

Irene de Lázaro, Ph.D.

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EDUCATION

- 2015** **Ph.D. in Regenerative Medicine**, University College London (UCL).
- 2011** **M.Sc. in Drug Delivery**, School of Pharmacy, University of London (now UCL).
- 2009** **PharmD in Pharmacy**, University of Alcalá, Madrid, Spain.

RESEARCH EXPERIENCE

- 2023-** **Assistant Professor of Biomedical Engineering** (tenure-track), Department of Biomedical Engineering, NYU Tandon School of Engineering, NYC, New York, USA
- 2022 - 23** **Research Assistant Professor of Biomedical Engineering**, Department of Biomedical Engineering, NYU Tandon School of Engineering, NYC, New York, USA
- 2021 -23** **Research Associate in Bioengineering**, Harvard John A. Paulson School of Engineering and Applied Sciences and Wyss Institute for Biologically Inspired Engineering, Cambridge, MA, USA
- 2018 -21** **Postdoctoral Fellow in Bioengineering**, Harvard John A. Paulson School of Engineering and Applied Sciences and Wyss Institute for Biologically Inspired Engineering, Cambridge, MA, USA
Faculty Advisor: David J Mooney, Robert P. Pinkas Family Professor of Bioengineering
- 2015-17** **Postdoctoral Fellow in Regenerative Therapeutics**, Faculty of Biology, Medicine and Health, University of Manchester, Manchester, UK
Faculty Advisor: Kostas Kostarelos, Professor and Chair of Nanomedicine
- April 2016** **Visiting post-doctoral researcher**. *Training in a mouse model of myocardial infarction*. Heart Centre Leipzig, University of Leipzig, Germany. Prof. Volker Adams.
- 2011-15** **PhD Thesis**. “*In vivo* cell reprogramming to pluripotency: generating induced pluripotent stem cells *in situ* for tissue regeneration”.
UCL School of Pharmacy, University College London, UK.
Faculty Advisor: Kostas Kostarelos, Professor and Chair of Nanomedicine
- 2010-11** **MSc thesis**. “*Multicellular tumor spheroids as in vitro three-dimensional model for the assessment of carbon nanotubes uptake*”. The School of Pharmacy, University of London, UK.

- 2008-09** **“Excellence in Academia” research internship (Education Council, Madrid).** *“Development of a medicinal formulation with microencapsulated albumin”*.
UAH, School of Pharmacy, Department of Pharmaceutics and Pharmaceutical Technology.
- 2008** **JAE-CSIC Introduction to Research Internship.** *“Synthesis of multifunctional molecules with cholinergic properties for the treatment of Alzheimer’s disease”*.
Institute of Medicinal Chemistry (IQM), Spanish National Research Council (CSIC), Madrid, Spain.
- 2004-07** **Research Assistant.** *Research support to the Departments of Parasitology and Microbiology.*
UAH, School of Pharmacy, Department of Pharmaceutics and Pharmaceutical Technology.

PUBLICATIONS

^Denotes equal contribution; ‡ Denotes corresponding author

Manuscripts under Review (also available as preprints)

1. **de Lázaro, I.**; Orejon-Sanchez, TL.; Tringides, CM. and Mooney, DJ. Induced reprogramming of adult murine cardiomyocytes to pluripotency in vivo.
Available as preprint in bioRxiv 2021, doi: <https://doi.org/10.1101/2021.12.22.473302>
2. Elosegui-Artola, A.; Gupta, A.; Najibi, A.; Seo, B.; Garry, R.; Tringides, C.; **de Lázaro, I.**; Darnell, M.; Gu, W.; Zhou, Q.; Weitz, D.; Mahadevan, L. and Mooney, DJ. Matrix viscoelasticity controls spatio-temporal tissue organization.
Available as preprint in bioRxiv 2022, doi: <https://doi.org/10.1101/2022.01.19.476771>

Manuscripts as corresponding or co-corresponding author

3. Armstrong, J. ‡; **de Lázaro, I. ‡**; Kirkland, K. ‡; Poon, W‡. and Sindhvani, S‡. Community-driven online initiatives have transformed scientific engagement. *Nature Review Materials* 2021, 6 (11): 963-965.
4. Kisby, Y., **de Lázaro, I. ‡**; Fisch, S.; Cartwright, E.; Cossu, G. and Kostarelos, K.‡ Adenoviral mediated delivery of OSKM factors induces partial reprogramming of mouse cardiac cells in vivo. *Adv Therapeutics* 2021, 4 (2): 2000141.
5. **de Lázaro, I. ‡** and Kostarelos, K. Exposure to graphene oxide sheets alters the expression of reference genes used for real-time RT-qPCR normalization. *Scientific Reports* 2019, 91: 1-10.

Other papers in peer-reviewed journals

6. Seo, BR.; Payne, CJ.; McNamara, SL.; Freedman, BR.; Kwee, BJ.; Nam, S.; **de Lázaro, I.**; Darnell, M.; Alvarez, JT.; Dellacherie, MO.; Vandenberg, HH.; Walsh, CJ. And Mooney, DJ‡. Skeletal muscle regeneration with robotic actuation-mediated clearance of neutrophils. *Science Translational Medicine* 2021, 13 (614), eabe8868.
7. **de Lázaro, I.** and Mooney, DJ.‡ Obstacles, opportunities, and a forward look to cancer nanomedicine. *Nature Materials* 2021, 20: 1469-1479.

8. Tringides, C.; Vachicouras, N.; **de Lázaro, I.**; Wang, H.; Trouillet, A.; Seo, BR.; Elosegui-Artola, A.; Fallegger, F.; Shin, Y.; Casiraghi, C.; Kostarelos, K., Lacour, S. and Mooney, DJ. † Fully viscoelastic surface electrode arrays to interface with viscoelastic tissues. *Nature Nanotechnology* 2021, 16: 1019-1029.
9. Kisby, T.; **de Lázaro, I.**; Stylianiou, M.; Cossu, G. and Kostarelos, K. † Transient reprogramming of mouse and rat neonatal cardiomyocytes to a de-differentiated proliferative state. *PLoS ONE* 2021, 16(5): e0251054.
10. **de Lázaro, I.**, Sharp, P., Gurcan, C.; Ceylan, A.; Stylianiou, M.; Kisby, T.; Chen, Y.; Vranic, S.; Barr, K.; Hadiseh, T.; Ozen, A.; Busy, C.; Yilmazer, A. and Kostarelos, K. † Deep tissue translocation of graphene oxide sheets in human glioblastoma 3D spheroids and an orthotopic xenograft model. *Adv Therapeutics* 2021, 4(1): 2000109.
11. Gonzalez-Pujana[^], A.; **de Lázaro, I.**[^]; Vying, K.; Santos-Vizcaino, E.; Igartua, M.; Hernandez-Martin, R; Mooney, DJ. † 3D encapsulation and inflammatory licensing of mesenchymal stromal cells alter the expression of common reference genes used in real-time RT-qPCR. *Biomaterials Science* 2020, 8 (23): 6741-6753.
12. Newman, L.; Jasim, D.; Prestat, E.; Lozano, N.; **de Lázaro, I.**; Nam, Y.; Bussy, C. and Kostarelos, K. † Splenic capture and in vivo intracellular biodegradation of biological-grade graphene oxide sheets. *ACS Nano* 2020, 14 (8): 10168-10186.
13. **de Lázaro, I.** and Mooney, DJ. † A nanoparticle's pathway into tumours. *Nature Materials* 2020, 19: 486-487.
14. Quintanilla, M.; Garcia, I.; **de Lázaro, I.**; Garcia-Alvarez, R.; Henriksen-Lacey, M.; Vranic, S.; Kostarelos, K. and Liz-Marzan, L. † Thermal Monitoring during Photothermia: Hybrid Probes for Plasmonic Heating and Near-Infrared Optical Nanothermometry. *Theranostics* 2019, 9.
15. **de Lázaro, I.**; Vranic, S.; Marson, D.; Rodrigues, A.F; Buggio, M.; Mazza, M.; Possoco, P.; Kostarelos, K. † Graphene oxide as 2D platform for complexation and intracellular delivery of siRNA. *Nanoscale* 2019, 11(29): 13863-13877.
16. **de Lázaro, I.**; Yilmazer, A.; Nam, Y.; Qubisi, S.; Razak, F.; Degens, H.; Cossu, G.; Kostarelos, K. † Non-viral induction of transient cell reprogramming in mouse skeletal muscle to enhance tissue regeneration. *Mol Therapy* 2019, 27 (1): 59-75.
17. **de Lázaro, I.**; Cossu, G. † and Kostarelos, K. † Transient transcription factor (OSKM) expression is key towards clinical translation of in vivo cell reprogramming. *EMBO Mol Med* 2017, 9 (6): 733-736.
18. **de Lázaro, I.** and Kostarelos, K. † Optical diagnostics: Nanosensors for liquid biopsies. *Nature Biomedical Engineering* 2017, 1, 0063.
19. Vincent, M.[^]; **de Lázaro, I.**[^]; Kostarelos, K. † Graphene materials as 2D non-viral gene transfer vector platforms. *Gene Therapy* 2017, 1-10.
20. **de Lázaro, I.** & Kostarelos, K. † Engineering cell fate for tissue regeneration by in vivo transdifferentiation. *Stem Cells Rev and Rep* 2016, 12, 129-139.
21. Yilmazer, A. †; **de Lázaro, I.**; Hadiseh, T. Reprogramming cancer cells: a novel approach for cancer therapy or a tool for disease-modelling? *Cancer Letters* 2015, 369, (1), 1-8.

22. Mazza, M.; Hadjidemetriou, M.; **de Lázaro, I.**; Bussy, C.; Kostarelos, K. ‡ Peptide Nanofiber Complexes with siRNA for Deep Brain Gene Silencing by Stereotactic Neurosurgery. *ACS Nano* 2015, 9, (2), 1137-49.
23. **de Lázaro, I.**; Bussy, C.; Yilmazer, A.; Jackson, M. S.; Humphreys, N. E.; Kostarelos, K. ‡ Generation of induced pluripotent stem cells from virus-free *in vivo* reprogramming of BALB/c mouse liver cells. *Biomaterials* 2014, 35, (29), 8312-20.
24. **de Lázaro, I.**; Yilmazer, A.; Kostarelos, K. ‡ Induced pluripotent stem (iPS) cells: a new source for cell-based therapeutics? *J Control Release* 2014, 185, 37-44.
25. **de Lázaro, I.**; Kostarelos, K. ‡ *In vivo* cell reprogramming to pluripotency: exploring a novel tool for cell replenishment and tissue regeneration. *Biochemical Society Transactions* 2014, 42, (3), 711-716.
26. Yilmazer, A.; **de Lázaro, I.**; Bussy, C.; Kostarelos, K. ‡ *In vivo* reprogramming of adult somatic cells to pluripotency by overexpression of Yamanaka factors. *JoVE* 2013, 17, (82)
27. Yilmazer A, **de Lázaro I**, Bussy C, Kostarelos, K. ‡ *In Vivo* Cell Reprogramming towards Pluripotency by Virus-Free Overexpression of Defined Factors. *PLoS ONE* 2013 8(1): e54754.

Book chapters

1. **de Lázaro, I.** ‡ *In vivo* cell reprogramming to pluripotency: proof of concept. In: *In vivo* Reprogramming in Regenerative Medicine. Springer: Stem Cell Biology and Regenerative Medicine Series, 2017.
2. **de Lázaro, I.** & Kostarelos, K. ‡ *In vivo* reprogramming towards pluripotency for tissue repair and regeneration. In: *In vivo* Reprogramming in Regenerative Medicine. Springer: Stem Cell Biology and Regenerative Medicine Series, 2017.

ORAL PRESENTATIONS & TALKS

Invited

1. **Seminar for CIC biomaGUNE.** “*In vivo* reprogramming: from proof of principle towards applications in tissue regeneration”. CIC biomaGUNE, San Sebastian, Spain, February 2022.
2. **Seminar for the Berlin Institute of Health at Charité.** “*In vivo* reprogramming: from proof of principle towards clinical translation”. Charité Universität Medizin, Berlin, Germany, June 2021.
3. **Seminar for the Department of Physiology and Cellular Biophysics, Columbia University.** “*In vivo* cardiomyocyte reprogramming: from proof of principle towards myocardial regeneration”. Columbia University, NYC, USA, June 2021.
4. **Seminars in Biomedical Science:** “*In situ* epigenetic cell reprogramming for tissue regeneration”. Imperial College London (virtual), February 2021.

5. **GRC Tissue Repair and Regeneration:** “Epigenetic memory in tissue repair and regeneration” **Invited discussion leader.** Gordon Research Conference. New London, NH, USA, June 2017.

Selected from Abstract Submission

6. **Biomedical Engineering Society (BMES, Annual Meeting):** “In Vivo Cell Reprogramming: from Proof-of-Principle towards Applications in Tissue Regeneration”. Orlando (USA), October 2021.
7. **Biomedical Engineering Society (BMES, Annual Meeting):** “Graphene Oxide (GO) Based Vaccines to Induce Antigen-Specific Immune Tolerance”. Virtual, October 2020.
8. **International Society for Stem Cell Research (ISSCR, Annual Meeting):** “Transient reprogramming of mouse and rat cardiomyocytes *in vitro* and *in vivo*”. Virtual, June 2020.
9. **Graphene for US:** “A Graphene Oxide 2D Platform for Intracellular siRNA Delivery”. Phantoms Foundation. New York, USA, February 2018.
10. **XXV Workshop Advances in Molecular Biology by Spanish Researcher Abroad:** “A graphene oxide 2D platform for siRNA intracellular delivery”. National Center for Biotechnology. Spanish National Research Council, Madrid, Spain, December 2017.
11. **BSGCT and UKRMP joint Annual Conference:** “*In vivo* reprogramming to a transient pluripotent-like state enhances regeneration of injured skeletal muscle”. British Society of Gene and Cell Therapy. UK Regenerative Medicine Platform. Cardiff, UK, April 2017.
12. **XXIII Workshop Advances in Molecular Biology by Spanish Researcher Abroad:** “*In vivo* reprogramming towards pluripotency: perspectives in regenerative medicine”. National Center for Biotechnology. Spanish National Research Council, Madrid, Spain, December 2015.
13. **Cell Therapy today: achievements, hopes and hypes:** “*In vivo* reprogramming to pluripotency enhances regeneration and functional rehabilitation of injured skeletal muscle”. EMBO Conference. Manchester, UK, September 2015.
14. **Tissue Repair and Regeneration. Exploring Innovations in Tissue Repair and Regeneration: From Bench to Therapies:** “*In vivo* reprogramming to pluripotency enhances regeneration and functional rehabilitation of injured skeletal muscle”. Gordon Research Seminar. New London, NH, USA, June 2015.
15. **The Biology of Regenerative Medicines:** “Teratoma-free *in vivo* reprogramming to pluripotency in the mouse liver and generation of i²PS cells”. Wellcome Trust Conference, Cambridge, UK, April 2015.
16. **Biochemical Determinants of Tissue Regeneration:** “*In vivo* reprogramming to pluripotency as a strategy for tissue regeneration”. Biochemical Society Annual Symposium, Macclesfield, UK, December 2013.

17. **Regenerative Medicine: from Biology to Therapy:** “Generation and characterisation of *in vivo* induced pluripotent stem (i²PS) cells”. Wellcome Trust Conference, Cambridge, UK, November 2013.

TEACHING & ADVISING EXPERIENCE

Guest lecturer

Harvard SEAS: Tissue Engineering (BE 125/ES 230): under- and postgraduate course (2019-2022)

Advising Experience

Graduate students (officially listed as PhD advisor or co-advisor)

1. Dr Thomas Kisby (University of Manchester, 2016-20)
Current affiliation: Postdoctoral Fellow at University of Manchester.

Other graduate students

2. Nuria Lafuente Gomez (IMDEA Nanoscience, Madrid, 2021 – 22)
3. Dr Yein Nam (University of Manchester, 2015-17)
Current affiliation: Consultant at IQVIA (UK).

Master students

1. Ahmed Ben Romdhane (EPFL student visiting Harvard University, 2021- 22)
2. Tiara Luna Orejon Sanchez (University of Applied Sciences Vienna student visiting Harvard University, 2021)
3. Daniel Nakhaee-Zadeh Gutierrez (EPFL student visiting Harvard University, 2019-20)
Current affiliation: co-founder at Adaptyv Biosystems (EPFL startup)
4. Faziela Maizatul (University of Manchester, 2014-15)
5. Dr Sarah Qubisi (University College London, 2012-13)
Current affiliation: Research Technician at the University of Auckland

Undergraduate students

1. Tomasz Cienkowski (Harvard SEAS, Summer 2020)
2. Mila Solaja (Harvard SEAS, Summer 2020)
3. Abena Peasah (MIT, REU Summer Program for underrepresented minorities, 2019).
Current: PhD student at Stanford University.

4. Bowen Chen (Harvard College, Spring 2019).

FELLOWSHIPS & AWARDS

Fellowships

- 2022 Ramon y Cajal Fellowship (RyC) 2021** (proposal reference: RYC2021-032212-I, score 92,40/100), Ministry of Science and Innovation, Spain. **5-year salary + €42,000** research funds. Declined.
- 2022 Ikerbasque Research Fellowship**, postdoctoral fellowship from the Basque Foundation for Science. **5-year salary + €4,500** research funds. Declined.
- 2012 PhD Fellowship, UCL School of Pharmacy.**
- 2009 Postgraduate Fellowship, Obra Social La Caixa.** Postgraduate fellowship awarded by Obra Social La Caixa, to undertake post-graduate studies in Great Britain. **£60,000 over 2 years.**
- 2004-7, 2009 Excellence in Academia Undergraduate Fellowship.** Awarded by the Education Council (Madrid, Spain) to undertake undergraduate research. **€4,500/year.**
- 2008 JAE-CSIC Intro.** Undergraduate summer fellowship to undertake research at the Spanish National Research Council, Institute of Medicinal Chemistry. **€3,000.**

Research Grants

- 2021 - 24** Initiative Advanced Biomedical Instrumentation (The University of Hong Kong, Hong Kong Special Administrative Region Government– Harvard University). Cardiac Regeneration through Partial Reprogramming of Cardiomyocytes. (**\$337,401**, role: **Co-PI**).
- 2019 - 23** International Centre-to-Centre grant, Engineering and Physical Sciences Research Council (EPSRC, UKRI). Van der waal heterostructures of 2D materials. Awarded to the University of Manchester, Harvard University and National University of Singapore. (Award number: EP/S030719, **£1.5M**, role: **team member, prepared proposal**).
- 2017** Internal equipment grant from the University of Manchester. Purchase of a muscle physiology testing suite. (**£20,000**, role: **Co-PI**).
- 2016** Research Grant, Royal College of Surgeons of Edinburgh (UK). In vivo reprogramming of the AV loop. (Award number: KAE WONJ4, **£10,000**, role: **Co-PI**).

Awards

- 2019 Best Poster Award.** Cancer Tissue Engineering Collaborative meeting, National Cancer Institute (NCI/NIH), USA.
- 2015 Lecture Award, Second Prize.** 3rd International Symposium SRUK/CERU, Society of Spanish Researchers in the United Kingdom.

- 2015 Best Poster Award.** The Biology of Regenerative Medicines. Wellcome Trust Conference, awarded by Faculty of 1000.
- 2014 Best Lecture Award.** PhD Research Day, UCL School of Pharmacy, University College London.
- 2013 Best Poster Award.** Annual Symposium Biochemical Society. Biochemical Determinants of Tissue Regeneration.
- 2012 Best Poster Award.** PhD Research Day, UCL School of Pharmacy, University College London
- 2011 National Awards for the Excellence in Academic Performance.** Ministry of Education, Spanish Government.
- 2009 Three Awards to DPharm trajectory** granted by (i) **University of Alcalá**, (ii) **Pharmaceutical Council** (Madrid, Spain) and (iii) **Normon Laboratories**.
- 2004 Baccalaureate Award with Special Distinction**, awarded by the Education Council (Castilla la Mancha, Spain) to the best academic qualifications in Baccalaureate in Castilla La Mancha region, Spain.
- 2004 XVII National Chemistry Olympiad, second prize** awarded by: Ministry of Science and Education, University of León, Spanish Royal Society of Chemistry and National Association of Chemists (Spain).
- 2004 Regional Chemistry Olympiad, Madrid. First prize** awarded by Association of Chemists (Madrid) and Chemistry Council (Madrid).

PROFESSIONAL SERVICE

Organization of Scientific Conferences and Seminars

- 2019- 22 **Topics in Bioengineering**, weekly seminar series (>1,000 registered attendees)
Lead organizer and host, Harvard SEAS area of Bioengineering ([About](#))
- 2021 **Annual Meeting of the Controlled Release Society (CRS)** ([About](#))
Virtual. Organization of the events related to the Young Scientist Committee.
- 2020 **The Dark Side of Science: Misconduct in Biomedical Research**, a discussion with Science Integrity consultant Dr Elisabeth Bik, (>600 attendees). ([About](#))
Organizer and host, Harvard SEAS
- 2019 **GRS Tissue Repair and Regeneration** ([About](#))
Chair, Gordon Research Seminar, NH, USA
- 2017 **GRS Tissue Repair and Regeneration** ([About](#))
Vice-Chair, Gordon Research Seminar, NH, USA

Peer-review activity (journal publications)

Reviewer for several journals including *ACS Nano*, *Biomaterials*, *Small*, *Current Biology*, *Regenerative Engineering and Translational Medicine*, *Transactions in Nanotechnology*, *Toxicology Research*, *Frontiers in Microbiology* and *F1000*.

Peer-review activity (funding and grant awards)

2021 External expert for FLAG-ERA Joint Translational Call (JTC) 2021, funded by the European Union.

2019 External expert for FLAG-ERA Joint Translational Call (JTC) 2019, funded by the European Union.

Educational Outreach

2015-17 **Cervantes Institute (Manchester, UK).** ([About](#))

Advisor and collaborator in the Scientific Events program “*Spain: science is the key*”.

2012-17 **Society of Spanish Researchers in the United Kingdom (SRUK/CERU)** ([About](#))

Northwest Constituency – Director (2015-17).

London Constituency – Member of the Working Group (2012-14).

Founding Member (2012).

Other service

2021 Abstract reviewer **Biomedical Engineering Society (BMES)** Annual Meeting 2021.

2021 Abstract reviewer **Controlled Release Society (CRS)** Annual Meeting 2021.

2021 Participated as speaker in the **Mentoring Session** of the **Research Days**, Organized by the Society of Pharmacy Students, **University of Valencia, Spain** ([About](#))

2020-present Member of the **Diversity, Equity and Inclusion (DEI)** working group at the Mooney Laboratory, Harvard John A. Paulson School of Engineering and Applied Sciences

2020-present Member of the **Young Scientist Committee (YSC)** or the **Controlled Research Society (CRS)** ([About](#))

2020 Participated in **Pathways for Women in STEM** panel, **Harvard Women in STEM Mentoring Community** ([About](#))

2018 Selected to participate in the Science Diplomacy Program “**Ambassadors for Science**” from the **Spanish Foundation for Science and Technology (FECYT)** and the **Office for Cultural and Scientific Affairs of the Spanish Embassy in London** ([About](#))

2016-20 **Ambassador for ASAPbio** (Accelerating Science and Publication in Biology) to promote Open Science and the use of preprint repositories ([About](#))

LANGUAGES

- **Spanish:** Native speaker.
- **English:** Proficiency level accredited by British Council, IELTS overall score 8/9.
- **German:** Intermediate (B1) level accredited by Spanish National School of Languages (EOI).