Gabriel S. Longo

Associate Researcher, CONICET

Instituto de Investigaciones Fisicoquímicas Teóricas y Aplicadas (INIFTA)
Universidad Nacional de La Plata – CONICET
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La Plata 1900, Argentina
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✉ longogs@inifta.unlp.edu.ar

Education

August 2007 **PhD, Physical Chemistry**
Purdue University, West Lafayette, IN, USA.
Department of Chemistry.
Thesis: "Theoretical Guidelines for the Design of Membrane Based Biosensors: From Lipid Membrane Stability to Polymer Mediated Specific Targeting."
Advisor: Prof. I. Szleifer.

March 2002 **Licenciatura en Física** (equivalent to BS+MS in Physics)
Universidad Nacional de Córdoba, Córdoba, Argentina.
Facultad de Matemática, Astronomía y Física (FaMAF).
Thesis: "Experimental Study of Secondary Ice-Particle Production under Severe Storm Conditions."
Advisor: Prof. E. E. Ávila.

Awards, Honors and Fellowships

10/2013 **2013 Outstanding Research Award**
International Institute for Nanotechnology, Northwestern University, Evanston, IL, USA.

10/2013 **Reinsertion Postdoctoral Fellowship**
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), La Plata, Argentina.
Fellowship intended for the reinsertion of abroad-trained researchers in the Argentine scientific system.

12/2009–3/2012 **Postdoctoral Fellowship**
National Science Foundation (NSF) at Northwestern University, Evanston, IL, USA.
MRSEC program of NSF (DMR-0520513).

12/2008–12/2009 **Postdoctoral Fellowship**
The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy.

12/2007–12/2008 **Postdoctoral Fellowship**
Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste, Italy.

4/2003 **Doctoral Fellowship**
CONICET, Córdoba, Argentina.
Resigned to continue education abroad.

Grants

2018–2021 **Proyectos de Investigación Científica y Tecnológica (PICT) 2017** (Scientific and Technological Research Projects 2017), *Agencia Nacional de Promoción Científica y Tecnológica (ANPCyT),* Arg.
"Diseño Asistido y Síntesis de Microgeles Inteligentes como Anfitriones Supramoleculares de Compuestos Bioactivos." (Assisted Design and Synthesis of Microgels as Supramolecular Hosts of Bioactive Compounds.)
Investigators: Juan M. Giussi and Gabriel S. Longo (PICT-2017-3513, AR$465000).

2015–2018 **PICT 2014,** *ANPCyT,* Argentina.
"Simulaciones por Computadora de Hidrogeles con Respuesta a Estímulo." (Stimuli-Responsive Hydrogels: Computer Simulations.)
Principal Investigator (PI): Gabriel S. Longo (PICT-2014-3377, AR$100000).

2016–2018 **Proyectos de Investigación Plurianuales (PIP) 2014-2016** (Multiannual Research Projects 2014-2016), *CONICET,* Argentina.
"Construcción de Nanoarquitecturas Interfaciales Mediante Ensamblado Electrostático Capa-por-Capa: Diseño Molecular de Heteroestructuras Funcionales, Química Preparativa, Caracterización y Aplicaciones."(Building Interfacial Nanoarchitectures Using Electrostatic Layer-by-Layer Self-Assembly: Molecular Design of Functional Heterostructures, Preparative Chemistry, Characterization and Applications.)
PI: Omar Azzaroni, Co-Investigator: Gabriel S. Longo (PIP-0370, AR$450000).

Research Experience

Instituto de Investigaciones Fisicoquímicas Teóricas y Aplicadas (INIFTA), UNLP–CONICET, *La Plata, Argentina.*

1/2017–present *Associate Researcher, CONICET.*
10/2013–12/2016 *Assistant Researcher, CONICET.*
Currently, I am a member of the institute's Soft Matter Lab. My research interests focus on the molecular modeling of stimuli-sensitive polymer hydrogels using theoretical and computational methods.

12/2009–10/2013 **Northwestern University,** *Evanston, IL, USA.*
Department of Materials Science and Engineering, and Department of Biomedical Engineering.
Postdoctoral Fellow.
I worked in the research group of Prof. M. Olvera de la Cruz in collaboration with Prof. I. Szleifer. We developed a general molecular theory to study stimuli-responsive polymer hydrogels.

12/2007–12/2009 **SISSA and ICTP,** *Trieste, Italy.*
Condensed Matter Sector of SISSA, and Condensed Matter and Statistical Physics Section of ICTP.
Postdoctoral Fellow.
In collaboration with Prof. S. Scandolo, we used Density Functional Theory and Molecular Dynamics simulations to study self-assembled monolayers of thiols on gold.

8/2003–12/2007 **Purdue University,** *West Lafayette, IN, USA.*
Department of Chemistry.
Graduate Student.
During my PhD studies in Prof. Szleifer's group at Purdue University, I worked on Statistical Mechanics of complex fluids, including confined polymeric systems, self-assemblies of surfactant molecules, and biological systems such as lipid layers.

2/2001–7/2003 **Universidad Nacional de Córdoba,** *Córdoba, Argentina.*
School of Mathematics, Astronomy and Physics (FaMAF).
Undergraduate Student.
For my master's thesis, under Prof. E. E. Avila's supervision, I studied the microphysics of thunderstorm electrification using simulated clouds in wind-tunnel experiments.

Publications

Journal Papers

1. "Role of Micellar Interface in the Synthesis of Chitosan Nanoparticles Formulated by Reverse Micellar Method." M. S. Orellano, **G. S. Longo**, C. Porporatto, N. M. Correa, and R. D. Falcone.
Colloids Surf. A:124876, 2020.
URL: http://www.sciencedirect.com/science/article/pii/S0927775720304696.

2. "A Study of the Complex Interaction between Poly Allylamine Hydrochloride and Negatively Charged Poly(N-Isopropylacrylamide-co-Methacrylic Acid) Microgels."
J. M. Giussi, M. Martínez Moro, A. Iborra, M. L. Cortez, D. Di Silvio, I. Llarena Conde, **G. S. Longo**, O. Azzaroni, and S. Moya.
Soft Matter 16(4):881–890, 2020.
URL: http://dx.doi.org/10.1039/C9SM02070E.

3. "Molecular theory of glyphosate adsorption to pH-responsive polymer layers."
N. A. Pérez-Chávez, A. G. Albesa, and **G. S. Longo**.
Adsorption 25(7):1307–1316, 2019.
URL: https://doi.org/10.1007/s10450-019-00091-9.

4. "Adsorption and Insertion of Polyarginine Peptides into Membrane Pores: The Trade-Off Between Electrostatics, Acid-Base Chemistry and Pore Formation Energy."
P. G. Ramírez, M. G. Del Pópolo, J. A. Vila, I. Szleifer, and **G. S. Longo**.
J. Colloid Interface Sci. 552:701–711, 2019.
URL: http://www.sciencedirect.com/science/article/pii/S0021979719306514.

5. "How Protonation Modulates the Interaction between Proteins and pH-Responsive Hydrogel Films."
G. S. Longo, N. A. Pérez-Chávez, and I. Szleifer.
Curr. Opin. Colloid Interface Sci. 41:27–39, 2019.
URL: http://www.sciencedirect.com/science/article/pii/S1359029418301183.

6. "Use of pH Gradients in Responsive Polymer Hydrogels for the Separation and Localization of Proteins from Binary Mixtures."
A. Hagemann, J. M. Giussi, and **G. S. Longo**.
Macromolecules 51(20):8205–8216, 2018.
URL: https://doi.org/10.1021/acs.macromol.8b01876.

7. "Using Polymer Hydrogels for Glyphosate Sequestration from Aqueous Solutions: Molecular Theory Study of Adsorption to Polyallylamine Films."
N. A. Pérez-Chávez, A. G. Albesa, and **G. S. Longo**.
Langmuir 34(42):12560–12568, 2018.
URL: https://doi.org/10.1021/acs.langmuir.8b02727.

8. "Pushing the Boundaries of Interfacial Sensitivity in Graphene FET Sensors: Polyelectrolyte Multilayers Strongly Increase the Debye Screening Length."
E. Piccinini, S. Alberti, **G. S. Longo**, T. Berninger, J. Breu, J. Dostalek, O. Azzaroni, and W. Knoll.
J. Phys. Chem. C 122(18):10181–10188, 2018.
URL: https://doi.org/10.1021/acs.jpcc.7b11128.

9. "Behavior of Ligand Binding Assays with Crowded Surfaces: Molecular Model of Antigen Capture by Antibody-Conjugated Nanoparticles."
D. C. Malaspina, **G. Longo**, and I. Szleifer.
PLOS ONE 12(9):e0185518, 2017.
URL: https://doi.org/10.1371/journal.pone.0185518.

10. "Thermally-Induced Softening of PNIPAm-Based Nanopillar Arrays."
B. Sanz, C. von Bilderling, J. S. Tuninetti, L. Pietrasanta, C. Mijangos, **G. S. Longo**, O. Azzaroni, and J. M. Giussi.
Soft Matter 13(13):2453–2464, 2017.
URL: http://dx.doi.org/10.1039/C7SM00206H.

11. "Controlling Swelling/Deswelling of Stimuli-Responsive Hydrogel Nanofilms in Electric Fields."
G. S. Longo, M. Olvera de la Cruz, and I. Szleifer.
Soft Matter 12(40):8359–8366, 2016.
URL: http://dx.doi.org/10.1039/C6SM01172A.

12. "Adsorption and Protonation of Peptides and Proteins in pH Responsive Gels."
G. S. Longo and I. Szleifer.
J. Phys. D: Appl. Phys. 49(32):323001, 2016.
URL: https://doi.org/10.1088/0022-3727/49/32/323001.

13. "Unusual Temperature-Induced Swelling of Ionizable Poly(N-Isopropylacrylamide)-Based Microgels: Experimental and Theoretical Insights into Its Molecular Origin."
J. M. Giussi, M. I. Velasco, **G. S. Longo**, R. H. Acosta, and O. Azzaroni.
Soft Matter 11(45):8879–8886, 2015.
URL: http://dx.doi.org/10.1039/C5SM01853F.

14. "Lysozyme Adsorption in pH-Responsive Hydrogel Thin-Films: The Non-Trivial Role of Acid-Base Equilibrium."
C. F. Narambuena*, **G. S. Longo***, and I. Szleifer.
Soft Matter 11(33):6669–6679, 2015.
URL: http://dx.doi.org/10.1039/C5SM00980D.
* Equal contribution.

15. "Equilibrium Adsorption of Hexahistidine on pH-Responsive Hydrogel Nanofilms."
G. S. Longo, M. Olvera de la Cruz, and I. Szleifer.
Langmuir 30(50):15335–15344, 2014.
URL: http://dx.doi.org/10.1021/la5040382.

16. "Non-Monotonic Swelling of Surface Grafted Hydrogels Induced by pH and/or Salt Concentration."
G. S. Longo, M. Olvera de la Cruz, and I. Szleifer.
J. Chem. Phys. 141(12):124909, 2014.
URL: http://scitation.aip.org/content/aip/journal/jcp/141/12/10.1063/1.4896562.

17. "pH-Controlled Nanoaggregation in Amphiphilic Polymer Co-Networks."
G. S. Longo, M. Olvera de la Cruz, and I. Szleifer.
ACS Nano 7(3):2693–2704, 2013.
URL: http://dx.doi.org/10.1021/nn400130c.

18. "A Molecular Dynamics Study of the Role of Adatoms in SAMs of Methylthiolate on Au(111): A New Force Field Parameterized from Ab Initio Calculations."
G. S. Longo, S. K. Bhattacharya, and S. Scandolo.
J. Phys. Chem. C 116(28):14883–14891, 2012.
URL: http://dx.doi.org/10.1021/jp301378x.

19. "New Insight into the Electrochemical Desorption of Alkanethiol SAMs on Gold."
E. Pensa, C. Vericat, D. Grumelli, R. C. Salvarezza, S. H. Park, **G. S. Longo**, I. Szleifer, and L. P. Mendez De Leo.
Phys. Chem. Chem. Phys. 14(35):12355–12367, 2012.
URL: http://dx.doi.org/10.1039/C2CP41291H.

20. "Molecular Theory of Weak Polyelectrolyte Thin Films."
G. S. Longo, M. Olvera de la Cruz, and I. Szleifer.
Soft Matter 8(5):1344–1354, 2012.
URL: http://dx.doi.org/10.1039/C1SM06708G.
• This article was selected by the journal as "Hot Paper", see http://blogs.rsc.org/sm/2012/03/20/hot-paper-molecular-theory-of-weak-polyelectrolyte-thin-films/.

21. "Molecular Theory of Weak Polyelectrolyte Gels: The Role of pH and Salt Concentration."
G. S. Longo, M. Olvera de la Cruz, and I. Szleifer.
Macromolecules 44(1):147–158, 2011.
URL: http://dx.doi.org/10.1021/ma102312y.

22. "Calculating Partition Coefficients of Chain Anchors in Liquid-Ordered and Liquid-Disordered Phases."
M. J. Uline, **G. S. Longo**, M. Schick, and I. Szleifer.
Biophys. J. 98(9):1883–1892, 2010.
URL: http://www.sciencedirect.com/science/article/pii/S0006349510002018.

23. "Phase Separation in Binary Mixtures of Bipolar and Monopolar Lipid Dispersions Revealed by 2H NMR Spectroscopy, Small Angle X-Ray Scattering, and Molecular Theory."
D. P. Brownholland, **G. S. Longo**, A. V. Struts, M. J. Justice, I. Szleifer, H. I. Petrache, M. Brown, and D. H. Thompson.
Biophys. J. 97(10):2700–2709, 2009.
URL: http://www.sciencedirect.com/science/article/pii/S0006349509014271.

24. "Stability and Liquid-Liquid Phase Separation in Mixed Saturated Lipid Bilayers."
G. S. Longo, M. Schick, and I. Szleifer.
Biophys. J. 96(10):3977–3986, 2009.
URL: http://www.sciencedirect.com/science/article/pii/S000634950900592X.

25. "Ligand–Receptor Interactions Between Surfaces: The Role of Binary Polymer Spacers."
G. S. Longo, D. H. Thompson, and I. Szleifer.
Langmuir 24(18):10324–10333, 2008.
URL: http://dx.doi.org/10.1021/la8009699.

26. "Stability and Phase Separation in Mixed Monopolar Lipid/Bolalipid Layers."
G. S. Longo, D. H. Thompson, and I. Szleifer.
Biophys. J. 93(8):2609–2621, 2007.
URL: http://linkinghub.elsevier.com/retrieve/pii/S0006349507715163.

27. "Stability and Phase Separation in Mixed Self-Assembled Monolayers."
S. N. Yaliraki, **G. Longo**, E. Gale, I. Szleifer, and M. A. Ratner.
J. Chem. Phys. 125(7):074708, 2006.
URL: http://dx.doi.org/10.1063/1.2336198.

28. "Ligand–Receptor Interactions in Tethered Polymer Layers."
G. Longo and I. Szleifer.
Langmuir 21(24):11342–11351, 2005.
URL: http://dx.doi.org/10.1021/la051685p.

29. "Mechanism for Electric Charge Separation by Ejection of Charged Particles from an Ice Particle Growing by Riming."
E. E. Avila, **G. S. Longo**, and R. E. Burgesser.
Atmos. Res. 69(1–2):99–108, 2003.
URL: http://www.sciencedirect.com/science/article/pii/S0169809503000966.

Invited Talks

11/2019 "Using Polyamine Concentration to Trigger Drug Release from Polymer Hydrogel Films."
Symposium: Molecular Modeling in Biophysics (invited talk), *IXLVIII Annual Meeting of the Argentinian Biophysics Society,* San Luis, Argentina.

6/2018 "Separation and Localization of Proteins in pH-Responsive Gels: Computer Simulations."
IFLySiB, School of Exact Sciences, UNLP-CONICET, La Plata, Argentina.

6/2017 "Adsorption and Protonation of Peptides and Proteins in pH-Responsive Gels: Computer Simulations."
INQUIMAE, School of Exact and Natural Sciences, Universidad de Buenos Aires, Buenos Aires, Argentina.

10/2016 "Protonation of Peptides and Proteins in pH-Responsive Gels: Computer Simulations."
Constituyentes Atomic Center, National Atomic Energy Commission (CNEA), Buenos Aires, Argentina.

5/2016 "Role of Acid-Base Equilibrium in the Adsorption of Proteins in pH-Responsive Hydrogels."
Department of Chemistry, School of Exact Sciences, Universidad Nacional de La Plata, La Plata, Argentina.

4/2016 "Molecular Theory: Introduction and Examples."
School of Exact and Natural Sciences, Universidad Nacional de Cuyo, Mendoza, Argentina.

9/2015 "Protein Adsorption on Stimuli-Responsive Hydrogels."
100 Annual Meeting of the Argentinian Physics Society (invited talk of Soft Matter Division), Merlo, San Luis, Argentina.

9/2015 "Molecular Modeling of Biomolecule Adsorption on Poly(Acrylic Acid) Hydrogels."
School of Exact and Natural Sciences, Universidad Nacional de Cuyo, Mendoza, Argentina.

6/2015 "The Physical Chemistry of Peptide and Protein Adsorption on pH-Responsive Hydrogels."
Universidad Favaloro, Buenos Aires, Argentina.

12/2014 "The Physical Chemistry of pH-Responsive Hydrogels."
Department of Organic Chemistry, School of Chemistry, Universidad Nacional de Córdoba, Córdoba, Argentina.

12/2014 "Stimuli-Responsive Hydrogels."
Instituto de Matemática Aplicada San Luis (IMASL), San Luis, Argentina.

3/2011 "Molecular Theory of Weak Polyelectrolyte Gels."
Department of Food Science, Purdue University, West Lafayette, IN, USA.

Academic Supervision Activity

Supervision of Licentiate (BS+MS) Theses

2017-2018 **Néstor Ariel Pérez Chávez,** *Department of Chemistry, School of Exact Sciences, UNLP.*
Title: "Adsorption of Glyphosate to pH-Responsive Polymer Layers." Co-supervised with Dr. Alberto G. Albesa.

Supervision of PhD Dissertations

2018-present **Lic. Néstor Ariel Pérez Chávez,** *Department of Chemistry, School of Exact Sciences, UNLP.*
Title: "Polymer Microgels: Response to Stimuli, Drug Encapsulation/Release, and Colloidal Solutions."

2018-present **Lic. María Vanina Chiarpotti,** *School of Exact and Natural Sciences, Univ. Nac. de Cuyo (UNCuyo), Mendoza, Argentina.*
Title: "Mechanisms of Nanoparticle Transport through Lipid Membranes." Co-supervised with Dr. Mario G. Del Pópolo.

2016-2020 **Lic. Pedro G. Ramírez,** *School of Chem., Biochem. and Pharmacy – IMASL, Univ. Nac. de San Luis (UNSL).*
Title: "Passive Transport of Cell Penetrating Peptides through Membranes."

Supervision of Postdoctoral Researchers

2017-2019 **Dr. Rodrigo E. Giménez,** *INIFTA, UNLP–CONICET.*
Topic: "Strategies for Controlling Transport Properties and Increasing MOF-Films Stability in Aqueous Media Using Post-Synthetic Modification." Co-supervised with Dr. Matias Rafti.

Reviewer Activities

Expert Evaluation

7/2019 Selection of new members of CONICET's Scientific Researcher Career 2019 (appointed by the Chemistry Admission Board), *CONICET, Argentina.*

5/2019 Projects PICT 2018 (Energy, Mining, Mechanical and Materials Technology Section), *ANPCyT, Argentina.*

6/2018 Selection of new members of CONICET's Scientific Researcher Career 2018 (appointed by the Chemistry Admission Board), *CONICET, Argentina*.

Thesis and Dissertation Committees

4/2020 Doctoral Committee for Paolo Sebastianelli. *School of Mathematics, Astronomy, Physics and Computer Science, Universidad Nacional de Córdoba*, Córdoba, Argentina.

2/2020 Doctoral Committee for Ezequiel N. Frigini. *School of Chem., Biochem. and Pharmacy, Universidad Nacional de San Luis*, San Luis, Argentina.

12/2015 Doctoral Committee for Matias H. Factorovich. *Department of Inorganic, Analytical and Physical Chemistry, School of Exact and Natural Sciences, Universidad de Buenos Aires*, Buenos Aires, Argentina.

Journal Manuscripts

Journal of Materials Chemistry B, *Royal Society of Chemistry, UK*.
8/2015.

Langmuir, *American Chemical Society, USA*.
5/2008, 8/2008.

Soft Matter, *Royal Society of Chemistry, UK*.
9/2014, 5/2015, 1/2018.

WIREs Nanomedicine and Nanobiotechnology, *Wiley, USA*.
6/2015.

Journal of Colloid and Interface Science, *Elsevier Inc., USA*.
7/2019.

Carbohydrate Polymers, *Elsevier Ltd., UK*.
10/2019.

Biomacromolecules, *American Chemical Society, USA*.
11/2019.

Journal of Chemical Information and Modeling, *American Chemical Society, USA*.
4/2020.

Teaching Experience

1/2012-4/2014 **Teaching Assistant,** *Northwestern University*

- Winter 2014: BME 250 Thermodynamics.
- Winter 2013: BME 250 Thermodynamics.
- Winter 2012: BME 250 Thermodynamics.

1/2004-12/2006 **Teaching Assistant,** *Purdue University*

- Fall 2006: CHM 671 Advanced Physical Chemistry.
- Spring 2006: CHM 682 Statistical Thermodynamics.
- Fall 2005: CHM 671 Advanced Physical Chemistry.
- Spring 2005: CHM 374 Physical Chemistry.
- Fall 2004: CHM 671 Advanced Physical Chemistry.
- Spring 2004: CHM 374 Physical Chemistry.

7/2000-12/2001 **Teaching Assistant,** *Universidad Nacional de Córdoba*.