

PERSONAL INFORMATION **Luca Digiacomo**

CURRENT POSITION Post Doctoral researcher at Sapienza University, Rome.

EDUCATION AND TRAINING

- 2018 **Ph.D. In Life and Health Sciences: Molecular Biology and Cellular Biotechnology** Excellent  
University of Camerino (Italy)  
Thesis title: *Mechanistic insights into nanoparticle-protein corona and its exploitation for novel targeted therapeutics.*
- 2014 **Master's Degree in Physics of Matter,** 103/110  
University of Pisa (Italy)  
Thesis title: *Structural, dynamical and optical properties of gold nanorod/DNA complexes for gene delivery applications.*
- 2011 **Bachelor's Degree in Physics,** 110/110 cum laude  
University of Catania (Italy)  
Thesis title: *Stochastic resonance: theory and applications.*
- 2007 **High School Diploma,** 100/100  
Liceo Scientifico E. Fermi, Ragusa (Italy)

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user  
[Common European Framework of Reference for Languages](#)

Communication skills

- good communication skills gained through my participation in scientific conferences, meeting and symposia.

Organisational / managerial skills

- Coaching undergraduate and Ph.D. students for experimental activities during their interns for bachelor's, master's thesis and Ph.D. projects.

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem solving
Proficient user	Independent user	Proficient user	Basic user	Proficient user

Levels: Basic user - Independent user - Proficient user  
[Digital competences - Self-assessment grid](#)

Basic

- **Molecular Dynamic simulation and visualization softwares:** Chimera, Abalone, GAMESS, Gabedit.

- Intermediate
  - *Raster graphics editor*: GIMP, Blender.
  - *Scientific image processing programs*: Imagej, Kodak Molecular Imaging Software.
- Advanced
  - *Numerical computing environment and data analysis*: MATLAB.
  - *Command-line softwares for plotting data, functions and data fits*: GNUplot, MATLAB.
  - *Scientific word processor and document markup language*: LATEX.

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 Experiences

- Attended the International school of nanomedicine with an oral presentation on “*The Protein Corona of Nanoparticles as a Powerful Tool for the Early Diagnosis of Pancreatic Ductal AdenoCarcinoma*”, Erice, July 2019.
- International visiting student at the Laboratory for Fluorescence Dynamics (University of California Irvine), under the mentorship of prof. E. Gratton. Jul-Sep 2017.
- Attended the second edition of the course: “Big Data, Image Processing and Analysis (BigDIPA)”, University of California Irvine, USA, September 2017.
- 2016 Attended the third edition of the “School of fluorescence microscopy” (super resolution techniques), Bologna, Italy, October 2016.
- *The protein corona of graphene oxide nanoflakes as a diagnostic tool for pancreatic cancer detection*. Poster presentation at the NANOtoday congress (Lisbon, Portugal, June 2019).
- *Study of graphene-protein interactions for the early detection of pancreatic cancer*. Poster presentation at the 4th edition of the meeting “Biophysics at Rome” (Rome, Italy, May 2019).
- *A gold nanoparticle-based blood test for the early detection of pancreatic cancer*. Poster presentation at the Applied Nanotechnology and Nanoscience International Conference (ANNIC) (Berlin, Germany, October 2018).
- *The biomolecular corona of Temozolomide-loaded liposomes enhances anti-cancer efficacy in glioblastoma cells*. Poster presentation at Congresso nazionale della società italiana di Biofisica pura ed applicata (SIBPA) (Ancona, Italy, September 2018)
- *Novel insights on nanoparticle-blood interactions for early diagnosis of pancreatic cancer*. Oral presentation at the European Foundation for Clinical Nanomedicine (CLINAM) summit (Basel, Switzerland, September 2018).
- *Protein Corona affects cellular uptake and intracellular trafficking of lipid nanoparticles*. Poster presentation at the 3rd edition of the meeting “Biophysics at Rome” (Rome, Italy, May 2017).
- *Intracellular dynamics of nanoparticles probed by an Image-derived Mean Square Displacement Approach*. Poster presentation at the 61st annual meeting of the BioPhysical Society (New Orleans, LA, USA. February 2017).
- 2016 *Transfection efficiency boost in hard-to-transfect cells by MENS reagents*. Oral communication at the “BeMM Symposium: Biology and Molecular Medicine” (Rome, Italy, November 2016).
- *Structure of liposomes in biological media: a synchrotron SAXS study*. Poster presentation at the symposium “SAXS on nanosystems” (Trieste, Italy. October 2016).
- *Development of an image correlation analysis to study the intracellular dynamics of nanoparticles*. Poster presentation at the annual meeting of the German Biophysical Society (Erlangen, Germany. September 2016).
- 2015 *Intracellular trafficking of lipid-based gene delivery systems investigated by Single Particle Tracking*. Oral communication at the 101 congress of the Italian Society of Physics (SIF), Section of Biophysics. (Rome, Italy. September 2015).

## Seminars and conferences

## Publications

- Di Santo, R., Digiaco, L., Quagliarini, E., Capriotti, A. L., Laganà, A., Chiozzi, R. Z., ... & Caracciolo, G. (2020). [Personalized Graphene Oxide-Protein Corona in the Human Plasma of Pancreatic Cancer Patients](#). *Frontiers in Bioengineering and Biotechnology*, 8.
- Digiaco, L., Jafari-Khouzani, K., Palchetti, S., Pozzi, D., Capriotti, A. L., Laganà, A., ... & Flammia, G. (2020). [A protein corona sensor array detects breast and prostate cancers](#). *Nanoscale*.
- Digiaco, L., Pozzi, D., Palchetti, S., Zingoni, A., & Caracciolo, G. (2020). [Impact of the protein corona on nanomaterial immune response and targeting ability](#). *Wiley Interdisciplinary Reviews: Nanomedicine and Nanobiotechnology*, e1615.
- Palchetti, S., Digiaco, L., Giulimondi, F., Pozzi, D., Peruzzi, G., Ferri, G., ... & Caracciolo, G. (2020). [A mechanistic explanation of the inhibitory role of the protein corona on liposomal gene expression](#). *Biochimica et Biophysica Acta (BBA)-Biomembranes*, 1862(3), 183159.
- Molfetta, R., Lecce, M., Quatrini, L., Caracciolo, G., Digiaco, L., Masuelli, L., ... & Santoni, A. (2019). [Immune complexes exposed on mast cell-derived nanovesicles amplify allergic inflammation](#). *Allergy*.
- Caracciolo, G., Safavi-Sohi, R., Malekzadeh, R., Poustchi, H., Vasighi, M., Chiozzi, R. Z., ... & Di Carlo, A. (2019). [Disease-specific protein corona sensor arrays may have disease detection capacity](#). *Nanoscale Horizons*, 4(5), 1063-1076.
- Giulimondi, F., Digiaco, L., Pozzi, D., Palchetti, S., Vulpis, E., Capriotti, A. L., ... & Mahmoudi, M. (2019). [Interplay of protein corona and immune cells controls blood residency of liposomes](#). *Nature communications*, 10(1), 1-11.
- Di Domenico, M., Pozzi, D., Palchetti, S., Digiaco, L., Iorio, R., Astarita, C., ... & Giordano, A. (2019). [Nanoparticle-biomolecular corona: A new approach for the early detection of non-small-cell lung cancer](#). *Journal of cellular physiology*, 234(6), 9378-9386.
- Papi, M., Palmieri, V., Palchetti, S., Pozzi, D., Digiaco, L., Guadagno, E., ... & Mahmoudi, M. (2019). [Exploitation of nanoparticle-protein interactions for early disease detection](#). *Applied Physics Letters*, 114(16), 163702.
- Ferri, G., Digiaco, L., Lavagnino, Z., Occhipinti, M., Bugliani, M., Cappello, V., ... & Cardarelli, F. (2019). [Insulin secretory granules labelled with phogrin-fluorescent proteins show alterations in size, mobility and responsiveness to glucose stimulation in living  \$\beta\$ -cells](#). *Scientific reports*, 9(1), 1-12.
- Palchetti, S., Digiaco, L., Pozzi, D., Zenezini Chiozzi, R., Capriotti, A. L., Laganà, A., ... & Caracciolo, G. (2019). [Effect of Glucose on Liposome-Plasma Protein Interactions: Relevance for the Physiological Response of Clinically Approved Liposomal Formulations](#). *Advanced Biosystems*, 3(2), 1800221.
- Papi, M., Palmieri, V., Digiaco, L., Giulimondi, F., Palchetti, S., Ciasca, G., ... & Coppola, R. (2019). [Converting the personalized biomolecular corona of graphene oxide nanoflakes into a high-throughput diagnostic test for early cancer detection](#). *Nanoscale*, 11(32), 15339-15346.
- Digiaco, L., Palchetti, S., Giulimondi, F., Pozzi, D., Chiozzi, R. Z., Capriotti, A. L., ... & Caracciolo, G. (2019). [The biomolecular corona of gold nanoparticles in a controlled microfluidic environment](#). *Lab on a Chip*, 19(15), 2557-2567.
- Digiaco, L., Giulimondi, F., Mahmoudi, M., & Caracciolo, G. (2019). [Effect of molecular crowding on the biological identity of liposomes: an overlooked factor at the bio-nano interface](#). *Nanoscale Advances*, 1(7), 2518-2522.
- Palchetti, S., Caputo, D., Digiaco, L., Capriotti, A. L., Coppola, R., Pozzi, D., & Caracciolo, G. (2019). [Protein corona fingerprints of liposomes: New opportunities for targeted drug delivery and early detection in pancreatic cancer](#). *Pharmaceutics*, 11(1), 31.
- Di Santo, R., Digiaco, L., Palchetti, S., Palmieri, V., Perini, G., Pozzi, D., ... & Caracciolo, G. (2019). [Microfluidic manufacturing of surface-functionalized graphene oxide nanoflakes for gene delivery](#). *Nanoscale*, 11(6), 2733-2741.
- Ferri, G., Digiaco, L., D'Autilia, F., Durso, W., Caracciolo, G., & Cardarelli, F. (2018). [Time-lapse confocal imaging datasets to assess structural and dynamic properties of subcellular nanostructures](#). *Scientific data*, 5, 180191.
- Digiaco, L., Palchetti, S., Pozzi, D., Amici, A., Caracciolo, G., & Marchini, C. (2018). [Cationic lipid/DNA complexes manufactured by microfluidics and bulk self-assembly exhibit different transfection behavior](#). *Biochemical and biophysical research communications*, 503(2), 508-512.
- Di Domenico, M., Pozzi, D., Palchetti, S., Digiaco, L., Iorio, R., Siciliano, C., ... & Giordano, A. (2018). [Alpha-1-microglobulin/bikunin \(AMBP\) protein corona \(PPC\) as biomarker for early diagnosis in non-small-cell lung carcinomas \(NSCLC\) patients: A case report](#). *Meta Gene*, 17, S19.
- Caputo, D., Cartillone, M., Cascone, C., Pozzi, D., Digiaco, L., Palchetti, S., ... & Coppola, R. (2018). [Improving the accuracy of pancreatic cancer clinical staging by exploitation of nanoparticle-blood interactions: A pilot study](#). *Pancreatology*, 18(6), 661-665.
- Arcella, A., Palchetti, S., Digiaco, L., Pozzi, D., Capriotti, A. L., Frati, L., ... & Mahmoudi, M. (2018). [Brain targeting by liposome-biomolecular corona boosts anticancer efficacy of temozolomide in glioblastoma cells](#). *ACS chemical neuroscience*, 9(12), 3166-3174.
- Caracciolo, G., Palchetti, S., Digiaco, L., Chiozzi, R. Z., Capriotti, A. L., Amenitsch, H., ... & Pozzi, D. (2018). [Human biomolecular corona of liposomal doxorubicin: The overlooked factor in anticancer drug delivery](#). *ACS applied materials & interfaces*, 10(27), 22951-22962.
- Digiaco, L., D'Autilia, F., Durso, W., Tentori, P.M., Caracciolo, G., Cardarelli, F. [Dynamic fingerprinting of sub-cellular nanostructures by image mean square displacement analysis](#) (2017) *Scientific Reports*, 7 (1), art. no. 14836, .
- Digiaco, L., Cardarelli, F., Pozzi, D., Palchetti, S., Digman, M.A., Gratton, E., Capriotti, A.L., Mahmoudi, M., Caracciolo, G. [An apolipoprotein-enriched biomolecular corona switches the cellular uptake mechanism and trafficking pathway of lipid nanoparticles](#) (2017) *Nanoscale*, 9 (44), pp. 17254-17262.

- Publications**
- Digiaco, L., Pozzi, D., Amenitsch, H., Caracciolo, G. [Impact of the biomolecular corona on the structure of PEGylated liposomes](#) (2017) *Biomaterials Science*, 5 (9), pp. 1884-1888.
  - Papi, M., Caputo, D., Palmieri, V., Coppola, R., Palchetti, S., Bugli, F., Martini, C., Digiaco, L., Pozzi, D., Caracciolo, G. [Clinically approved PEGylated nanoparticles are covered by a protein corona that boosts the uptake by cancer cells](#) (2017) *Nanoscale*, 9 (29), pp. 10327-10334.
  - Palchetti, S., Pozzi, D., Capriotti, A.L., Barbera, G.L., Chiozzi, R.Z., Digiaco, L., Peruzzi, G., Caracciolo, G., Laganà, A. [Influence of dynamic flow environment on nanoparticle-protein corona: From protein patterns to uptake in cancer cells](#) (2017) *Colloids and Surfaces B: Biointerfaces*, 153, pp. 263-271.
  - Palchetti, S., Pozzi, D., Marchini, C., Amici, A., Andreani, C., Bartolacci, C., Digiaco, L., Gambini, V., Cardarelli, F., Di Rienzo, C., Peruzzi, G., Amenitsch, H., Palermo, R., Screpanti, I., Caracciolo, G. [Manipulation of lipoplex concentration at the cell surface boosts transfection efficiency in hard-to-transfect cells](#) (2017) *Nanomedicine: Nanotechnology, Biology, and Medicine*, 13 (2), pp. 681-691.
  - Caputo, D., Papi, M., Coppola, R., Palchetti, S., Digiaco, L., Caracciolo, G., Pozzi, D. [A protein corona-enabled blood test for early cancer detection](#) (2017) *Nanoscale*, 9 (1), pp. 349-354.
  - Amici, A., Caracciolo, G., Digiaco, L., Gambini, V., Marchini, C., Tilio, M., Capriotti, A.L., Colapicchioni, V., Matassa, R., Familiari, G., Palchetti, S., Pozzi, D., Mahmoudi, M., Laganà, A. [In vivo protein corona patterns of lipid nanoparticles](#) (2017) *RSC Advances*, 7 (2), pp. 1137-1145.
  - Digiaco, L., Digman, M.A., Gratton, E., Caracciolo, G. [Development of an image Mean Square Displacement \(iMSD\)-based method as a novel approach to study the intracellular trafficking of nanoparticles](#) (2016) *Acta Biomaterialia*, 42, pp. 189-198.
  - Palchetti, S., Digiaco, L., Pozzi, D., Peruzzi, G., Micarelli, E., Mahmoudi, M., Caracciolo, G. [Nanoparticles-cell association predicted by protein corona fingerprints](#) (2016) *Nanoscale*, 8 (25), pp. 12755-12763.
  - Colapicchioni, V., Tilio, M., Digiaco, L., Gambini, V., Palchetti, S., Marchini, C., Pozzi, D., Occhipinti, S., Amici, A., Caracciolo, G. [Personalized liposome-protein corona in the blood of breast, gastric and pancreatic cancer patients](#) (2016) *International Journal of Biochemistry and Cell Biology*, 75, pp. 180-187.
  - Cardarelli, F., Digiaco, L., Marchini, C., Amici, A., Salomone, F., Fiume, G., Rossetta, A., Gratton, E., Pozzi, D., Caracciolo, G. [The intracellular trafficking mechanism of Lipofectamine-based transfection reagents and its implication for gene delivery](#) (2016) *Scientific Reports*, 6, art. no. 25879
  - Ojeda, E., Puras, G., Agirre, M., Zarate, J., Grijalvo, S., Eritja, R., Digiaco, L., Caracciolo, G., Pedraz, J.-L. [The role of helper lipids in the intracellular disposition and transfection efficiency of niosome formulations for gene delivery to retinal pigment epithelial cells](#) (2016) *International Journal of Pharmaceutics*, 503 (1-2), pp. 115-126.
  - Palchetti, S., Colapicchioni, V., Digiaco, L., Caracciolo, G., Pozzi, D., Capriotti, A.L., La Barbera, G., Laganà, A. [The protein corona of circulating PEGylated liposomes](#) (2016) *Biochimica et Biophysica Acta - Biomembranes*, 1858 (2), pp. 189-196.
  - Caracciolo, G., Palchetti, S., Colapicchioni, V., Digiaco, L., Pozzi, D., Capriotti, A.L., La Barbera, G., Laganà, A. [Stealth Effect of Biomolecular Corona on Nanoparticle Uptake by Immune Cells](#) (2015) *Langmuir*, 31 (39), pp. 10764-10773.
  - Pozzi, D., Caracciolo, G., Digiaco, L., Colapicchioni, V., Palchetti, S., Capriotti, A.L., Cavaliere, C., Zenezini Chiozzi, R., Puglisi, A., Laganà, A. [The biomolecular corona of nanoparticles in circulating biological media](#) (2015) *Nanoscale*, 7 (33), pp. 13958-13966.
- Patents**
- Italian patent: "Metodo per coadiuvare la diagnosi precoce dell'adenocarcinoma del pancreas" 22/07/2019. Id: 102019000012555
  - Italian patent: "Test sierologico a ossido di grafene per la diagnosi e il monitoraggio del glioblastoma multiforme". Patent filed 26-05-2020
  - International patent (P.C.T.) "A method to assist in the early diagnosis of pancreatic adenocarcinoma". Application number: PCT/IB2020/056251 - 12 - date 02-07-2020