOI:10.1038/s41598-018-34560-y

(2018) *Gravure printed organic thin film transistors: Study on the ink printability improvement*, S. Calvi, F. Maita, M. Rapisarda, G. Fortunato, A. Valletta, V. Preziosi, A. Cassinese and L. Mariucci, Organic Electronics, Vol. 61, pp.104-112, DOI: 10.1016/j.orgel.2018.06.026

(2018) *Spontaneous galvanic displacement of Pt nanostructures on nickel foam: Synthesis, characterization and use for hydrogen evolution reaction*, R. G. Milazzo, S. M. S. Privitera, D. D'Angelo, S. Scalese, S. Di Franco, F. Maita and S. Lombardo, International Journal of Hydrogen Energy, pp.7903-7910, DOI: 10.1016/j.ijhydene.2018.03.042

(2016) *A Comparison Among Low Temperature Piezoelectric Flexible Sensors Based on Polysilicon TFTs for Advanced Tactile Sensing on Plastic*, L. Maiolo, F. Maita, A. Pecora, A. Minotti, G. Fortunato, E. Smecca, and A. Alberti, Journal of Display Technology, Vol. 12, n. 3, pp. 209-213. DOI: 10.1109/JDT.2015.2439737

(2015) *PEDOT-CNT-Coated Low-Impedance, Ultra-Flexible, and Brain-Conformable Micro-ECoG Arrays*, E. Castagnola, L. Maiolo, E. Maggolini, A. Minotti, M. Marrani, F. Maita, A. Pecora, G. N. Angotzi, A. Ansaldo, M. Boffini, L. Fadiga, G. Fortunato, and D. Ricci, IEEE Transactions on Neural Systems and Rehabilitation Engineering, Vol. 23, n.3, art. no. 6866220, pp. 342-350. DOI: 10.1109/TNSRE.2014.2342880

(2015) *Ultraflexible Tactile Piezoelectric Sensor Based on Low-Temperature Polycrystalline Silicon Thin-Film Transistor Technology*, F. Maita, L. Maiolo, A. Minotti, A. Pecora, D. Ricci, G. Metta, G. Scandurra, G. Giusi, C. Ciofi, and G. Fortunato, IEEE Sensors Journal, Vol. 15 Issue 7, pp. 3819-3826. DOI: 10.1109/JSEN.2015.2399531

(2015) *AlN texturing and piezoelectricity on flexible substrates for sensor applications*, E. Smecca, F. Maita, G. Pellegrino, V. Vinciguerra, L. La Magna, S. Mirabella, L. Maiolo, G. Fortunato, G. G. Condorelli, and A. Alberti, Applied Physics Letters 106, 232903; DOI: 10.1063/1.4922229

(2014) *Flexible pH sensors based on polysilicon thin film transistors and ZnO nanowalls*, L. Maiolo, S. Mirabella, F. Maita, A. Alberti, A. Minotti, V. Strano, A. Pecora, Y. Shacham-Diamand, and G. Fortunato, Applied Physics Letters 105, 093501 (2014). DOI: 10.1063/1.4894805

(2014) *Ultra-flexible microelectrode array nanostructured by FIB: A possible route to lower the device impedance*, L. Maiolo, A. Notargiacomo, M. Marrani, A. Minotti, F. Maita, A. Pecora, Microelectronic Engineering 121, pp. 10-14. DOI:10.1016/j.mee.2014.02.020

(2013) *Flexible sensing systems based on polysilicon thin film transistors technology*, L. Maiolo, A. Pecora, F. Maita, A. Minotti, E. Zampetti, S. Pantalei, A. Macagnano, A. Bearzotti, D. Ricci, G. Fortunato, Sensors and Actuators B: Chemical 179, pp. 114-124. DOI: 10.1016/j.snb.2012.10.093

(2012) *Flexible PVDF-TrFE pyroelectric sensor driven by polysilicon thin film transistor fabricated on ultra-thin polyimide substrate*, A. Pecora, L. Maiolo, F. Maita, A. Minotti, Sensors and Actuators A: Physical 185, pp. 39-43. DOI:10.1016/j.sna.2012.07.013

(2011) *Flexible sensorial system based on capacitive chemical sensors integrated with readout circuits fully fabricated on ultra thin substrate*, E. Zampetti, L. Maiolo, A. Pecora, F. Maita, S. Pantalei, A. Minotti, A. Valletta, M. Cuscunà, A. Macagnano, G. Fortunato, A. Bearzotti, Sensors and Actuators B: Chemical 155, pp.768-774. DOI:10.1016/j.snb.2011.01.045

SCIENTIFIC PRODUCTION - CONFERENCES AND WORKSHOP:

(2020) *A wireless sensor network based on laser-annealed ZnO nanostructures for advance monitoring in precise agriculture*, D. Polese, F. Maita, (...) SENSORNETS 2020 - Proceedings of the 9th International Conference on Sensor Networks, DOI: 10.5220/0009368201770181

(2019) *Room temperature gas sensors based on laser-annealed ZnO nanostructures for gaseous pollutants detection*, D. Polese, I. Lucarini, A. Convertino, F. Maita, G. Fortunato, L. Maiolo, 2019 IEEE SENSORS, DOI:10.1109/SENSORS43011.2019.8956909

(2019) *49dB depletion-load amplifiers with polysilicon source-gated transistors*, E. Bestelink, S. Ravi, P. Silva, R. Sporea, L. Maiolo, F. Maita, ESSDERC 2019 - 49th European Solid-State Device Research Conference (ESSDERC), DOI: 10.1109/ESSDERC.2019.8901692

(2018) *Calibration of the IXPE instrument*, F. Muleri, (...), F. Maita, (...), Proceedings of SPIE, Vol. 10699, n.106995C, DOI: 10.1117/12.2312203

(2017) *Integrated steering wheel system based on nanostructured elastomeric sensors for real time detection of driver drowsiness status*, F. Maita, S. A. Bruno, A. Castiello, M. Ruggeri, A. Pecora and L. Maiolo, Proceedings of IEEE Sensors, Vol. 2017-Dec, pp. 1-3, DOI: 10.1109/ICSENS.2017.8234171

(2016) *Highly wearable wireless wristband for monitoring pilot cardiac activity and muscle fine movements*, L. Maiolo, F. Maita, A. Castiello, A. Minotti and A. Pecora, MetroAeroSpace 2017 -

Proceedings, n.7999578, pp. 271-275, DOI: 10.1109/MetroAeroSpace.2017.7999578

(2016) *Low temperature poly-silicon thin film transistor flexible sensing circuit*, D. M. Keren, A. Efrati, F. Maita, L. Maiolo, A. Minotti, A. Pecora, G. Fortunato, M. Zajac, Y. Shacham, IEEE ICSEE 2016, DOI: 10.1109/ICSEE.2016.7806127

(2016) *Wearable band for hand gesture recognition based on strain sensors*, A. Ferrone, F. Maita, L. Maiolo, M. Arquilla, A. Castiello, A. Pecora, X. Jiang, C. Menon, L. Colace, BioRob 2016, DOI: 10.1109/BIOROB.2016.7523814

(2015) *Pollution gas sensing devices composed by LDH nanostructures connected to wearable ultra-flexible readout circuit based on polysilicon*, A. Ferrone, L. Maiolo, F. Maita, A. Pecora, A. Minotti, D. Polese, L. Pazzini, A. De Iacovo, L. Colace, A. Matocchia, F. Giorgi, L. Di Giamberardino and P. G. Medaglia, GE2015, June 24-26, (Siena, Italy)

(2015) *A compact integrated system for neural signal acquisition and stimulation*, L. Pazzini, D. Polese, M. Marrani, F. Maita, N. Tort, J. Weinert, M. D'Andola, L. Maiolo, A. Pecora, G. Fortunato, M.V. Sanchez-Vives, BDEBATE | A Dialogue with the Cerebral Cortex: Cortical Function and Interfacing

(2015) *Nanostructured sensing devices controlled by ultra-flexible polysilicon readout circuits*, L. Maiolo, F. Maita, A. Minotti, A. Pecora, G. Fortunato, A. Ferrone, S. Mirabella, V. Strano, IEEEIC 2015 - Conference Proceedings, art. no. 7165441, pp. 1770-1773. DOI: 10.1109/IEEEIC.2015.7165441

(2015) *Flexible Double Stage POSTFT Based on Poly-Si Technology for Robotic Skin Application*, F. Maita, L. Maiolo, A. Minotti, A. Pecora, D. Ricci, G. Metta, G. Fortunato. IEEE Nano, art. 15724418, pp. 1313 – 1316, 27-30 July (Rome, Italy). DOI: 10.1109/NANO.2015.7388874

(2014) *LTPS TFT Technology on Flexible Substrates for Sensor Applications*, G. Fortunato, L. Maiolo, F. Maita, A. Minotti, S. Mirabella, V. Strano, G. Metta, D. Ricci and A. Pecora, Proceedings of AM-FPD 2014, art. no. 6867206, pp. 311-314. DOI: 10.1109/AM-FPD.2014.6867206

(2014) *Flexible tactile sensor based on PVDF-TrFE integrated on high performing organic TFT for robotic applications*, L. Maiolo, M. Rapisarda, F. Maita, S. Calvi, A. Pecora, L. Mariucci, G. Fortunato, ICOE, 11-13 June 2014, (Modena, Italy)

(2014) *Reliability of fully printed CMOS organic ring oscillator*, L. Mariucci, M. Rapisarda, F. Maita, A. Valletta, G. Fortunato, S. Jacob, M. Benwadih, I. Chartier, R. Coppard, S. Abdinia, F. Tramontana, G. Palmisano. ITC2014, Jan. 23-24, 2014 (Delft, The Netherlands) (ORAL).

(2014) *Investigation on nanostructured biosensor for Biotin detection*, D. Polese, A. Convertino, L. Maiolo, A. Ferrone, L. Pazzini, M. Marrani, F. Maita, A. Pecora, G. Fiaschi, G. Fortunato, Proceedings of IEEE Sensors, 2014-December (December), art. no. 6985331, pp. 1627-1630. DOI: 10.1109/ICSENS.2014.6985331

(2014) *Fully-organic flexible tactile sensor for advanced robotic applications*, M. Rapisarda, L. Maiolo, F. Maita, S. Calvi, A. Ferrone, A. Minotti, A. Pecora, L. Mariucci, G. Fortunato, IEEE 9th Nanotechnology Materials and Devices Conference, NMDC 2014, art. no. 6997418, pp. 45-48. DOI: 10.1109/NMDC.2014.6997418

(2014) *Ultra-flexible extended-gate poly-Si TFTs for electrochemical bio-sensing*, L. Maiolo, A. Pecora, A. Minotti, F. Maita, Y. Shacham, G. Fortunato, ITC 2014, 23-24 January, (Delft, The Netherlands) (ORAL)

(2014) *Low-temperature flexible piezoelectric AlN capacitor integrated on ultra-flexible poly-Si TFT for advanced tactile sensing*, F. Maita, L. Maiolo, A. Pecora, A. Minotti, G. Fortunato, E. Smecca, A. Alberti, IEEE SENSORS 2014 Proceedings, pp. 1730-1733. DOI: 10.1109/ICSENS.2014.6985357

(2014) *Ultra-flexible sensing systems based on low temperature polysilicon electronics: from material selection to device application*, L. Maiolo, A. Pecora, F. Maita, M. Marrani, A. Minotti, G. Fortunato, SID Mid Europe Meeting October 9–10, (Stuttgart, Germany)

(2014) *Flexible Sensors based on Low-Temperature Polycrystalline Silicon Thin Film Transistor*, G. Fortunato, L. Maiolo, F. Maita, A. Minotti, S. Mirabella, V. Strano, G. Metta, D. Ricci and A. Pecora, ECS Transactions, 64 (10), pp. 165-173. DOI: 10.1149/06410.0165ecst

(2014) *ZnO nanowalls integrated on ultra-thin flexible TFT based on polysilicon for pH sensing*, L. Maiolo, V. Strano, S. Mirabella, F. Maita, A. Minotti, A. Pecora, G. Fortunato, IEEE 9th Nanotechnology Materials and Devices Conference, NMDC 2014, art. no. 6997417, pp. 41-44. DOI: 10.1109/NMDC.2014.6997417 (ORAL)

(2013) *Ultra-flexible and brain-conformable micro-electrocorticography device with low impedance PEDOT-carbon nanotube coated microelectrodes*, E. Castagnola, L. Maiolo, E. Maggolini, A. Minotti, M. Marrani, F. Maita, A. Pecora, G. N. Angotzi, A. Ansaldo, L. Fadiga, G. Fortunato, D. Ricci, EMBS Conference on Neural Engineering, November 6 - 8, (San Diego, California) DOI: 10.1109/NER.2013.6696087

(2013) *Enhanced piezoelectric hybrid tactile sensors fully integrated on ultra-thin polyimide substrates for robotic applications*, L. Maiolo, A. Pecora, F. Maita, A. Minotti, G. Fortunato, D. Ricci and G. Metta, ICRA 2013 IEEE International Conference on Robotics and Automation, 6-10 May 2013, (Karlsruhe, Germany) (ORAL)

(2012) *Piezoelectric flexible tactile sensor based on poly-silicon TFT for humanoid robots*, L. Maiolo, A. Pecora, F. Maita, A. Minotti, G. Fortunato, D. Ricci and G. Metta, ITC 2012 – 8th International Thin Film Transistor Conference, January 30-31, 2012, (Lisbon, Portugal) (ORAL)

(2012) *SPICE model for lossy piezoelectric PVDF-TrFE touch sensor integrated with flexible polysilicon TFTs*, F. Maita, L. Maiolo, A. Pecora, A. Valletta, D. Ricci, G. Metta, G. Fortunato, ITC 2012 – 8th International Thin Film Transistor Conference, January 30-31, 2012, (Lisbon, Portugal) (POSTER)

(2012) *Flexible tactile sensors based on polysilicon TFT technology for robotics application*, G. Fortunato, L. Maiolo, A. Pecora, F. Maita, A. Minotti, D. Ricci and G. Metta. IMID2012 DIGEST (Oral)

(2012) *Flexible PVDF-TrFE pyroelectric sensor integrated on a fully printed p-channel organic transistor*, L. Maiolo, F. Maita, A. Pecora, M. Rapisarda, L. Mariucci, M. Benwadih, S. Jacob, I. Chartier and R. Coppard, Proceedings of EuroSensors XXVI, September 9-12, 2012, (Kraków, Poland) DOI: 10.1016/j.proeng.2012.09.200

(2009) *Flexible sensors with integrated circuits based on polysilicon thin film transistors*, G. Fortunato, A. Bearzotti, M. Cuscuna', A. Macagnano, L. Maiolo, F. Maita, L. Mariucci, A. Minotti, S. Pantalei, A. Pecora, D. Simeone, A. Valletta and E. Zampetti. Proceedings of 16th International Display Workshop - IDW'09, December 9-11, 2009, (Miyasaki, Japan) (INVITED)

(2009) *Realization of Touch-Keypad and flexible circuits on polyimide*, L. Maiolo, M. Cuscuna', F. Maita, L. Mariucci, A. Minotti, A. Pecora, D. Simeone, A. Valletta and G. Fortunato, S. Abbisso, C. Caligiore, E. Fontana, S. Leonardi, L. Maddiona, G. Nastasi, A. Scuderi and F. Tramontana. Forum "be-flexible" - "flexible electronic system", 26 Novembre 2009 (Munich, Germany)

(2009) *Flexible electronics based on polysilicon thin film transistor*, G. Fortunato, M. Cuscunà, L. Maiolo, F. Maita, L. Mariucci, A. Minotti, A. Pecora, D. Simeone, A. Valletta, A. Bearzotti, A. Macagnano, S. Pantalei and E. Zampetti, 9th International Meeting on Information Display (IMID 2009), October 12 to 16, 2009, (Seoul, Korea) (ORAL)

(2009) *Chemoresistive nanofibrous sensor array and read-out electronics on flexible substrate*, A. Pecora, L. Maiolo, E. Zampetti, S. Pantalei, A. Valletta, A. Minotti, F. Maita, D. Simeone, M. Cuscunà, A. Bearzotti, A. Macagnano, L. Mariucci and G. Fortunato. TRANSDUCERS 2009 - 15th International Conference on Solid-State Sensors, Actuators and Microsystems, art. no. 5285542, pp. 144-147. DOI:10.1109/SENSOR.2009.5285542

(2009) *Read-out Interface based on polysilicon TFTs technology integrated with humidity sensor for flexible electronics*, L. Maiolo, M. Cuscunà, A. Pecora, E. Zampetti, S. Pantalei, A. Valletta, A. Minotti, D. Simeone, F. Maita, A. Bearzotti, A. Macagnano, L. Mariucci, G. Fortunato ITC 09; 01/2009, Proceedings of The 5th International Thin-Film Transistor Conference, 5-6 Marzo 2009, 220-223, (Palaiseau, Francia)