

# Andrea Capasso

## Institution

International Iberian Nanotechnology Laboratory

2D Materials and Devices

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## Curriculum Vitae

### ACADEMIC DEGREES

- 20 March 2012: **PhD** in Materials Science  
*Queensland University of Technology – Brisbane, Australia*  
Faculty of Built Environment and Engineering – School of Engineering Systems  
Concentrations: nanotechnology, materials science, physics, photovoltaics  
Thesis: “**Controlled growth of carbon nanotubes for electronic applications**”
- 30 May 2007: “**Laurea**” in Electronic Engineering (five-year coursework)  
*University of Roma Tre – Rome, Italy*  
Faculty of Engineering

### SCIENTIFIC AND ACADEMIC POSITIONS

- June 2025 – present: **Co-Lead, Working Group 4 (Electronics)**  
*Innovative Advanced Materials Initiative (IAM-I)*  
Co-Leader for Research
- June 2025 – present: **Head of Laboratory “2D Crystal Fab”**  
*International Iberian Nanotechnology Laboratory – Braga, Portugal*  
Lab coordinator
- Oct 2024 – present: **Lecturer**  
*University of Minho*  
Guest lecturer in the MSc course “Nanodevices and Nanoelectronics”
- July 2024 – present: **Tenured Research Scientist – Principal Investigator**  
*International Iberian Nanotechnology Laboratory – Braga, Portugal*  
Principal Investigator
- Nov. 2020 – July 2024: **Staff Researcher**  
*International Iberian Nanotechnology Laboratory – Braga, Portugal*  
Principal Investigator “GEMIS” Project
- Nov. 2018 – Nov. 2020: **Marie Curie Research Fellow**  
*International Iberian Nanotechnology Laboratory – Braga, Portugal*  
2D Materials and Devices
- March 2018 – Nov. 2018: **Research Scientist**  
*Yonsei University – Seoul, Korea*  
Department of Materials Science and Engineering
- Oct. 2014 – Dec 2017: **Researcher**  
*Italian Institute of Technology – Genoa, Italy*  
Graphene Labs
- May 2013 – Dec. 2014: **Research Fellow**  
*ENEA Casaccia Research Centre – Rome, Italy*  
Department of Materials and New Technologies
- Oct. 2012 – Oct. 2016: **Visiting Researcher**  
*Queensland University of Technology – Brisbane, Australia*  
Science and Engineering Faculty

- July 2011 – Oct. 2012: **Postdoctoral Research Fellow**  
*Queensland University of Technology – Brisbane, Australia*  
Science and Engineering Faculty
- Mar. 2010 – July 2011: **Research Assistant**  
*Queensland University of Technology – Brisbane, Australia*  
Faculty of Built Environment and Engineering
- Feb. 2010 – March 2011: **Sessional Academic**  
*Queensland University of Technology – Brisbane, Australia*  
Faculty of Built Environment and Engineering – School of Engineering Systems

## SUMMARY OF SCIENTIFIC PRODUCTION

70 journal articles, 8 conference proceedings, 2 book chapters: 2723 citations, 28 *h*-index. (31 journal publications as lead/corresponding author. Source: Google Scholar 16 February 2024). Full list available at <https://scholar.google.it/citations?user=lSos5ssAAAAJ&hl=it&oi=ao>

47 presentations at international conferences.

### Journal Articles (selection – underlined if main/corresponding author):

- G. Moreira, B. Silva, T. Abreu, S.S. Nemala, P. Alpuim, C. Rodrigues, S. Abalde-Cela, M. Xavier, F. De Boni, M. Prato, A. Capasso, “Substrate-dependent fluorination of graphene for advanced biointerfaces”. ACS Applied Materials and Interfaces (in revision).
- S.S. Nemala, B. Bernardino, R.M.R. Pinto, V. Lopes, P. Alpuim, I. Çaha, E. Sotgiu, M.A. Gómez-Fatou, J.F. Vega, H.J. Salavagione, A. Capasso, “Electrically conductive nanocarbon/elastomer composite inks for flexible and wearable strain sensing”. Small (accepted).
- D. Biswabhusan, S.N. Paltasingh, C. Naman, S.S. Nemala, R. Aparna, S. Kaushik, A. Capasso, S. Kumar Nayak, L.H. Yeh, G. Kalon, “Interaction Driven Giant Electrostatic Modulation of Ion Permeation in Atomically Small Capillaries”, Nature Communications (accepted) <https://doi.org/10.21203/rs.3.rs-4376877/v1>.
- G. Araújo, V.C.A. Ficca, V. Lopes, E. Placidi, A. Capasso, “Interface Engineering of Chemical Vapor-Deposited 2D MoSe<sub>2</sub>”, physica status solidi RRL, (2025) 2500124.
- V. Lopes, T. Abreu, M. Abrantes, S.S. Nemala, F. De Boni, M. Prato, P. Alpuim, A. Capasso, “Graphene-based glucose sensors with an attomolar limit of detection”. J. Am. Chem. Soc. 147 (2025) 13059–13070.
- S. Kaushik, L. Saini, S.S. Nemala, A. Capasso, L.H. Yeh, G. Kalon, “Can structure influence hydrovoltaic energy generation? Insights from metallic 1T' and semiconducting 2H phases of MoS<sub>2</sub>”. Nanoscale 17 (2025), 3451-3459
- R. Banavath, S.S. Nemala, R. Srivastava, A. Capasso, P. Bhargava, “Hybrid Graphene Nanoflakes for Simultaneous Multianalyte Detection via Electrochemical Sensing”. Diamond and related materials 149 (2024), 111511.
- S.S. Nemala, J. Fernandes, G. Araujo, F. Cerqueira, E. Placidi, S. Marras, P. Alpuim, A.R. Ribeiro, F. Lebre, A. Capasso, “Eco-Friendly Production of 2D Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene and Cytotoxicity Mitigation Toward Biomedical Applications”. Adv. Mater. Interfaces (2024), 2400203.
- S.S. Nemala, J. Fernandes, J. Rodrigues, V. Lopes, R.M.R. Pinto, K.B. Vinayakumar, E. Placidi, G. De Bellis, P. Alpuim, R.S. Sampaio, M.F. Montemor, A. Capasso, “Sustainable graphene production for solution-processed micro-supercapacitors and multipurpose flexible electronics”. Nano Energy 127 (2024) 109781.
- G. Faggio, G.G. Politano, N. Lisi, A. Capasso, G. Messina, “The structure of chemical vapor deposited graphene substrates for graphene-enhanced Raman spectroscopy”. Journal of Physics: Condensed Matter 36 (2024), 195303.
- V. Lopes, G. Moreira, M. Bramini, A. Capasso, “The potential of graphene coatings as neural interfaces”. Nanoscale Horizons 9 (2024), 384-406.
- J. Fernandes, J. Grzonka, G. Araújo, A. Schulman, V. Silva, J. Rodrigues, J. Santos, O. Bondarchuk, P. Ferreira, P. Alpuim, A. Capasso, “Bipolar Resistive Switching in 2D MoSe<sub>2</sub> Grown by Atmospheric Pressure Chemical Vapor Deposition”. ACS Applied Materials and Interfaces 16 (2023), 1767.

- M.J. Kim, G. Moreira, N. Lisi, N. Kim, W. Shim., G.H. Lee, **A. Capasso**, “Solvent-free transfer of monolayer graphene with recrystallized cyclododecane”. *Applied Physics Letters* 123 (2023), 211602.
- E. Napolitani, M. Perego, **A. Capasso**, J. McCallum, “Doping at the Nanoscale: New Challenges and Advanced Applications”, *Materials Science in Semiconductor Processing* 167 (2023), 107755.
- R.M. Pinto, S.S. Nemala, M. Faraji, J. Fernandes, C. Ponte, G. De Bellis, A. Retolaza, K.B. Vinayakumar, **A. Capasso**, “Material jetting of carbon nano onions for printed electronics”. *Nanotechnology* 34 (2023), 365710.
- S.S. Nemala, J. Fernandes, M.B. Santos, B. Espiña, P. Alpuim, A.G. Díez, S. Lanceros-Mendez, L. Saini, S. Kaushik, G. Kalon, **A. Capasso**, “Stable graphene membranes for selective ion transport and emerging contaminants removal in water”. *Advanced Functional Materials* (2023), 2214889.
- B. Ricciardi, B. Mecheri, W. Silva Freitas, V.C.A. Ficca, E. Placidi, I. Gatto, A. Carbone, **A. Capasso**, Alessandra D’Epifanio, “Porous Iron-Nitrogen-Carbon electrocatalysts for Anion Exchange Membrane Fuel Cells”. *ChemElectroChem* 10 (2023), e202201115.
- M. Dieng, S.S. Nemala, P. Ni, I. Florea, P. Alpuim, **A. Capasso**, A. Yassar, F.Z. Bouanis, “Solution-Processed Functionalized Graphene Film Prepared by Vacuum Filtration for Flexible NO<sub>2</sub> Sensors”. *Sensors* 23 (2023), 1831.
- C.D. Liao, **A. Capasso**, T. Queirós, T. Domingues, F. Cerqueira, N. Nicoara, J. Borme, P. Freitas, P. Alpuim, “Optimizing PMMA solutions to suppress contamination in the transfer of CVD graphene for batch production”, *Beilstein J. Nanotechnol.* 13 (2022), 796-806.
- G. Faggio, R. Grillo, N. Lisi, F. Buonocore, R. Chierchia, M.J. Kim, G.H. Lee, **A. Capasso**, G. Messina, “Nanocrystalline graphene for ultrasensitive surface-enhanced Raman spectroscopy”, *Applied Surface Science* 599 (2022), 154035.
- J. Fernandes, J. Grzonka, J. Rodrigues, J. Santos, O. Bondarchuk, P. Ferreira, P. Alpuim, **A. Capasso**, “Understanding 2D MoSe<sub>2</sub> grown by CVD”, preprint DOI: 10.21203/rs.3.rs-1646934/v1.
- J. Rodrigues, J. Grzonka, J. Fernandes, J. Santos, O. Bondarchuk, P. Ferreira, P. Alpuim, **A. Capasso**, “Strain-modulated optical response in 2D MoSe<sub>2</sub> made by Na-assisted CVD on glass”. *Applied Physics Letters* 120 (2022), 213104.
- J. Fernandes, T. Queirós, J. Rodrigues, S.S. Nemala, A.P. LaGrow, E. Placidi, P. Alpuim, J.B. Nieder, **A. Capasso**, “Room-temperature emitters in wafer-scale few-layer hBN by atmospheric pressure CVD”. *FlatChem* 33 (2022), 100366.
- J. Fernandes, S.S. Nemala, G. De Bellis, **A. Capasso**, “Green Solvents for the Liquid Phase Exfoliation Production of Graphene: The Promising Case of Cyrene”. *Frontiers in Chemistry*, (2022), 10.
- F. Buonocore, **A. Capasso**, M. Celino, N. Lisi, O. Pulci, “Tuning the Electronic Properties of Graphane via Hydroxylation: An Ab Initio Study”. *J. Phys. Chem. C* 125, (2021), 16316-16323.
- B. Silva, J. Rodrigues, B. Sompalle, C.D. Liao, N. Nicoara, J. Borme, F. Cerqueira, M. Claro, S. Sadewasser, P. Alpuim, **A. Capasso**, “Efficient ReSe<sub>2</sub> Photodetectors with CVD Single-Crystal Graphene Contacts”. *Nanomaterials* 11, (2021), 1650.
- S. Tkachev, M. Monteiro, J. Santos, E. Placidi, M. Hassine, P. Marques, P. Ferreira, P. Alpuim, **A. Capasso**, “Environmentally-friendly graphene inks for touch screen sensors”. *Adv. Funct. Mater.* 31 (2021), 2103287.
- J. Santos, M. Moschetta, J. Rodrigues, P. Alpuim, **A. Capasso**, “Interactions between 2D materials and living matter: A review on graphene and hexagonal boron nitride coatings”. *Frontiers in Bioengineering and Biotechnology* 9 (2021).
- M. Moschetta, J.Y. Lee, J. Rodrigues, A. Podestà, O. Varvichio, J. Son, Y. Lee, K. Kim, G.H. Lee, F. Benfenati, M. Bramini, **A. Capasso**, “Hydrogenated Graphene Improves Neuronal Network Maturation and Excitatory Transmission”. *Advanced Biology* 5 (2021), 2000177.
- **A. Capasso**, J. Rodrigues, M. Moschetta, F. Buonocore, G. Faggio, G. Messina, M.J. Kim, J. Kwon, E. Placidi, F. Benfenati, M. Bramini, G.H. Lee, N. Lisi, “Interactions between Primary Neurons and Graphene Films with Different Structure and Electrical Conductivity”. *Adv. Funct. Mater.* (2020), 2005300.

- **A. Capasso**, F. Muñoz-Rojas, B. Gupta, N. Motta, E. Placidi, “*Double grain boundary configurations on graphite surfaces*”. Carbon 170 (2020), 630-635.
- H. Lee, J.H. Kim, M. Kim, J.Y. Lee, E. Ji, **A. Capasso**, H. Choi, G.H. Lee, “*Highly flexible graphene-polydimethylsiloxane strain sensors with proximity-sensing capability*”. Materials Research Express 7 (2020), 045603.
- G. Faggio, G. Messina, C. Lofaro, N. Lisi, **A. Capasso**, “*Recent Advancements on the CVD of Graphene on Copper from Ethanol Vapor*”. C - Journal of Carbon Research 6 (2020), 14.
- M.I. Ortiz-Torres, M. Fernández-Niño, J.C. Cruz, **A. Capasso**, F. Matteocci, E.J. Patiño, Y. Hernández, A.F. González Barrios, “*Rational Design of Photo-Electrochemical Hybrid Devices Based on Graphene and Chlamydomonas reinhardtii Light-Harvesting Proteins*”. Scientific Reports 10 (2020), 1-11.
- S. Kang, D. Lee, J.H. Kim, **A. Capasso**, H.S. Kang, C. Lee, G.H. Lee. “*Two-dimensional Materials for Electronic and Optoelectronic Applications: Potential and Challenge*”, 2D Materials 7 (2020), 022003.
- M. Kim, J.H. Jeong, J.Y. Lee, **A. Capasso**, F. Bonaccorso, S.H. Kang, Y.K. Lee, G.H. Lee. “*Highly Conducting and Mechanically Strong Graphene-PLA Composites for 3D Printing*”. ACS Applied Materials and Interfaces 11 (2019), 11841-11848.
- **A. Capasso**, S. Bellani, A.L. Palma, L. Najafi, A.E. Del Rio, N. Curreli, L. Cinà, V. Miseikis, C. Coletti, G. Calogero, V. Pellegrini, A. Di Carlo, F. Bonaccorso, “*CVD-graphene/graphene flakes dual-films as advanced semi-transparent counter electrodes in DSSCs*”, 2D Materials 6 (2019), 035007.
- G. Faggio, A. Gnisci, G. Messina, N. Lisi, **A. Capasso**, G.H. Lee, A. Armano, A. Sciortino, F. Messina, M. Cannas, F.M. Gelardi, E. Schilirò, F. Giannazzo, S. Agnello, “*Carbon Dots Dispersed on Graphene/SiO<sub>2</sub>/Si: a Morphological Study*”. Phys. Status Solidi A (2019), 1800559.
- A. Gnisci, G. Faggio, L. Lancellotti, G. Messina, R. Carotenuto, E. Bobeico, P. Delli Veneri, **A. Capasso**, T. Dikonimos, N. Lisi, “*Role of Graphene-Based Derivative as Interfacial Layer in Graphene/n-Si Schottky Barrier Solar Cells*”. Phys. Status Solidi A (2018), 1800555.
- A. Gnisci, G. Faggio, G. Messina, J. Kwon, J.Y. Lee, G.H. Lee, T. Dikonimos, N. Lisi, **A. Capasso**, “*Ethanol-CVD Growth of Sub-mm Single-Crystal Graphene on Flat Cu Surfaces*”. J. Phys. Chem. C 122 (2018), 28830-28838.
- A. Gnisci, G. Faggio, G. Messina, L. Lancellotti, E. Bobeico, P. Delli Veneri, **A. Capasso**, T. Dikonimos, N. Lisi, “*Graphene-Based Derivative as Interfacial Layer in Graphene/n-Si Schottky Barrier Solar Cells*”. Advances in Modelling and Analysis A 55 (2018), 144-150.
- S. Belviso, **A. Capasso**, E. Santoro, L. Najafi, F. Lelj, S. Superchi, D. Casarini, C. Villani, D. Spirito, S. Bellani, A.E. Del Rio, F. Bonaccorso, “*Thioethyl-porphyrazine/Nanocarbon Hybrids for Photoinduced Electron Transfer*”. Adv. Funct. Mater. 28 (2018), 1705418.
- A.E. Del Rio Castillo, V. Pellegrini, H. Sun, J. Buha, D.A. Dinh, E. Lago, A. Ansaldo, **A. Capasso**, L. Manna, F. Bonaccorso, “*Exfoliation of Few-Layer Black Phosphorus in Low Boiling Point Solvents and its Application in Li-ion Batteries*”. Chem. Mat. 30 (2018), 506-516.
- F. Buonocore, **A. Capasso**, N. Lisi, “*An ab initio study of hydroxylated graphene*”. J. Chem. Phys. 147 (2017) 104705.
- N. Lisi, T. Dikonimos, F. Buonocore, M. Pittori, R. Mazzaro, R. Rizzoli, S. Marras, **A. Capasso**. “*Contamination-free graphene by chemical vapor deposition in quartz furnaces*”. Sci. Rep., 7 (2017) 9927.
- S. Bellani, L. Najafi, **A. Capasso**, A.E. Del Rio Castillo, M.R. Antognazza, F. Bonaccorso, “*Few-layer MoS<sub>2</sub> flakes as hole-selective layer for solution-processed hybrid organic hydrogen-evolving photocathodes*”. J. Mater. Chem. A 5 (2017), 4384-4396.
- **A. Capasso**, L. Salamandra, G. Faggio, T. Dikonimos, F. Buonocore, V. Morandi, L. Ortolani, N. Lisi. “*Chemical vapor deposited graphene-based derivative as high-performance hole selecting material for organic photovoltaics*”. ACS Appl. Mater. Interfaces 8 (2016), 23844-23853.
- **A. Capasso**, F. Matteocci, L. Najafi, M. Prato, J. Buha, L. Cinà, V. Pellegrini, A. Di Carlo, F. Bonaccorso, “*Few-layer MoS<sub>2</sub> flakes as active buffer layer for stable perovskite solar cells*”. Adv. Energy Mater. 6 (2016), 1600920.

- H. Sun, A.E. Del Rio Castillo, S. Monaco, **A. Capasso**, A. Ansaldo, M. Prato, D.A. Dinh, V. Pellegrini, B. Scrosati, L. Manna, F. Bonaccorso. “*Binder-free graphene as advanced anode for lithium batteries*”. J. Mater. Chem. A 4 (2016), 6886-6895.
- L. Lancellotti, E. Bobeico, **A. Capasso**, E. Lago, P. Delli Veneri, E. Leoni, F. Buonocore, N. Lisi. “*Combined effect of double antireflection coating and reversible molecular doping on performance of few-layer graphene/n-silicon Schottky barrier solar cells*”. Solar Energy 127 (2016), 198-205.
- **A. Capasso**, T. Dikonimos, F. Sarto, A. Tamburrano, G. De Bellis, M.S. Sarto, G. Faggio, A. Malara, G. Messina, N. Lisi. “*Nitrogen-doped graphene films from chemical vapor deposition of pyridine: influence of process parameters on the electrical and optical properties*”. Beilstein J. Nanotechnol. 6 (2015), 2028-2038.
- **A. Capasso**, A.E. Del Rio Castillo, H. Sun, A. Ansaldo, V. Pellegrini, F. Bonaccorso, “*Ink-jet printing of graphene for flexible electronics: An environmentally-friendly approach*”. Solid State Commun. 224 (2015), 53-63.
- N. Lisi, F. Buonocore, T. Dikonimos, E. Leoni, G. Faggio, G. Messina, V. Morandi, L. Ortolani and **A. Capasso**, “*Rapid and highly efficient growth of graphene on copper by chemical vapor deposition of ethanol*”. Thin Solid Films 571 (2014), 139-144.
- **A. Capasso**, M. De Francesco, E. Leoni, T. Dikonimos, F. Buonocore, L. Lancellotti, E. Bobeico, M.S. Sarto, A. Tamburrano, G. De Bellis, and N. Lisi, “*Cyclododecane as support material for clean and facile transfer of large-area few-layer graphene*”. Appl. Phys. Lett. 105 (2014), 113101.
- F. Buonocore, **A. Capasso** and N. Lisi, “*Interface of graphene with copper: a van der Waals density-functional study*”. Materials Research Express 1 (2014), 015608.
- **A. Capasso**, E. Placidi, H. Zhan, E. Perfetto, J.M. Bell, Y.T. Gu and N. Motta, “*Graphene ripples generated by grain boundaries in Highly Ordered Pyrolytic Graphite*”. Carbon 68 (2014), 330-336.
- S. Santangelo, G. Messina, A. Malara, N. Lisi, T. Dikonimos, **A. Capasso**, L. Ortolani, V. Morandi and G. Faggio, “*Taguchi optimized synthesis of graphene films by copper catalyzed ethanol decomposition*”. Diam. Relat. Mater. 41 (2014), 73-78.
- **A. Capasso**, L. Salamandra, A. Chou, A. Di Carlo and N. Motta, “*Multi-wall carbon nanotubes coating of fluorine-doped tin oxide as electrode surface modifier for polymer solar cells*”. Sol. Energ. Mat. Sol. Cells 122 (2014), 297-302.
- G. Faggio, **A. Capasso**, S. Santangelo, T. Dikonimos, S. Gagliardi, R. Giorgi, V. Morandi, L. Ortolani, G. Messina, N. Lisi, “*High temperature growth of graphene films on copper foils by ethanol chemical vapour deposition*”. Journal of Physical Chemistry C 117 (2013), 21569-21576.
- L. Persichetti, **A. Capasso**, A. Sgarlata, A. Quatela, S. Kaciulis, A. Mezzi, M. Notarianni, N. Motta, M. Fanfoni, and A. Balzarotti, “*Fabrication of SiGe rings and holes on Si(001) by flash annealing*”. Applied Surface Science 283 (2013), 813-819.
- F. Matteocci, G. Mincuzzi, F. Giordano, **A. Capasso**, E. Artuso, C. Barolo, G. Viscardi, T.M. Brown, A. Reale and A. Di Carlo, “*Blocking Layer Optimization of poly(3-hexylthiophene) based Solid State Dye Sensitized Solar Cells*”. Organic Electronics 14 (2013), 1882-1890.

#### Book chapters:

- L. Morawska, P. McGarry, H. Morris, L. Knibbs, T. Bostrom and **A. Capasso**, “*Measurements of particle emissions from nanotechnology processes, with assessment of measuring techniques and workplace controls*”. Safe Work Australia (2012).
- L. Persichetti, **A. Capasso**, A. Sgarlata, M. Fanfoni, N. Motta and A. Balzarotti, “*Towards a controlled growth of self-assembled nanostructures: shaping, ordering and localization in Ge/Si heteroepitaxy*”. Self-Assembly of Nanostructures, The INFN Lectures, Vol. III, Series: Lecture notes in Nanoscale Science and Technology, Vol. 12, Bellucci, Stefano (Ed.), Springer (2012), ISBN 978-1-4614-0741-6.

#### Conference proceedings:

- R. Pinto, S.S. Nemala, M. Faraji, **A. Capasso**, K.B. Vinayakumar. “*Inkjet-Printing of Carbon Nano Onions for Sensor Applications in Flexible Printed Electronics*”, 2022 IEEE International Conference on Flexible and Printable Sensors and Systems (FLEPS).

- **A. Capasso**, A.E. Del Rio Castillo, L. Najafi, V. Pellegrini, F. Bonaccorso, F. Matteocci, L. Cinà, A. Di Carlo. "*Spray deposition of exfoliated MoS<sub>2</sub> flakes as hole transport layer in perovskite-based photovoltaics*". Nanotechnology (IEEE-NANO), 2015 IEEE 15th International Conference on Nanotechnology, 1138-1141.
- G. Faggio, **A. Capasso**, A. Malara, E. Leoni, M.A. Nigro, S. Santangelo, G. Messina, T. Dikonimos, F. Buonocore, N. Lisi. "*Fast growth of polycrystalline graphene by chemical vapor deposition of ethanol on copper*". Nanotechnology Materials and Devices Conference (NMDC), 2014 IEEE 9th, 69-72.
- L. Lancellotti, E. Bobeico, **A. Capasso**, M. Della Noce, N. Lisi, T. Dikonimos, P. Delli Veneri. "*Effects of HNO<sub>3</sub> molecular doping in graphene/Si Schottky barrier solar cells*". Photonics Technologies, 2014 Fotonica AEIT Italian Conference on Photonics Technologies, 10.1109/Fotonica.2014.6843898.
- L. Lancellotti, E. Bobeico, **A. Capasso**, M. Della Noce, P. Delli Veneri, S. Del Sorbo, T. Dikonimos, G. Di Francia, N. Lisi, A. Mittiga, T. Polichetti, F. Ricciardella. "*Graphene/silicon heterojunction for photovoltaic applications*". Conference Proceedings EU PVSEC, 2013, Paris, France. 10.4229/28thEUPVSEC2013-1AV.2.31.
- M. Shafiei, J. Yu, N. Motta, **A. Capasso**, K. Kalantar-Zadeh and W. Wlodarski. "*Hydrogen gas sensors based on Pt/nanostructured metal-oxide/SiC Schottky diodes: A review*". Conference Proceedings APMC 10/ICONN 2012/ACMM 22, 6-9 February, 2012, Perth, Western Australia.
- **A. Capasso**, L. Salamandra, F. Matteocci, A. Di Carlo, M. Shafiei, J. M. Bell and N. Motta. "*Fast synthesis of carbon nanotubes on transparent conductive oxides for solar cells*". Conference Proceedings APMC 10/ICONN 2012/ACMM 22, 6-9 February 2012, Perth, Western Australia.

#### Oral presentations at conferences (selection):

- **A. Capasso**, "Tunable Ion Transport in Graphene Membranes for Advanced Nanofiltration", 21st International Conference on Diffusion in Solids and Liquids (DSL2025), Naples, Italy. **(Invited oral)**.
- **A. Capasso**, "Sustainable strategies for large-scale 2D crystal production and applications", Graphene2025, San Sebastian, Spain. **(Invited oral)**.
- **A. Capasso**, "Eco-friendly production of 2D crystals for advanced technologies", E-MRS 2025, Strasbourg, France.
- **A. Capasso**, "Integration and optimization of 2D transition metal dichalcogenides as switching layers in memristors", ECS Prime 2024, Honolulu, US. **(Invited oral)**.
- **A. Capasso**, "Graphene-based membranes and flexible technologies", NanoSea 2024, Marseille, France. **(Invited oral)**.
- **A. Capasso**, "2D material-based memristors for neuromorphic computing", NanoInnovation 2024, Rome, Italy. **(Invited oral)**.
- **A. Capasso**, "Optimized production techniques for 2D crystal-based technology", RPGR 2023 November, Bangalore, India. **(Invited oral)**
- **A. Capasso**, "Graphene-based technologies by solution processing: Advances and Applications", NanoRome 2023 June, Rome, Italy. **(Invited oral)**
- **A. Capasso**, "Turning graphene films into advanced neuronal interfaces", RIVA 2023 June, Braga, Portugal.
- **A. Capasso**, "*Optimized production techniques for graphene-based interfaces and devices*", The 12th Recent Progress in Graphene and Two-dimensional Materials Research Conference, 10-14 October 2021, Seoul, South Korea. **(Invited oral)**
- **A. Capasso**, C.D. Liao, J. Borme, N. Lisi, P. Alpuim, "*CVD growth of mm-size single-crystal graphene*". ANM 2019 – International Conference on Advanced Materials, 4-6 November, Aveiro, Portugal.
- **A. Capasso**, C.D. Liao, B. Baumgartner, B. Sompalle, J. Borme, S. Sadewasser, P. Alpuim, "*CVD growth of 2D materials for electronic applications*". Materiais 2019, 14-17 April, Lisbon, Portugal.
- **A. Capasso**. "*Recent progresses in the CVD growth of graphene for electronic applications*". NanoInnovation 2019, 11-14 June 2019, Rome, Italy. **(Invited oral)**
- **A. Capasso**, C.D. Liao, B. Sompalle, M.F. Cerqueira, J. Borme, G. Faggio, G. Messina, N. Lisi, G.H. Lee, P. Alpuim. "*Scaling up single-crystal graphene by CVD of ethanol and methane*". Graphene Korea 2019 International Conference, 27-29 March 2019, Incheon, South Korea.

- **A. Capasso**, F. Matteocci, L. Najafi, V. Pellegrini, A. Di Carlo, F. Bonaccorso. “*Stable perovskite solar cells with a MoS<sub>2</sub> active buffer layer*”. 8<sup>th</sup> International Conference on Recent Progress in Graphene/2D Research, 25-29 September 2016 Seoul, South Korea.
- **A. Capasso**, A.E. Del Rio Castillo, H. Sun, A. Ansaldo, V. Pellegrini, F. Bonaccorso. “*Inkjet printing of two-dimensional materials in eco-friendly solvents*”. E-MRS, 11-15 May 2015, Lille, France.
- **A. Capasso**, N. Lisi. “*Advanced synthesis and processing for nanocarbon-based technologies*”. Nanoforum, 22-25 September 2014, Rome, Italy. **(Invited oral)**
- **A. Capasso** and N. Lisi. “*Nanocarbons and highly-structured materials for sustainable energy technologies*”. NanotechITALY2013, 27-29 November 2013, Venice, Italy. **(Invited oral)**
- **A. Capasso**, F. Buonocore, T. Dikonimos, S. Gagliardi, L. Lancellotti, G. Messina, G. Faggio, V. Morandi, L. Ortolani, M.S. Sarto, G. De Bellis, A. Tamburrano, N. Lisi. “*Graphene and related materials towards two-dimensional photovoltaics*”. Nanoforum, 18-20 September 2013, Rome, Italy. **(Invited oral)**
- **A. Capasso**, M. Notarianni, L. Salamandra, F. Matteocci, A. Di Carlo, J. M. Bell and N. Motta. “*Getting the most from the implementation of carbon nanotubes in polymer solar cells*”. IOESC 2012, 3-7 September 2012, Coolum Beach, Australia. **(Best presentation: AU\$1000 award)**.

### CONFERENCE ORGANIZATION

- ❖ 24th Conference on “*Insulating Films on Semiconductors*”, Granada, Spain (25/06/2025). Member of Technical Program Committee.
- ❖ General Conference of the Condensed Matter Division (CMD) – MC 39: *2D Materials beyond graphene: from fundamental studies to enabling technologies*, Braga, Portugal (06/09/2024)
- ❖ “*Platforms and open access research infrastructures for the technology transfer discussion*”, a round-table discussion with Directors and CTOs from major international institutes and industries (Rome, 19/09/23): <https://www.nanoinnovation2023.eu/home/index.php/programme/round-table>
- ❖ €-MRS 2022 Fall Meeting – Nanomaterials Symposium L “*Doping at the nanoscale: new challenges and advanced applications*”, Warsaw, Poland (21/09/2022).

### SELECTED GRANTS AND FUNDING

- ❖ DefCom2, Principal Investigator (INL) - 2024 Call for Exploratory Research Projects under the UT Austin Portugal Program, FCT Portugal (2025-present) – € 50k – Principal Investigator
- ❖ Confidential Industrial Project (2025–present) – €500k – Principal Investigator
- ❖ CSIC's international scientific collaboration - i-Link 2022 (€20k) – Team member
- ❖ 2DM4EH, DRI/India/0664/2020, FCT Portugal (2022–2025) – € 100k – Principal investigator
- ❖ HR21-00410, Caixa Health Research 2021, (2021–2024) – €1M – Team member
- ❖ GEMIS, AAC 04/ SI/2019 System of Incentives for Research and Technological Development - Projects in Co-operation - International Partnerships – FCT Portugal 2020/European Union (2020–2023) (€ 1.2M) - Principal investigator

### SELECTED FELLOWSHIPS AND AWARDS

- ❖ Wiley Top Cited Article Award (2023) — ChemElectroChem.
- ❖ Marie Curie Actions - H2020 COFUND - INL 2018-2020, Braga, Portugal (€ 95k)
- ❖ Yonsei Frontier Lab Fellowship - Seoul, South Korea (Won 44M)
- ❖ ENEA International Fellowship, Rome, Italy - 2013 (€ 25k)

### SELECTED SCIENTIFIC AND COMMUNITY ENGAGEMENT ACTIVITIES

- ❖ Associate Editor for *Frontiers in Nanotechnology*, *Frontiers in Neuroscience*,
- ❖ Reviewer for scientific journals, such as *Advanced Functional Materials*, *Small*, *Nano Letters*, *Carbon*, *2D Materials*, *Journal of Physical Chemistry C*, etc.
- ❖ Volunteering activity for the fabrication of face shields for hospitals (due to COVID19 pandemic) at INL, Braga, Portugal (30/03/2020)
- ❖ Noite Branca (public demonstration of INL technologies to the community) at Braga, Portugal (05/09/2019)
- ❖ Workshop organizer: “*Workshop on Focused Ion Beam*”, QUT, Brisbane, Australia (11/04/10)

## ADDITIONAL SCIENTIFIC EXPERIENCES

- ❖ “*Abilitazione scientifica nazionale – Professore I fascia, 02/B1 Fisica sperimentale della materia*”
- ❖ Research visit at Yonsei University, Seoul, Korea (Sept-Dec/2016)
- ❖ Research visits at CHOSE, Rome, Italy (July-Aug/2011, June-Aug/2012, Apr/2015)
- ❖ Research visits at University of Tor Vergata, Rome, Italy (June-July/2010, Jan/2012)
- ❖ Research visit at University of Brescia, Brescia, Italy (Jan/2010)

## KEY RESEARCH EXPERTISE

Synthesis and modification of nanomaterials and thin films (graphene and two-dimensional materials in particular) for optoelectronics, photovoltaics, and biotechnology. Self-assembly and nanostructuring of semiconductors at the nanoscale for advanced devices. Development and testing of new materials, processes and architectures for flexible electronics, photovoltaics, neuronal interfaces and biosensors. Characterization by microscopy, spectroscopy, spectrophotometry and conductivity measurements. Computer-aided modeling of nanomaterials. Teaching experience as assistant for PhD students (nanotechnology, electronics). Supervisor for PhD and MSc students (9 MSc, 1 PhD, 4 research internships).

## TECHNICAL SKILLS

- ❖ Materials production:
  - **Thin film deposition**
  - **CVD** (Chemical Vapor Deposition) and **PVD** (Physical Vapor Deposition)
  - **Liquid-phase exfoliation**
- ❖ Nanofabrication and materials deposition:
  - **Photolithography, FIB** (Focused Ion Beam) and **nanoindentation**
  - **Inkjet and screen printing, spray coating, flexography**
- ❖ Electronic devices:
  - **Organic, dye-sensitized, and perovskite-based solar cells** design and assembly
  - Optoelectronic devices design, characterization and testing
- ❖ Microscopy:
  - **SEM** and **TEM** (Scanning and Transmission Electron Microscopy)
  - **AFM** and **STM** (Atomic Force and Scanning Tunneling Microscopy) in air and UHV
- ❖ Spectroscopy:
  - **EDX** (Energy Dispersive X-Ray)
  - **Raman**
  - **XPS** (X-ray Photoemission Spectroscopy)
  - **Ellipsometry**
  - **Absorption** (UV-vis, FTIR)

## INFORMATION TECHNOLOGY SKILLS

- ❖ **Image SXM, WSxM, SPIP, Gwyddion, Origin and Kaleidagraph** for data analysis
- ❖ **Microsoft Office, Adobe Photoshop and Illustrator** for video writing and graphics editing
- ❖ Programming ability in **Java, C and Mathematica**
- ❖ All **Microsoft** operating systems
- ❖ Deep knowledge of computer and network architectures

## LANGUAGES

- ❖ **Italian**: mother tongue
- ❖ **English**: excellent (IELTS 8)
- ❖ **Spanish**: good understanding and speaking, basic writing
- ❖ **Portuguese**: good understanding, basic speaking and writing

## **OTHER SKILLS**

Management of complex projects (either with commercial or research-related aims), with ability in generating high-impact publications and progress reports in compliance with deadlines. Highly proficient in project writing, with experience in international cooperation and partnerships. High-level interpersonal skills, leadership and long-term vision. Aptitude to personnel supervision. Wide expertise in technology transfer. Expert in scientific dissemination to expert audiences and/or public. High motivation and ambition, in right balance with the respect for others and the progress of science.

Braga 27/08/2025