Ph.D. Estibaliz Gómez de Mariscal

Postdoc fellowship at Heriques Lab
Optical Cell Biology
Instituto Gulbenkian de Ciência
Oeiras, Portugal
egomez@igc.gulbenkian.pt

Google Scholar esgomezm @gomez_mariscal
0000-0003-2082-3277 (Researcher ID: C-4637-2018)

EDUCATION

2017 – 2021	**PhD student in Mathematical Engineering** Universidad Carlos III de Madrid, UC3M (Engineering School) Title: *Insights to the characterization of cell motility and intercellular communication through a bioimage analysis perspective* Advisors: **Prof. Arrate Muñoz-Barrutia** (Universidad Carlos III de Madrid) **Prof. Denis Wirtz** (Johns Hopkins University) Grade: (Sobresaliente) *Cum laude* – **Awarded as outstanding thesis**
2015 – 2016	**MSc in Statistical and Computational Data Processing** Universidad Complutense de Madrid, UCM (Faculty of Mathematics) Universidad Politécnica de Madrid, UPM (School of Telecommunications Engineering) Thesis: Processing of IRT images taken under emotional stress situations. Grade: 9/10, Average grade: 8.93/10; Ranking: 5/18
2009 – 2014	**BSc + MSc in Mathematics (5-year degree)** University of the Basque Country (UPV / EHU) (Faculty of Sciences and Technology) ** 2012-2013 Erasmus 11 moths, University of Copenhagen Average grade: 7.82/10; Ranking: 10/38

PROFESSIONAL EXPERIENCE

2022	**EMBO postdoc fellowship ALTF 174-2022:** *A transformative data-driven live-cell super-resolution microscopy development to elucidate the initial steps of effective viral transmission* Instituto Gulbenkian de Ciência, Portugal Group leader: Prof. Ricardo Henriques
2021	**Postdoc fellowship Project EMBO Installation Grant 4734:** *Unveiling live-cell viral replication at the nanoscale* Instituto Gulbenkian de Ciência, Portugal Group leader: Prof. Ricardo Henriques
2017 – 2021	**Personal Investigador Pre-doctoral en formación (PIPF scholarship)** Universidad Carlos III de Madrid, UC3M (Engineering School)
2016 - 2017	**Research support technician** Dep. of bioengineering and aerospace engineering, Universidad Carlos III Madrid. Biomedical imaging and instrumentation group (BiiG). Research supervisor: Prof. Arrate Muñoz Barrutia.
2016	**Biostatistician** LINICAL SPAIN, S.L. (Internship). Statistical analysis and report preparation of pharmaceutical research and competitiveness studies. SAS Base software programmer.

2014 – 2015   **Financial consultant**
MANAGEMENT SOLUTIONS. Management of financial securitizations and information protocols.

SPECIALIZATION COURSES AND SEMINARS

2018   Machine Learning Summer School, Madrid, Spain (MLSS2018)
2018   International Computer Vision Summer School, Sicily, Italy (ICVSS2018).
34% of acceptance ratio.
2017   Summer School of Masaryk University *"Advanced Methods in Biomedical Image Analysis"*

SUPERVISED STUDENTS

2020   M. Calzada García, "*Automatic segmentation of cells in phase-contrast microscopy images*". Final bachelor thesis.
2018   T. Pereira, "On the creation of large microscopy image datasets for robust training of deep-learning methods". Summer research lab student from Johns Hopkins University.
2017   C. Guzmán García, "Microstructure-mechanical property relation of the extracellular matrix in lung cancer", Co-supervisor: Arrate Muñoz Barrutia. Final bachelor thesis.

ACADEMIC TEACHING EXPERIENCE

Universidad Carlos III de Madrid:

- **Master in Information and health engineering:**
  Biomedical image processing (1st semester, teaching assistant) 2019, 2020
- **Bachelor in biomedical engineering:**
  Medical image processing (2nd semester, teaching assistant) 2018, 2019, 2020
  Biomedical microdevices (2nd semester, teaching assistant) 2018, 2019
  Transport phenomena in biomedical engineering (1st semester, students support) 2017

FACULTY IN COURSES, SUMMER SCHOOLS, SEMINARS, AND INVITED TALKS

2022   E. Gómez-de-Mariscal, "Deep-Learning with ImageJ and Google Colab", Computational optical biology, EMBO Practical Course, Instituto Gulbenkian de Ciência, Portugal, 2nd - 7th October 2022. Web site.
2022   E. Gómez-de-Mariscal, "Deep Learning Community Tools", Deep Learning for Microscopy Image Analysis school, Marine Biological Lab (MBL), WoodsHole, USA, 2022, 26th August – 6th September 2022. Web site.
2022   E. Gómez-de-Mariscal, "FAIRy Deep Learning for BioImage Analysis", Open Source Microscopy Symposium, Open Neuroscience, FENS Forum, Paris, France, 8th July, 2022. Web site.
2022   E. Gómez-de-Mariscal, "Deep learning tools for 3D segmentation…and more", 3D Developmental Imaging, EMBO Practical Course, Instituto Gulbenkian de Ciência, Oeiras, Portugal, 1st July – 9th July 2022. Web site.
2022   E. Gómez-de-Mariscal, "BioImage analysis: from visual to quantitative biology and the other way around", 15th Edition of the Frontiers in Neurophotonics Summer School, CERVO Brain Research Center, Québec City, Canada, 12th June – 22nd June 2022. Web site.
2021   A. Kreshuk, W. Ouyang, E. Gómez-de-Mariscal. Microscopy data analysis: Machine learning and the BioImage Archive, EBI – EMBL course. Web site.
2022   E. Gómez-de-Mariscal, "Bioimage Analysis", 13th Course on Optical Microscopy Imaging for Biosciences, i3S, Instituto de Investigação e Inovação em Saúde, 28th March – 1st April 2022. Web site.

2021   E. Gómez-de-Mariscal, "Open-source ecosystems for user-friendly deep learning workflows in bioimage analysis", BioImage Informatics Finland network, Turku Bioimaging, University of Turku, Findland August 2021. Web site.

2021   E. Gómez-de-Mariscal, G. Jacquemet. "User-friendly face of deep learning for bioimage analysis", Collab + ZCDL4M + Model Zoo, Zurich Image and Data Analysis School (ZIDAS), Lausanne, Switzerland. Web site.

2021   A. Kreshuk, W. Ouyang, E. Gómez-de-Mariscal. Microscopy data analysis: Machine learning and the BioImage Archive, EBI – EMBL course. Web site.

2020   "Deep learning en imagen biomédica", Master in Data Science Seminar, Universidad Rey Juan Carlos de Madrid

2020   I. Arganda-Carreras, R. F. Laine, E. Gómez-de-Mariscal, "WS6: Practical Applications of Deep learning for Bioimage Analysis", Spanish Portuguese Meeting for Advanced Optical Microscopy (SPAOM). Slides and video.

2020   E. Gómez de Mariscal, M. Weigert, "Introduction to Deep Learning", Zurich Image and Data Analysis School (ZIDAS), Lausanne, Switzerland. Materials.

2020   NEUBIAS Bioimage analysts' school 2020, Bordeaux, France. Materials and video.

2019   E. Gómez-de-Mariscal, "New insights on 3D cell migration through the study of cellular protrusions", Seminars on Mechanobiology, CSIC. Video.

2018   I. Arganda-Carreras, E. Gómez de Mariscal, A. Muñoz-Barrutia, S. Tosi, "WS5: Machine Learning - Deep Learning. Applications to Bioimage Analysis", Spanish Portuguese Meeting for Advanced Optical Microscopy (SPAOM). Slides.

ACADEMIC ACTIVITIES AND SERVICES

Reviewer for:
- JCR indexed journals: Nature Methods, Computers in Biology and Medicine, Bioinformatics, Oxford Academics, BMC Bioinformatics, IEEE Transactions on Medical Imaging, Medical Image Analysis.
- Conferences: Medical Imaging with Deep Learning (MIDL), IEEE International Symposium on Biomedical Imaging (ISBI), International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI).

Jury of Master's degree (MSc):

- 2019: Segmentación y extracción del pulmón dañado por infección causada por Micobacteria Tuberculosis en imágenes de TAC, Carmen Guzmán García, Master en Visión Artificial, Universidad Rey Juan Carlos I.

External reviewer for PhD thesis (PhD):

- 2022: Simplifying the usage and construction of deep image classification models, Candidate: Adrián Inés Armas, Supervisors and tutors: Jónathan Heras y Julio Rubio García, Dept. de Matemáticas y Computación, Universidad de la Rioja

2019-20   Representative of Mathematical Engineering PhD program (RD 99/2011), UC3M.

2014   First Joint International Meeting RSME-SCM-SEMA-SIMAI-UMI. Organization support.

FELLOWSHIPS, TRAVEL GRANTS AND PRIZES

2022   **President Innovation Award**, Annual 2022 of **Society of Biomolecular Imaging and Informatics (SBI2)** (1000 USD $)

2022   **EMBO Postdoctoral Fellowship,** "A transformative data-driven live-cell super-resolution microscopy development to elucidate the initial steps of effective viral transmission", Prof. Ricardo Henriques Lab, Instituto Gulbenkian de Ciência, Portugal.

2021   **Outstanding PhD thesis award** of the PhD program in Mathematical Engineering, Universidad Carlos III de Madrid.

2019   **Short Term Scientific Mission, NEUBIAS Cost Action CA15124.** Biomedical Imaging Group, EPFL, Lausanne, Switzerland

2018   **Ayudas para la movilidad de investigadores de la Universidad Carlos III de Madrid en centros de investigación nacionales o extranjeros.**
PhD mobility scholarship.

2017   **Personal Investigador Pre-doctoral en Formación (PIPF)**
PhD scholarship of the Universidad Carlos III de Madrid.

2017   **Best Poster Award (2nd place) in the Summer School of Masaryk University** *"Advanced Methods in Biomedical Image Analysis" for the work Infrared Thermography Processing to Characterize Emotional Stress: A Pilot Study.* E. Gómez de Mariscal, *A. Muñoz-Barrutia, J. de Frutos, A. P. González-Marcos, A. M. Ugena Martínez.*

2015   **Excellence Scholarship**
Master's degree funding, Universidad Complutense de Madrid.

2015   **Master degree scholarship from the Faculty of Mathematics**
Master's degree funding, Universidad Complutense de Madrid.

2014   **Introduction to Mathematical Research scholarship.**
University of the Basque Country, *Riemannian geometry.*

2014   **Partner of Bizkaia-Talent: Best tests of records.**

2012   **Erasmus Scholarship.** Copenhagen University (KU).

SCIENTIFIC DIVULGATION ACTIVITIES

2019   International day of women and girls in science, February 11
"*Filtros de instagram y computer vision contra el cáncer*", Colegio Madre de Dios, Bilbao. 11 de Febrero

2019   International day of women and girls in science, February 11
"*El papel de una tecnóloga en un entorno quirúrgico: soluciones de realidad virtual y aumentada*", IES Julio Verne, Leganés, Madrid. 11 de Febrero

2018   International day of women and girls in science, February 11
"*Ciencia el confeti de la fiesta*", IES Julio Verne, Leganés, Madrid. 11 de Febrero

2018   Week of science activities, UC3M. VisualStem

2014   Divulgation summer course: Cultura con M de Matemáticas, UPV/EHU (Attendance)

RESEARCH STAYS AND VISITS

2019   Biomedical Imaging Group (Prof. Michael Unser). Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland (15 days)

2018   Computer Vision Group (Prof. Thomas Brox). University of Freiburg, Germany. (3 months)

2017   Wirtz lab (Prof. Denis Wirtz). Johns Hopkins University, E.E.U.U. (9 days)

PUBLICATIONS AND CONTRIBUTIONS

JCR JOURNAL PAPERS AND PREPRINTS

[1]   C. Spahn, E. Gómez de Mariscal, R. F. Laine, P. Matos Pereira, L. von Chamier, M. Conduit, M. Gomes de Pinho, G. Jacquemet, S. Holden, M. Heilemann, R. Henriques, "DeepBacs for multi-

task bacterial image analysis using open-source deep learning approaches", Communications Biology, 2022

[2] W. Ouyang*, F. Beuttenmueller*, E. Gómez-de-Mariscal*, C. Pape*, T. Burke, C. Garcia-López-de-Haro, C. Russell, L. Moya-Sans, C. de-la-Torre-Gutiérrez, D. Schmidt, Dominik Kutra, M. Novikov, M. Weigert, U. Schmidt, P. Bankhead, G. Jacquemet, D. Sage, R. Henriques, A. Muñoz-Barrutia, E. Lundberg, F. Jug, A. Kreshuk, "BioImage Model Zoo: A Community-Driven Resource for Accessible Deep Learning in BioImage Anlaysis", bioRxiv 2022

[3] E. Gómez-de-Mariscal, H. Jayatilaka, O. Çiçek, T. Brox, D. Wirtz, A. Muñoz-Barrutia, Search for temporal cell segmentation robustness in phase-contrast microscopy videos, arXiv 2021

[4] P. R. Nair, L. Danilova, E. Gómez-de-Mariscal, D. Kim, R. Fan, A. MuñozBarrutia, E. J. Fertig, D. Wirtz, "MLL1 regulates cytokine-driven cell migration and metastasis", 2021 (submitted).

[5] A. Sneider, Y. Liu, B. Starich, W. Du, C. Marar, N. Faqih, G. Ciotti, J. Ho Kim, S. Krishnan, S. Ibrahim, M. Igboko, A. Locke, D. Lewis, H. Hong, M. Karl, R. Vij, G. Russo, P. Nair, E. Gómez-de-Mariscal, M. Habibi, A. Muñoz-Barrutia, L. Gu, T.S. K. Eisinger, D. Wirtz, "Small extracellular vesicles promote stiffness-mediated metastasis", 2021, (submitted).

[6] E. Gómez de Mariscal, A. Sneider, H. Jayatilaka, J.M. Phillip, D. Wirtz, A. Muñoz-Barrutia "Use of the p-value as a size-dependent function to address practical differences when analyzing large datasets", Scientific Reports, 2021

[7] E. Gómez-de-Mariscal, C. García-López-de-Haro, W. Ouyang, L. Donati, E., Lundberg, M. Unser, A. Muñoz-Barrutia, D. Sage, "DeepImageJ: A user-friendly environment to run deep learning models in ImageJ", Nature Methods, 2021

[8] P. Martín-Gonzalez, E. Gómez de Mariscal, M. E Martino, P. M. Gordaliza, I. Peligros, J. L. Carreras, F. A. Calvo, J. Pascau, M. Desco, A. Muñoz-Barrutia, "Association of visual and quantitative heterogeneity of 18F-FDG PET images with treatment response in locally advanced rectal cancer: A feasibility study", PloS one, 2020

[9] E. Gómez-de-Mariscal, M. Maška, A. Kotrbová, V. Pospíchalová, P. Matula, A. Muñoz-Barrutia, "Deep-Learning-Based Segmentation of Small Extracellular Vesicles in Transmission Electron Microscopy Images", Scientific Reports, 2019

PEER-REVIEWED CONFERENCE PROCEEDINGS

[1] E. Gómez-de-Mariscal, H. Jayatilaka, O. Çiçek, T. Brox, D. Wirtz, A. Muñoz-Barrutia, Search for temporal cell segmentation robustness in phase-contrast microscopy videos, (Short paper) MIDL 2022

[2] P. Martín-González, E. Gómez de Mariscal, M. E. Martino, P. M. Gordaliza, J. L. Carreras, F. A. Calvo, J. Pascau, M. Desco, A. Muñoz-Barrutia, "PET Texture Analysis: Dois it Have Clinical Significance in Locally Advanced Rectal Cancer?," XXXV Congreso Anual de la Sociedad Española de Ingeniería Biomédica (CASEIB'17), 29, 30 Noviembre y 1 Diciembre 2017, Bilbao, Spain (15 minutes talk)

[3] E. Gómez de Mariscal, A. Muñoz-Barrutia, J. Frutos Vaquerizo, A. P. Gonzalez-Marcos, A. M. Ugena Martinez, "Semi-Automatic Processing of Infrared Thermography to Characterize Emotional Stress: A Pilot Study," 8th International Conference of Pattern Recognition Systems (ICPRS'17), 11-13 July, 2017, Madrid, Spain (15 minutes talk)

CONFERENCE ABSTRACTS

[1] E. Gómez-de-Mariscal, C. García-López-de-Haro, C. de-la-Torre-Gutiérrez, R.F. Laine, G. Jacquemet, R. Henriques, D. Sage, A. Muñoz-Barrutia, "Reproducible user-friendly deep learning workflows for microscopy image analysis with deepImageJ", Focus on Microscopy, 2022 (15 minutes talk)

[2] E. Gómez-de-Mariscal, C. García-López-de-Haro, A. Muñoz-Barrutia, D. Sage, "Deep Learning-based bioimage processing in one click with deepImageJ", Bioimage informatics, Institut Pasteur, 2021 (25 minutes talk)

[3] E. Gómez-de-Mariscal, C. García-López-de-Haro, A. Muñoz-Barrutia, D. Sage, "Deep Learning prediction for microscopy imaging with ImageJ", Crick BioImage Analysis Symposium (CBIA), 2021 (Poster)

[4] E. Gómez-de-Mariscal, C. García-López-de-Haro, A. Muñoz-Barrutia, D. Sage, "DeepImageJ: Bridging Deep Learning to ImageJ", European Light Microscopy Initiative, (ELMI), 2021 (15 minutes talk)

[5] E. Gómez de Mariscal, A. Sneider, H. Jayatilaka, J.M. Phillip, D. Wirtz, A. Muñoz-Barrutia "Use of the p-value as a size-dependent function: model and applications", Spanish & Portuguese Advanced Optical Microscopy Meeting (SPAOM), 2020 (poster)

[6] E. Gómez de Mariscal, A. Sneider, H. Jayatilaka, J.M. Phillip, D. Wirtz, A. Muñoz-Barrutia "Use of the p-value as a size-dependent function: model and applications", NEUBIAS Symposium Bordeaux, 2020 (poster)

[7] E. Gómez-de-Mariscal, C. García-López-de-Haro, L. Donati, M. Unser, A. Muñoz-Barrutia, D. Sage, "DeepImageJ: Bridging Deep Learning to ImageJ", 2020 IEEE International Symposium on Biomedical Imaging (ISBI), 2020 (15 minutes talk)

[8] E. Gómez-de-Mariscal, M. Maška, A. Kotrbová, V. Pospíchalová, P. Matula, A. Muñoz-Barrutia, "Universal extracellular vesicle segmentation method in TEM images", Spanish & Portuguese Advanced Optical Microscopy Meeting (SPAOM), 2019 (poster)

[9] E. Gómez-de-Mariscal, C. Guzmán-García, I. Andreu, M. Santiago, M.J. Pajares, C.J. Conti, C. Ortiz de Solorzano, M.R. Elizalde, and A. Muñoz-Barrutia, "Quantification of Collagen I degradation in lung cancer biopsies", 18th European Light Microscopy Initiative Meeting (ELMI), 2018 (poster)

[10] E. Gómez-de-Mariscal, M. Maška, A. Kotrbová, V. Pospíchalová, P. Matula, A. Muñoz-Barrutia, "Fully automatic exosomes segmentation in transmission electron microscopy images", Spanish & Portuguese Advanced Optical Microscopy Meeting (SPAOM), 2018 (poster)

[11] E. Gómez-de-Mariscal, H. Jayatilaka, H. J. Kim, P. Tyle, M. Matsuda, D. Wirtz, A. Munoz-Barrutia, "Automatic segmentation of cell protrusions in low magnification phase contrast microscopy videos", 2018 IEEE International Symposium on Biomedical Imaging (ISBI), 2018 (poster)

[12] P. Martín-González, E. Martino, P. M. Gordaliza, E. Gómez de Mariscal, J. L. Carreras, F. A. Calvo, J. Pascau, M. Desco, A. Muñoz-Barrutia, "Heterogeneity Analysis in ^{18}F-FDG FET/CT: Does it Have Clinical Significance for Evaluating the Response to Chemoradiotherapy in Locally Advanced Rectal Cancer?," Prediction and Modeling of Response to Molecular and External Beam Radiotherapies, Workshop of the European Association for Cancer Research, 20-23 September 2017, Le Bono, France (15 minutes talk)

BOOK CHAPTERS

[1] E. Gómez de Mariscal, D. Franco, A. Muñoz-Barrutia, I. Arganda-Carreras. "Building a Bioimage Analysis Workflow using Deep Learning", NEUBIAS Bioimage Analysis Series, Springer, 2021

SCIENTIFIC COMMUNICATION BLOG ENTRIES

[1] E. Gómez de Mariscal, C. de-La-Torre-Gutiérrez, A. Muñoz-Barrutia, D. Sage, DeepImageJ: Deep learning in bioimage analysis for dummies, FocalPlane 2021

[2] Daniel Sage, E. Gómez-de-Mariscal, Laurène Donati, Michael Unser, A. Muñoz-Barrutia, Deep Learning for Bio-Image Analysis in one Click, Behind the paper, Nature Methods, Springer Nature Protocols and Methods Community, 2021

CONTRIBUTIONS TO OPEN-SOURCE SCIENCE

[1] DeepImageJ (software tool). Major contribution associated with a publication. [Web site and access to the code.](#)

[2] BioImage Model Zoo (collaborative initiative). Major contribution. [Web site](#).

[3] ZeroCostDL4Mic (software tool). Minor contribution to build software connections with other tools (deepImageJ and the BioImage Model Zoo). [Web site and access to the code.](#)

[4] DeepBacs (software tool). Minor contribution to adapt existing software to bacteria microscopy imaging. [Web site and access to the code.](#)

[5] Cell Tracking Challenge (challenge). Minor contribution to support the reproducibility and reusability of submissions. [Web site](#).

[6] pMoSS (software tool). Major contribution associated with a publication. [Access to the code](#).

[7] FRU-Net exosome segmentation (software tool). Major contribution associated with a publication. [Access to the code](#).

PARTICIPATION IN FUNDED PROJECTS

06/2020 - 05/2023	Plataforma de imagen multi-escala para acelerar el desarrollo de fármacos contra infecciones pulmonares (Ref: PID2019-109820RB-I00), Ministerio de Ciencia e Innovación, Universidad Carlos III de Madrid Lead-PI: Arrate Muñoz Barrutia, Co-PI: Juan José Vaquero López, 210.298€
09/2017 - 03/2019	Plataforma computacional para la caracterización de la dinámica espacio-temporal de las protrusiones celulares, BBVA Foundation – LEONARDO Program, Universidad Carlos III de Madrid Lead-PI: Arrate Muñoz Barrutia, 35.000€
12/2016 - 12/2019	Imagen paramétrica del cerebro embrionario: Una nueva propuesta de instrumentación biomédica de altas prestaciones (Ref: TEC2016-78052-R), Spanish Ministry of Economy and Competitiveness, Universidad Carlos III de Madrid Lead-PI: Arrate Muñoz Barrutia, Co-PI: Juan José Vaquero López, 158.510€
05/2017 – 04/2018	Descifrando la estructura y la función de las protrusiones celulares en la migración tridimensional (TEC2015-73064-EXP), Spanish Ministry of Economy and Competitiveness, Universidad Carlos III de Madrid Lead-PI: Arrate Muñoz Barrutia, 40.000€
01/2014 – 12/2016	Imaging and measuring cancer cell mechanics (Ref.: TEC2013-48552-C2), Spanish Ministry of Science and Innovation, Fundación para la Investigación Médica Aplicada (FIMA), Centro de Estudios e Investigaciones Técnicas (IK4-CEIT) Lead-PI: Arrate Muñoz Barrutia, 133.000€

Danish Beginners level 1.

LANGUAGES

English Advanced writing and speaking level.
IELTS October, 2014: 7.00

Basque C1 Level

COMPUTER SKILLS

Statistical analysis: R, SAS Base, SAS Enterprise Guide, SPSS

Programming: Python, Matlab, Wolfram Mathematica

Deep Learning and Big Data: Keras, TensorFlow,
SAS Enterprise Miner