

ALEX BOSCHI



Age: 32
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Research Positions

Jul 22 – Dec 25

Post-doc Research Fellow

Center for Nanotechnology Innovation - IIT (CNI-IIT), Pisa, Italy

Group PI: Dott. C. Coletti

Activities:

- Assembly of 2D material hetero-stacks and their characterization;
- Microfabrication of optoelectronic devices for telecom applications: scalable graphene-based photodetectors and frequency mixers operating at sub-THz frequencies and integrated on photonic platforms;
- Low-temperature magneto-transport studies of novel twisted multi-layer graphene systems.

Apr 21 – Apr 22

Post-doc Research Fellow

Institute of Organic Synthesis and Photoreactivity (CNR-ISOF), Bologna, Italy

Group PI: Dott. V. Palermo – Supervisor: Dott. A. Candini

Activities:

- Optical and spectroscopic investigation of pseudorotaxanes complexation in solid states;
- Electrical measurements at the nanoscale of different organic compounds and nanofibers by scanning probe techniques;
- Integration of photochromic molecules in liquid-gated field effect transistors and their electrical characterization.

Dec 17 – Mar 21

Doctoral Research Fellow

Institute of Organic Synthesis and Photoreactivity (CNR-ISOF), Bologna, Italy

Group PI/ Supervisor: Dott. V. Palermo

Activities:

- Charge transport studies in 2D material-based thin films: electrical measurements as a function of temperature and of magnetic field;
- Thin films fabrication by different solution-based deposition techniques (“drop-casting”, “spin-coating”, “filtration”, “blade-coating”)
- X-ray Photoelectron Spectroscopy (XPS) measurements of graphene-based materials and of materials for electronics;
- Atomic Force Microscopy (AFM) characterization of different nanostructured materials;
- Electrical characterization of graphite nanoplatelets-filled polymer composites;

Mar 17 – Sept 17 *Research Intern*

Laboratoire d'Innovation en Chimie des Surfaces et Nanosciences (LICSEN), CEA-Saclay, France

Group PI: Dott. V. Derycke – Supervisor: Prof. A. Filoramo

Activities:

- Full fabrication of field-effect transistors based on a carbon-nanotube network;
- Electrical and optoelectronic (*i.e.* electroluminescence and photocurrent measurements) characterization of aforementioned devices;
- Optoelectronic characterization of aforementioned devices coupled with silicon-on-insulator waveguides.

Education

Nov 17 – Apr 21 *PhD in Physics and Nanosciences*

University of Modena and Reggio Emilia, Italy

Thesis: *“Investigation of charge transport in graphene-related materials (GRMs) thin films.”*

Sept 16 – Sept 17 *Master 2 in Nanosciences (*)*

Université Paris-Saclay, France

Finale grade: 15.69 /20

Studied topics: Molecular Electronics, Nano- and Micro-fabrication, Scanning Probe Microscopy and Spectroscopy, Nanophotonics, Thin Film Photovoltaics.

(*) *Double-degree program*

Oct 15 – Sept 17 *Master's Degree in Physics*

University of Ferrara, Italy

Thesis: *“Electroluminescence and photoconductivity studies in carbon nanotube-based devices.”*

Finale grade: 110 /110 with honors

Studied topics: Solid State Physics, Surface Physics, Electron Microscopy, Silicon Micro-electronics, Magnetic Materials Properties

Sept 12 – Sept 15 *Bachelor of Science in Physics*

University of Bologna, Italy

Finale grade: 110 /110

Studied topics: Classical Physics, Basic and Advanced Calculus, Data Acquisition and Coding, Electronics, Quantum Mechanics

Sept 08 – Jul 12 *High-School Diploma in Applied Mechanics*

I.T.I “Belluzzi-Fioravanti”, Bologna, Italy

Finale grade: 100 /100

Studied topics: Applied Mechanics of Solids and Fluids, Technology of Materials, Technical Design and CAD drawing

Published Works

- *“Built-in Bernal gap in large-angle-twisted monolayer-bilayer graphene”*;
A. Boschi, Z. M. Gebeyehu, S. Slizovskiy, V. Mišeikis, S. Forti, A. Rossi, K. Watanabe, T. Taniguchi, F. Beltram, V. I. Fal’ko, C. Coletti, S. Pezzini;
Commun. Phys. **7**, 391 (2024), [www.doi.org/10.1038/s42005-024-01887-0](https://doi.org/10.1038/s42005-024-01887-0)
- *“Decoupled High-Mobility Graphene on Cu (111)/Sapphire via Chemical Vapor Deposition”*;
Z. M. Gebeyehu, V. Mišeikis, S. Forti, A. Rossi, N. Mishra, A. Boschi, Y. P. Ivanov, L. Martini, M. W. Ochapski, G. Piccinini, K. Watanabe, T. Taniguchi, G. Divitini, F. Beltram, S. Pezzini, C. Coletti;
Adv. Mat. **36**, 44, 2404590 (2023), [www.doi.org/10.1002/adma.202404590](https://doi.org/10.1002/adma.202404590)
- *“Insight on the Intracellular Supramolecular Assembly of DTTO: A Peculiar Example of Cell-Driven Polymorphism”*;
L. Aloisio, M. Moschetta, A. Boschi, A. García Fleitas, M. Zangoli, I. Venturino, V. Vurro, A. Magni, R. Mazzaro, V. Morandi, A. Candini, C. D'Andrea, G. M. Paternò, M. Gazzano, G. Lanzani, F. Di Maria;
Adv. Mat. **35**, 42, 2302756 (2023), [www.doi.org/10.1002/adma.202302756](https://doi.org/10.1002/adma.202302756)

- *“Mesoscopic 3D charge transport in solution-processed graphene-based thin films: a multiscale analysis.”;*
A. Boschi, A. Kovtun, F. Liscio, Z. Xia, K.H. Kim, S. Lara Avila, S. De Simone, V. Mussi, C. Barone, S. Pagano, M. Gobbi, P. Samorì, M. Affronte, A. Candini, V. Palermo, A. Liscio;
Small, 2303238 (2023), www.doi.org/10.1002/sml.202303238
- *“Graphene oxide nanosheets for drinking water purification by tandem adsorption and microfiltration”;*
 S. Khaliha, A. Bianchi, A. Kovtun, F. Tunioli, A. Boschi, M. Zambianchi, D. Paci, L. Bocchi, S. Valsecchi, S. Polesello, A. Liscio, M. Bergamini, M. Brunetti, M. L. Navacchia, V. Palermo, M. Melucci;
Sep. and Pur. Tech. **300**, 121826 (2022), www.doi.org/10.1016/j.seppur.2022.121826
- *“Multimodal sensing in rewritable, data matrix azobenzene-based devices”;*
A. Boschi, S. Cinili, G. Ruani, E. Bystrenova, J. Groppi, A. Credi, M. Baroncini, A. Candini, D. Gentili, M. Cavallini;
J. Mater. Chem. C **10**, 10132 (2022), www.doi.org/10.1039/D2TC01565J
- *“Push-pull thiophene-based small molecules with donor and acceptor units of varying strength for photovoltaic application: beyond P3HT and PCBM”;*
 M. Marinelli, A. Candini, F. Monti, A. Boschi, M. Zangoli, E. Salattelli, F. Pierini, M. Lanzi, A. Zanelli, M. Gazzano, F. Di Maria;
J. Mater. Chem. C **9**, 11216 (2021), www.doi.org/10.1039/D1TC02641K
- *“Ultrafast charge carrier dynamics in Vanadium-modified TiO₂ thin films and its relation to their photoelectrocatalytic efficiency for water splitting”;*
 A. Piccioni, D. Catone, A. Paladini, P. O’Keeffe, A. Boschi, A. Kovtun, M. Katsikini, F. Boscherini, and L. Pasquini;
J. Phys. Chem. C **124**, 49, 26572 (2020), www.doi.org/10.1021/acs.jpcc.0c06790
- *“Benchmarking of graphene-based materials: real commercial products versus ideal graphene”;*
 A. Kovtun, E. Treossi, N. Mirotta, A. Scidà, A. Liscio, M. Christian, F. Valorosi, A. Boschi, R. J. Young, C. Galiotis, I. A. Kinloch, V. Morandi, and V. Palermo;
2D Mater. **6**, 025006 (2019), www.doi.org/10.1088/2053-1583/aafc6e

Submitted/ pre-print, not peer-reviewed

- *"Phason-driven temperature-dependent transport in moiré graphene";*
A. Boschi, A. Ramos-Alonso, V. Mišeikis, K. Watanabe, T. Taniguchi, F. Beltram, S. Forti, A. Rossi, C. Coletti, R. M. Fernandes, H. Ochoa, S. Pezzini;
www.doi.org/10.48550/arXiv.2511.01691

Oral Contributions in Conferences

- *"Intrinsic Bernal gap in large-angle-twisted monolayer-bilayer graphene grown by CVD"*
Conference: "Graphene Week 2025"; Sept 25 – Vicenza, Italy
- *"Charge transport mechanisms in GRM thin films: interplay between different length scales"*
Conference: "Chem2Dmat"; Sept 21 – online
- *"Low temperature resistivity behaviour in GRM films: role of the vertical stacking order"*
Conference: "FisMat 2019"; Oct 19 – Catania, Italy
- *"Benchmarking of Graphene-based materials: new standards for industry"*
Conference: "Graphene Week 2019"; Sept 19 - Helsinki, Finland

Poster Contributions in Conferences

- *"Observation of an intrinsic Bernal gap in large-angle-twisted monolayer-bilayer graphene grown by CVD"*
Conference: "EMRS Spring Meeting 2025"; May 25 – Strasbourg, France
- *"Photobolometer based on high mobility graphene hetero-stacks as enabling technology for sub-THz wireless links"*
Conference: "Graphene 2024"; Jun 24 – Madrid, Spain
- *"Optoelectronic, frequency mixer based on graphene hetero-stacks as enabling technology for sub-THz wireless links"*
Summer school: "2D Quantum Matter"; Jul 23 – Lucca, Italy
- *"Preparation of graphene-based films with tuned structural and electrical properties"*
Conference: "Materials.it 2018"; Oct 18 – Bologna, Italy

Training/ Supervision

- Several users training in ISO6 cleanroom access and micro-fabrication equipment use (such as magnetron-sputterer, RIE, thermal evaporator, spin-coater, optical microscope); Mar 24 – Dec 25
- PhD student training in different deposition techniques and in measuring with scanning probe instruments; July 20 – Sept 21
- Graduate Fellow training in the use of an industrial laser for composite materials processing; Apr 21 – Jun 21

Academic teaching

- Classical Physics Tutorials module (15h+40h) for Mechanical Engineering Degree Program, at University of Modena and of Reggio Emilia; Sept 21-Jan 22 (a.y. 21/22)
- Tutoring (40h) of Classical Physics Laboratory classes for Physics Degree Program, at University of Modena and of Reggio Emilia; Feb 19 – May 19 (a.y. 18/19)