



Dr. Valeria Nele

[REDACTED]
Email address: valeria.nele@unina.it
[REDACTED]

Executive Summary

As a Fondazione Veronesi Post-doctoral Fellow based at the Department of Pharmacy of the University of Naples Federico II, I am working on the design and development of hybrid lipid nanoparticles for RNA delivery for the treatment of metastatic melanoma. I have an established track-record comprising 19 peer-reviewed publications, 1 filed patent, numerous presentations at national and international conferences, and numerous early career awards. During my PhD, I have investigated liposome-based formulations for the design of ultrasound-responsive systems, and I have developed a platform that enables the use of ultrasound as a novel trigger for enzymatic catalysis and hydrogel formation. I have also mastered the use of neutron and X-ray scattering techniques, as well as cryo-TEM to characterize a variety of organic and inorganic synthetic nanoparticles, as well as cell-derived vesicles. Overall, my skills and expertise span from the fundamental understanding of self-assembled systems to application-driven biomaterials and nanoparticles design for drug delivery.

Professional experience

University of Naples Federico II (IT), January 2022 – present.

“Fondazione Umberto Veronesi” Post-doctoral Fellow at the Department of Pharmacy of the University of Naples Federico II (IT). Supervisor: Prof. Giuseppe De Rosa.

University of Naples Federico II (IT), October 2020 – October 2021.

Post-Doctoral Researcher at the Department of Pharmacy of the University of Naples Federico II (IT). Supervisor: Prof. Giuseppe De Rosa.

Education

Imperial College London (UK), 26/10/2015-01/01/2020

PhD in Materials Research. Thesis Title: “Engineering responsive liposome systems for biomedical applications”. Supervisor: Professor Molly Stevens.

University of Naples Federico II (IT), 2013-2015

MSc Chemical Engineering, 110/110 cum laude. 1st prize for outstanding performance in the MSc Chemical Engineering. Thesis title: “Optimization of process parameters for the electrospinning of elastin-like recombinamers”. Supervisor: Prof. Paolo Netti.

University of Naples Federico II (IT), 2010-2013

BSc Chemical Engineering, 110/110 cum laude.

Teaching experience

University of Naples “Parthenope” (IT), November-December 2021

Teaching assistant (40 hours) for the Biochemistry course, BSc in Biology.

Imperial College London (UK), October-December 2016 and October-December 2017

Graduate teaching assistant for the course of Biomolecular Engineering I, Bioengineering Department, Dr. Ben Almquist.

Grants and Fellowships

Fondazione Umberto Veronesi (2023), Post-doctoral Fellowship. € 30.000,00.

Fondazione Umberto Veronesi (2022), Post-doctoral Fellowship. € 30.000,00.

ISIS Neutron and Muon Source (2019), Co-Investigator (Co-I) on ISIS Beamtime Application RB1920464 “Effect of formulation method and lipid composition on liposome lamellarity”. Awarded: 2 days of allocated SANS beamtime and £ 1000.

ISIS Neutron and Muon Source (2018), Co-Investigator (Co-I) on ISIS Beamtime Application RB1910285 “Self-assembly of thermo-responsive gels”. Awarded: 2 days of allocated SANS beamtime and £ 1000.

ISIS Neutron and Muon Source (2017), Co-Investigator (Co-I) on ISIS Beamtime Application RB1810203 “Self-assembly of lipid and triblock copolymer-based amphiphiles for drug delivery”. Awarded: 3 days of allocated SANS beamtime and £ 1000.

Ermenegildo Zegna Founder’s Scholarship, 2015-2018. Highly competitive, nation-wide Italian scholarship program awarded to promising Italian young researchers sponsored by the Ermenegildo Zegna Foundation. Awarded: € 96.000,00.

Publications – h-index: 10 (Scopus)

1. **Nele, V.***, D’aria, F.*, Campani, V., Silvestri, T., Biondi, M., Giancola, C., De Rosa, G. “Unravelling the role of lipid composition on liposome-protein interactions”. **Journal of Liposome Research** (accepted for publication). (* equal contribution).
2. Abate, M., Lombardi, A., Luce, A., Porru, M., Leonetti, C., Bocchetti, M., Campani, V., De Rosa, G., **Nele, V.**, Cardile, F., Zito Marino, F., Franco, R., Scrima, M., Sperlongano, R., Alfano, R., Misso, G., Amler, E., Caraglia, M., Zappavigna, S. “Fluorescent Nanodiamonds as innovative delivery systems for MiR-34a replacement in breast cancer”. **Molecular Therapy-Nucleic Acids** (accepted for publication).
3. **Nele, V.***, Tedeschi, V.*, Campani, V., Ciancio, R., Angelillo, A., Graziano, S.F., De Rosa, G., Secondo, A. “Cerium-Doped Self-Assembling Nanoparticles as a Novel Anti-Oxidant Delivery System Preserving Mitochondrial Function in Cortical Neurons Exposed to Ischemia-like Conditions”. **Antioxidants** 2023, 12(2), 358. (* equal contribution).
4. Delle Donne, R., Iannucci, R., Rinaldi, L., Luca, R., Oliva, M., Senatore, E., Borzacchiello, D., Lignitto, L., Giurato, G., Rizzo, F., Sellitto, A., Chiuso, F., Castaldo, S., Scala, G., Campani, V., **Nele, V.**, De Rosa, G., D’Ambrosio, C., Garbi, C., Scaloni, A., Weisz, A., Ambrosino, C, Arcella, A., Feliciello, A. “Targeted inhibition of ubiquitin signaling reverses metabolic reprogramming and suppresses glioblastoma growth”. **Communications Biology**, 2022, 5(1), 780.
5. Barriga, H. M. G., Pence, I. J., Holme, M. N., Douth, J. J., Penders, J., **Nele, V.**, Thomas, M. R., Carroni, M., Stevens, M. M. “Coupling Lipid Nanoparticle Structure and Automated Single Particle Composition Analysis to Design Phospholipase Responsive Nanocarriers”. **Advanced Materials** 2022, 34, 2200839.
6. Constantinou, A., **Nele, V.**, Douth, J. J., Correia, J. S., Moiseev, R., V., Cihova, M., Gaboriau, D. C. A., Krell, J., Khutoryanskiy, V. V., Stevens, M. M., Georgiou, T. K. “Investigation of the Thermogelation of a Promising Biocompatible ABC Triblock Terpolymer and Its Comparison with Pluronic F127”. **Macromolecules** 2022, 55, 5, 1783–1799.

7. Abate, M., Scotti, L., **Nele, V.**, Caraglia, M., Biondi, M., De Rosa, G., Leonetti, C., Campani, V., Zappavigna, S., Porru, M. "Hybrid Self-Assembling Nanoparticles Encapsulating Zoledronic Acid: A Strategy for Fostering Their Clinical Use". *International Journal of Molecular Sciences* 2022, 23, 5138.
8. Campani, V., Salaroglio, I. C., **Nele, V.**, Kopecka, J., Bernkop-Schnürch, A., Riganti, C., De Rosa, G. "Targeted Self-Emulsifying Drug Delivery Systems to Restore Docetaxel Sensitivity in Resistant Tumors". *Pharmaceutics* 2022, 14(2), 292.
9. **Nele, V.**, Holme, M.N., Rashid, H.M, Le, T., Barriga, H.M.G., Thomas, M.R., Douth, J., Yarovsky, I., Stevens, M.M. "Design of lipid-based nanocarriers via cation modulation of ethanol-interdigitated lipid membranes". *Langmuir* 2021, 37, 40, 11909–11921.
10. Friedl, J.D., **Nele, V.**, De Rosa, G., Bernkop-Schnürch, A. "Bioinert, Stealth or Interactive: How Surface Chemistry of Nanocarriers Determines Their Fate In Vivo". *Advanced Functional Materials* 2021, 2103347.
11. Potter, M. Najer, A., Klöckner, A., Zhang, S., Holme, M.N., **Nele, V.**, Penders, J., Saunders, C., Douth, J.J., Edwards, A.M., Ces, O., Stevens, M.M. "A controlled dendrimersome nanoreactor system for localised hypochlorite induced killing of bacteria". *ACS Nano* 2020, 14 (12), 17333-17353.
12. Massi, L., Najer, A., Chapman, R., Spicer, C.D., **Nele, V.**, Che, J., Booth, M. A., Douth, J.J., Stevens, M.M. "Tuneable peptide cross-linked nanogels for enzyme-triggered protein delivery". *Journal of Materials Chemistry B* 2020, 8 (38), 8894-8907.
13. Whittaker, T.E., Nagelkerke, A., **Nele, V.**, Kauscher, U., Stevens, M.M. "Experimental artefacts can lead to misattribution of bioactivity from soluble Mesenchymal Stem Cell paracrine factors to Extracellular Vesicles". *Journal of Extracellular Vesicles*, 9 (1), 1807674.
14. **Nele, V.**, Wojciechowski, J.P., Armstrong, J.P., Stevens, M.M. "Tailoring gelation mechanisms for advanced hydrogel design". *Advanced Functional Materials* 2020, 30 (42), 2002759.
15. Horgan, C.C., Nagelkerke, A., Whittaker, T., **Nele, V.**, Massi, L., Kauscher, U., Penders, J., Bergholt, M.S., Hood, S.R., Stevens, M.M. "Molecular Imaging of Extracellular Vesicles in vitro via Raman Metabolic Labelling". *Journal of Materials Chemistry B* 2020, 8, 4447-4459.
16. Kauscher, U., Penders, J., Nagelkerke, A., Holme, M., **Nele, V.**, Massi, L., Gopal, S., Whittaker, T., Hood, S.R., Stevens, M.M. "AuNC EV Supraparticles: Self-Assembled Nanostructures for 3D Uptake Visualisation". *Langmuir* 2020, 36, 14, 3912–3923.
17. **Nele, V.**, Ibsen, C.S., Wojciechowski, J., Kit-Anan, W., Douth, J., Armstrong, J.P., Stevens, M.M. "Ultrasound-triggered enzymatic gelation". *Advanced Materials* 2020, 1905914.
18. **Nele, V.**, Holme, M.N., Kauscher, U., Douth, J., Thomas, M.R., Stevens, M.M. "Effect of PEG, lipid composition and formulation method on vesicle lamellarity: a small-angle neutron scattering study". *Langmuir* 2019, 35(18), 6064-6074.
19. Putzu, M., Causa, F., **Nele, V.**, de Torre, I.G., Rodriguez-Cabello, J.C., Netti, P.A. "Elastin-like recombinamers multi-layered scaffolds for cardiovascular applications". *Biofabrication* 2016 8 045009.

Patents

Nele, V., Armstrong, J. P. K., Ibsen, C. S., Stevens, M. M., Coussios, C. "Ultrasound-triggered payload release". International Patent application number: PCT/GB2020/051847. US application number: 17/631,766.

Conferences

Nele, V., Angelillo, A., Campani, V., De Rosa, G. "mRNA-Loaded Lipid Self-Assembling Nanoparticles As Novel Vaccine Formulations". Oral presentation at the Phospholipid Research Center Researcher's Day, Bad Dürkheim (2023).

Nele, V., Tedeschi, V., Zucaro, L., Campani, V., Secondo, A., De Rosa, G. "Bioactive Self-Assembling Nanoparticles to Tackle Neurodegeneration". Oral presentation at the 4th European Conference on Pharmaceutics, Marseille (2023).

Nele, V., Tedeschi, V., Zucaro, L., Campani, V., Secondo, A., De Rosa, G. "Self-assembling nanoparticles to tackle neurodegeneration". Oral presentation at the 2022 CRS Italy Workshop "Unmet Medical Needs: Opportunities and Challenges for Drug Delivery Scientists", Genova (2022).

Nele, V., Tedeschi, V., Secondo, A., De Rosa, G. "Self-assembling nanoparticles to tackle neurodegeneration" Flash oral presentation at the 7th International Symposium on Phospholipids in Pharmaceutical Research organized by the Phospholipid Research Center, Heidelberg (2022).

Nele, V., Tedeschi, V., Secondo, A., De Rosa, G. "Multi-functional Self-Assembled Nanoparticles As Novel Anti-Oxidants For Neurodegenerative Diseases". Oral presentation at the 5th Nanomed Workshop, Pavia (2022).

Nele, V., Ibsen, C.S., Wojciechowski, J., Armstrong, J.P., Stevens, M.M. "Ultrasound-triggered enzymatic hydrogelation". Oral presentation at the World Biomaterials Congress Virtual (2020).

Honours and Awards

Italy Made Me Award (2020) from the Italian Embassy in London. The prize is awarded in recognition of outstanding research performed in the UK by early career Italian researchers. £ 1000.

Matthey PhD Prize (2020) from the Department of Materials, Imperial College London. £ 250.

Armourers & Brasiers Postgraduate Travel Award (2018). £ 600.

City & Guilds Postgraduate Travel Award (2018). £ 400.

Imperial College Trust Travel Grant (2018). £ 300.

Imperial College President's medal for outstanding research team awarded to the Stevens Group (2016).

1st prize for outstanding performance MSc Chemical Engineering (2016), University of Naples Federico II. Awarded: € 1.000.

Professional service

Journal reviewer for Small, Journal of Visualized Experiments, and Ceramics International.

Board member of the interdivisional group "Diffusione della cultura chimica" of the Italian Chemical Society, whose aim is to communicate chemistry to the general public by organizing gatherings, conferences, workshops, and a science communication school (2023-present).

Member of the Italian Chemical Society (2021-present).

Member of ADRITELF (Association of Italian Researchers and Professors in Pharmaceutical Technology and Legislation, 2021-present).

Member of the Biophysical Society (2017-2019).

Member of the Institution of Engineering and Technology (2018-2019).

Leadership and Outreach

Ricercatori in Classe 2022 – An initiative of Fondazione Umberto Veronesi (June 2022). I

designed and led a workshop to inspire high school students to pursue STEM careers and to disseminate the activities of Fondazione Umberto Veronesi.

Coordinamento Napoletano Donne nella Scienza (Association of Neapolitan Women in Science), 2021- present. I am in charge of the development and management of the social media platforms of the association to disseminate its activity and raise awareness on women in STEM.

AISUK (Association of Italian Scientists in the UK), 2018-2020. I coordinated the organization of a series of events called APERicerca, which have been organised across the UK to bring Italian early-career scientists together to discuss science, foster new collaborations and network.

Native Scientists, 2017-2019. Native Scientists is a network of international scientists whose aim is to inspire ethnic minority pupils to consider STEM careers through dedicated workshops. I have designed and conducted a workshop for Italian pupils currently living in London.

LYSF lab visit, Imperial College London, 2018. I designed and led a workshop session on cryo-TEM imaging for high school students visiting the Stevens lab at Imperial College London.