Curriculum Vitae et Studiorum

Dr. Valerio Marino

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Research topics and expertise

- Quantitative structure-function relationship of proteins and complexes involved in the phototransduction cascade
- Biochemical and biophysical characterization of protein-nanodevice interactions (nanoparticles, liposomes) for nanomedical applications
- Protein-ion and protein-protein interaction studied by experimental techniques (Absorption, Circular Dichroism and Fluorescence Spectroscopies, Dynamic Light Scattering, Surface Plasmon Resonance)
- Bioinformatics and computational analysis of structural properties of single proteins, protein-ion and protein-protein interactions (protein modeling, Molecular Dynamics simulations, protein-protein rigid-body docking simulation, Protein Structure Networks)
- Expert in Windows OS, Unix-based OS, Office suite, biological databases (Protein Data Bank, Uniprot and NCBI related databases), molecular modeling and visualization software (Pymol, VMD), Molecular Dynamics simulations software and tools, (Gromacs, Wordom, Pyinteraph)
- Expert in Matlab, competent in Java and Python programming languages

Education / Academic positions

- **January 2022 - present**: Assistant professor (SSD BIO/10) at the University of Verona, Department of Neurosciences, Biomedicine and Movement Sciences, section of Biological Chemistry (Fondo Sociale Europeo REACT EU – Programma Operativo Nazionale "Ricerca e innovazione" 2014-2020)
- **May 2021 - December 2021**: Postdoctoral Fellow (SSD BIO/10) at the University of Verona, Department of Neurosciences, Biomedicine and Movement Sciences, section of Biological Chemistry (Velux Foundation)
- **January 2020 - May 2021**: Postdoctoral Fellow (SSD BIO/10) at the University of Verona, Department of Neurosciences, Biomedicine and Movement Sciences, section of Biological Chemistry (Joint project JPVR184ZZ5)
- **January 2018 - December 2019**: Postdoctoral Fellow (SSD BIO/10, BIO/09) at the University of Pisa, Department of Translational Research and of New Surgical and Medical Technologies (Telethon GGP16010)
- **January 2017 - December 2017**: Postdoctoral Fellow (SSD BIO/10) at the University of Verona, Department of Neurosciences, Biomedicine and Movement Sciences, section of Biological Chemistry
- **January 2014 - December 2016**: PhD student in "Biomolecular Medicine" at the University of Verona, Department of Neurosciences, Biomedicine and Movement Sciences, section of Biological Chemistry

- **March 2013 - December 2013**: Research collaborator at the University of Verona, Department of Life Sciences and Reproduction, section of Biological Chemistry
- **October 2010 - March 2013**: M.Sc. student in Bioinformatics and Medical Biotechnologies at the University of Verona
- **October 2006 - March 2010**: B.Sc. student in Bioinformatics at the University of Verona

International research activities

- **June 5 - July 30, 2016**: Visiting PhD student under the supervision of Prof. Koch (University of Oldenburg, Germany)
- **May 15 - July 15, 2014**: Visiting PhD student under the supervision of Prof. Koch (University of Oldenburg, Germany)

Teaching activities

- **2023 - 2024:** Teacher in charge of the "Bio-information technology workshop (Module 1)" course (B.Sc in Bioinformatics, University of Verona, SSD BIO/10)
- **2023 - 2024:** Teacher in charge of the "Biological macromolecules, interactions and networks (Laboratory)" course (M.Sc in Biology for Translational Research and Precision Medicine, University of Verona, SSD BIO/10)
- **2022 - 2023:** Teacher in charge of the "Biomolecular fundamentals of life (Module Biochemistry" (B.Sc in Environmental and Workplace Accident Prevention Techniques, University of Verona and University of Trento, SSD BIO/10)
- **2022 - 2023:** Teacher in charge of the "Bio-information technology workshop (Module 1)" course (B.Sc in Bioinformatics, University of Verona, SSD BIO/10)
- **2022 - 2023:** Introduction to medical Humanities (Combined Bachelor's + Master's degree in Medicine and Surgery, University of Verona, SSD BIO/10)
- **2019 - 2021**: Teacher in charge of "Bioinformatics and Biological Databases (Module 2)" course (B.Sc in Biotechnologies, University of Verona, SSD BIO/10)
- **2016 - present**: Tutor for the "Bioinformatics Laboratory" course (B.Sc in Bioinformatics, University of Verona, SSD BIO/10)
- **2018 - 2019**: Teacher in charge of the practical course in chemistry (Tandem project)
- **2019**: Teacher in charge for the practical part of the "Protein-protein recognition: from structures to dynamics. A theoretical and practical course" (PhD Program in Biomolecular Medicine, University of Verona)
- **2017**: Tutor for the "Protein-protein recognition: from structures to dynamics. A theoretical and practical course" (PhD Program in Biomolecular Medicine, University of Verona)
- **2015 - 2016**: Tutor for the "Bioinformatics and Biological Database Laboratory" course (B.Sc in Biotechnology, University of Verona, SSD BIO/10)

Student supervision

- **2016 - present**: Co-supervision of 3 students from the Bachelor's degree in Biotechnology, University of Verona

- **2016 - present**: Co-supervision of 2 students from the Master's degree in Molecular and Medical Biotechnology course, University of Verona
- **2019 - present**: Co-supervision of 2 students from the Master's degree in Quantitative and Computational Biology course, University of Trento
- **2018**: Co-supervision of visiting PhD student from the University of Oldenburg, Germany
- **2017**: Co-supervision of visiting PhD student from the University of Modena and Reggio Emilia

Awards and qualifications

- **2021**: Qualification as Associate Professor of Biochemistry in Italian Universities
- **2019**: Protein Society "33rd annual symposium of the Protein Society. Seattle, June 30 - July 3, 2019" Hans Neurath Oustanding Promise Travel Award
- **2017**: Qualification as Honorary Fellow (Cultore della Materia) of Bioinformatics at the University of Verona

Grants

- **2021**: Italian Super Computing Resource Allocation - Grant HP10CLGGAV (Effects of Pb2+ and cardiac arrhythmia associated CaM variants on CaM-RyR2 interaction, 64000 hours)
- **2020**: Italian Super Computing Resource Allocation - Grant HP10C6ZWA1 (Intra/intermolecular protein structure networks of monomeric and dimeric GCAP1 involved in retinal dystrophies based on exhaustive MD simulations, 50000 hours)
- **2016**: Consorzio Interuniversitario Biotecnologie - Short Visit Grant (Oldenburg, Germany)
- **2015**: CINECA "High Performance Molecular Dynamics" - Travel Grant
- **2014**: European Calcium Society "13th International Meeting of the European Calcium Society. Aix-en-Provence, September 13-17" - Travel Grant
- **2014**: Consorzio Interuniversitario Biotecnologie - Short Visit Grant (Oldenburg, Germany)

Memberships

- **2019 - present**: Member of the Protein Society
- **2018 - present:** Member of the Italian Society of Biochemistry and Molecular Biology (SIB)
- **2014, 2018, 2022:** Member of the European Calcium Society

Editorial board editing

Research Topic Editor for *Frontiers in Molecular Biosciences*

Refereeing

Ad-Hoc referee for:

- *International Journal of Molecular Science* (sezione Molecular Biophysics)
- *Scientific Reports*
- *Biomolecules*

- *Computational and Structural Biotechnology Journal*

Peer Reviewer for the Qatar National Research Fund (QNRF)

Seminars

1. **2022:** 16th International Meeting of the ECS (European Calcium Society, August 20-25, Cork, Ireland). Selected talk entitled: "Ca2+ sensitivity of the prototypical Neuronal Calcium sensor recoverin is tuned by synergistic protein-protein and protein-membrane interactions"
2. **2021**: 16th Bioinformatics and Computational Biology Conference (December 1-3). Selected talk entitled: "The structural and allosteric properties of Recoverin are influenced by membrane and its biological target"
3. **2021**: 61st SIB2021 Congress (September 23-24). Selected short talk entitled: "An integrated experimental and computational investigation of heterogeneous molecular phenotypes in retinal dystrophies"
4. **2019**: The Young Researcher Vision Camp (July 14, Leibertingen, Germany). Invited talk entitled: "Molecular dynamics simulations to unveil physiological and pathological mechanisms in vision"
5. **2018**: Workshop of the SIB group "Computational and Systems Biology" (November 12, Rome, Italy). Invited talk entitled: "Evolutionary-conserved structural communication in three Neuronal Calcium Sensor proteins investigated by PSN analysis"
6. **2018**: Sensory System in Health and Disease (June 6, Verona, Italy). Invited talk entitled: "Intra vs. intermolecular communication in proteins revealed by Molecular Dynamics simulations: a GCAP1 story"
7. **2016**: Neuronal Calcium Sensors in Health and Disease (December 6, Delmenhorst, Germany). Invited talk entitled: "Intra-molecular communication pathways and allosteric mechanisms in GCAP1 revealed by MD simulations"

Publications

Since 2014, Dr. Marino has authored 38 articles appearing in international peer-reviewed journals (Underlined: corresponding author, *co-first author). To date, **H-index** is 13 (Scopus)

1. Dal Cortivo G*, **Marino V***, Zamboni D, Dell'Orco D. Impact of calmodulin missense variants associated with congenital arrhythmia on the thermal stability and the degree of unfolding. Hum Genet. 2023 Dec 28. doi: 10.1007/s00439-023-02629-y.

2. Asteriti S*, **Marino V***, Avesani A, Biasi A, Dal Cortivo G, Cangiano L, Dell'Orco D. Recombinant protein delivery enables modulation of the phototransduction cascade in mouse retina. Cell Mol Life Sci. 2023 Nov 25;80(12):371. doi: 10.1007/s00018-023-05022-0.

3. **Marino V**, Dal Cortivo G, Dell'Orco D. Ionic displacement of Ca2+ by Pb2+ in calmodulin is affected by arrhythmia-associated mutations. Biochim Biophys Acta Mol Cell Res. 2023 Aug;1870(6):119490. doi: 10.1016/j.bbamcr.2023.119490.

4. Bodenbender JP*, **Marino V***, Bethge L, Stingl K, Haack TB, Biskup S, Kohl S, Kühlewein L, Dell'Orco D, Weisschuh N. Biallelic Variants in TULP1 Are Associated with Heterogeneous Phenotypes of Retinal Dystrophy. Int J Mol Sci. 2023 Jan 31;24(3):2709. doi: 10.3390/ijms24032709.

5. Dal Cortivo G*, **Marino V***, Bianconi S, Dell'Orco D. Calmodulin variants associated with congenital arrhythmia impair selectivity for ryanodine receptors. Front Mol Biosci. 2023 Jan 5;9:1100992. doi: 10.3389/fmolb.2022.1100992.

6. Meyer NH, Corbo C, Castro GR, Stjepanovic G, Genchi GG, **Marino V**. Editorial: Interactions of nanoparticles with and within living organisms-What can we learn to improve efficacy of nanomedicine? Front Mol Biosci. 2022 Oct 18;9:1044063. doi: 10.3389/fmolb.2022.1044063.

7. Avesani A, Bielefeld L, Weisschuh N, **Marino V**, Mazzola P, Stingl K, Haack TB, Koch KW, Dell'Orco D. Molecular Properties of Human Guanylate Cyclase-Activating Protein 3 (GCAP3) and Its Possible Association with Retinitis Pigmentosa. *Int J Mol Sci*. **2022** Mar 17;23(6):3240. doi: 10.3390/ijms23063240.

8. Dal Cortivo G, Barracchia CG, **Marino V**, D'Onofrio M, Dell'Orco D. Alterations in calmodulin-cardiac ryanodine receptor molecular recognition in congenital arrhythmias. *Cell Mol Life Sci.* **2022** Feb 8;79(2):127. doi: 10.1007/s00018-022-04165-w.

9. Biasi A, **Marino V**, Dal Cortivo G, Maltese PE, Modarelli AM, Bertelli M, Colombo L, Dell'Orco D. A Novel GUCA1A Variant Associated with Cone Dystrophy Alters cGMP Signaling in Photoreceptors by Strongly Interacting with and Hyperactivating Retinal Guanylate Cyclase. *Int J Mol Sci.* **2021** Oct 6;22(19):10809. doi: 10.3390/ijms221910809.

10. Weisschuh N, **Marino V**, Schäferhoff K, Richter P, Park J, Haack TB, Dell´Orco D. Mutations at a split codon in the GTPase-encoding domain of OPA1 cause dominant optic atrophy through different molecular mechanisms. *Hum Mol Genet*. **2021** Sep 24:ddab286. doi: 10.1093/hmg/ddab286.

11. **Marino V**, Dal Cortivo G, Maltese PE, Placidi G, De Siena E, Falsini B, Bertelli M and Dell'Orco D. Impaired Ca^{2+} Sensitivity of a Novel GCAP1 Variant Causes Cone Dystrophy and Leads to Abnormal Synaptic Transmission Between Photoreceptors and Bipolar Cells. *Int J Mol Sci.* **2021** Apr 14;22(8):4030. doi: 10.3390/ijms22084030

12. Avesani A, **Marino V**, Zanzoni S, Koch KW, Dell'Orco D. Molecular properties of human guanylate cyclase-activating protein 2 (GCAP2) and its retinal dystrophy-associated variant G157R. *J Biol Chem.* **2021** Apr 1:100619. doi: 10.1016/j.jbc.2021.100619.

13. Kellner U, Weisschuh N, Weinitz S, Farmand G, Deutsch S, Kortüm F, Mazzola P, Schäferhoff K, **Marino V**, Dell'Orco D. Autosomal Dominant Gyrate Atrophy-Like Choroidal Dystrophy Revisited: 45 Years Follow-Up and Association with a Novel *C1QTNF5* Missense Variant. *Int J Mol Sci.* **2021** Feb 19;22(4):2089. doi: 10.3390/ijms22042089.

14. **Marino V**, Riva M, Zamboni D, Koch KW, Dell'Orco D. Bringing the Ca^{2+}-sensitivity of myristoylated recoverin into the physiological range. *Open Biol*. **2021** Jan;11(1):200346. doi: 10.1098/rsob.200346

15. Iarossi G*, **Marino V***, Maltese PE, Colombo L, D'Esposito F, Manara E, Dhuli K, Modarelli AM, Cennamo G, Magli A, Dell'Orco D, Bertelli M. Expanding the Clinical and Genetic Spectrum of RAB28-Related Cone-Rod Dystrophy: Pathogenicity of Novel Variants in Italian Families. *Int J Mol Sci*. **2020** Dec 31;22(1):381. doi: 10.3390/ijms22010381

16. Bonì F, **Marino V**, Bidoia C, Mastrangelo E, Barbiroli A, Dell'Orco D, Milani M. Modulation of Guanylate Cyclase Activating Protein 1 (GCAP1) Dimeric Assembly by Ca2+ or Mg2+: Hints to Understand Protein Activity. *Biomolecules*. **2020** Oct 5;10(10):E1408. doi: 10.3390/biom10101408

17. Michelini S, Chiurazzi P, **Marino V**, Dell'Orco D, Manara E, Baglivo M, Fiorentino A, Maltese PE, Pinelli M, Herbst KL, Dautaj A, Bertelli M. Aldo-Keto Reductase 1C1 (AKR1C1) as the First Mutated Gene in a Family with Nonsyndromic Primary Lipedema. *Int J Mol Sci*. **2020** Aug 29;21(17):6264. doi: 10.3390/ijms21176264

18. Dal Cortivo G*, **Marino V***, Bonì F, Milani M, Dell'Orco D. Missense mutations affecting Ca2+-coordination in GCAP1 lead to cone-rod dystrophies by altering protein structural and functional properties. *Biochim Biophys Acta Mol Cell Res*. **2020** Jul 7;1867(10):118794. doi: 10.1016/j.bbamcr.2020.118794

19. Abbas S, **Marino V**, Weisschuh N, Kieninger S, Solaki M, Dell'Orco D, Koch KW. The neuronal calcium sensor GCAP1 encoded by GUCA1A exhibits heterogeneous functional properties in two cases of retinitis pigmentosa. *ACS Chem Neurosci*. **2020** May 20;11(10):1458-1470. doi: 10.1021/acschemneuro.0c00111

20. Di Stazio M, Morgan A, Brumat M, Bassani S, Dell'Orco D, **Marino V**, Garagnani P, Giuliani C, Gasparini P, Girotto G. New age-related hearing loss candidate genes in humans: an ongoing challenge. *Gene*. **2020** Jun 5;742:144561. doi: 10.1016/j.gene.2020.144561

21. Abbas S*, **Marino V***, Bielefeld L, Koch KW, Dell'Orco D. Constitutive Activation of Guanylate Cyclase by the G86R GCAP1 Variant Is Due to "Locking" Cation-π Interactions That Impair the Activator-to-Inhibitor Structural Transition. *Int J Mol Sci*. **2020**;21(3):E752. doi:10.3390/ijms21030752

22. Abbas S, **Marino V**, Dell'Orco D, Koch KW. Molecular Recognition of Rhodopsin Kinase GRK1 and Recoverin Is Tuned by Switching Intra- and Intermolecular Electrostatic Interactions. *Biochemistry*. **2019** Oct 29;58(43):4374-4385. doi: 10.1021/acs.biochem.9b00846

23. Dal Cortivo G, **Marino V**, Iacobucci C, Vallone R, Arlt C, Rehkamp A, Sinz A, Dell'Orco D. Oligomeric state, hydrodynamic properties and target recognition of human Calcium and Integrin Binding protein 2 (CIB2). *Sci Rep*. **2019** Oct 21;9(1):15058. doi: 10.1038/s41598-019-51573-3

24. Borsatto A, **Marino V**, Abrusci G, Lattanzi G, Dell'Orco D. Effects of Membrane and Biological Target on the Structural and Allosteric Properties of Recoverin: A Computational Approach. Int J Mol Sci. **2019** Oct 10;20(20). doi: 10.3390/ijms20205009

25. **Marino V**, Dell'Orco D. Evolutionary-Conserved Allosteric Properties of Three Neuronal Calcium Sensor Proteins. *Front Mol Neurosci*. **2019** Mar 7;12:50. doi: 10.3389/fnmol.2019.00050

26. **Marino V***, Dal Cortivo G*, Oppici E, Maltese PE, D'Esposito F, Manara E, Ziccardi L, Falsini B, Magli A, Bertelli B, Dell'Orco D. A novel p.(Glu111Val) missense mutation in GUCA1A associated with cone-rod dystrophy leads to impaired calcium sensing and perturbed second messenger homeostasis in photoreceptors. *Hum Mol Genet*. **2018**, doi: 10.1093/hmg/ddy311

27. **Marino V***, Borsatto A*, Vocke F, Koch KW, Dell'Orco D. CaF2 nanoparticles as surface carriers of GCAP1, a calcium sensor protein involved in retinal dystrophies. *Nanoscale*. **2017** Aug 17;9(32):11773-11784. doi: 10.1039/c7nr03288a

28. Vocke F, Weisschuh N, **Marino V**, Malfatti S, Jacobson SG, Reiff CM, Dell'Orco D, Koch KW. Dysfunction of cGMP signaling in photoreceptors by a Macular Dystrophy-related mutation in the calcium sensor GCAP1. *Hum Mol Genet***. 2017** Jan 1;26(1):133-144. doi: 10.1093/hmg/ddw374

29. **Marino V**, Dell'Orco D. Allosteric communication pathways routed by Ca2+/Mg2+ exchange in GCAP1 selectively switch target regulation modes. *Sci Rep*. **2016** Oct 14;6:34277. doi: 10.1038/srep34277

30. Butturini E, Gotte G, Dell'Orco D, Chiavegato G, **Marino V**, Canetti D, Cozzolino F, Monti M, Pucci P, Mariotto S. Intermolecular disulfide bond influences unphosphorylated STAT3 dimerization and function. *Biochem J*. **2016** Aug 2. doi: 10.1042/BCJ20160294

31. Astegno A, La Verde V, **Marino V**, Dell'Orco D, Dominici P. Biochemical and biophysical characterization of a plant calmodulin: Role of the N- and C-lobes in calcium binding, conformational change, and target interaction. *Biochim Biophys Acta*. **2016** Mar;1864(3):297-307. doi: 10.1016/j.bbapap.2015.12.003

32. **Marino V**, Scholten A, Koch KW, Dell'Orco D. Two retinal dystrophy-associated missense mutations in GUCA1A with distinct molecular properties result in a similar aberrant regulation of the retinal guanylate cyclase. *Hum Mol Genet*. **2015** 24 (23): 6653-6666. doi: 10.1093/hmg/ddv370

33. Robin J, Brauer J, Sulmann S, **Marino V**, Dell'Orco D, Lienau C, Koch KW. Differential Nanosecond Protein Dynamics in Homologous Calcium Sensors. *ACS Chem Biol*. **2015** Oct 16;10(10):2344-52. doi: 10.1021/acschembio.5b00278

34. **Marino V**, Sulmann S, Koch KW, Dell'Orco D. Structural effects of Mg(2+) on the regulatory states of three neuronal calcium sensors operating in vertebrate phototransduction. Biochim Biophys Acta. **2015** Sep;1853(9):2055-65. doi: 10.1016/j.bbamcr.2014.10.026

35. Astegno A, Maresi E, **Marino V**, Dominici P, Pedroni M, Piccinelli F, Dell'Orco D. Structural plasticity of calmodulin on the surface of CaF2 nanoparticles preserves its biological function. *Nanoscale*. **2014** Dec 21;6(24):15037-47. doi: 10.1039/c4nr04368e

36. Sulmann S, Dell'Orco D, **Marino V**, Behnen P, Koch KW. Conformational changes in calcium-sensor proteins under molecular crowding conditions. *Chemistry*. **2014** May 26;20(22):6756-62. doi: 10.1002/chem.201402146

37. Dell'Orco D, Sulmann S, Zägel P, **Marino V**, Koch KW. Impact of cone dystrophy-related mutations in GCAP1 on a kinetic model of phototransduction. *Cell Mol Life Sci*. **2014** Oct;71(19):3829-40. doi: 10.1007/s00018-014-1593-4

38. **Marino V**, Astegno A, Pedroni M, Piccinelli F, Dell'Orco D. Nanodevice-induced conformational and functional changes in a prototypical calcium sensor protein. *Nanoscale*. **2014** Jan 7;6(1):412-23. doi: 10.1039/c3nr04978g

05/02/2024
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