

## RESEARCH EXPERIENCE

**Dec 2022 - present**

**Postdoctoral fellow**

*Nanoscience institute, CNR (Pisa, Italy)*

Research activity on the project: "Innovative brain-targeting nano-tools and imaging methods for therapeutic development in Angelman Syndrome (InnovAS).

- Development of polymeric nanoparticles for the intranasal delivery of antisense oligonucleotide to the brain in Angelman Syndrome.

**Nov 2017 - Apr 2022**

**Research trainee for PhD program**

*NEST, Scuola Normale Superiore (Pisa, Italy)*

Research activity on the project: "Structural insights into human NAPE-PLD interactions".

- Structural and functional investigation of the human protein target NAPE-PLD (N-acylphosphatidylethanolamine phospholipase D) by small molecule modulators for target validation.

Other research activities:

- nanodiscs assembly for protein structure determination;
- structural investigation of novel dual PDK1/AurA inhibitors interactions;
- expression, purification, crystallization, and interaction of the 14-3-3 protein (isoform  $\zeta$ ) with modulators.

**May 2015 - Mar 2016**

**Research trainee for graduation program**

*Department of Pharmacy, University of Pisa (Pisa, Italy)*

Research activity on the project: "Med chem optimization of synthetic thyronamine analogues with diphenylmethane structure".

- Design, synthesis and characterization of new thyronamine analogues with diphenylmethane scaffold for in vitro and in vivo evaluation.

## EDUCATION & QUALIFICATIONS

**Nov 2017 - April 2024**

**PhD in Nanosciences**

*Scuola Normale Superiore di Pisa (Pisa, Italy)*

Research project: "Structural insights into human NAPE-PLD interactions".

**Jul 2016**

**State examination for professional qualification**

*University of Pisa (Pisa, Italy)*

**Mar 2016**

**Master degree in Pharmaceutical Chemistry and Technology**

*University of Pisa (Pisa, Italy)*

Final score: 110/110 cum laude

Final thesis: "Med chem optimization of synthetic thyronamine analogues with diphenylmethane structure".

## TECHNICAL & SCIENTIFIC SKILLS

<b>Cell biology</b>	Cell culture (SH-SY5Y, RPMI2650, HEK293, HEK293T), cell transfection (calcium phosphate), cell counting, cell fractionation, protein quantification (BCA assay), western blot, confocal microscopy on live specimens.
<b>Molecular biology</b>	Inserts and cloning vector design, primers design, PCR, electrophoretic analysis of nucleic acids, DNA extraction and purification, DNA cloning, sequencing of nucleic acids, spectrophotometric quantification of nucleic acids.
<b>Protein expression and purification</b>	Recombinant protein expression in bacterial systems ( <i>E.coli</i> ), protein expression optimization, protein purification (dialysis, ion-exchange chromatography, affinity chromatography, gel-filtration chromatography) with gravity-flow system or fast protein liquid chromatography (FPLC) technology (ÄKTA™ system), membrane filtration, protein quantification, SDS-PAGE, western blot.
<b>Structural biology</b>	Protein crystallization techniques and single-crystal X-ray diffraction experiments using synchrotron radiation for protein structure determination (data collected at ELETTRA Synchrotron of Trieste, XRD2 beamline and at the European Synchrotron Radiation Facility- ESRF of Grenoble). Data analysis (data reduction, phasing, refinement and validation process). Nanodiscs assembly for protein structure determination. EM imaging for nanostructures characterization.
<b>Ligand-protein interaction screening</b>	Development of enzymatic assays (HPLC-MS and fluorescence based methods), development of SPR assays for the study of ligand binding interactions with targets.
<b>Drug design and synthesis</b>	Drug design and synthetic strategies planning, small molecule synthesis, purification (crystallization, chromatography, HPLC) and characterization (by NMR, IR, MS).
<b>Nanoparticles (NPs)</b>	Development of polymeric NPs (chitosan NPs, PLGA NPs). NPs characterization by Dynamic Light Scattering. Oligonucleotides loading tests, release studies. Biocompatibility and cell uptake tests.
<b>Instruments</b>	<ul style="list-style-type: none"><li>• SPR system (SensiQ Pioneer)</li><li>• FPLC (ÄKTAexpress)</li><li>• Image Quant LAS 4000</li><li>• HPLC (Dionex Ulti Mate 3000 with Chromeleon software and Shimadzu with LabSolutions software)</li><li>• Mass spectroscopy (AB SCIEX 3200 Q TRAP With Analyst software)</li><li>• NMR (Bruker 300/400)</li><li>• UV/Vis spectroscopy (Spectrophotometer Jasco V-550 with Spectra Manager software)</li><li>• Infrared spectroscopy (Agilent Technologies Cary 600 Series FTIR Spectrometer)</li><li>• Fluorescent confocal microscope (Zeiss LSM 800)</li><li>• Transmission electron microscope (Zeiss Libra 120 +)</li><li>• Plate Reader (Promega GloMax Discover)</li><li>• Zetasizer Nano ZS</li></ul>
<b>Bioinformatics and IT skills</b>	OS: Macintosh, Windows, Linux. Applications: Microsoft Office (Full ECDL certification), image analysis and editing (ImageJ), chemical structure editors (ChemDraw, ChemSketch), statistical analysis (GraphPad Prism, Origin, Excel), SPR data analysis (Pioneer analysis software QDAT), structure determination software for macromolecular X-Ray Crystallography (CCP4, Phenix, Coot), software for mass spectra analysis (MultiQuant 2.1.1), software for NMR spectra analysis (Bruker TopSpin 3.2, MestReNova).

## PERSONAL SKILLS

<b>Languages</b>	Italian: mother tongue English: B2 level certification (2007) French: basic communicational skills
<b>Job-related skills</b>	Full autonomy in designing and executing experimental protocols
<b>Other skills</b>	Good ability to work within a scientific research team, developed during my thesis internship and the PhD program
<b>Driving license</b>	B

## OTHER WORK EXPERIENCES

<b>May 2017 - Sep 2017</b>	<b>Pharmacist</b> , Farmavaldera S.R.L., Ponsacco (Pisa, Italy)
<b>Sep 2016 - Apr 2017</b>	<b>Pharmacist</b> , Farmacia Viotti, Selvatelle (Pisa, Italy)
<b>Jun 2016 - Sep 2016</b>	<b>Sales assistant</b> , Farmacia Viotti, Selvatelle (Pisa, Italy)

## SCHOOLS & CONFERENCES

### **ASA scientific conference**

Coventry (UK), 1-2 Aug 2024 (poster presentation)

### **Workshop "Disease modifying therapies for neurodevelopmental disorders"**

Scuola Normale Superiore, Pisa (Italy), 31 Aug 2023 (poster presentation)

### **Giovani Cristallografi Italiani online event "GCI@HOME" (BioCrystallography section)**

29 Sep 2020 (virtual oral communication)

### **School of crystallography "GeCrySchool From Gene to Protein Crystal Structure" (on line edition)**

ELETTRA Synchrotron, Trieste (Italy) 22-25 Sep 2020

### **"Accelerating the Drug Discovery Process, bringing together academic research & industrial experience"**

Pisa (Italy) 12 Dec 2019

### **EMBO workshop "Tool for Structural Biology of Membrane Proteins"**

EMBL Hamburg (Germany), Centre for Structural System Biology (CSSB) 7-9 Oct 2019 (poster presentation)

### **IIT Workshop "Advanced theranostic nanomedicine in oncology"**

Pontedera (Pisa, Italy) 31 Jan 2019

### **Workshop "Hands-on single particle cryo-EM data processing and analysis"**

Laboratorio NEST, Pisa (Italy) 7-8 May 2018

## SCIENCE DISSEMINATION

European Researchers' Night: Open laboratories; "Nanomateriali per la salute".  
CNR - Nanoscience institute, Pisa (Italy), 29 Sep 2023

La Primavera della Ricerca - 100 anni del CNR: Open laboratories; "Le nanotecnologie per la salute".  
CNR - Nanoscience institute, Pisa (Italy), 12 May 2023

## PUBLICATIONS

Crosslinked Chitosan Nanoparticles with Muco-Adhesive Potential for Intranasal Delivery Applications. Gagliardi M, **Chiarugi S**, De Cesari C, Di Gregorio G, Diodati A, Baroncelli L, Cecchini M, Tonazzini I. 2023. Int J Mol Sci. doi: 10.3390/ijms24076590.

Mapping, Structure and Modulation of PPIs. Martino E, **Chiarugi S**, Margheriti F, Garau G. 2021. Front. Chem. doi: 10.3389/fchem.2021.718405.

Development of potent dual PDK1/AurA kinase inhibitors for cancer therapy: Lead-optimization, structural insights, and ADME-Tox profile. Sestito S, Bacci A, **Chiarugi S**, Runfola M, Gado F, Margheritis E, Gul S, Riveiro ME, Vasquez R, Huguet S, Manera C, Rezai K, Garau G, Rapposelli S. 2021. Eur J Med Chem. doi: 10.1016/j.ejmech.2021.113895.

Hit-to-Lead Optimization of Mouse Trace Amine Associated Receptor 1 (mTAAR1) Agonists with a Dyphenylmethane-scaffold: Design, Synthesis, and Biological Study. Chiellini G, Nesi G, Sestito S, **Chiarugi S**, Runfola M, Espinoza S, Sabatini M, Bellusci L, Laurino A, Cichero E, Gainetdinov RR, Fossa P, Raimondi L, Zucchi R, Rapposelli S. 2016. J Med Chem. doi: 10.1021/acs.jmedchem.6b01092.

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