CURRICULUM VITAE

Dr. Mirko Rocci

November 2019

PERSONAL INFORMATION

Gender
Nationality:
Date of birth:
Place of birth:
Marital Status:
Phone Numbers:
Address:
Institutional e-mail addresses:
Personal e-mail address:
Website:
ORCID:

CURRENT POSITION

From 11/2018 — *Marie Curie Fellow* at:

- **Massachusetts Institute of Technology** – Cambridge (US).
  (Outgoing phase, 1st year)
  Group Leader/Supervisor: Dr. Jagadeesh Moodera
- **NEST – CNR - Scuola Normale Superiore**, Pisa (Italy).
  (Return phase, 2nd year)
  Group Leader/Supervisor: Dr. Francesco Giazotto

FIELDS OF INTEREST

Nanoscience – Nanotechnology – Experimental Quantum Technology.
Superconducting Spintronics, Nanoelectronics, III-V Semiconductor Nanowires, 2-D Materials, Graphene, LTS and HTS Superconductors, Magnetic Tunnel Junctions, Complex Oxide Nanostructures, Hybrid Nanodevices.

EDUCATION

2009 – 2016 — **Institution:** Campus of International Excellence "Moncloa" (Spain)
Universities: Universidad Complutense de Madrid and Universidad Politécnica de Madrid (Spain)
Thesis Title: "Proximity effects in Complex Oxide nanostructures"
Major: Ph.D. in Condensed Matter Physics
Final Mark: Sobresaliente *Cum Laude*
Advisors: Prof. Zouhair Sefrioui, Prof. Jacobo Santamaría

2006 – 2009 — **University:** Università degli Studi dell'Aquila (Italy)
Major: Master's Degree in Physics

Final Mark: 110/110
Dissertation Title: "Interplay between ferromagnetism and superconductivity in complex oxide interfaces"
Advisors: Prof. Franco Lucari, Prof. Jacobo Santamaría

2002 – 2006 **University:** Università degli Studi dell'Aquila (Italy)
Major: Bachelor's Degree in Physics
Final Mark: 107/110
Dissertation Title: "Growth of germanium nanowires. Morphological and structural characterisation"
Advisor: Prof. Maurizio Passacantando

1997 – 2002 **High School:** Istituto Tecnico Industriale Statale dell'Aquila "Amedeo di Savoia Duca d'Aosta" (Italy)
Major: Industrial Mechanic Technician
Final Mark: 100/100

PREVIOUS POSITIONS

11/2017 – 11/2018 ***Post-doctoral Associate*** at Plasma Science of Fusion Center - **Massachusetts Institute of Technology** – Cambridge (US).
Group Leader/Supervisor: Dr. Jagadeesh Moodera

06/2015 – 11/2017 ***Post-doctoral Associate*** at **NEST –** Scuola Normale Superiore, Pisa (Italy).
Group Leaders/Supervisors: Prof. Stefano Roddaro, Dr. Francesco Rossella.

06/2011 – 06/2015 ***Ph.D. Fellow*** at Univesidad Complutense de Madrid and Universidad Politécnica de Madrid (Spain).

07/2009 – 06/2011 ***Research Assistant*** at Facultad de Ciencias Fisicas - Univesidad Complutense de Madrid (Spain).

FELLOWSHIPS AND AWARDS

11/2018 – 11/2019 ***Marie Skłodowska Curie - Global Fellowship*** (2 years).
Project: "***EuSuper*** - "Superconducting Magnetic RAM for Next Generation of Supercomputers". Budget: 165 kEUR.
Partners: Massachusetts Institute of Technology (US) and NEST – CNR - SNS, Pisa (Italy). Supervisors: Dr. Jagadeesh Moodera and Dr. Francesco Giazotto.

06/2017 – 10/2017 ***Post-doctoral Fellowship***, NEST – Scuola Normale Superiore, Pisa (Italy).
Project: "Quantum Transport in nanoelectronic systems (QUANTRA)"
Principal investigator: Prof. Stefano Roddaro

06/2016 – 06/2017 ***Post-doctoral Fellowship***, NEST – Scuola Normale Superiore, Pisa (Italy).
Project: "Thermoelectricity in nanodevices: harnessing quantum and interaction effects".
Principal investigator: Prof. Stefano Roddaro

06/2015 – 06/2016 ***Post-doctoral Fellowship***, NEST – Scuola Normale Superiore, Pisa (Italy).
Project: "Ultrafast Thermodynamics at the Nanoscale".
Principal investigator: Dr. Francesco Rossella

06/2011 – 06/2015 ***Ph.D. Fellowship***, granted by "Campus of International Excellence – Moncloa" (Spain). International Programme for Attracting Talent (PICATA).

01/2008 – 07/2008 ***Awarded ERASMUS - Placement Scholarship***, Instituto de Ciencias de Materiales de Madrid – CSIC (Spain).

09/2006 – 09/2007 ***Awarded ERASMUS European Exchange Program Scholarship***, Facultad de Ciencias Fisicas - Univesidad Complutense de Madrid (Spain).

TEACHING EXPERIENCE

Spring, 2014 **Graduate Teaching Assistant**, at Facultad de Ciencias Fisicas - Universidad Complutense de Madrid (Spain). **Course:** 1º. **Subject:** Laboratorio de Física General I. **E.C.T.S.:** 2.45. **Hours:** 24.5

Spring, 2013 **Graduate Teaching Assistant**, at Facultad de Ciencias Fisicas - Universidad Complutense de Madrid (Spain). **Course:** 1º. **Subject:** Laboratorio de Física General I. **E.C.T.S.:** 2.45. **Hours:** 24.5

Spring, 2012 **Graduate Teaching Assistant**, at Facultad de Ciencias Fisicas - Universidad Complutense de Madrid (Spain). **Course:** 5º. **Subject:** Laboratorio de Electrónica_I. **E.C.T.S.:** 2.45. **Hours:** 24.5

LIST OF INTERNATIONAL PEER-REVIEWED PUBLICATIONS

[P1]. **Investigation of InAs–based devices for topological applications.**
M. Carrega, S. Guiducci, A. Iorio, L. Bours, E. Strambini, G. Biasiol, **M. Rocci**, V. Zannier, L. Sorba, F. Beltram, S. Roddaro, F. Giazotto, S. Heun.
Spintronics XII **11090**, 110903Z (2019).

[P2]. **Conductometric Sensing with Individual InAs Nanowires.**
V. Demontis, **M. Rocci**, M. Donarelli, R. Maiti, V. Zannier, F. Beltram, L. Sorba, S. Roddaro, F. Rossella and C. Baratto.
Sensors **19 (13)**, 2994 (2019).

[P3]. **Vectorial control of the spin-orbit interaction in suspended InAs nanowires.**
A. Iorio, **M. Rocci**, L. Bours, M. Carrega, V. Zannier, L. Sorba, S. Roddaro, F. Giazotto and E. Strambini.
Nano Letters (2018).

[P4]. **Suspended InAs nanowire-based devices for thermal conductivity measurements using the 3ω-method.**
M. Rocci, V. Demontis, D. Prete, D. Ercolani, L. Sorba, F. Beltram, G. Pennelli, S. Roddaro, and F. Rossella
Journal of Materials Engineering and Performance **27 (12)**, 6299-6305 (2018)

[P5]. **Self-assembled InAs nanowires as optical reflectors.**
F. Floris, A. Marini, L. Fornasari, V. Bellani, F. Banfi, S. Roddaro, D. Ercolani, **M. Rocci**, F. Beltram, L. Sorba, F. Rossella.
Nanoscale **7 (11)**, 400 (2017)

[P6]. Crystal phases in hybrid metal-semiconductor nanowire devices.
J. David, F. Rossella, **M. Rocci**, D. Ercolani, L. Sorba, F. Beltram, M. Gemmi, and S. Roddaro.
Nano Letters, **17 (4)**, 2336 (2017)

[P7]. InAs nanowire superconducting tunnel junctions: quasiparticle spectroscopy, thermometry and nanorefrigeration.
J. Mastomaki, S. Roddaro, **M. Rocci**, D. Ercolani, L. Sorba, I. J. Maasilta, N. Ligato, A. Fornieri, E. Strambini, and F. Giazotto.
Nano Research, **1**, 1-6 (2017)

[P8]. Tunable Esaki effect in catalyst-free InAs/GaSb core-shell nanowires.
M. Rocci, F. Rossella, U. P. Gomes, V. Zannier, F. Rossi, D. Ercolani, L. Sorba, F. Beltram, and S. Roddaro.
Nano Letters, **16 (12)**, 7950 (2016)

[P9]. GHz electroluminescence modulation in nanoscale subwavelength emitters.
F. Rossella, V. Piazza, **M. Rocci**, D. Ercolani, L. Sorba, F. Beltram, S. Roddaro.
Nano Letters **16 (9)**, 5521 (2016)**.**

[P10]. Local noise in a diffusive conductor.
E. S. Tikhonov, D. V. Shovkun, D. Ercolani, F. Rossella, **M. Rocci**, L. Sorba, S. Roddaro, V. S. Khrapai.
Scientific Reports **6**, 30621 (2016).

[P11]. Noise thermometry applied to thermoelectric measurements in InAs nanowires.
E. Tikhonov, D. Shovkun, V. Khrapai, D. Ercolani, F. Rossella, **M. Rocci**, L. Sorba, S. Roddaro.
Semiconductor Science & Technology **31**, 104001 (2016).

[P12]. Proximity Driven Commensurate Pinning in $YBa_2Cu_3O_7$ through All-Oxide Magnetic Nanostructures.
M. Rocci, J. Azpeitia, J. Trastoy, A. Perez-Muñoz, M. Cabero, R. F. Luccas, C. Munuera, F. J. Mompean, M. Garcia-Hernandez, K. Bouzehouane, Z. Sefrioui, C. Leon, A. Rivera-Calzada, J. E. Villegas and J. Santamaria.
Nano Letters **15** (11), 7526 (2015).

[P13]. Paving the way to nanoionics: atomic origin of barriers for ionic transport through interfaces.
M. A. Frechero, **M. Rocci**, G. Sánchez-Santolino, Amit Kumar, J. Salafranca, Rainer Schmidt, M. R. Díaz-Guillén, O. J. Durá, A. Rivera-Calzada, R. Mishra, Stephen Jesse, S. T. Pantelides, Sergei V. Kalinin, M. Varela, S. J. Pennycook, J. Santamaria & C. Leon.
Scientific Reports **5**, 17229 (2015).

[P14]. Resistive switching in manganite/graphene hybrid planar nanostructures.
M. Rocci, J. Tornos, A. Rivera, Z. Sefrioui, M. Clement, E. Iborra, C. Leon and J. Santamaria.
Applied Physics Letters **104**, 102408 (2014).

[P15]. Caracterización eléctrica de fronteras de grano en conductores iónicos mediante medidas de espectroscopia de impedancias en un bicristal.
M. A. Frechero, **M. Rocci**, Rainer Schmidt, M. R. Díaz-Guillén, O. J. Durá, A. Rivera-Calzada, J. Santamaria, C. Leon.
Boletín de la Sociedad Española de Cerámica y Vidrio **51** (1), 13-18 (2012).

[P16]. Symmetrical interfacial reconstruction and magnetism in $La_{0.7}Ca_{0.3}MnO_3$ / $YBa_2Cu_3O_7$ / $La_{0.7}Ca_{0.3}MnO_3$ heterostructures.
C. Visani, J. Tornos, N. M. Nemes, **M. Rocci**, C. Leon, S. G. E. te Velthuis, Yaohua Liu, A.

Hoffmann, J. W. Freeland, M. Garcia-Hernandez, M. R. Fitzsimmons, B. J. Kirby, M. Varela, S. J. Pennycook and J. Santamaria.
Physical Review B **84**, 060405(R) (2011).

[P17]. Directionally controlled superconductivity in ferromagnet/superconductor/ferromagnet trilayers with biaxial easy axes.
C. Visani, N. M. Nemes, **M. Rocci**, Z. Sefrioui, C. Leon, S. G. E. te Velthuis, A. Hoffmann, M. R. Fitzsimmons, F. Simon, T. Feher, M. Garcia-Hernandez, J. Santamaria.
Physical Review B **81**, 094512 (2010).

LIST OF INTERNATIONAL PUBLICATIONS (UNDER REVIEW)

1. Thermal biasing at nanoscale.
A. O. Denisov, E. S. Tikhonov, S. U. Piatrusha, F. Rossella, M. Rocci, L. Sorba, S. Roddaro, and V. S. Khrapai.
Submitted to *Physical Review Applied* (2019).

INTERNATIONAL CONFERENCES (INCLUDING INVITED PRESENTATIONS)

1. High Field Superconductivity and Magnetic Moment Enhancement in Proximity Exchange Coupled GdN/NbN Nano-bridges.
APS - March Meeting. Denver, Colorado (U.S.A.) - March (2020). (*Oral presentation*).

2. [INVITATO] Dalle Aule del D'Aosta ai Laboratori del MIT.
Istituto d'Istruzione Superiore "Amedeo D'Aosta" – L'Aquila (Italy) – May (2019) (2 hours Seminar).
Invited by: Prof. Maria Chiara Marola.

3. Enhanced Superconductivity and Infinite Electro-Resistance in Proximity Exchange Coupled Superconductor Nano-bridges by Electric Field – Towards First Generation of Triplet Paired Superconductor FETs.
APS - March Meeting. Boston, Massachusetts (U.S.A.) - March (2019). (*Oral presentation*).

4. [INVITED] Proximity and interfacial effects in nanostructured hybrid heterojunctions.
Francis Bitter Magnet Laboratory & Plasma Science and Fusion Center, **Massachusetts Institute of Technology, Cambridge (US) –** September (2017). (*Oral presentation*).
Invited by: Dr. Jagadeesh Moodera.

5. Tunable Esaki effect in broken-gap core-shell nanowires.
Nanowire Week 2017. Lund (Sweden) **–** May-June (2017).

6. Memristive behavior in tunnel junctions with graphene oxide barrier.
APS - March Meeting. San Antonio, Texas (U.S.A.) - March (2015). (*Oral presentation*).

7. [INVITED] Complex oxide nanostructures for functional applications.
Raith User Meeting – RUM2014. Zaragoza (Spain), October (2014). (*Oral presentation*).

8. Manganite magnetic tunnel junctions with graphene oxide barriers.
XXX Trobades Cientifíque de la Meditarrania Josep Miquel Vidal "Graphene and Related Materials. Production, Characterization and Applications". Menorca (Spain), October (2014). (*Oral presentation*).

9. **Hysteretic Transport in Manganite/Graphene Hybrid Planar Nanostructures.**
Workshop PICATA 2013. Madrid (Spain), February (2013). (*Oral presentation*).

10. **Hysteretic Transport in Oxide/Graphene Hybrid Planar Nanostructures.**
NANOLITO 2012. San Sebastián (Spain), November (2012). (*Oral presentation*).

11. **Tunable Esaki effect in broken-gap core-shell nanowires**
CMD26. Groningen, (The Netherlands) – September 2016. (*Poster contribution*).

12. **Proximity driven commensurate pinning in $YBa_2Cu_3O_7$ through all-oxide magnetic nanostructures.**
GEFES 2016. Cuenca, (Spain) – January 2016. (*Poster contribution*).

13. **Hysteretic Transport in Manganite/Graphene Hybrid Planar Nanostructures.**
ISOE2013. Cargèse, Corsica (France) – September (2013). (*Poster contribution*).

14. **Hysteretic Transport in Manganite/Graphene Hybrid Planar Nanostructures.**
IMAGINENANO - GRAPHENE 2013. Bilbao (Spain) – April (2013). (*Poster contribution*).

INTERNATIONAL SCHOOLS & WORKSHOPS

1. **Workshop: Quantum Computing and High Performance Computing.** CINECA, Bologna (Italy) – December 2018.

2. **Symposium. LAUNCH.nano: MIT.nano.**
Massachusetts Institute of Technology, Cambridge (US) **–** October (2018).

3. **Workshop: High Structural and Spatial Resolution using Raman Confocal and Scanning Probe Microscopy.** Cantoblanco, Madrid (Spain) – November (2013).

4. **International School of Oxide Electronics (ISOE 2013).** Cargèse, Corsica (France) – September (2013).

5. **Workshop GRAPHēNe: A mobilizing action in an emerging field.** ICMM – CSIC Cantoblanco, Madrid (Spain) – April (2013).

6. **II Workshop on the Physics of Complex Oxides.** Alcudia, Mallorca/Majorca (Spain) – October (2012).

7. **Workshop GRAPHēNe: A mobilizing action in an emerging field.** IMDEA, E.T.S. de Ingenieros de Caminos – Madrid (Spain) – September (2011).

8. **European School on Multiferroics (ESMF2010).** Univesità degli Studi dell'Aquila – L'Aquila (Italy) – September (2010).

SUPERVISION OF STUDENTS

07/2018 – 08/2018 2 High School Students (M. Cua, G. Narayanan).
Massachusetts Institute of Technology, Cambridge (USA)

06/2015 – 07/2017 2 Master Students (J. Mastomaki, O. Durante).
NEST – Scuola Normale Superiore, Pisa (Italy).

10/2009 – 07/2013 2 Master Students (T. Cebriano-Ramirez, D. Sueiro).
Physics of Complex Materials Group, Universidad Complutense de Madrid (Spain).

MEMBERSHIPS OF SCIENTIFIC SOCIETIES & NETWORKS

From 2016	ArXiv (*http://arxiv.org*).
From 2012	ResearchGate (*http://www.researchgate.net*).
From 2009	LinkedIn (*https://www.linkedin.com*).
From 2014	American Physical Society (APS).
2009-2011	Italian Physical Society (SIF).