

CURRICULUM VITAE

Dr. Mirko Rocci

October 2018

PERSONAL INFORMATION

Gender: Male
Nationality: Italian
Address:
Institutional e-mail addresses:
Personal e-mail address:
ORCID:

CURRENT AND FUTURE POSITIONS

- 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
- 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

FIELDS OF INTEREST

Nanoscience & Nanotechnology.

Superconducting Spintronics, Quantum Transport, 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

- 06/2015 – 10/2017 *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 Físicas - 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 Físicas - Universidad Complutense de Madrid (Spain).

TEACHING EXPERIENCE

- Spring, 2014 **Graduate Teaching Assistant**, at Facultad de Ciencias Físicas - 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 Físicas - 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 Físicas - 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]. **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)
- [P2]. **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)
- [P3]. **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)
- [P4]. **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)
- [P5]. **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).
- [P6]. **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).
- [P7]. **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).

- [P8]. **Proximity Driven Commensurate Pinning in $\text{YBa}_2\text{Cu}_3\text{O}_7$ 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).
- [P9]. **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).
- [P10]. **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).
- [P11]. **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).
- [P12]. **Symmetrical interfacial reconstruction and magnetism in $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3 / \text{YBa}_2\text{Cu}_3\text{O}_7 / \text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ 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).
- [P13]. **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)

- 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
Submitted to Journal of Materials Engineering and Performance (2018).
- 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.
Submitted to Nano Letters (2018).

INTERNATIONAL CONFERENCES (INCLUDING INVITED PRESENTATIONS)

1. **[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.
2. **Tunable Esaki effect in broken-gap core-shell nanowires.**
Nanowire Week 2017. Lund (Sweden) – May-June (2017).
3. **Memristive behavior in tunnel junctions with graphene oxide barrier.**
APS - March Meeting. San Antonio, Texas (U.S.A.) - March (2015). (*Oral presentation*).
4. **[INVITED] Complex oxide nanostructures for functional applications.**
Raith User Meeting – RUM2014. Zaragoza (Spain), October (2014). (*Oral presentation*).
5. **Manganite magnetic tunnel junctions with graphene oxide barriers.**
XXX Trobades Científiques de la Mediterrània Josep Miquel Vidal “Graphene and Related Materials. Production, Characterization and Applications”. Menorca (Spain), October (2014). (*Oral presentation*).
6. **Hysteretic Transport in Manganite/Graphene Hybrid Planar Nanostructures.**
Workshop PICATA 2013. Madrid (Spain), February (2013). (*Oral presentation*).
7. **Hysteretic Transport in Oxide/Graphene Hybrid Planar Nanostructures.**
NANOLITO 2012. San Sebastián (Spain), November (2012). (*Oral presentation*).
8. **Tunable Esaki effect in broken-gap core-shell nanowires**
CMD26. Groningen, (The Netherlands) – September 2016. (*Poster contribution*).
9. **Proximity driven commensurate pinning in $\text{YBa}_2\text{Cu}_3\text{O}_7$ through all-oxide magnetic nanostructures.**
GEFES 2016. Cuenca, (Spain) – January 2016. (*Poster contribution*).
10. **Hysteretic Transport in Manganite/Graphene Hybrid Planar Nanostructures.**
ISOE2013. Cargèse, Corsica (France) – September (2013). (*Poster contribution*).
11. **Hysteretic Transport in Manganite/Graphene Hybrid Planar Nanostructures.**
IMAGINENANO - GRAPHENE 2013. Bilbao (Spain) – April (2013). (*Poster contribution*).

INTERNATIONAL SCHOOLS & WORKSHOPS

1. **Workshop: High Structural and Spatial Resolution using Raman Confocal and Scanning Probe Microscopy.** Cantoblanco, Madrid (Spain) – November (2013).
2. **International School of Oxide Electronics (ISOE 2013).** Cargèse, Corsica (France) – September (2013).
3. **Workshop GRAPHENE: A mobilizing action in an emerging field.** ICMN – CSIC Cantoblanco, Madrid (Spain) – April (2013).
4. **II Workshop on the Physics of Complex Oxides.** Alcudia, Mallorca/Majorca (Spain) – October (2012).

5. **Workshop GRAPHēNe: A mobilizing action in an emerging field.** IMDEA, E.T.S. de Ingenieros de Caminos – Madrid (Spain) – September (2011).
6. **European School on Multiferroics (ESMF2010).** Univesità degli Studi dell'Aquila – L'Aquila (Italy) – September (2010).

SUPERVISION OF GRADUATE STUDENTS

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|-------------------|---|
| 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

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