Curriculum Vitae of Dr. Laura Fusco, Ph.D.,

Dept. of Biomedical Sciences, University of Padua (Italy)

Dr. Laura Fusco is a Marie Curie Postdoctoral Fellow in the ImmuneNano Laboratory, in the Department of Biomedical Sciences of the University of Padua. Her current main lines of research rely on:

- The development of new **cell labeling and tracking methods** to overcome the limitations of classic fluorescence-based probes such as green fluorescent protein (GFP).
- The study of new drug delivery systems for RNA therapeutics based on nanomedicine.
- The impact of airborne particulate matter and micro/nanoplastics on human health, evaluating the effects on the immune system and the underlying molecular mechanisms. The research is conducted with a particular focus on Veneto (Italy) as a suitable region to study air pollution due to the frequent exceedance of limit values for air quality.



• New strategies in **Space Biology** to mitigate the immune dysregulation and other health problems faced by astronauts during space flights due to microgravity.

Dr. Laura Fusco received her B.Sc. in Medical Biotechnologies from the University of Milan (Italy), studying the effects of air pollution on mitochondria at the Fondazione IRCCS Ospedale Maggiore Policlinico, Mangiagalli (Advisor: Prof. Andrea Baccarelli, Incoming Dean, Harvard T. H. Chan School of Public Health; Chair and Professor at Columbia University). After receiving her M.Sc. in Medical Biotechnologies and Molecular Medicine "Summa cum laude" from the University of Trieste (Italy), studying anticancer drugs, in 2018, she earned her Ph.D. with Excellent Recognition with a project on biocompatibility and biomedical applications of graphene, with a particular focus on mitochondrial membrane depolarization and oxidative stress (University of Trieste in partnership with Ca' Foscari University of Venice, Ph.D. Supervisor: Prof. Maurizio Prato). The Ph.D. project was supported by the **EU H2020 Programme Graphene Flagship**, Europe's biggest research initiative, with a budget of €1 billion.

Dr. Fusco integrated her research at Karolinska Institutet (Sweden) in the laboratory of Prof. Bengt Fadeel and has worked as a Postdoctoral Fellow in the framework of different EU projects coordinated by Prof. Lucia G. Delogu, including i) the EU project G-IMMUNOMICS, under the FLAG-ERA international program H2020 for the Graphene Flagship, and ii) as a Seconded Scientist, in the framework of the MSCA RISE H2020 project CARBO-IMmap, at Sidra Medicine (Qatar) in the laboratory of the Director, Prof. Davide Bedognetti, where she was awarded a \$50.000 grant from the Cancer Research Department. The project involved seven countries and leading experts in biomedicine and nanobiotechnologies concerning the immune interactions of carbon nanomaterials (2019-2020).

In 2020, Dr. Laura Fusco served as a Postdoctoral Fellow at the University of Padua, working on a project funded by the European Space Agency (ESA) concerning the study of nanomaterials promoting skin regeneration for potential wound healing applications during space flights. In 2021, she was awarded a Marie Curie Individual Fellowship (MSCA-IF) Global (Host Institution: University of Padua, in the ImmuneNano Laboratory directed by Prof. Lucia G. Delogu – Project SEE under the grant agreement No 101029140). She spent two years as a visiting Marie Curie Global Fellow at Drexel University (USA) for the outgoing project phase in the laboratory of Prof. Yury Gogotsi, where she was in charge of MXene biomedical applications. In 2022, she was an Invited Speaker as "International Rising Star in MXene Research" at the MXene Conference (USA) to talk about her scientific career and inspire young researchers. In 2022, she was selected by the Lindau Nobel Committee to attend the prestigious 71st Lindau Nobel Laureate Meeting (Germany), where the most talented young researchers can meet and interact with about 40 Nobel Laureates. Dr. Fusco was Invited by the German Research Foundation at the Lindau academic dinner with the Nobel Laureate Richard Schrock and the member of the Nobel Prize Committee Pernilla Wittung, and by the Lindau Nobel Committee at the "Laureate Lunch" with the Nobel Laureate Ada Yonath. In 2023, she was invited to a conversation between Nobel Laureates as well as Lindau alumni by the Head of the Science and Technology Department of the Embassy of the Federal Republic of Germany in Washington D.C., René Haak, and the Lindau Nobel Laureate Meetings (USA). In 2023, she was selected to participate in the prestigious 3rd Lindau Sciathon and was an Invited panelist at the National Institutes of Health (NIH) working group meeting on biomedicine. Recently, she was awarded the Marie Curie Alumni Association (MCAA) microgrant MG to support career development and participated in the 83rd ESA parabolic flight campaign (Novespace, France) to develop biomedical strategies to mitigate the negative impact of microgravity on astronauts' health during space flights. In 2024, she received the Best Talk Award at the Marie Curie Alumni Association Conference. She is currently serving as a Marie Curie Fellow at the University of Padua for the third year of her Marie Curie project (01/07/2021-30/06/2023).

BRIEF TRACK RECORD (ORCID: 0000-0003-1418-507X):

Ph.D. in Chemistry in 2018 (project funded by the Graphene Flagship), receiving the Excellent Recognition.

Master's Degree in Medical Biotechnologies – Curriculum Molecular Medicine, "Summa cum laude", in 2014.

Awarded a Marie Curie Individual Fellowship - Global (251.002 Euros), 2021-Current

Awarded a 50.000 USD grant from the Cancer Research Department, Sidra Medicine, Doha (Qatar), 2019.

Selected by the Lindau Nobel Laureate Committee to attend the 71st Lindau Nobel Laureate Meeting, 2022 (highly competitive selection of 600 young researchers worldwide).

- Postdoctoral Fellow within a project funded by the European Space Agency at the University of Padua (Italy), 2020-21.
- Seconded Scientist within two EU projects at the University of Trieste (Italy) and Sidra Medicine (Qatar), 2018 2020.

 Additional working experience abroad:

- Marie Curie Global Postdoctoral Fellow at Drexel University (USA), from 2021 to 2023.
- Visiting Scientist at Sidra Medicine (Qatar), in 2020.
- Seconded Scientist at Sidra Medicine (Qatar) in the framework of a H2020 RISE project, from 2019 to 2020.
- Visiting Ph.D. student at the **Karolinska Institutet** (Sweden), in 2017.

Participation in the 83rd European Space Agency parabolic flight campaign (Novespace, France)

- 25 peer-reviewed publications (18 without the Ph.D. supervisor)
- Number of papers in the last 5 years: 22 papers and one in submission, 15 as a first author, 10 in Journals with IF>10, and 2 with IF>20 including Advanced Materials (IF>30) and 5 covers on NanoToday (IF>18), Adv.Mat. (IF>30), Small Methods (IF>15), Small (IF>13), and Nanoscale.
- A paper as a first author on Adv. Mat. (IF>30), in 2022.
- First author of the manuscript awarded the 2021 "ACS Nano Championships", 2021 (best "ACS Nano" journal article of the year, Impact Factor = 18).
- A pending patent
- Awarded the "Marie Curie Alumni Association (MCAA) microgrant MG" to support career development, 2023.
- Invited Talk at the European Space Agency-ESTEC (The Netherlands), 2023.
- Invited panelist at the **NIH Working Group meeting**, 2023.
- Best oral presentation award at the Marie Curie Alumni Association Conference (Italy), 2024.
- Best young oral presentation award at the NanoMib conference (Italy), 2024.
- Best poster award at the MRS Spring Meeting, Honolulu (Hawaii), 2022.
- Best oral presentation award MXene symposium MRS Spring Meeting, Honolulu (Hawaii), 2022.
- Awarded the "Best Cancer Research Department Series presentation of 2020", Sidra Medicine (Qatar).
- Awarded a Short Stay at the Cambridge Graphene Center (UK), in 2018;
- Best poster award at the National Conference of the Italian Society of Pharmacology, Rimini (Italy), 2017.
- Selected for the 3rd Lindau Online Sciathon organized through the Lindau Alumni Network, 2023;
- Invited to a conversation with Nobel Laureates P. Agre, J. Mather, and W.D. Phillips (USA), 2023;
- Selected by the European Commission to attend the 71st Lindau Nobel Laureate Meeting (2022);
- Lecture on the Marie Curie Individual Fellowship experience and international research mobility at the EU Open House 2023, at the EU Delegation in Washington D.C. (USA), invited by EURAXESS North America (2023);
- Travel grant from SIF to attend the 1st Meeting in Translational Pharmacology, S. de Compostela (Spain), 2018;
- Travel grant from SITOX to attend the International Congress of Toxicology, Bologna (Italy), 2018;
- Travel grant for Young Scientists from SIF, Rome (Italy), 2016.
- -Reviewer for ACS Nano, Scientific Reports, APL Materials, Nanomaterials, Vaccine, Frontiers in Immunology, etc.
- Reviewer for grant proposal for the National Science Center, Poland.

1 Affiliation

University of Padua (Italy)

ImmuneNano-Lab, Department of Biomedical Sciences, via Ugo Bassi, 58/B, 35131 Padua, Italy.

E-mail: laura.fusco@unipd.it

Laboratory website: www.delogulab.eu

Marie Curie Project website: www.seeproject.eu





2 Academic record and activity

2.1 – Education

- 23/02/2018 Ph.D. in Chemistry, <u>University of Trieste (UNITS)</u>, Trieste (Italy). Supervisor: Prof. Maurizio Prato. Project title: "Toxicological effects of graphene family nanomaterials after cutaneous exposure" supported by the EU H2020 Programme under grant agreement no.696656 Graphene Flagship.

- 18/07/2014 Master's degree in Medical Biotechnologies – Curriculum Molecular Medicine, <u>UNITS</u> (Italy).

- 13/10/2011 Bachelor's degree in Medical Biotechnologies, <u>University of Milan (UNIMI)</u>, Milan (Italy).

2.2 – Research expeditions

- 01/07/2021 – Current MSCA Individual Fellow – Global (Project: SEE, Grant agreement No 101029140)
Dept. of Biomedical Sciences, <u>University of Padua</u> (Padua, Italy).

• Supervisor: Prof. Lucia G. Delogu

- 01/07/2021 – 30/06/2023 Visiting **MSCA Individual Fellow** – Global (Outgoing Phase of the SEE project)
A.J. Drexel Nanomaterials Institute and Dept. of Materials Science and Engineering,

Drexel University (Philadelphia, USA)

Outgoing phase Supervisor: Prof. Yury Gogotsi

- 29/09/2022 – 01/07/2023 Joint appointment at the Dept. of Neurology, <u>University of Pennsylvania</u>

(Philadelphia, USA).

- 01/07/2020 – 30/06/2021 Postdoctoral Fellow at the Dept. of Biomedical Sciences, <u>University of Padua</u>

(Padua, Italy), supported by the WHISKIES project funded by the **European Space Agency** (**ESA**).

- 02/05/2019 - 30/06/2020

Seconded and Visiting Scientist at <u>Sidra Medicine</u> (Doha, Qatar) within the **MSCA RISE H2020** project CARBO-IMmap (H2020 RISE project).

-01/03/2018 - 30/06/2020

Postdoctoral Fellow at the Dept. of Life Sciences and the Dept. Chemical and Pharmaceutical Sciences, <u>University of Trieste</u> (Trieste, Italy), supported by the EU project G-IMMUNOMICS (**FLAG-ERA** Joint Translational Call (JTC) Graphene).

- 30/05/2017 - 31/08/2017

Visiting Ph.D. Student at the Institute of Environmental Medicine, Unit of Molecular Toxicology, <u>Karolinska Institutet</u> (Stockholm, Sweden). Supported by the EU H2020 Programme - **Graphene Flagship**.













2.3 – Funding received

- 2023: Shortlisted by the Research & Innovation Center for Graphene and 2D Materials "RIC-2D Open Call 2022" with the project entitled "Commercial MXene manufacturing toward technology innovations in the UAE and beyond" (MX-INNOVATION) (expected budget: \$4.000.000) (role: Co-Applicant).
- 2022: Awarded the European Space Agency (ESA) project with a proposal for a sounding rocket flight experiment entitled "Kinetics of red cell aggregation and blood structure-rheology link (KRABS)". The proposal was qualified as "outstanding" (role: Team Leader).
- 2022: Project: WoundXene: chronic wound regeneration by MXenes-based 3D-printed patches. PRIN funded by MIUR. Budget: **279.085 euros**. Role: Project participant (PI: Prof. Lucia G. Delogu).
- 2022: Project "A Universal Strategic Necessity: from Molecule to Drug" from EU, KA220-VET Cooperation partnerships in vocational education and training. Role: Project participant (PI: Prof. Lucia G. Delogu)
- 2022: Project "MX-MAP: Towards MXenes' biomedical applications by high-dimensional immune MAPping" by the European Commission under HORIZON work program. Total budget: **1.389.200 euros**. MX-MAP is highly interdisciplinary and involves leading scientists from 14 partners and 11 Countries, including USA, Saudi Arabia, Canada, Ukraine, Italy, and Germany. Role: Project participant (PI: Prof. Lucia G. Delogu)
- 2021: Awarded a **Marie Skłodowska-Curie Actions Global Individual Fellowship (MSCA-IF Global)** with the project "Mapping the skin-immune interactions of novel 2D materials: MXenes" (SEE) (**251.002 Euros**), under the grant agreement No 101029140. 1/07/2021 30/06/2024. (role: Individual Fellowship beneficiary).
- 2021: Project "DETECTION: DevelopmEnT of mxEne-based tracking and Therapeutic systems in bIOmediciNe" by the University of Padua (Italy), under "STARS" 2021. Role: Project participant (PI: Prof. Lucia G. Delogu). Budget: **140.000 euros**.
- 2021: Project "WHISKIES: Wound healing in space: key challenges towards intelligent and enabling sensing platform" by the ESA. Role: Project participant (PI: Prof. Lucia G. Delogu).. Total budget: **2.248.800 euros**.
- 2019: Project: Multifunctional nanotool for advanced cancer diagnostics, PRIN 2016 (started at UNIPD in 2019) under the Italian MIUR PRIN. Budget: **28.000 euros** for UNIPD. Role: Project participant (PI: LG. Delogu).
- 2019: Awarded the Cancer Research Department grant (\$50.000) from Sidra Medicine, Doha (Qatar).
- 2019: Project "Immune activity Mapping of Carbon Nanomaterials" Carbo-IMmap by the European Commission Marie Skłodowska-Curie Actions Research and Innovation Staff Exchange in the framework of the H2020 program. Total budget: **796.500 euros**. Role: Project participant (PI: Prof. Lucia G. Delogu).





2.4 – Awards and highly competitive selections

- 2024: Best oral presentation award at the Marie Curie Alumni Association Conference (Milan, Italy), 2024.
- 2024: Best Young Oral Presentation award at the NanoMib conference (Milan, Italy), 2024.
- 2023: Participation in the 83rd European Space Agency (ESA) parabolic flight campaign (Novespace, France)
- 2023: Awarded the "Marie Curie Alumni Association (MCAA) microgrant MG" to support career development.
- 2023: Selected for the **3rd Lindau Online Sciathon** organized through the Lindau Alumni Network with the project "Mapping the biological activity of new 2D materials: MXenes" (role: Team leader), Apr 28-30,2023.
- 2023: Invited to a conversation between Nobel Laureates Peter Agre, John Mather and William D. Phillips as well as Lindau alumni (by the Head of the Science and Technology Department of the Embassy of the

- Federal Republic of Germany in Washington D.C., René Haak, and the Lindau Nobel Laureate Meetings Washington D.C., USA, March 3, 2023).
- 2022: **Invited by the German Research Foundation at the Lindau academic dinner** with the Nobel Laureate Richard Schrock and the member of the Nobel Prize Committee Pernilla Wittung (Germany-28 Jun 2022).
- 2022: Invited by the Lindau Nobel Committee at the "Laureate Lunch" with the Nobel Laureate Ada Yonath (Lindau, Germany 29 Jun 2022).
- 2022: Selected by the Lindau Nobel Laureate Committee to attend the 71st Lindau Nobel Laureate Meeting, 2022 (600 young researchers selected worldwide).
- 2022: Sponsored by the European Commission for the 71st Lindau Nobel Laureate Meeting2022 selection process
- 2022: **Best poster award** at the MRS Spring Meeting, Honolulu (Hawaii), May 8 -13, 2022.
- 2022: Best spotlight presentation award MXene symposium MRS Spring Meeting, Hawaii, May 8-13, 2022.
- 2021: "Marie Skłodowska-Curie Actions Global Individual Fellowship" (H2020-MSCA-GF-2020). 251.002,56 euros. Starting date: 01/07/21 ending date: 30/06/24.
- 2021: First author of the manuscript awarded the 2021 "ACS Nano Championships", 2021 (top "ACS Nano" journal article, Impact Factor>18). 27 Jan 2021.
- 2020: Awarded the "Best Cancer Research Department Series presentation", Sidra Medicine, Doha (Qatar).
 - 2018: Short Stay at Cambridge Graphene Center (UK), 2018.
 - 2018: Travel grant from the "Italian Society of Pharmacology" (SIF), Santiago de Compostela (Spain), 2018.
 - 2018: Travel grant from the "Italian Society of Toxicology" (SITOX), Bologna (Italy), 2018.
 - 2017: Awarded the "Best Poster Presentation" at the SIF National Conference, Rimini (Italy), 2017.
 - 2016: Travel grant for Young Scientists from SIF, Rome (Italy), 2016.

2.5 – Supervisor activity

- Nov 2023-March 2024: Co-supervisor of a Ph.D. student for the Ph.D. Program in Biomedical Sciences, University of Padua (Italy)
- 2017-2023: Co-supervisor of 5 master's degree thesis at the University of Padua and at the University of Trieste, mainly in biomedicine and nanomedicine
- 2021-2023: **Tutor assistant of 5 Ph.D. students** and **5 undergraduate students** at the University of Padua (Italy) and Drexel University (USA)
- 2015-2023: **Tutor assistant of more than 20 undergraduate students** at the University of Padua, the University of Trieste (Italy), and Sidra Medicine (Qatar).

2.6 – Teaching activities

- Instructor for the **Ph.D. School of Biomedical Sciences**, University of Padua, Italy: Biocompatibility and biomedical applications of new two-dimensional nanomaterials: MXenes (scheduled for April 2024).
- Instructor in video courses for the European project "A Universal Strategic Necessity: from Molecule to Drug" (DRUG), 2023.
- Lecture on the Marie Curie Individual Fellowship experience and international research mobility at the **EU Open House 2023** open to general audience, at the EU Delegation in Washington D.C. (USA), invited by EURAXESS North America, May 13th, 2023.
- Instructor on **biomedical applications of nanomaterials** for the MXene Course at Drexel University (Philadelphia, USA), February 20-24th, 2023.
- Instructor on biomedicine and nanomedicine for the MXene Course, Drexel University (USA), Feb 7-11th, 2022.
- Instructor on scientific writing for high school students at the University of Padua, "Dietro le quinte della ricerca scientifica" event (2021).
- Lecture on the H2020 MSCA-IF project SEE for high school students at the University of Padua, Dietro le quinte della ricerca scientifica" event (2021).
- Instructor in Nanotoxicology for the Environmental Toxicology course, **Bachelor's Degree in Ambient Sciences**, University of Trieste (a.y. 2017/2018).
- Instructor for the Phytotherapy advanced traineeships for graduate students (Portogruaro, Italy), 2016-2018.
- Tutor for laboratory classes of > 60 students (Pharmacy, Pharmacognosy, and Phytotherapy) at the University of Trieste, from 2015 to 2018.
- Tutor for laboratories open to general audience ("Trieste Next" event, 2015).

2.7 – Seminars and conference contributions

27 oral communications (18 as first author), 14 as presenting author. 23 posters (17 as first and presenting author). Selection of oral communications:

- Best oral presentation award at the Marie Curie Alumni Association Conference (Milan, Italy), 14-16 March 2024. Title: Immune Profiling and Detection of Two-Dimensional Nanomaterials MXenes at the single-cell level for Biomedical Applications
- Best Young Oral Presentation award at the NanoMib conference (Milan, Italy), 29 Feb-1 March 2024. Title: Single-Cell Detection of Two-Dimensional Nanomaterials by Mass Cytometry for Biomedical Applications
- Matcon 2024, Conference On Materials Science and Engineering, Feb 12-13, 2024. Title: High-Dimensional Approaches for Immune Profiling of 2D Materials
- **Invited speaker** at the European Space Agency 83rd parabolic flight campaign, Novespace, France, Nov 2023. Title: "Nanomaterials for Space Medicine".
- **Invited speaker** at the European Space Agency (ESA)-ESTEC, The Netherlands, Aug 31 Sep 1, 2023. Title: "Wound healing in space: nanomaterials for skin regeneration".
- 8th Nano Today Conference, 22-25 April 2023, San Diego, USA.

 Title: "Immune compatibility and single-cell label-free detection of MXenes by high-dimensional technologies".
- **Invited panelist** at the NIH Quantum Sensing Technologies in Biomedical Sciences Working group meeting, Jan 5-6, 2023. Title: "Quantum materials, immune profiling and label-free detection of 2D MXenes by mass cytometry". Prototype and Emerging Technologies Panel.
- MRS Fall Meeting, Boston, USA, Nov 26-Dec 2, 2022.
 Title: "Immune Profiling and Single-Cell Label-Free Detection of Two-Dimensional MXenes by Mass Cytometry and High-Dimensional Imaging".
- IEEE Nanomaterials: Applications & Properties (NAP), 12th International Conference, Krakow, Poland, Sep 11-16, 2022 (hybrid event). Title: "Immune Interactions of V₄C₃ MXene"
- **Invited speaker** at the "Youth forum on MXenes", 4th MXene conference, Aug 5-8, 2022, Nanjing, China Title: "MXene-mediated immune cell-cell interactions revealed by enzymatic LIPSTIC labeling"
- **Invited speaker** in the panel "International Rising Stars in MXene Research", 2nd International MXene Conference 2022, Philadelphia, USA, Aug 1-3, 2022. Title: "International Rising Stars in MXene Research"
- MXene symposium, MRS Spring Meeting, Honolulu (Hawaii), May 8-13, 2022. Title: "Immune Compatibility of MXenes", **Best presentation award**.
- 61° SIB 2021 Congress (Società Italiana di Biochimica e Biologia Molecolare), virtual edition. Title: "MXenes with immunomodulatory properties against SARS-CoV-2", Sept 23-24, 2021
- 6th Nano Today Conference, Lisbon (Portugal), June 16-20, 2019. Title: "Graphene Modulation of Immune Cells: Trick or Treat".
- XXI SIF seminar, Bresso (Italy), September 19-22, 2018

Title: "Assessment of the *in vitro* skin sensitization properties of graphene and graphene oxide".

Posters and conferences (more than 30 international conferences) selection:

- 1st European CyTOF Congress, Rome (Italy), Oct 23, 24, 2023.
- Cellicon Valley '23: The Future of Cell and Gene Therapies. Philadelphia, USA, June 21-23, 2023.
- Materials and Sustainability Research Networking and Showcase. Philadelphia, USA, June 8, 2023. Title: "V₄C₃ MXene: a Biocompatible Immune Modulator". Fusco *et al*.
- Materials and Sustainability Research Networking and Showcase. Philadelphia, USA, June 8, 2023. Title: "Effects of Oxidation on Biocompatibility of M₄X₃ MXenes". Fusco *et al.*
- Materials and Sustainability Research Networking and Showcase. Philadelphia, USA, June 8, 2023. Title: "Synthesis and Characterization of Biocompatible Nb₄C₃ for Wound Healing". Fusco *et al.*
- Annual Meeting of the American Association for the Advancement of Science (AAAS). Washington D.C., USA, March 2-5 -2023.
- Invited to: NIH Quantum Sensing Technologies in Biomedical Sciences Working group meeting, Jan 6, 2023.
- Invited Panelist for the NIH Virtual Workshop Pre-meeting-Near Term Quantum Sensing Applications In Biomedicine, Dec 2022.
- MRS Fall Meeting, Boston, USA, Nov 26-Dec 2, 2022.
- Singh Center for Nanotechnology 2022 Annual User Meeting, Philadelphia, USA, Oct 13, 2022.
- Lindau Nobel Laureate Meetings nominated by the European Commission (#LINO22) Lindau, Germany, June 26 July 1, 2022.
- MRS Spring Meeting, Honolulu (Hawaii), May 8 -13, 2022. Best presentation award.

Title: "Immune Compatibility of MXenes". Fusco L, et al.

2nd International MXene Conference 2022, Philadelphia, USA, 1-3 August 2022.

Title: "V₄C₃ MXene-mediated immunomodulation". Fusco L, et al.

- Federation of Clinical Immunology Societies (FOCIS) Annual Meeting, San Francisco, USA, June 21-24, 2022. Title: "Two-dimensional materials for biomedical applications: MXenes immune profiling", Fusco *et al.*
- Singh Center for Nanotechnology 2021 Annual User Meeting, Philadelphia, USA, Oct 21, 2021.
- MXenes: Looking ahead to the Next Ten Years, 19 October 2021
- Chem 2D mat 2021 (Online conference), Aug 31 -Sept 3, 2021.
- 61° SIB 2021 Congress (Italian Society of Biochemistry and Molecular Biology), Sep 23-24, 2021 (Online). Title: "MXenes with immunomodulatory properties against SARS-CoV-2", Fusco *et al*.
- Chem 2D mat 2021 (Online conference), Aug 31-Sep 3, 2021. Title: "MXenes against SARS-CoV-2", Fusco et al
- World Nano Congress on Advanced Science and technology (WNCST) 2021, March 8-24, 2021 (Virtual event)
- European Research & Innovation days, September 22-24, 2020 (Virtual event)
- Graphene for Research, Innovations, Collaboration, September 22-24, 2020 (Virtual event)
- Maternal and Child Health Symposium 2020, Doha (Qatar), March 7-9, 2020.
- Middle-Eastern Association for Cancer Research (MEACR), Doha (Qatar), December 7-8, 2019.
- 6th Nano Today Conference, Lisbon (Portugal), June 16-20, 2019.
- 1st Meeting in Translational Pharmacology, Santiago de Compostela (Spain), June 19-22, 2018.
- Graphene Week, Athens (Greece), September 25-29, 2017. Title: "Graphene biocompatibility after skin exposure". Fusco L, *et al.*
- Graphene Week, Warsaw (Poland), June 13-17, 2016. Title: "Graphene effects on mitochondria". Fusco L, *et al.*

2.9 – Organization of scientific meetings

- Organizing Committee member of the IEEE NAP-2024 Conference. 08-13 Sep 2024, Riga, Latvia
- Organizing Committee member of the Fourth Transnational Project Meeting of the project ERASMUS+ "A universal strategic necessity: from molecule to drug". 11-14 Jul 2023, Padova, Italy.
- Organizing Committee member of the kick-off meeting for the project MX-MAP. 17 Jan 2023
- Organizing Committee member of the 2nd Inter. MXene Conference 2022, Philadelphia, USA, Aug 1-3, 2022.
- Organizing committee member of the 7th International Conference on Nanomaterials, Nanodevices, Fabrication and Characterization (ICNNFC'22), virtual event, April 4-6, 2022.
- Organizing committee of the lecture series on "Nanomaterials and impact on human health" at Sidra Medicine, Doha, Qatar (2020).
- Organizing committee member of the 1st meeting on "Natural toxins" University of Padua (Italy), September 6-7, 2018.
- Organizing committee member of the Phytotherapy advanced traineeships for post-graduate students. Portogruaro, Italy (from 2016 to 2018).
- University Trieste (UNITS) lectures in Nanobiotechnology and Nanotoxicology (2018).

2.10– Commissions of trust

- Reviewer for: Scientific Reports, Vaccine, APL Materials, ACS Nano, IJMS, "Nanotechnology, Science and Applications", Life Sciences, Nanomaterials, and Frontiers in Immunology.
- Reviewer for grant proposals for the National Science Center, Poland.

2.11—Membership:

- American Association for the Advancement of Science (AAAS).
- Lindau Alumni Network (Nobel Laureates Meetings: www.lindau-alumni-network.org.
- Marie Curie Alumni Association (MCAA).
- Materials Research Society (MRS).
- Federation of Clinical Immunology Societies (FOCIS).

2.12- Courses:

- "Chemical hygiene", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Compressed gas safety", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Electrical safety", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Radiation safety", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Biological safety", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Mercury safety", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Pyrophoric chemical safety", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Respiratory protection", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Hydrofluoric acid safety", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Laboratory equipment safety", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Hazard communication", Drexel University, Philadelphia, Pennsylvania, USA), 2023
- "Emergency response", Drexel University, Philadelphia, Pennsylvania, USA), 2023

- "System Immunology Course". Federation of Clinical Immunology Societies (FOCIS) meeting course, June 20-21, 2022 (San Francisco, California, USA).
- "Big data Immunology". Federation of Clinical Immunology Societies (FOCIS) meeting course, June 20-21, 2022 (San Francisco, California, USA).
- MXenes course (synthesis, processing, characterization, and electrochemisty of MXenes), Feb 2021 (USA).
- **COVID-19**: what you need to know (CME eligible) course authorized by Osmosis and offered through Coursera (June 20, 2020).
- **Zebra Fish** Functional Genomics Core Facility at **Sidra Medicine** Hands-On Workshop of CUDOS Congress 2019 theoretical and practical course (November 19-20, 2019)
- Deep Phenotyping Core Facility at **Sidra Medicine** Hands-On Workshop of CUDOS Congress 2019 theoretical and practical course (November 21, 2019).
- Invited by Prof. Andrea Ferrari to visit the **Cambridge Graphene Centre** (CGC), **University of Cambridge** (Cambridge, United Kingdom) to attend the NNPO meeting (Network of National Press Officers), October 2-3, 2018.
- 2018 Northern European Mass Cytometry User Group Meeting, Cambridge (United Kingdom), Oct 1-2, 2018.
- Course "Health risk assessment: principles and applications", Karolinska Insitutet Stockolm (Sweden), March 20-24, 2017.
- HER2 and breast cancer: perspectives for personalized therapy, Cattinara Hospital Trieste (Italy), Dec 2, 2016.
- Scientific writing school, University of Trieste and Ca' Foscari University of Venice (Italy), Feb- Mar 2016.
- First IPCOS school, University of Trieste (Italy), February 8-10, 2016.
- 1° Sustainable Nanotechnology School, Ca' Foscari University Venice (Italy), Jan 11-16, 2015.
- La valutazione della sicurezza e dell'efficacia dei dispositivi medici ad uso topico, **University of Milan** (Italy), November 25, 2014.

2.13—Press attention (selection):

- -Dec 5, 2023: Drexel University (USA) video-article about participation in the 83rd ESA parabolic flight campaign.
- https://www.linkedin.com/posts/drexel-engineering_benj-chacon-a-phd-student-working-in-the-activity-7138520518508351489-J7CK?utm_source=share&utm_medium=member_android
- https://drexel.edu/engineering/news-events/news/archive/2023/December/mxene-immune-cell-research-parabolic-flight/
- -April 17, 2023: A.J. Drexel Nanomaterials Institute article about selection for the Lindau Sciathon 2023.
- https://nano.materials.drexel.edu/2023/04/laura-fusco-selected-for-the-3rd-lindau-online-sciathon/
- -August 20, 2022: MXene Association article about participation at the Lindau Nobel Laureate Meetings 2022.
- https://www.mxenes.org/blogpost/1919661/477143/Visiting-Scholar-Laura-Fusco-Selected-to-Attend-Lindau-Nobel-Laureate-Meeting?hhSearchTerms=%22laura+and+fusco%22&terms=
- -August 20, 2022: MXene Association article "International Fellows Advancing Their Research With Drexel Materials".
- https://www.mxenes.org/blogpost/1919661/477142/International-Fellows-Advancing-Their-Research-With-Drexel-Materials?tag=Laura+Fusco
- March 25 and April 15, 2022: A.J. Drexel Nanomaterials Institute article about participation at the Lindau Nobel Laureate Meetings 2022.
- https://nano.materials.drexel.edu/2022/03/visiting-researcher-dr-laura-fusco-italy-to-attend-71st-lindau-nobel-laureate-meeting/
- https://nano.materials.drexel.edu/2022/04/visiting-scholar-laura-fusco-selected-to-attend-lindau-nobel-laureate-meeting/
- https://nano.materials.drexel.edu/2022/03/25/
- April 12, 2022: Interviewed by the College of Engineering for an article about participation at the Lindau Nobel Laureate Meetings 2022.
- https://drexel.edu/engineering/news-events/news/archive/2022/April/fusco-lindau-fellowship/
- July 26, 2022: Interviewed by the College of Engineering for an article about the Marie Curie Individual Fellowship Award.
- https://drexel.edu/engineering/news-events/news/archive/2022/July/mse-2022-intl-fellows/
- July 2021: Interviewed by the Italian Journal Veneto Economia for an article about the Marie Curie Individual Fellowship Award.
- https://www.venetoeconomia.it/2021/07/unipd-tre-marie-curie-a-scienze-biomediche/
- Jun 28, 2021: Materials Today promotes our work on MXenes against SARS-CoV-2. Editor Sealy's article:
- https://www.materialstoday.com/nanomaterials/news/mxenes-show-promise-against-sarscov2/

2.14— Major collaborations:

At the University of Padua (UNIPD)

Prof. Marco Giorgio, Department of Biomedical Sciences, Unipd - Cellular signaling pathways, Aging

Prof. Marco Sandri, Department of Biomedical Sciences, Unipd - Molecular Biology, Aging

Prof. Emanuele Papini, Department of Biomedical Sciences, Unipd - Nanotoxicology, Nanomedicine

Prof. Martina Pigazzi, Department of Medicine, Department of Woman and Child Health, Unipd – *Biomedicine*

Prof. Marta Giacomello, Department of Biology, Unipd – *Biology*

Prof. Mauro Alaibac, Department of Medicine, Unipd – Skin signaling pathways

In Italy and abroad

Prof. Yury Gogotsi, Drexel University (USA) H-index = 225 – Biomedicine, Nanomedicine

Prof. Klaus Ley, La Jolla Institute, Augusta Univ. (USA) H-index=157 – Immunology, Cellular signaling pathways

Prof. Bengt Fadeel, Karolinka Institutet, Sweden – Immunology, Biomedicine

Prof. Xinliang Feng, TU Dresden (Germany) H-index=145 – Biomedicine, Nanomedicine

Prof. Andrea Baccarelli, Columbia University, Harvard University (USA) H-index=115-Air pollution, Mitochondria

Prof. Sean Bendal, Stanford University (USA) – Cell Imaging, Single-Cell Biology

Prof. Alberto Bianco, CNRS Strasbourg (France) - Cellular molecular and enzymatic pathways

Prof. Cinzia Casiraghi, University of Manchester (UK) – Biomedicine

Prof. Valeria Nicolosi, Trinity College (UK) – Nanomedicine

Prof. Andrea Ferrari, University of Cambridge. CGC (UK) H-index=128 -Nanomedicine

Prof. Giulio Cerullo, Politecnico di Milano (Italy) H-index = 102 – Bioimaging, Cell labeling

Prof. Davide Bedognetti, Sidra Medicine (Qatar) – Biomedicine, Oncology

Prof. Husam N Alshareef, KAUST (UAE) **H-index=124** – *Biomedicine*, *Nanomedicine*

Prof. Andrea Cattaneo, Università degli Studi dell'Insurbia (Italy) – Air pollution, Particulate Matter health impact

Prof. Denise Mitrano, ETH Zurich (Switzerland) – Nanotoxicology, Nanoplastic health impact

Prof. Anna Maria Pappa and Yarjan Abdul Samad, Research & Innovation Center for Graphene and 2D Materials RIC-2D (UAE) – *Nanomedicine*

Prof. Antonio Bencomo, Abu Dhabi Stem Center (UAE) – Modern Cellular Therapy

Prof. Carlo Iorio, Centre for Research and Engineering in Space Technology (CREST), Université Libre de Bruxelles (Belgium) – *Space biology, Microgravity health impact*

Prof. Jeremy Teo, New York University Abu Dhabi (NYUAD), (UAE) – Nanomedicine

Prof. Massimiliano Papi, Università Cattolica del Sacro Cuore – Biomedicine

Prof. Flavia Vitale, University of Pennsylvania (USA) – Neurology, Muscle activity

Prof. Acelya Yilmazer, University of Ankara (Turkey) – Biomedicine, Biology

Companies and Research Centers

Standard Biotools

Cambridge Raman Imaging

Research & Innovation Center for Graphene and 2D Materials RIC-2D (UAE)

Abu Dhabi Stem Center – Modern Cellular Therapy

Centre for Research and Engineering in Space Technology (CREST)

2.15—Patent applications:

The below-referenced provisional application was filed with the U.S. Patent and Trademark Office on September 2, 2022:

U.S. Provisional Application No. 63/374,460

"Two-Dimensional- And Nano-Materials As Mass Tags And Cell Labeling Systems In Mass Cytometry And High-Dimensional Imaging"

Drexel Ref: 22-2443

BakerHostetler Ref: 104889.000913

3 Research record

Summary of research record

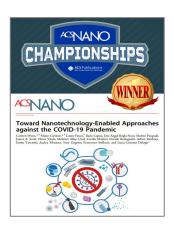
25 articles published in peer-reviewed journals (14 as a first author: 11 in Journals with IF>10 and 2 with IF>20)

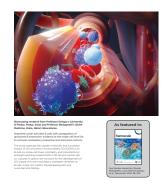
A paper to Advanced Materials as first author, IF > 32).

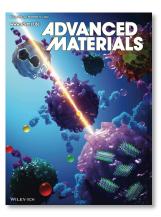
5 covers and an award as best article of the year (first author) in ACS Nano (IF>18)

H-index = 15

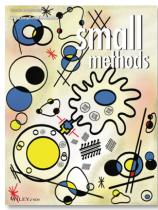












- **Cover on Nano Today** (IF>18), Co-first author: Gazzi A[#], Fusco L[#] *et al.* (2023)
- Cover on Small Methods (IF>15), Fusco L et al. (2023)
- Cover on Advanced Materials (IF > 32): Fusco L et al. (2022)
- Cover on Nanoscale (IF > 8) Co-first author: Orecchioni M*, Fusco L** et al. (2022)
- **Cover on Small** (IF > 11): Unal MA *et al.* (2021)
- ACS Nano Award 2021: Co-first author of the paper "C Weiss*, M Carrière*, L Fusco*, Ilaria Capua *et al.*, ACS Nano (2020)", awarded the **best article of the year** by the journal *ACS Nano* (Impact Factor>18) "ACS Nano Championships" (2021).

List of publications (#Equal contribution, IF= Impact Factor):

- 1. Gazzi A#, Fusco L#, Schefer RB, GiroL, D'Almeida SM, Orecchioni M, Mitrano DM, Delogu LG. Nanoplastics: immune impact, detection, and internalization after human blood exposure by single-cell mass cytometry. Submitted to Advanced Materials (IF>30), Dec 2023.
- 2. Gazzi A#, **Fusco L**# Orecchioni M, Keshavan S, Shin Y, J-C Grivel, Rinchai D, Ahmed EI, Elhanani O, Furesi G, Rauner M, Keren L, Ley K, Casiraghi C, Bedognetti D, Fadeel B, Delogu LG. Immune profiling and tracking of two-dimensional transition metal dichalcogenides in cells and tissues. Nano Today, Dec 2023. https://doi.org/10.1016/j.nantod.2023.102084. **IF > 18 Cover**
- 3. **Fusco** L, A. Gazzi, C.E. Shuck, M. Orecchioni, E.I. Ahmed, L. Giro, B. Zavan, A. Yilmazer, K. Lei, D. Bedognetti, Y. Gogotsi, L.G. Delogu, V₄C₃ MXene immune profiling and modulation of T cell-dendritic cell function and interaction, Small Methods, 2300197, (2023). **IF** >15 **Cover**
- 4. **Fusco L**, Gazzi A, Shuck CE, Orecchioni M, Alberti D, D'Almeida SM, Rinchai D, Ahmed E, Elhanani O, Rauner M, Zavan B, Grivel J-C, Keren L, Pasqual G, Bedognetti D, Ley K, Gogotsi Y, Delogu LG. Immune Profiling and Multiplexed Label-Free Detection of 2D MXenes by Mass Cytometry and High-Dimensional Imaging. Advanced Materials (Oct, 2022). DOI: 10.1002/adma.202205154) **IF** > **32 Cover**
- 5. Fuoco C#, Luan X#, Fusco L#, Riccio F, Giuliani G, Lin H, Orecchioni M, Martín C, Cesareni G, Feng X, Mai Y, Bianco A, Delogu LG. Graphene nanoribbons are internalized by human primary immune cell subpopulations maintaining a safety profile: A high-dimensional pilot study by single-cell mass cytometry. Applied Materials Today 2022 Jul; 29: 101593. IF >10
- 6. Dalla Colletta A, Pelin M, Sosa S, **Fusco** L, Prato M, Tubaro A. Carbon-based nanomaterials and skin: An overview. Carbon, 2022, 196, pp. 683–698. https://doi.org/10.1016/j.carbon.2022.05.036. **IF** > **11**
- 7. Orecchioni M#, **Fusco L**#, Mall R, Bordoni V, Fuoco C, Rinchai D, Guo S, Sainz R, Zoccheddu M, Gurcan C, Yilmazer A, Zavan B, Ménard-Moyon C, Bianco A, Hendrickx W, Bedognetti D, Delogu LG. Graphene

- oxide activates B cells with upregulation of granzyme B expression: evidence at the single-cell level for its immune-modulatory properties and anticancer activity. Nanoscale. 2022 Jan 6;14(2):333–349. doi: 10.1039/d1nr04355b. PMID: 34796889. **IF:** >8
- 8. K Shirvanimoghaddam, B Czech, R Yadav, C Gokce, L Fusco, LG Delogu, A Yilmazer, G Brodie, A Al-Othman, AK Al-Tamimi, J Grout, M Naebe. "Facemask Global challenges: The case of effective synthesis, utilization and environmental sustainability". Sustainability (2022)
- 9. **L Fusco**, M Orecchioni, G Reina, V. Bordoni, C Fuoco, C Gurcan, S Guo, M Zoccheddu, F Collino, B Zavan, E Treossi, A Yilmazer, V Palermo, A Bianco, LG Delogu. "Lateral dimension and aminofunctionalization on the balance to assess the single-cell toxicity of graphene on fifteen immune cell types". NanoImpact (June, 2021) **IF** = 5.53
- 10. MA Unal, F Bayrakdar, H Nazir, O Besbinar, C Gurcan, N Lozano, LM Arellano, S Yalcin, O Panatli, D Celik, D Alkaya, A Agan, L Fusco, SS Yildiz, LG Delogu, KC Akcali, K Kostarelos, A Yilmazer. "Graphene Oxide Nanosheets Interact and Interfere with SARS-CoV-2 Surface Proteins and Cell Receptors to Inhibit Infectivity". Small (May, 2021) IF >15 Cover
- 11. MA Unal#, F Bayrakdar#, L Fusco# et al., "2D MXenes with antiviral and immunomodulatory properties: a pilot study against SARS-CoV-2". Nano Today (March, 2021) IF >20
- 12. F Cavion, L Fusco, S Sosa, C Manfrin, B Alonso, A Zurutuza, R Della Loggia, A Tubaro, M Prato, M Pelin. "Ecotoxicological impact of graphene oxide: toxic effects on the model organism Artemia franciscana" Environmental Science: Nano (Sept, 2020) IF >8
- 13. E Avitabile#, **L Fusco**#, S Minardi#, B Zavan, A Yilmazer, M Rauner, P Pippia, E Tasciotti, LG Delogu. "Bioinspired scaffold action under the extreme physiological conditions of simulated space flights: osteogenesis enhancing under microgravity". Frontiers in Bioengineering and Biotechnology (July, 2020) **IF** = **6**
- 14. C Weiss#, M Carrière#, L Fusco#, I Capua, JA Regla Nava, M Pasquali, J Scott, F Vitale,MA Unal, C Mattevi, D Bedognetti, A Merkoçi, E Tasciotti, A Yilmazer, Y Gogotsi, F Stellacci, and LG Delogu "Toward Nanotechnology-Enabled Approaches Against the COVID-19 Pandemic". ACS Nano (Jun, 2020) IF = 18
- 15. A Gazzi#, **L Fusco**#, M Orecchioni, S Ferrari, G Franzoni, JS Yan, M Rieckher, G Peng, MA Lucherelli, IA Vacchi, NDQ Chau, A Criado, A Istif, D Mancino, A Dominguez, H Eckert, E Vazquez, T Da Ros, P Nicolussi, V Palermo, B Schumacher, G Cuniberti, Y Mai, C Clementi, M Pasquali, X Feng, K Kostarelos, A Yilmazer, D Bedognetti, B Fadeel, M Prato, A Bianco, LG Delogu. "Graphene, other carbon nanomaterials and the immune system: toward nanoimmunity-by-design" J Phys Mat (May, 2020).
- 16. **L Fusco**#, A Gazzi#, G Peng#, Y Shin, S Vranic, D Bedognetti, F Vitale, A Yilmazer, X Feng, B Fadeel, C Casiraghi, LG Delogu. "Graphene and other 2D materials: a multidisciplinary analysis to uncover the hidden potential of cancer theranostics". Theranostics (Apr 2020) **IF** = **11.5**
- 17. L Fusco#, E Avitabile#, V Armuzza, M Orecchioni, I Akcan, D Bedognetti, T Da Ros, L Delogu (#equal contribution). "Impact of the surface functionalization on nanodiamond biocompatibility: a comprehensive view on human blood immune cells". Carbon (Jan 2020) IF = 11.3
- 18. **L Fusco**, M Pelin, S Mukherjee, S Keshavan, S Sosa, C Martín, V González, E Vázquez, M Prato, B Fadeel, A Tubaro. "Keratinocytes are capable of selectively sensing low amounts of graphene-based materials: Implications for cutaneous applications". Carbon (Jan, 2020) **IF** = **11.3**
- 19. L Fusco, M Garrido, C Martín, S Sosa, C Ponti, A Centeno, B Alonso, A Zurutuza, E Vázquez, A Tubaro, M Prato, M Pelin. "Skin irritation potential of graphene-based materials using a non-animal test". Nanoscale (2020) IF = 8.3
- 20. A Gazzi, L Fusco, A Khan, D Bedognetti, B Zavan, F Vitale, A Yilmazer, LG Delogu. "Photodynamic Therapy Based on Graphene and MXene in Cancer Theranostics". Frontiers in Bioengineering and Biotechnology (2019) IF = 5.89
- 21. S Keshavan, P Calligari, L Stella, L Fusco, LG Delogu, Bengt Fadeel. "Nano-bio interactions: a neutrophil-centric view". Cell Death and Disease (2019) IF = 6.3
- 22. M Pelin, S Sosa, V Brovedani, L **Fusco**, M Poli, A Tubaro. "A novel sensitive cell-based immunoenzymatic assay for palytoxin quantitation in mussels". Toxins (2018) IF = 4.5

- 23. M Pelin, L Fusco, C Martín, S Sosa, JM González Domínguez, J Frontiñan Rubio, M Duran Prado, E Vázquez, M Prato, A Tubaro. "Graphene and graphene oxide induce ROS production in human HaCaT skin keratinocytes: role of xanthine oxidase and NADH dehydrogenase". Nanoscale (2018) IF = 8.3
- 24. M Pelin, E Genova, **L Fusco**, M Marisat, U Hofmann, D Favretto, M Lucafò, S Martelossi, A Ventura, G Stocco, M Schwab, G Decorti. "Pharmacokinetics and pharmacodynamics of thiopurines in an in vitro model of human hepatocytes: insights from an innovative mass spectrometry assay". Chemico-Biological Interactions (2017) **IF** = **5.19**
- 25. M Pelin, L Fusco, V León, C Martín, A Criado, S Sosa, E Vázquez, A Tubaro, M Prato. "Differential cytotoxic effects of graphene and graphene oxide on skin keratinocytes". Scientific Reports (2017) IF = 4.99
- 26. M Pelin, S De Iudicibus, L Fusco, E Taboga, G Pellizzari, C Lagatolla, S Martelossi, A Ventura, G Decorti, G Stocco: "Role of oxidative stress mediated by glutathione-S-transferase in thiopurines toxic effects". Chemical Research in Toxicology (2015) IF = 3.97