

EUROPASS
CURRICULUM VITAE



PERSONAL INFORMATION



Name and
surname

FRANCESCA CIARPELLA

Address

RESIDENCE: VIA C.COLOMBO, 40 – 63821 PORTO SANT'ELPIDIO (FM), ITALY

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Nationality

Italian

Date of birth

01/08/1991

WORK EXPERIENCE

- Date (from – to)
- Name and address of employer
- Position held
- Main activities and responsibilities

May 2019 – ongoing

University of Verona, Department of Diagnostic and Public Health – Sect. of Pharmacology, under the supervision of Prof.ssa Decimo Ilaria.

Post-doctoral fellowship

Involvement in developing advanced therapies for the cure of Spinal Cord Injury: cell-based transplantation and metabolic reprogramming. Cell-based therapies, *in vivo* mice handling, ex-vivo analysis (immunofluorescence), *in vitro* cell production and characterization.

Involvement in the project funded by A.M.Me.C. - Associazione malattie metaboliche congenite "Understanding the neuropathological phenotype of NUBPL-related disease in an *in vitro* 3D brain model and exploiting new therapeutic approaches". Setting up CRISPR/CAS9 technology in murine brain organoid; metabolomic profile and neuronal characterization.

Telethon Spring Seed Grant 2020 "Targeting mitochondrial metabolism to promote full neural development in Allan Herndon Dudley syndrome (AHDS)" – Project Number Telethon_GSP20004_PAsMCT8006. Generation of murine cerebral organoid for modeling AHDS. Neural characterization by immunofluorescence, calcium imaging, gene expression; metabolic characterization by Seahorse analysis, western blot; miRNA profiling by NSG.

European project HERMES (hybrid Enhanced Regenerative Medicine Systems) - Project Number 824164: development of brain organoids starting from mouse neural

stem cells. Set up of organoids generation protocol, immunocito- immunohistochemical characterization, gene expression analysis and assessment of functional activity.

- Date (from – to) February 2019 – April 2019
- Name and address of employer University of Ferrara, Department of Biomedical and Specialty Surgical Sciences and Center for Translational Neurophysiology (*Fondazione Istituto Italiano di Tecnologia*), under the supervision of Prof. Fadiga Luciano
- Position held **Post-doctoral fellowship**
- Main activities and responsibilities Understanding the interaction of neural probe with brain tissue.
Evaluation of the tissue inflammatory reaction (histological staining techniques) upon epi- and intra-cortical electrodes implantation on animal models (rats), with particular attention to drug-functionalized electrodes array and electrophysiological recording analysis.
- Date (from – to) November 2015 – November 2018
- Name and address of employer University of Ferrara, Department of Biomedical and Specialty Surgical Sciences and Center for Translational Neurophysiology (*Fondazione Istituto Italiano di Tecnologia*), under the supervision of Prof. Fadiga Luciano
- Position held **PhD Student in Biomedical Sciences and Biotechnology**
- Main activities and responsibilities Study of long-term biocompatibility of nanostructured microelectrodes.
Development of “biohybrid” electrodes to improve chronic implants.
In vivo/in vitro study of distribution/internalization and axonal transport of barium titanate nanoparticles used to elicit neuronal activity.
- Date (from – to) September 2017 – November 2017
- Name and address of employer Albert Ludwigs Universitat Freiburg, Section for Neuroelectronic Systems at the Department of Neurosurgery of the Medical Center - University of Freiburg (Germany), under the supervision of Prof. Fadiga Luciano and Prof. Ulrich G. Hofmann
- Position held **Visiting PhD Student**
- Main activities and responsibilities Involvement in Cluster of Excellence's CAPRI project - Characterization of probe interactions with brain tissue
- Date (from – to) July 2015 – October 2015
- Name and address of employer University of Ferrara, Department of Biomedical and Specialty Surgical Sciences, under the supervision of Prof.ssa Piva Roberta
- Position held **Research student assistant**
- Main activities and responsibilities Study of molecular mechanism undergoing osteogenic and chondrogenic differentiation of human mesenchymal stem cells (hMSCs), regulation of mitochondrial DNA expression by nuclear transcription factors (TFs) related to hMSCs osteogenic differentiation.
- Date (from – to) September 2014 – July 2015
- Name and address of employer University of Ferrara, Department of Biomedical and Specialty Surgical Sciences, under the supervision of Prof.ssa Piva Roberta
- Position held **Internship student**
- Main activities and responsibilities Study of molecular mechanism undergoing osteogenic and chondrogenic differentiation of human mesenchymal stem cells (hMSCs).
- Date (from – to) May 2013 – September 2013

- Name and address of employer University of Ferrara, Department of Biomedical and Specialty Surgical Sciences, Section of Biochemistry, Molecular biology and medical genetics, under the supervision of Prof.ssa Hanau Stefania
- Position held **Internship student**
- Main activities and responsibilities Enzymatic studies of 6PGDH in T.brucei and liver sheep

EDUCATION AND TRAINING

- Date February 2019
- Title of qualification awarded **Doctor of Philosophy (PhD) in Biomedical Sciences and Biotechnology**
- Thesis title The chronic challenge: strategies to improve biocompatibility and performance of implanted neural devices.
- Name and type of organisation providing education and training University of Ferrara, Department of Biomedical and Specialty Surgical Sciences supervisor: Prof. Luciano Fadiga
- Date July 2015
- Title of qualification awarded **Master's degree in Biomolecular and Cellular Sciences**
- Thesis title Validation of investigation methods for transcriptional factors localization in human mesenchymal stem cells mitochondria
- Name and type of organisation providing education and training University of Ferrara, Department of Biomedical and Specialty Surgical Sciences supervisor: Prof.ssa Roberta Piva
- Mark 110/110 cum laude
- Date October 2013
- Title of qualification awarded **Bachelor's degree in Biological Sciences**
- Thesis title Comparison between the 6-phosphogluconate dehydrogenases of sheep liver and Trypanosoma brucei
- Name and type of organisation providing education and training University of Ferrara, Department of Biomedical and Specialty Surgical Sciences supervisor: Prof.ssa Stefania Hanau
- Mark 108/110
- Date July 2010
- Title of qualification awarded **High school leaving qualification in Scientific studies**

PUBLICATIONS

"On the longevity of flexible neural interfaces: Establishing biostability of polyimide-based intracortical implants" Vomero M*, **Ciarpella F***, Kirsch M, Fadiga L, Stieglitz T; Asplund M. (2022) Biomaterials, <https://doi.org/10.1016/j.biomaterials.2022.121372>

"Murine cerebral organoids develop network of functional neurons and hippocampal brain region identity" **Ciarpella F***, Zamfir R*, Campanelli A*, Ren E, Pedrotti G, Bottani E, Caron D, Di Chio M, Dolci S, Ahtiainen A, Malpeli G, Malerba G, Bardoni R, Fumagalli G, Hyttinen J, Bifari F, Palazzolo G, Panuccio G, Curia G, Decimo I. (2021) IScience, - <https://doi.org/10.1016/j.isci.2021.103438>

"Environmental Enrichment Induces Meningeal Niche Remodeling through TrkB-Mediated Signaling" Zorzin S, Corsi A, **Ciarpella F**, Bottani E, Dolci S, Malpeli G, Pino A, Amenta A, Fumagalli G, Chiamulera C, Bifari F, Decimo I. (2021) Int J Mol Sci - Oct 1;22(19):10657. doi: 10.3390/ijms221910657.

"Conformable Polyimide-Based μ ECoGs: Bringing the Electrodes Closer to The Signal Source". Vomero M, Cruz MFPC, Zucchini E, **Ciarpella F**, Delfino E, Carli S, Boehler C, Asplund M, Ricci D, Fadiga L, Stieglitz T. (2020) Biomaterials, doi: 10.1016/j.biomaterials.2020.120178

"A New Drug Delivery System Based on Tauroursodeoxycholic Acid and PEDOT". Carli S, Fioravanti G, Armirotti A, **Ciarpella F**, Prato M, Ottonello G, Salerno M, 2590 Scarpellini A, Perrone D, Marchesi E, Ricci D, Fadiga L. (2018) Chemistry - A European Journal, doi: 10.1002/chem.201805285

"Single Walled Carbon Nanohorns Composite for Neural Sensing and Stimulation". Carli S, Lambertini L, Zucchini E, **Ciarpella F**, Scarpellini A, Prato M, Castagnola E, Fadiga L, Ricci D; (2018) Sensors and Actuators B: Chemical Volume 271, 15 October, Pages 280-288 <https://doi.org/10.1016/j.snb.2018.05.083>

"Incorporation of Silicon Carbide and Diamond-Like Carbon as Adhesion Promoters Improves In Vitro and In Vivo Stability of Thin-Film Glassy Carbon ECoG Arrays". Vomero M, Castagnola E, Ordonez J S, Carli S, Zucchini E, Maggiolini E, Gueli C, Goshi N, **Ciarpella F**, Cea C, Fadiga L, Ricci D, Kassegne S, Stieglitz T; (2017) Adv. Biosys. doi: 10.1002/adbi.201700081

"A direct comparison of Glassy Carbon and PEDOT-PSS for high charge injection and low impedance neural interfaces". Vomero M, Castagnola E, Maggiolini E, **Ciarpella F**, Rembado I, Goshi N, Fadiga L, Kassegne S, Ricci D; (2017) Advances in Science and Technology, Vol. 102, pp. 68-76, <https://doi.org/10.4028/www.scientific.net/AST.102.68>

"Highly stable glassy carbon interfaces for long-term neural stimulation and low-noise recording of brain activity". Vomero M, Castagnola E, **Ciarpella F**, Maggiolini E, Goshi N, Zucchini E, Carli S, Fadiga L, Kassegne S, Ricci D; (2017) Sci Rep. Jan 13; 7:40332. <https://doi.org/10.1038/srep40332>

"pHEMA encapsulated PEDOT-PSS-CNT microsphere microelectrodes for recording single unit activity in the brain". Castagnola E, Maggiolini E, Ceseracciu L, **Ciarpella F**, Zucchini E, De Faveri S, Fadiga L, Ricci D. (2016) Frontiers in Neuroscience 10-331 <https://doi.org/10.3389/fnins.2016.00151>

"Establishment of a 3D-dynamic osteoblasts–osteoclasts co-culture model to simulate the jawbone microenvironment in vitro". Penolazzi L, Lolli A, Sardelli L, Angelozzi M, Lambertini E, Trombelli L, **Ciarpella F**, Vecchiatini R, Piva R. (2016) Life Sciences, 152

TECHNICAL COMPETENCE

CELLULAR AND MOLECULAR EXPERIENCES:

- Isolation and in vitro culture of **rodent primary cells**: mouse embryonic (E14.5 and E16.5) neural stem cells (NSCs) from hippocampus tissue, meninges and the sub-ventricular zone (SVZ), hippocampal stem cells from rat embryos (E18.5), isolation and in vitro maintenance of mouse cerebellar granule neurons in compartmented cultures (Campanot chambers); isolation and culture of mouse bone marrow-derived monocytes (BMDMs);

- isolation and in vitro culture of **human primary cells**: osteoblasts and chondrocytes from nasal septal surgical tissue and mesenchymal stem cells (MSCs) from Wharton's jelly of umbilical cord; procedures for osteogenic and chondrogenic differentiation and following analyses: gene expression by classic PCR and quantitative Real Time-PCR, alkaline phosphatase activity analysis, alizarin red staining, alcian blue staining;

- in vitro culture and maintenance of established **cell line** like HAPI Rat Microglial cells and HEK;

- development and characterization of brain **organoid technology** starting from mouse embryonic neural stem cells; development of three-dimensional (3D) dynamic cell culture model for *in vitro* studies by using Rotary Cell Culture System (Synthecon) equipped with High Aspect Ratio Vessels (HARV);

- sample preparation for immunofluorescence, immunohistochemistry, DNA/RNA extraction, real-time PCR, western blot analysis, mitochondrial DNA extraction, ATP content assay, proliferation assay, ELISA (enzyme-linked immunosorbent assay), metabolic analysis by Seahorse instrument, calcium imaging assay using Fluo4-AM dye and GcAMP6m vector, cell viability Live/Dead assay, cellular preparation for Fluorescence Activated Cell Sorting (FACS), Chromatin Immunoprecipitation Assay (ChIP);

- transient transfection of synthetic oligonucleotides (siRNAs, antagomiRs and miR-mimics); stable transduction of lentivirus.

ENZYMATIC ACTIVITY STUDIES:

- Ion Exchange and Affinity Chromatography; Isothermal Titration Calorimetry (ITC); Sucrose gradient ultracentrifugation; Quantitative analysis by spectrophotometry; SDS-page.

ELECTROPHYSIOLOGICAL PROCEDURES:

- Rat intracortical and epicortical microelectrodes cerebral implants and neuronal signal recording and analysis;

ANIMAL MODELS (RAT AND MOUSE) AND EX-VIVO ANALYSIS:

- Handling; anesthesia; craniotomy surgery; stereotactic multi-site electrode implant; electrophysiological recording; *in vivo* electrodes impedance measurements; cell transplantation; animal perfusion; brain and tissues extraction, fixation and slicing using microtome/cryotome; immunofluorescence protocol on freely floating fixed tissue sections and on slices; immunohistology (thionin, E&H staining); protocol for animal tissue sample preparation for ICP analysis.

ADDITIONAL INFORMATION: COMMUNICATION FOR SCIENTIFIC CONFERENCE

“Development of robust and reproducible murine brain organoids endowed with networks of functional neurons and specific brain region signature” ***Ciarpella F**, Zamfir R, Campanelli A, Ren E, Pedrotti G, Bottani E, Caron D, Di Chio M, Dolci S, Ahtiainen A, Malpeli G, Malerba G, Bardoni R, Fumagalli G, Hyttinen J, Bifari F, Palazzolo G, Panuccio G, Curia G, Decimo I; poster presented at Virtual SFN2021, 8-11 November **2021**.

“The role of structural biocompatibility for tissue integration of intra-cortical neural probes” Asplund M, Vomero M, **Ciarpella F**, Kirsch M, Fadiga L, Stieglitz T. oral communication in 54th Annual Conference of the German Society for Biomedical Engineering, BMT conference, 29 September – 1 October **2020**

“Setting up 3D in vitro brain model for drug discovery: molecular and functional characterization” **Ciarpella F**, Zamfir R, Campanelli A, Dolci S, DiChio M, Patuzzo C, Ren E, Bardoni R, Pedrotti G, Mannino L, Fumagalli G, Ahtiainen A, Malerba G, Hyttinen J, Panuccio G, Palazzolo G, Curia G, *Decimo I; oral communication in Congresso Nazionale della Società Italiana di Farmacologia (SIF), digital edition 9-13 March **2021**

“Development of mouse hippocampal organoids” ***Ciarpella F**, Zamfir R, Campanelli A, Dolci S, Di Chio M, Patuzzo C, Ren E, Bardoni R, Pedrotti G, Mannino L, Fumagalli G, Ahtiainen A, Malerba G, Hyttinen J, Panuccio G, Palazzolo G, Curia G, Decimo I; poster presented at Virtual FENS2020, 11-15 July **2020**. **Grant award winner poster**.

“Conformable Polyimide-Based μ ECoGs:Bringing The Electrodes Closer to The Signal Source” Vomero M, Cruz MFPC, Zucchini E, **Ciarpella F**, Delfino E, Carli S, Boehler C, Asplund M, Ricci D, Fadiga L, Stieglitz T; poster presented in GRC (Gordon Conference on Neuroelectronic Interfaces), 15-20 March **2020**, Ventura (CA).

“Generation of 3D brain organoids to recapitulate hippocampal structure” ***Ciarpella F**, Zamfir R, Campanelli A, Di Chio M, Pedrotti G, Dolci S, Mannino L, Fumagalli G, Curia G, Panuccio G, Palazzolo G, Decimo I; poster presented in European Organoids Symposium 2019, 23-24 September **2019**, Milan (Italy).

“How Flexibility and Probe Size Influence Chronic Reliability: A Study on Batch Processed Polyimide-Based Intracortical Neural Arrays” Stieglitz T, Vomero M*, **Ciarpella F***, Johnston M, Joseph K, Thiele S, Kirsch M, Haas C, Fadiga L, Asplund M; poster presented in Neuroscience 2018, 3-7 November **2018**, San Diego (CA).

"Poly(3,4-ethylenedioxythiophene)-Single Walled Carbon Nanohorns Composite Coatings for Neural Sensing and Stimulation". Carli S, Lambertini L, Zucchini E, **Ciarpella F**, Scarpellini A, Prato M, Castagnola E, Fadiga L, Ricci D. Applied Nanotechnology and Nanoscience International Conference 2017 – Rome, October 18-20, **2017**

“Glassy Carbon based microelectrode array technology for use in long-term neural recording and stimulation with superior electrical and electrochemical properties”. Vomero M, Goshi N, Dryg I, Maxfield T, Castagnola E, Maggiolini E, **Ciarpella F**, Ordonez J, Gueli C, Cea C, Richner T, Bjanec D, Perlmutter S and Kassegne S; poster in NeuroFuture **2016** - San Diego

“Establishment of a 3D-dynamic osteoblasts-osteoclasts co-culture model to simulate the jawbone microenvironment in vitro”. Penolazzi L, Lolli A, Sardelli L, Angelozzi M, **Ciarpella F**, Vecchiatini R, Lambertini E, Piva R. Poster exhibit during the 6th Meeting

of the Italian Society of Stem Cell Research (SCR) – Bari 10-12 June **2015**

“Osteogenic differentiation of human MSCs: specific occupancy of the mitochondrial DNA by NFATc1 transcription factor”. Angelozzi M, **Ciarpella F**, Penolazzi L, Lambertini E, Lolli A, Lisignoli G, Pinton P, Piva R. Poster exhibit during the 6th Meeting of the Italian Society of Stem Cell Research (SCR) – Bari 10-12 June **2015**

“Finding peculiar patterns of kinetoplastida enzymes to be exploited in drug design”. Hanau S, Almugadam SH, Bellini T, Contini C, Maritati M, Valente N, Rugna G, Trentini A, Proietti D'Empaire L, Capone I, **Ciarpella F**, Barbini C, Fongaro E, Dardonville C, Barrett MP, Gilbert IH, Dallochio F. Abstract exhibit during the Theoretical and Practical Course “Molecular Biology of Leishmania” – ICGEB - Trieste 22-24 October **2014**

“NADPH reduces oligomerization rate of pre-existing dimer-tetramer equilibrium in Trypanosoma brucei 6-phosphogluconate dehydrogenase”. Hanau S, Proietti d'Empaire L, Capone I, **Ciarpella F**, Barbini C, Montoli R, Dallochio F. Poster exhibit during the 57th National Meeting of the Italian Society of Biochemistry and Molecular Biology (SIB) - Ferrara 18-20 September **2013**

ADDITIONAL INFORMATION: ACCADEMIC ASSIGNMENT

“Organoid technology: new insights on development, diseases and drug screening” 29 November 2021 – 2h Lesson within the Molecular Pharmacology course (Prof. Decimo Ilaria) of the University of Verona (Master's Degree in Molecular and Medical Biotechnology).

“In vitro pharmacological approaches: from cells culture to organoids” 16 December 2020 – 2h Lesson within the Molecular Pharmacology course (Prof. Decimo Ilaria) of the University of Verona (Master's Degree in Molecular and Medical Biotechnology).

“In vitro 3D brain modeling: the organoid technology” 26 October 2020 – 1h Lesson within the Models in genetic disease research course (Prof. Zordan Mauro and Viscomi Carlo) of the University of Padova (Master's Degree in Molecular Biology) in collaboration with Université de Paris (Master's Degree in Génétique Moléculaire).

“In vitro approaches for pharmacological research” 11 December 2019 – 2h Lesson within the Molecular Pharmacology course (Prof. Decimo Ilaria) of the University of Verona (Master's Degree in Molecular and Medical Biotechnology).

Additional Information: MENTORING

Supervision of 1 PhD candidate of the XXXVIII Doctoral Cycle in Neuroscienze, Scienze Psicologiche e Psichiatriche, e Scienze del Movimento, University of Verona: “The role of meninges and meningeal neural stem cells in health and disease”

Academic year 2020-2021: Supervision of 3 students of Master's degree thesis in Molecular and Medical Biotechnology, University of Verona: “Specification of hippocampal identity in mouse brain organoids”; “Bioenergetics of brain organoids: setting up Seahorse analysis for the metabolic profile of developing mouse cerebral organoids”; “Deciphering the role of T3 on neuronal development in murine cerebral organoids: implications for Allan-Herndon-Dudley syndrome”

Academic year 2019-2020: Supervision of 1 student of Master's degree thesis in Molecular and Medical Biotechnology, University of Verona: “Developmental study of functional brain-region specific mouse organoids”

ADDITIONAL INFORMATION:
PERSONAL SKILLS

MOTHER TONGUE **ITALIAN**

OTHER LANGUAGE

ENGLISH

- Understanding GOOD
- Speaking GOOD
- Writing GOOD

PERSONAL PROFILE

Availability to travel and meet new people; good entrepreneurial spirit and initiative, good team-working skills and ability to plan and organize. Precise, highly motivate hard-worker. Open to new working experiences and professional improvement.

COMPUTER SKILLS

PCs running Microsoft Windows, Word for Windows, Excel for Windows, Power point for Windows, Adobe Acrobat Writer, Adobe Photoshop, ImageJ, Matlab, Neurolucida, Offline sorter, Neuro Explorer, IMARIS, Origin, PRISM (graphpad), Gamry Instruments.

DRIVING LICENSE

B driving license

Autorizzo il trattamento dei miei dati personali ai sensi dell'art 13, del D.lgs 30 giugno 2003, n 196.

Verona, February 28, 2022

Francesca Ciarpella