



## Europass Curriculum Vitae



### Personal information

Surname / First name(s) **Saponaro Andrea Cosimo**  
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E-mail andreasaponaro@unimi.it, andreacosimo.saponaro@gmail.com  
Nationality Italian  
Date of birth January, 9<sup>th</sup> 1986  
Gender Male

### Desired employment field **Research in Biological sciences**

#### Work experience

dates **05/2017 – to date**  
Position held Researcher, RTDA  
dates **04/2015 – 04/2017**  
Position held Postdoctoral fellowship granted by Accademia Nazionale dei Lincei  
dates **01/2014 – 03/2015**  
Position held Postdoctoral fellowship in ion channel structure-function relationship, Prof. A. Moroni's lab, University of Milan.

Main activities and responsibilities

- Study of the functional, biochemical and structural properties of the interaction between  $\alpha$  and  $\beta$ -subunits forming ion channels both in animals and plants.
- Teaching:
  - Synthetic Biology (Master Degree Program in Molecular Biology of the Cell);
  - Hand-on course on Molecular biology (Bachelor Degree Program in Biology);
  - Macromolecular interactions (PhD Degree Program in Biomolecular sciences).
- Tutoring of PhD and master students.

Principal skills covered Membrane and soluble protein biochemistry, Soluble NMR techniques, ITC (Isothermal Titration Calorimetry), CD (circular dichroism), Planar Lipid Bilayer Electrophysiology.

Name and address of employer University of Milan, Dept Biosciences, via Celoria, 26 – 20133 Milan, Italy

Type of business or sector Research

## Education and training

dates	<b>01/2011 – 01/2014</b>
Title of qualification awarded	PhD Degree in Biomolecular sciences
Principal subjects/skills covered	Structural Biology, Biochemistry. IV Hands-on Course “from Proteomics to Proteins” 2011, Caparica, Portugal. Visiting fellow at REQUIMTE/CQFB, Department of Chemistry, FCT/UNL, Lisbon, Portugal (January 2012 – December 2012). Visiting fellow at Department of Biology, Technische University of Darmstadt, Darmstadt, Germany (December 2011).
Name and type of organization providing education and training	University of Milan, Dept Biosciences, via Celoria, 26 – 20133, Milan, Italy
Level in national or international classification	PhD Degree
dates	<b>10/2008 – 10/2010</b>
Title of qualification awarded	Master Degree in Molecular Biology of the Cell (full marks and honors)
Principal subjects covered	Molecular Biology, Advanced Biochemistry, Functional Genomics and Proteomics, Applied Biotechnology, Bioinformatics, Chemical Physics of Macromolecules.
Principal skills covered	Heterologous expression in bacteria, protein purification techniques, basics of X-ray crystallography of soluble proteins.
Name and type of organization providing education and training	University of Milan, Dept Biosciences, via Celoria, 26 – 20133 Milan, Italy
Level in national or international classification	Mater Degree
dates	<b>10/2005 – 07/2008</b>
Title of qualification awarded	Bachelor Degree in Biology (full marks and honors)
Principal subjects covered	Chemistry, Physics, Mathematics, Biochemistry, Genetics, Microbiology, Cellular Biology, Molecular Biology, Physiology, Immunology, Ecology, Laboratory methods applied to Biological systems.
Name and type of organization providing education and training	University of Milan, Dept Biosciences, via Celoria, 26 – 20133 Milan, Italy
Level in national or international classification	Bachelor Degree
dates	<b>09/2001 – 07/2005</b>
Title of qualification awarded	Secondary School focusing on humanities diploma, final grade: 85/100.
Principal subjects/occupational skills covered	Italian literature, latin and ancient greek literature and grammar, History, Philosophy, science, physics, mathematics.
Name and type of organization providing education and training	<i>Liceo Classico</i> “Stefano Maria Legnani”, via Volonterio 34 - 21047 Saronno, Italy
Level in national or international classification	Secondary school diploma

Mother tongue  
Other language  
Self-assessment  
European level (\*)

**Italian**  
**English**

Understanding				Speaking				Writing	
Listening		Reading		Spoken interaction		Spoken production			
C1	Effective Operational Proficiency	C1	Effective Operational Proficiency	C1	Effective Operational Proficiency	C1	Effective Operational Proficiency	C1	Effective Operational Proficiency

(\*) Common European Framework of Reference for Languages

Social skills and competences	Good ability to work and cooperate in international teams acquired during my working experience in national and international research institutes.
Organizational skills and competences	Good interaction skills, including the ability to assist and comprehend, acquired through 10 years of charitable work experience and as a delegate for students in the Biology program.
Technical skills and competences	<p><b>Gene cloning:</b> Standard and LIC cloning procedures in <i>E. coli</i> cells; DNA&amp;RNA purification; standard PCR protocols; site-directed mutagenesis.</p> <p><b>Protein Expression and Purification:</b> Standard and enhanced membrane and soluble protein heterologous expression in mammalian HEK293F cells and <i>E. coli</i>; purification of membrane and soluble proteins by affinity chromatography (His-Tag, Strep-Tag); ion exchange chromatography and FPLC; western blotting.</p> <p><b>Electrophysiology:</b> Recording of ion channel activity in Planar Lipid Bilayer;</p> <p><b>Structural Biology:</b> Soluble NMR techniques for protein 3D-structure determination, protein-protein and protein-ligand interaction studies; NMR spectra analysis with CARRA and CCPN (backbone and side chain assignment, NMR titration analysis); basics of X-ray crystallography of soluble proteins.</p> <p><b>Biophysics:</b> Structural characterization of protein using Circular Dichroism (CD); biophysical analysis of protein – protein and protein – ligand interaction by means of Isothermal Titration Calorimetry (ITC) and Florescence Polarization (FP).</p> <p><b>Bioinformatics:</b> Data banks sequence search (NCBI, SwissProt, PDB, EMBL, Ensembl); sequence alignment; fold recognition analysis; secondary structure prediction; disordered region prediction.</p>
Computer skills and competences	<p><b>Bioinformatic Softwares:</b> Rasmol, SeaView, clustalW2, ExPASy tools, Finch TV.</p> <p><b>Softwares:</b> Word, Excel, PowerPoint, data analysis with OriginLab, image manipulation with Photoshop</p> <p><b>Operating system:</b> Windows</p>
Driving licence	European driving license, category B

## Additional information Abstracts

- Lolicato M., Gazzarrini S., Holger M., Saponaro A., Romani G., Moroni A., “*Crystallization of the soluble C-terminus of human HCN channels*”, Gordon Research Conference 2010, Barga, Italy;
- Lolicato M., Nardini M., Gazzarrini S., Saponaro A., Bolognesi M., Moller S., Herberg F., Thiel G., Moroni A., “*Structural and functional comparison of the C-linker and CNBD of HCN channels*”, EDICT meeting 2010, Tallin, Estonia;
- Saponaro A., Moroni A., “*Study of the association between HCN2 channel and its neuronal interactor TRIP8b*”, IV Hands-on Course “from Proteomics to Proteins” 2011, Caparica, Portugal;
- Hu L., Santoro B., Saponaro A., Liu H., Moroni A., Siegelbaum S. A., “*TRIP8b allosterically regulates the ability of cAMP to enhance the HCN2 channel opening*”, 56<sup>th</sup> Biophysical Meeting 2012, San Diego, California (U.S.A.);
- Saponaro A., Matzapetakis M., Pauleta S. R., Moroni A. “*NMR structural studies of the soluble domain of HCN2 channel*”, IV Ibero-American NMR meeting 2012, Aveiro, Portugal;
- Saponaro A., Matzapetakis M., Moroni A., Pauleta S. R., “*Structural rearrangements occurring on HCN2 CNBD domain upon cAMP binding*”, 9th European Biophysics Congress EBSA2013, Lisbon, Portugal;
- Saponaro A., Santoro B., Matzapetakis M., Pauleta S. R., Moroni A. “*The auxiliary subunit TRIP8b inhibits the binding of cAMP to HCN2 channels through an allosteric mechanism*”, 58<sup>th</sup> Biophysical Meeting 2014, San Diego, California (U.S.A.);
- Saponaro A., Pauleta S.R., Cantini F., Matzapetakis M., Hu L., Donadoni C., Banci L., Santoro B., Moroni A. “*Structural basis for the dual regulation of HCN channel activity by cAMP and their auxiliary subunit TRIP8b*”, XXII Congresso Nazionale SIBPA – 2014, Palermo, Italy, **Oral presentation**;
- Saponaro A., Donadoni C., Pauleta S.R., Cantini F., Matzapetakis M., Thiel G., Banci L., Santoro B., Moroni A. “*HCN channels: the molecular basis for their cAMP-TRIP8b regulation*”, 59<sup>th</sup> Biophysical Meeting 2015, Baltimore, Maryland (U.S.A.), **Oral presentation**;
- Porro A., Gazzarrini S., Nardini M., Moroni A., Saponaro A. “*The molecular basis for the interaction between KAT1 channels and their regulatory protein 14-3-3*”, SIBV-SIGA congress 2015, Milan, Italy;
- Saponaro A., Donadoni C., Porro A., Cantini F., Thiel G., Banci L., Santoro B., Moroni A. “*HCN channel modulation: the competition between cAMP and TRIP8b explained in molecular detail*” Gordon Research Conference 2016, Il Ciocco, Italy, **Oral presentation**.
- Saponaro A., Donadoni C., Porro A., Cantini F., Thiel G., Banci L., Santoro B., Moroni A. “*An atomic view of memory: the “complex” structure of HCN channels and TRIP8b*”. XXIII Congresso Nazionale SIBPA – 2016, Cortona, Italy. **Oral presentation**.
- Saponaro A., Porro A., Sanjuan A.C., Introini B., Nardini M., Thiel G., Moroni A. “*The molecular basis and structural insights into the interaction between KAT1 channels and their regulatory protein 14-3-3*”. International Workshop on Plant Membrane Biology 2016. Annapolis, U.S.A.
- Saponaro A., Porro A., Sanjuan A.C., Introini B., Nardini M., Thiel G., Moroni A. “*Exploring new pharmacological perspectives of Fusicoccin, a stabilizer of 14-3-3 – target protein complex*”. 61<sup>th</sup> Biophysical Meeting 2017, New Orleans, U.S.A. **Oral presentation**.
- Saponaro A., Porro A., Alberio L., Thiel G., Moroni A. “*An optogenetic tool for the regulation of HCN channels*”. Symposium: Studying and Controlling Membrane Proteins with Light, 2017, organized by Novo Nordisk Foundation, Copenhagen, Denmark.
- Saponaro A., Cantini F., Porro A., Bucchi A., DiFrancesco D., Maione V., Donadoni C., Introini B., Mesirca P., Mangoni M., Thiel G., Banci L., Santoro B., Moroni A. “*Structure-guided design of synthetic peptides for orthogonal control of HCN channels*” Gordon Research Seminar/Conference 2018, South Hadley, MA, (U.S.A.), **Oral presentation**.

## Publications

I have co-authored 9 articles published in international scientific journals (with over 151 citations, h-index = 4, Google Scholar). I submitted 1 NMR and 2 X-ray structures on PDB.

- Santoro B., Hu L., Liu H., Saponaro A., Pian P., Piskorowski R. A., Moroni A., Siegelbaum S. A., "Tetratricopeptide Repeat-Containing Rab8b Interacting Protein (TRIP8b) regulates hyperpolarization-activated cyclic nucleotide-regulated 1 (HCN1) channel trafficking and gating through two distinct C-terminal interaction sites", *The Journal of Neuroscience*, 2011, 31(11): 4074-4086 [doi:10.1523/JNEUROSCI.5707-10.2011].
- Smeazzetto S., Saponaro A., Young H.S., Moncelli M.R., Thiel G., "Structure-Function Relation of Phospholamban: Modulation of Channel Activity as a Potential Regulator of SERCA Activity", *PLoS One.*, 2013, 8(1):e52744 [doi: 10.1371/journal.pone.0052744].
- Hu L., Santoro B., Saponaro A., Liu H., Moroni A., Siegelbaum S. A., "Binding of the auxiliary subunit TRIP8b to HCN channels shift the mode of action of cAMP", *The Journal of General Physiology*, 2013, 142(6): 599-612 [doi: 10.1085/jgp.201311013].
- Saponaro A., Pauleta S.R., Cantini F., Hu L., Matzapetakis M., Hammann C., Donadoni C., Thiel G., Banci L., Santoro B., Moroni A. "Structural basis for the mutual antagonism of cAMP and TRIP8b in regulating HCN channel function", *Proc Natl Acad Sci U S A.*, 2014, 111(40) :14577-82 [doi: 10.1073/pnas.1410389111].
- Weißgraeber S, Saponaro A., Thiel G., Hamacher K. "A reduced mechanical model for cAMP-modulated gating in HCN channels". *Sci Rep.*, 2017, 7:40168 [doi: 10.1038/srep40168].
- Saponaro A., Porro A., Chaves-Sanjuan A., Nardini M., Rauh O., Thiel G., Moroni A. "Fusicoccin Activates KAT1 Channels by Stabilizing Their Interaction with 14-3-3 Proteins". *Plant Cell.* 2017, 29(10):2570-2580. [doi: 10.1105/tpc.17.00375].
- Saponaro A., Cantini F., Porro A., Bucchi A., DiFrancesco D., Maione V., Donadoni C., Introini B., Mesirca P., Mangoni M., Thiel G., Banci L., Santoro B., Moroni A. "A synthetic peptide that prevents cAMP regulation in mammalian Hyperpolarization-activated Cyclic Nucleotide-regulated (HCN) channels". *Elife.* 2018, pii: e35753. doi: 10.7554/eLife.35753.
- Groß C., Saponaro A., Santoro B., Moroni A., Thiel G., Hamacher K. "Mechanical transduction of cytoplasmic-to-transmembrane-domain movements in a hyperpolarization-activated cyclic nucleotide-gated cation channel" *J Biol Chem.* 2018, pii: jbc.RA118.002139. doi: 10.1074/jbc.RA118.002139. [Epub ahead of print].
- Saponaro A. "Isothermal Titration Calorimetry: a Biophysical Method to Characterize the Interaction between Label-free Biomolecules in Solution". 2018, *Bio-protocol*, Vol 8, Iss 15. doi: 10.21769/BioProtoc.2957.
- Alberio L., Locarno A., Saponaro A., Romano E., Bercier V., Albadri S., Del Bene F., Simeaoni F., Moleri S., Beltrame M., Pelucchi S., Marcellio E., Di Luca M., Kukovetz K., Boender AJ., Luo S., Moutal A., Ji Y., Khanna R., Colecraft H.M., Thiel G., Tonini R., Moroni A. "A light-gated K<sup>+</sup> channel for sustained neuronal inhibition in freely moving animals". *Nature Methods*, under revision.
- Brocca P., Saponaro A., Introini B., Rondelli V., Mauri L., Raciti D., Corti, Mario R.A." Proteins at the Gas-Liquid Interface Sensed by a New Interferometric Technique". *Submitted to Langmuir*.

## Grants

- Fulbright research fellowship at Columbia University, in the laboratory of Prof Filippo Mancia. Eukaryotic membrane protein production and purification for cryo-EM purpose.
- 2015 - 2017, 40.000,00 € Postdoctoral fellowship granted by Accademia Nazionale dei Lincei. Title of the project: "A molecular prospective of memory: the interaction between HCN channels and their neural regulator TRIP8b"

## Professional Memberships

- 2014 – 2017, American Biophysical Society, fellow member.
- 2014 – 2017, Italian Biophysical Society, fellow member.
- 2017, Italian Society of Plant Biology, fellow member.

## Awards

- Lifelong Learning Programme/Erasmus fellowship (January – September 2012).
- “Piero Redaelli” fellowship, University of Milan (2013).
- EBSA bursary for attendance to the 9th European Biophysics Congress EBSA2013, Lisbon, Portugal (13<sup>th</sup>-17<sup>th</sup> July 2013).
- EBSA 2013 poster award.
- 2014 Biophysical Society membership as a recipient of the EBSA 2013 poster award.
- “Antonio Borsellino” award 2014 for the best PhD thesis in Biophysics, assigned by SIBPA (Italian Society of Pure and Applied Biophysics).

## References

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