

Matteo Dal Peraro, Ph.D.

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Personal information

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Education

2004-2007	Postdoctoral fellow - Biochemistry and Computational Chemistry University of Pennsylvania, Philadelphia, USA
2004	Ph.D. (<i>Magna cum Laude</i>) - Biophysics International School for Advanced Studies - SISSA, Trieste, Italy
2000	M.Sc. (<i>Magna cum Laude</i>) - Physics University of Padova, Padova, Italy

Research experience and appointments

2014 - present	Associate Professor, School of Life Sciences - EPFL, Lausanne
2013 - present	Group Leader at the Swiss Institute of Bioinformatics - SIB, Lausanne
2007 - 2014	Assistant Professor, School of Life Sciences - EPFL, Lausanne
2004 - 2007	Postdoctoral fellow, University of Pennsylvania
2000 - 2004	Ph.D student, International School for Advanced Studies - SISSA

Institutional responsibilities

2021 - present	Associate Director of the Institute of Bioengineering, http://bioengineering.epfl.ch
2019 - 2021	Director of the Doctoral Program in Computational and Quantitative Biology - EDCB, http://phd.epfl.ch/EDCB
2015 - 2019	Director of the Doctoral Program in Biotechnology and Bioengineering - EDBB, http://phd.epfl.ch/EDBB
2013 - present	Member of the Steering Committee for EPFL HPC, http://scitas.epfl.ch
2013 - present	Director of the Steering Committee of the Protein Crystallography Core Facility, http://pcrycf.epfl.ch

Approved research projects (2016-present)

2022-2025	SNSF Lead Agency - Biological nanopore sequencing of long digitally-encoded polymers (200021L_212128) - CHF 670'330.
2021-2024	SNSF - Sinergia, Origins of broad-spectrum β -lactam resistance: multidimensional dissection of chromosomally encoded metallo- β -lactamases Co-PI, Main Applicant P. Viollier, CHF 2'205'492, to the lab CHF 770'460
2020-2024	SNSF - Project funding in Mathematics, Natural Sciences and Engineering (division II), Integrative modeling of biological interfaces (205321_192371) - CHF 744'216
2020-2021	CSCS – Production Project, Molecular dynamics simulations to assist the engineering of protein-based nanopores for DNA sequencing" - CHF 496'400
2017-2020	SNFS - Argentinian-Swiss Joint Research Programme (ASJRP), Role of Membrane Anchoring in Carbapenem Resistance Mediated by New Delhi Metallo- β -Lactamases (IZSAZ3_173464) - CHF 249'918
2016-2019	SNSF - Project funding in Biology and Medicine (division III), Molecular investigation of mitochondrial membrane-associated protein complexes (31003A_170154) - CHF 429'000

Patents

2020	M Dal Peraro, J-F Lutz, A Radenovic, C Cao, L Krapp, "Systems and methods for digital information decoding and data storage in hybrid macromolecules", to be filed.
2019	M Dal Peraro, C Cao, EP 19197435.1 "Mutant aerolysin and uses thereof".

Teaching activities

2022-present	Biological Chemistry I (Bachelor, 4 ECTS)
2022-present	Structural Biology (Master, 4 ECTS)
2009-2021	Biomolecular structure and mechanics (Master, 4 ECTS)
2014-present	Scientific literature in computational molecular biology (Master, 4 ECTS)
2009-present	Projects in bioengineering and biosciences (Bachelor, 5 ECTS)
	Projects in computational science and engineering (Master, 8 ECTS)

Supervision of junior researchers**Ph.D. students**

2023-present:	Simon Crouzet
2022-present:	Jana Anton
2022-present:	Alissa Agerova
2022-present:	Fernando Meireles
2020-present:	Arthur Samurkas
2020-present:	Anastasia Theodoropoulou
2019-present:	Simon Mayer
2019-present:	Zhidian Zhang
2019-present:	Lucien Krapp
2016-2021:	Sylvain Traeger
2015-2020:	Alessio Prunotto
2015-2019:	Giulia Fonti
2014-2019:	Deniz Aydin
2014-2019:	Alexandra Kalantzi
2013-2018:	Giorgio Tamo'
2012-2017:	Martina Audagnotto
2010-2014:	Hassan Pezeshgi Modares
2010-2014:	Christophe Bovigny

2008-2013:	Enrico Spiga
2008-2013:	Thomas Lemmin (<i>Uni Bern</i>)
2008-2013:	Matteo Degiacomi (<i>Durham U</i>)

Postdoctoral fellows

2020-present:	Dr. Juan Bada
2017-2020:	Dr. Chan Cao (<i>Uni Geneva</i>)
2014-present:	Dr. Maria J. Marcaida
2012-present:	Dr. Luciano A. Abriata
2015-2016:	Dr. Nuria Cirauqui
2014-2014:	Dr. Christos Lamprakos
2012-2014:	Dr. Benoîte Bargeton (visiting)
2012-2013:	Dr. Anna Lindeløv Westergaard
2009:	Dr. Thorsteins Holmfridur (visiting)
2009-2012:	Dr. Marco Stenta
2009-2010:	Dr. Shantanu Roy
2008-2012:	Dr. Davide Alemani

Memberships in panels, and individual scientific reviewing activities

- Assessor for the *Critical Assessment of Protein Structure Prediction* (CASP12 - CASP13)
- Invited editor for *Current Opinions in Structural Biology*, for the October 2019 issue on cryo-EM.
- Member of the editorial board of *Scientific Reports* and *Frontiers in Molecular Biosciences*
- Ad hoc reviewer for grant agencies: *Swiss National Science Foundation (SNSF)*, *Agence Nationale de la Recherche (ANR, France)*, *Israel Science Foundation (ISF, Israel)*, *Novo Nordisk Fonden (Denmark)*, *European Research Council (ERC)*
- Ad hoc reviewer for the following scientific journals: *Nature*, *Nature Communications*, *Proceeding of the National Academy of Sciences USA*, *Accounts of Chemical Research*, *Journal of the American Chemical Society*, *Biochemistry*, *Journal of Physical Chemistry*, *Scientific Reports*, *Journal of Chemical Theory and Computation*, *Biophysical Journal*, *PLoS ONE*, *Proteins*, *ChemPhysChem*, *Bioinformatics*, etc.

Prizes, awards, fellowships

2018	EPFL-Stanford Exchange Program Fellowship
2004	Magna cum Laude - Ph.D. in Biophysics
2000	Magna cum Laude - M.Sc. in Physics

Organization of conferences (2018-2023)

2023	Macromolecular complexes: from ab initio and integrative modelling to functional dynamics, CECAM Flagship workshop, Lausanne, September 5-8
2023	Computational Advances in Drug Discovery (SBDD2023), Sestri Levante, May 2-5
2021	Nanopore Translocation and Nanochannel Confined Biopolymers: bridging theory and experiments, CECAM Flagship conference, Trieste, September 17-19.
2019	Computational Advances in Drug Discovery (SBDD2019), Sestri Levante, September 19-21
2019	Multiscale Modeling from Macromolecules to Cell: Opportunities and Challenges of Biomolecular Simulations, CECAM Lausanne, February 2-6
2018	CompAllo: Towards a Unified Approach to the Analysis and Design of Allostery, CECAM, Lausanne, April 9-11

➡ See complete publications record on Google Scholar: <http://scholar.google.ch/citations>.
(6670 citations, h-index 48, i10-index 106 - 21.08.2023)

Articles in peer-reviewed journals (2018-2023)

1. von der Malsburg *et al.*, Structural mechanism of mitochondrial membrane remodeling by human OPA1, *Nature* 2023, in press.
 2. LF Krapp, AL Abriata, F Cortes Rodriguez, **M Dal Peraro***, PeSTo: parameter-free geometric deep learning for accurate prediction of protein binding interfaces, *Nature Communications*, 14 (1), 2175, 2023,
 3. M Manicki, H Aydin, LA Abriata, KA Overmyer, RM Guerra, JJ Coon, **M Dal Peraro**, A Frost, DJ Pagliarini, Structure and functionality of a multimeric human COQ7: COQ9 complex, *Molecular Cell* 82(22), 4307-4323. e10, 2022
 4. T Schönfeldová, HI Okur, V Vežočník, I Iacovache, C Cao, **M Dal Peraro**, P Maček, B Zuber, S Roke, Ultrasensitive Label-Free Detection of Protein–Membrane Interaction Exemplified by Toxin-Liposome Insertion, *The Journal of Physical Chemistry Letters* 13(14), 3197-3201, 2022
 5. SF Mayer, C Cao, **M Dal Peraro***, Biological nanopores for single-molecule sensing, *iScience*, 104145, 2022
 6. FC Rodríguez, L Krapp, **M Dal Peraro**, LA Abriata, Visualization, Interactive Handling and Simulation of Molecules in Commodity Augmented Reality in Web Browsers Using molecuARweb's Virtual Modeling Kits, *Chimia* 76 (1-2), 145-145
 7. FC Rodríguez, **M Dal Peraro**, LA Abriata, Online tools to easily build virtual molecular models for display in augmented and virtual reality on the web, *Journal of Molecular Graphics and Modelling*, 108164, 2022
 8. K Rosier, MT McDevitt, J Smet, BJ Floyd, M Verschoore, MJ Marcaida, et al., Prolyl endopeptidase-like is a (thio) esterase involved in mitochondrial respiratory chain function, *iScience* 24 (12), 103460, 2022.
 9. S Donkervoort, N Krause, M Dergai, P Yun, J Koliwer, S Gorokhova, et al. BET1 variants establish impaired vesicular transport as a cause for muscular dystrophy with epilepsy, *EMBO Molecular Medicine*, 13 (12), e13787, 2022.
 10. FC Rodríguez, **M Dal Peraro**, LA Abriata, Democratizing interactive, immersive experiences for science education with WebXR, *Nature Computational Science* 1 (10), 631-632, 2022.
 11. A Chiki, Z Zhang, K Rajasekhar, LA Abriata, I Rostami, L Krapp, D Boudeffa, **M Dal Peraro***, HA Lashuel, Investigating crosstalk among PTMs provides novel insight into the structural basis underlying the differential effects of Nt17 PTMs on mutant Httex1 aggregation, *Frontiers in Molecular Biosciences*, 8, 2021.
 12. F Mesquita, L Abrami, O Sergeeva, P Turelli, B Kunz, C Raclot, J Paz Montoya, LA Abriata, **M Dal Peraro**, D Trono, G D'Angelo, G van der Goot, S-acylation controls SARS-Cov-2 membrane lipid organization and enhances infectivity, *Developmental Cell*, 56 (20), 2790-2807. e8, 2021
 13. C López, A Prunotto, G Bahr, R A Bonomo, LJ González, **M Dal Peraro**, AJ Vila, Specific Protein-Membrane Interactions Promote Packaging of Metallo- β -Lactamases into Outer Membrane Vesicles, *Antimicrobial Agents and Chemotherapy*, 65(10) e00507-21, 2021
 14. F Cortés Rodríguez, G Frattini, L Krapp, H Martinez-Huang, D Moreno, J Salomón, L Stemkoski, S Träger, **M Dal Peraro**, L Abriata, *MolecuARweb*: A Website for Chemistry and Structural Biology Education Through Interactive Augmented Reality out of the Box in Commodity Devices, *Journal of Chemical Education* 98 (7), 2243-2255, 2021.
 15. S Traeger, G Tamo', D Aydin, G Fonti, M Audagnotto, **M Dal Peraro***, CLoNe: Automated clustering based on local density neighborhoods for application to biomolecular structural ensembles, *Bioinformatics*, 37 (7), 921-928, 2021.
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16. L Abriata, **M Dal Peraro***, State-of-the-art web services for de novo protein structure prediction, *Briefings in Bioinformatics* 22 (3), bbaa139, 2021.
17. L Abrami, M Audagnotto, S Ho, MJ Marcaida, FS Mesquita, MU Anwar, PA Sandoz, G Fonti, F Pojer, **M Dal Peraro***, FG van der Goot*, Molecular mode of action of an acyl protein thioesterase, *Nature Chemical Biology*, 1-10, 2020.
18. L Abriata, **M Dal Peraro***, Assessment of transferable forcefields for protein simulations attests improved description of disordered states and secondary structure propensities, and hints at multi-protein systems as the next challenge for optimization, *Computational and Structural Biotechnology Journal*, 19, 2626-2636, 2021.
19. M Litovchenko, , ACA Meireles-Filho, , MV Frochoux, RPJ Bevers, A Prunotto, AM Anduaga, B Hollis, V Gardeux, VS Braman, JMC Russeil, S Kadener, **M Dal Peraro**, Bart Deplancke, Extensive tissue-specific expression variation and novel regulators underlying circadian behavior, *Science Advances*, 7 (5), eabc3781, 2021.
20. C Cao, L Krapp, A Al Ouahabi, N Konig, N Cirauqui, A Radenovic*, J-F Lutz*, **M Dal Peraro***, Aerolysin nanopores decode digital information stored in tailored macromolecular analytes, *Science Advances*, 6(50), eabc2661, 2020.
21. MJ Marcaida; A Kauzlaric; A Duperrex; J Sülzle; M Moncrieffe; D Adebajo; S Manley; D Trono; **M Dal Peraro***, The human RNA helicase DDX21 presents a dimerization interface necessary for helicase activity, *iScience*, 23(12), 101811, 2020.
22. Y Shen, I Kalograiaki, A Prunotto, M Dunne, S Boulos, NMI Taylor, E Sumrall, MR Eugster, R Martin, A Julian-Rodero, B Gerber, PG Leiman, M Menéndez, **M Dal Peraro**, FJ Cañada, MJ.Loessner, Structural basis for recognition of bacterial cell wall teichoic acid by pseudo-symmetric SH3b-like repeats of a viral peptidoglycan hydrolase, *Chemical Science*, 12 (2), 576-589, 2021.
23. A Prunotto, G Bahr, LJ González, AJ Vila*, **M Dal Peraro***, Molecular Bases of the Membrane Association Mechanism Potentiating Antibiotic Resistance by New Delhi Metallo- β -Lactamase 1, *ACS Infectious Diseases*, 6(10), 2719-2731, 2020.
24. T Yung, B Shin, G Tamo, H Kim, R Vijayvargia, A Leitner, MJ Marcaida, J Astorga-Wells, R Jung, R Aebersold, **M Dal Peraro***, H Hebert*, IS Seong*, J-J Song*, The polyglutamine expansion at the N-terminal of huntingtin modulates the dynamic configuration and phosphorylation of the C-terminal HEAT domain, *Structure*, i28(9):1035-1050, 2020.
25. J Bürgi, L Abrami, I Castanon, LA Abriata, B Kunz, SE Yan, M Lera, S Unger, A Superti-Furga, **M Dal Peraro**, M Gonzalez Gaitan, FG van der Goot, Ligand Binding to the Collagen VI Receptor Triggers a Talin-to-RhoA Switch that Regulates Receptor Endocytosis, *Developmental Cell* 53 (4), 418-430, 2020
26. DP Duarte, AJ Lamontanara, G La Sala, S Jeong, Y-K Sohn, A Panjkovich, A Georgeon, T Kükenshöner, MJ Marcaida, F Pojer, M De Vivo, D Svergun, H-K Kim, **M Dal Peraro**, O Hantschel, Btk SH2-kinase interface is critical for allosteric kinase activation and its targeting inhibits B-cell neoplasms, *Nature Communications*, 11 (1):1-15, 2020
27. LA Abriata, **M Dal Peraro***, Will cryo-electron microscopy shift the current paradigm in protein structure prediction? *Journal of Chemical Information and Modeling*, 60(5), 2443-2447, 2020
28. LA Abriata, R Lepore, **M Dal Peraro***, About the need to make computational models of biological macromolecules available and discoverable. *Bioinformatics*, 36(9):2952-2954, 2020
29. S Meister, A Prunotto, **M Dal Peraro**, T Kohn , Salt enhances the thermostability of enteroviruses by stabilizing capsid protein interfaces. *Journal of Virology*, 94(11), 2020
30. BS Belluzo, LA Abriata, E Giannini, D Mihovilcevic, **M Dal Peraro**, LI Llarrul, An experiment-informed signal transduction model for the role of the Staphylococcus aureus MecR1 protein in β -lactam resistance, *Scientific Reports* 9(1):1-15, 2019
31. P Fernández, L Porrini, D Albanesi, LA Abriata, **M Dal Peraro**, D de Mendoza, MC Mansilla, Transmembrane Prolines Mediate Signal Sensing and Decoding in Bacillus subtilis DesK Histidine Kinase, *Mbio*, 10 (6), 2019

32. LA Abriata, GE Tamò, **M Dal Peraro***, A further leap of improvement in tertiary structure prediction in CASP13 prompts new routes for future assessments, *Proteins: Structure, Function, and Bioinformatics*, 87 (12), 1100-1112, 2019
33. C Cao, N Cirauqui, MJ Marcaida, E Buglakova, A Duperrex, A Radenovic, **M Dal Peraro***, Single-molecule sensing of peptides and nucleic acids by engineered aerolysin nanopores, *Nature Communications*, 10(1):1-11, 2019
34. **M Dal Peraro*** and J Song, The future after the cryo-EM resolution revolution, *Current Opinion in Structural Biology*, 58, III-IV, 2019
35. G Fonti, MJ Marcaida, L Bryan, S Traeger, A Kalantzi, P-Y Helleboid, D Demurtas, M Tully, S Grudinin, D Trono, B Fierz, **M Dal Peraro***, KAP1 is an antiparallel dimer with a functional asymmetry, *Life Science Alliance*, 2 (4), e201900349, 2019.
36. LA Abriata GE Tamò and **M Dal Peraro***, A further leap of improvement in tertiary structure prediction in CASP13 prompts new routes for future assessments, *Proteins: Structure, Function, and Bioinformatics*, 87 (12):1100-1112, 2019.
37. S Malhotra, S Träger, **M Dal Peraro**, M Topf, Modelling structures in cryo-EM maps, *Current Opinion in Structural Biology*, 58:105-114, 2019
38. A Mayorov, **M Dal Peraro**, LA Abriata, Active Site-Induced Evolutionary Constraints Follow Fold Polarity Principles in Soluble Globular Enzymes, *Molecular Biology and Evolution*, 36(8):1728–1733, 2019
39. D Lohman, D Aydin, H C Von Bank, R W Smith, V Linke, E Weisenhorn, M T McDevitt, P Hutchins, E M Wilkerson, B Wancewicz, J Russell, M S Stefely, E T Beebe, A Jochem, J J Coon, C A Bingman, **M Dal Peraro***, D Pagliarini*, An isoprene lipid binding protein promotes eukaryotic coenzyme Q biosynthesis, *Molecular Cell*, 73(4), 763-774.e10, 2019
40. C Cao, MY Li, N Cirauqui, YQ Wang, **M Dal Peraro***, H Tian, YT Long*, Mapping the sensing spots of aerolysin for single oligonucleotides analysis, *Nature Communications*, 9(1), 2823, 2018
41. AG Reidenbach, ZA Kemmerer, D Aydin, A Jochen... **M Dal Peraro**, D Pagliarini, Conserved Lipid and Small-Molecule Modulation of COQ8 Reveals Regulation of the Ancient Kinase-like UbiB Family, *Cell Chemical Biology*, 25(2), 154-165.e11, 2018
42. GE Tamò, LA Abriata, G Fonti, **M Dal Peraro***, Assessment of data-assisted prediction by inclusion of crosslinking/mass-spectrometry and small angle X-ray scattering data in the 12th Critical Assessment of protein Structure Prediction experiment, *Proteins: Structure, Function, and Bioinformatics*, 86 (S1), 215-227, 2018
43. LA Abriata, GE Tamò, B Monastyrskyy, A Kryshtafovych, **M Dal Peraro***, Assessment of hard target modeling in CASP12 reveals an emerging role of alignment-based contact prediction methods, *Proteins: Structure, Function, and Bioinformatics*, 86 (S1), 97-112, 2018
44. LA Abriata, LN Kinch, GE Tamò, B Monastyrskyy, **M Dal Peraro***, Definition and classification of evaluation units for tertiary structure prediction in CASP12 facilitated through semi-automated metrics, *Proteins: Structure, Function, and Bioinformatics*, 86 (S1), 16-26, 2018
45. NG Bologna, R Iselin, LA Abriata, A Sarazin, N Pumplin, F Jay, T Grentzinger, **M Dal Peraro**, O Voinnet, Nucleo-cytosolic Shuttling of ARGONAUTE1 Prompts a Revised Model of the Plant MicroRNA Pathway, *Molecular Cell*, 69(4), 709-719.e5, 2018
46. M Audagnotto, AK Lorkowski, **M Dal Peraro***, Recruitment of the amyloid precursor protein by γ -secretase at the synaptic plasma membrane, *Biochemical and Biophysical Research Communications*, 498(2), 334-341, 2018

Reviews

1. SF Mayer, C Cao, **M Dal Peraro***, Biological nanopores for single-molecule sensing, *iScience*, 104145, 2022.
2. S Malhotra, S Träger, **M Dal Peraro**, M Topf, Modelling structures in cryo-EM maps, *Current Opinion in Structural Biology*, 58:105-114, 2019