

● WORK EXPERIENCE

06/04/2020 – CURRENT

POST DOCTORAL FELLOW - GENERATION OF GENETICALLY-ENCODED CONSTRUCTS TO TRACK THE DEVELOPMENT OF GBM IN VIVO – CNR INSTITUTE FOR NANOSCIENCE

I generated genetically-encoded constructs for the *in vivo* tracking of oncogenic cells in their development of a Glioblastoma Multiforme (GBM) tumor in adult mice. These constructs will be used to monitor *in vivo* the physiology (calcium activity) and the pathology (invasive capability) of tumor cells in adult mice.

Professional, scientific and technical activities | Pisa, Italy

06/04/2019 – 06/04/2020

EXTERNAL COLLABORATOR AT NEST - CNR NANOSCIENCE - PUBLICATION FINALIZATION AND MENTORING

I came back to the Lab of Dr. Gian Michele Ratto to finalize a publication in which I'm a co-first author ("A Cre amplifier to generate and detect genetic mosaics *in vivo*", see Publications for details). In the meantime, I also mentored 2 graduate students and 1 undergraduate student.

Professional, scientific and technical activities

01/01/2019 – CURRENT

STUDENT: HARVARDX DATA SCIENCE PROFESSIONAL CERTIFICATE – HARVARDX

I attended the courses for the Data Science Professional Certificate (still ongoing).

To date I completed the modules:

Data Science: R Basics

<https://courses.edx.org/certificates/36b26450e9a6407aa6948e3cb2d0aff2>

Data Science: Visualization

<https://courses.edx.org/certificates/203556a659654b93a41fbce786a32a91>

Data Science: Probability

<https://courses.edx.org/certificates/35a54e7e71624963bcaabb221a73239e>

Data Science: Inference and Modeling

<https://courses.edx.org/certificates/ba2221182feb4438ae230a0c2e22f26d>

Data Science: Productivity Tools

<https://courses.edx.org/certificates/61f25ae6baa94e33a01a247206aaaeb9>

Education | Cambridge, MA, United States

28/09/2016 – 02/10/2018

POST DOCTORAL ASSOCIATE: DEVELOPMENT OF A 3-DIMENSIONAL HUMAN IPSC MODEL (ORGANOID) SUITABLE FOR LONGITUDINAL LIVE-IMAGING OF SYNAPTIC STRUCTURE USING 2-PHOTON MICROSCOPY – YALE UNIVERSITY - SCHOOL OF MEDICINE

<http://higleylab.org/people/>
<https://medicine.yale.edu/lab/vaccarino/people/>

I generated 3D cultures of human brain cells and I followed their growth and development by means of 2-photon imaging. I performed all the procedures required from the iPS expansion up to the whole organoid formation. With Molecular Biology techniques, I adapted commercially available genetically-encoded constructs to make them suitable to specifically label inhibitory synapses and excitatory synapses *in vivo*. Finally, I performed the deep layers 2-photon imaging of the alive organoids.

Acquired Skills: Induced Pluripotent Stem cells (iPS) expansion, development of human 3D brain organoids, 2-photon imaging on organoids.

Professional, scientific and technical activities | <https://medicine.yale.edu/> |

333 Cedar Street - New Haven, CT 06510, New Haven, United States

01/09/2012 – 31/07/2016

POST DOCTORAL FELLOWSHIP: GENERATION AND TWO-PHOTON ANALYSIS OF A SENSOR FOR CRE RECOMBINASE ACTIVITY IN VIVO. – NEST - ISTITUTO DI NANOSCIENZE CNR

I generated the sensor through PCR amplifications, digestions with restriction enzymes and ligations. I assayed the activity of the sensor through two-photon *in vivo* imaging.

The sensor I generated is a sensor for Cre recombinase activity. The tool was realized to detect *in vivo* the presence of the intact MeCP2 gene in an MeCP2 floxed mouse model of Rett syndrome.

Rett syndrome is a rare disease caused by mutations in MeCP2 and since this gene is located on the X chromosome, due to the inactivation of the Barr body, cells of heterozygous females randomly block the expression either of the mutated allele or of healthy allele. This process creates the mosaic of healthy and diseased cells which causes the disease.

My tool is capable not only to create and reveal the mosaic *in vivo* by expressing GFP in healthy cells and a Red fluorescent protein in diseased ones, but it is also capable to amplify the Cre effect, so that the genomic floxed gene is cut with 100% of accuracy, avoiding the case of false positives.

It is worth noting that the tool is a sensor for Cre, so it is suitable to detect EVERY floxed gene. In addition, thanks to its amplifying effect, it can also be used to induce and detect double or triple floxed recombinations, with very low doses of tamoxifen.

Finally, as a side project, I also used such molecular biology techniques to improve a genetically-encoded fluorescent Chloride sensor (ClpHensor) to visualize the intracellular Chloride currents *in vivo*. The sensor will be used to measure (for the first time *in vivo*) the shift in the role of GABA from excitatory to inhibitory, which occurs during development.

Acquired skills: *In vivo* two-photon imaging of intact mouse brain, *In vivo* plasmid iontoporation, Two-photon imaging, Brain slice preparation.

Professional, scientific and technical activities | <http://www.laboratorionest.it/> |

Piazza San Silvestro, 12, 56127, Pisa, Italy

01/01/2005 – 06/03/2013

PH. D. PROJECT: TRAFFICKING PROPERTIES OF ERK1 AND ERK2 IN NEURAL CELLS – SCUOLA NORMALE SUPERIORE AND ISTITUTO DI NEUROSCIENZE CNR

I studied two proteins involved in synaptic plasticity (ERK1 and ERK2) by analyzing their properties of nuclear-cytoplasmic trafficking by means of confocal imaging of fluorescent chimeric constructs.

My work was under the supervision of Dr. Gian Michele Ratto and Prof. Lamberto Maffei.

Acquired skills: Cell Culture of cell lines, Primary neurons cell culture, Transfection, Confocal Imaging, FLIP, FRAP, StripFRAP, Data analysis with ImageJ, Immunocytochemistry.

Professional, scientific and technical activities | <http://www.sns.it/en/> |

Piazza dei Cavalieri, 7, 56126, Pisa, Italy

07/01/2002 – 06/05/2004

M. SC. PROJECT: FUNCTIONAL ANALYSIS OF THE C-TERMINAL DOMAIN OF XOTX2 AND XOTX5B IN XENOPUS LAEVIS EARLY DEVELOPMENT – UNIVERSITÀ DI PISA

I performed a molecular dissection of XOt2 and XOt5b to find the domain responsible for anterior fate specification and induction in *Xenopus laevis* gastrulation. Through Molecular Biology techniques, I generated deletion constructs and I assessed their capability to induce the development of an anterior marker in *Xenopus*.

My work was under the supervision of Prof. Robert Vignali and Prof. Giuseppina Barsacchi.

Acquired skills: Molecular cloning, PCR, restriction digestion, DNA Electrophoresis, Production and purification of DNA, RNA and proteins, PAGE, Western Blot, Micromanipulation, Microinjection of *Xenopus* oocytes and embryos, "whole mount" *in situ* hybridization of *Xenopus* embryos.

Professional, scientific and technical activities | <http://www.unipi.it/index.php/english> |

Lungarno Antonio Pacinotti, 56126, Pisa, Italy

● **EDUCATION AND TRAINING**

01/01/2005 – 06/03/2013 – Pisa, Italy

PH. D IN NEUROBIOLOGY – Scuola Normale Superiore

During my Ph. D. School I attended the courses of Neurobiology, Seminars in Neurobiology and Molecular Medicine and I performed the experimental activity on ERK1 and ERK2 described in the work experience section.

Ph. D. degree in Neurobiology with a final graduation of 70/70 cum laude.

EQF level 8

05/11/1998 – 06/05/2004 – Pisa, Italy

MSc. IN BIOLOGICAL SCIENCES: MOLECULAR BIOLOGY CURRICULUM – University of Pisa

At University of Pisa I focused on Molecular Biology courses and I performed the MSc. thesis on XOt2 and XOt5b at the Cellular and Molecular Laboratory (see work experience for details).

MSc. degree in Biological Sciences with a final graduation of 110/110 cum laude.

EQF level 7

15/09/1993 – 15/07/1998 – Pisa, Italy

HIGH SCHOOL DEGREE (DIPLOMA DI MATURITÀ SCIENTIFICA) – Liceo Scientifico Ulisse Dini

I choose a High School focused on scientific courses. There, I learned integrals, derivatives and study of functions, basic Physics, history of philosophy from Tales to Hegel. I learned also basic Latin and German. High School degree with 60/60.

EQF level 5

● LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C1	C1	B2	C1	C1
GERMAN	B1	B1	B1	B1	B1
FRENCH	A2	A2	A2	A2	A2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

● DIGITAL SKILLS

Microsoft Word | Microsoft Excel | Outlook | Microsoft Powerpoint | Microsoft Office | Google Drive

Neuroinflammation: A Signature or a Cause of Epilepsy?

Pracucci E., Pillai V., Lamers D., **Parra R.**, Landi S.

Int J Mol Sci. 2021 Jun 29;22(13):6981.

PMID: 34209535

doi: 10.3390/ijms22136981.

Modelling genetic mosaicism of neurodevelopmental disorders in vivo by a Cre-amplifying fluorescent reporter

Trovato F.*, **Parra R.***, Pracucci E., Landi S., Cozzolino O., Nardi G., Cruciani F., Pillai V., Mosti L., Cwetsch AW., Cancedda L., Gritti L., Sala C., Verpelli C., Maset A., Lodovichi C., Ratto GM.

*** Equal contributors.**

Nat Commun. 2020 Dec 3;11(1):6194.

PMID: 33273479

doi: 10.1038/s41467-020-19864-w

A Cre amplifier to generate and detect genetic mosaics in vivo

Trovato F.*, **Parra R.***, Pracucci E., Landi S., Cozzolino O., Nardi G., Cruciani F., Mosti L., Cwetsch A., Cancedda L., Gritti L., Sala C., Verpelli C., Maset A., Lodovichi C., Ratto GM.

*** Equal contributors.**

bioRxiv (Nature Communications accepted)

doi: <https://doi.org/10.1101/715490>

Modulation of ERK1/MAPK3 potentiates ERK nuclear signalling, facilitates neuronal cell survival and improves memory in mouse models of neurodegenerative disorders

Indrigo M., Morella I., Orellana D., d'Isa R., Papale A., **Parra R.**, Gurgone A., Lecca D., Cavaccini A., Tigaret CM., Ratto GM., Carta AR., Giustetto M., Middei S., Tonini R., Hall J., Brooks S., Thomas K., Brambilla R., Fasano S.

bioRxiv

doi: <https://doi.org/10.1101/496141>

Simultaneous two-photon imaging of intracellular chloride concentration and pH in mouse pyramidal neurons in vivo

Sulis Sato S., Artoni P., Landi S., Cozzolino O., **Parra R.**, Pracucci E., Trovato F., Szczurkowska J., Luin S., Arosio D., Beltram F., Cancedda L., Kaila K., Ratto GM.

Proc Natl Acad Sci U S A 2017 Oct 10;114(41):E8770-E8779.

PMID: 28973889

doi: 10.1073/pnas.1702861114.

Trafficking properties of ERK1 and ERK2 in neural cells.

Parra R., Zotter A., Ratto GM.

ISBN-13:978-3-639-51279-3

ISBN-10:3639512790

EAN:9783639512793

Published on: 2013-03-16

Localization and trafficking of fluorescently tagged ERK1 and ERK2.

Marchi M.*, **Parra R.***, Costa M., Ratto GM.

*** Equal contributors.**

Methods Mol Biol. 2010;661:287-301.

PMID: 20811990

doi: 10.1007/978-1-60761-795-2_17

The N-terminal domain of ERK1 accounts for the functional differences with ERK2.

Marchi M., D'Antoni A., Formentini I., **Parra R.**, Brambilla R., Ratto GM., Costa M.

PLoS One. 2008;3(12):e3873. Epub 2008 Dec 4.

PMID: 19052640

doi: 10.1371/journal.pone.0003873

● ORGANISATIONAL SKILLS

Organisational skills

Ability to manage a research project, choosing the experiments to do and the appropriate strategy to solve the problems. Ability to work independently as well as a part of a team.

● JOB-RELATED SKILLS

Job-related skills

Microscopy related skills:

In vivo two-photon imaging of intact mouse brain, Two-photon imaging of brain slices and cell cultures, Confocal Imaging, FLIP, FRAP, StripFRAP, Data analysis with ImageJ.

Cell culture related skills:

Cell Culture of cell lines, Primary neurons cell culture, Cell culture Transfection, Immunocytochemistry.

iPS and organoids related skills:

iPS expansion, generation of human brain organoids, embedding, cryosectioning and immunostaining of organoids. Longitudinal 2-photon imaging of living human brain organoids.

Molecular Biology skills:

Molecular cloning, Production and purification of DNA, RNA and proteins, PAGE, Western Blot.

Other skills:

In vivo plasmid iontoporation, Micromanipulation, Microinjection of *Xenopus* oocytes and embryos, "whole mount" in situ hybridization of *Xenopus* embryos, Brain slice preparation.

● OTHER CERTIFICATES

Other certificates

Participation to "International Astrocytes School 2013" Bertinoro, Italy (March 17-23, 2013)<http://ias2013.azuleon.org/>

Participation to the course "Tridimensional Microscopy in Fluorescence: methods and applications" Institute for Neuroscience CNR (June 14, 2007).

Participation to the course "Molecular Genetics of Cancer" held by Prof. Martyn Smith of School of Public Health, University of California, Berkeley, (June 3-6, 2002).

Participation to the course "Mindfulness-Based Stress Reduction" held by Anne Dutton, Yale Stress Center (January 27 - March 17, 2017, Retreat March 5, 2017)

Participation to the "Basic Program" (Online) 2018-2022 held by Istituto Lama Tzong Khapa, Pomaia (PI). Courses of the program completed up to now: "Mind and Cognition", "Tenets", "Heart Sutra", "Stages of the Path", "Tathagata Essence".

● POSTERS

Posters

Poster for Neuroscience 2014 Annual Meeting

TT46 269.07 "*In vivo* measurement of intracellular Chloride and pH during neuronal development by means of 2-photon spectroscopy"