Emerson M. Carmona
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EDUCATION

August 2020: Ph.D. in Science with mention in Biophysics and Computational Biology. **Universidad de Valparaiso, Valparaiso, Chile.**

May 2016: Biochemistry B.S. Degree. **Pontificia Universidad Catolica de Valparaiso, Valparaiso, Chile.**

ACADEMIC APPOINTMENTS

October 2026-Present: Research Scientist. Department of Chemistry. **University of Washington, Seattle, WA, U.S.**

September 2025-September 2026: Acting Instructor. Department of Neurobiology and Biophysics. **University of Washington, Seattle, WA, U.S.**

July 2023-September 2025: Postdoctoral Scholar in Dr. Sharona E. Gordon and William N. Zagotta's laboratories. **University of Washington, Seattle, WA, U.S.**

September 2020-July 2023: Postdoctoral Fellow in Dr. Luis G. Cuello's laboratory. **Texas Tech University Health Sciences Center, Lubbock, TX, U.S.**

RESEARCH EXPERIENCE

2019: Doctoral internship in structural biology. Dr. Luis G. Cuello's laboratory. **Texas Tech University Health Sciences Center, Lubbock, TX, U.S.**

2015: Research assistant in physiology of reproduction. Dr. Juan G. Reyes' laboratory. **Pontificia Universidad Catolica de Valparaiso, Valparaiso, Chile.**

2015: Professional internship in ion channels biophysics. Dr. Ramon Latorre's laboratory. **Centro Interdisciplinario de Neurociencia de Valparaiso (CINV), Valparaiso, Chile.**

2014: Undergraduate thesis in physiology of reproduction. Dr. Juan G. Reyes' laboratory. **Pontificia Universidad Catolica de Valparaiso, Valparaiso, Chile.**

TEACHING EXPERIENCE

2025: Mentor of Biomedical Research Internship for the Growth of High-school Trainees from Underrepresented Populations (BRIGHT-UP) program. **University of Washington, Seattle, WA, U.S.**

2025: Invited speaker for graduate course PBIO519: Progress in Neurobiology and Biophysics Seminar Series. Session: Ion channel biophysics. **University of Washington, Seattle, WA, U.S.**

2024: Science Teaching Experience Program: Working in Science Education (STEP-WISE) Postdoctoral Scholar. Teacher of undergraduate senior seminar course BIOL 485: Protein Structural Dynamics: Unveiling the machinery of the cell. **University of Washington, Seattle, WA, U.S.**

2010-2015: Teaching Assistant of Metabolism, Bioinorganic, Calculus 1, Calculus 2, Physical Chemistry, Structures and Characterization Methods of Macromolecules, Bioinorganic, and Kinetics, Bioenergetics, and Transport, General Chemistry. **Pontificia Universidad Catolica de Valparaiso, Valparaiso, Chile.**

MENTORING

2023-2025: **Charlie DeFreest. Chemistry Ph.D. student, University of Washington, Seattle, WA.**

2016-2020: **Miguel Fernandez. Ph.D. student, Universidad de Valparaiso, Chile.** Present: Postdoctoral fellow, University of Chicago, Chicago, IL.

2016-2020: **Juan-Jose Alvear. Undergraduate, Master, and Ph.D. student, Universidad de Valparaiso, Chile.** Present: Postdoctoral fellow, Universidad de Buenos Aires, Argentina.

PEER REVIEW AND COMMITTEE SERVICE

2026: Ad-hoc reviewer. **iScience.**

2024-2025: Postdoctoral co-reviewer. **Nature Communications.**

2024-2025: Postdoctoral member of the faculty search committee. Department of Neurobiology and Biophysics. **University of Washington, Seattle, WA, U.S.**

RESEARCH FUNDING

2021-2026: Structural determinants of the voltage-gated proton channel functioning. **Pew Latin American Fellowship, The Pew Charitable Trusts.**

PEER-REVIEWED PUBLICATIONS

Alvear-Arias, J. J., Basaez, D., **Carmona, E. M.**, Galizia, L., Fernandez, M., Peña-Pichicoi, A., Ozu, M., Jorquera, O., Latorre, R., Neely, A., Garate, J. & Gonzalez, C. (2026) A Negative-Hydrated Constriction Zone is revealed during the Activation of the Hv1 Channel. *PNAS, 123(22), e2518376123.*

Carmona, E. M., Zagotta, W. N. & Gordon S. E. (2026) Incorporation of acridonylalanine in the human voltage-gated proton channel (hHv1) by genetic code expansion for interrogating its structural dynamics. *eLife, 15, RP110161*.

Carmona, E. M., Cortes, D. M., & Cuello, L. G. (2025). Expression and purification of the human voltage-gated proton channel (hH_v1). *Bio-protocol*, 15(12), e5344.

Carmona, E. M., Cortes, D. M., & Cuello, L. G. (2025). A novel method for expressing and purifying large quantities of functional and stable human voltage-gated proton channel (hH_v1). *Protein Science*, 34(2), e70017.

Fernández, M., Alvear-Arias, J. J., **Carmona, E. M.**, Carrillo, C., Pena-Pichicoi, A., Hernandez-Ochoa, E. O., Neely, A., Alvarez, O., Latorre, R., Garate, J. A. & Gonzalez, C. (2023). Trapping Charge Mechanism in Hv1 Channels (CiHv1). *International Journal of Molecular Sciences*, 25(1), 426.

Peña-Pichicoi, A., Fernández, M., Navarro-Quezada, N., Alvear-Arias, J. J., Carrillo, C. A., **Carmona, E. M.**, Garate, J., Lopez-Rodriguez, A. M., Neely, A., Hernández-Ochoa, E. O. & González, C. (2023). N-terminal region is responsible for mHv1 channel activity in MDSCs. *Frontiers in Pharmacology*, 14, 1265130.

Ozu, M., Alvear-Arias, J. J., Fernandez, M., Caviglia, A., Peña-Pichicoi, A., Carrillo, C., **Carmona E.**, Otero-Gonzalez A., Garate J. A., Amodeo G. & Gonzalez, C. (2022). Aquaporin Gating: A New Twist to Unravel Permeation through Water Channels. *International Journal of Molecular Sciences*, 23(20), 12317.

Alvear-Arias, J. J., Carrillo, C., Villar, J. P., Garcia-Betancourt, R., Peña-Pichicoi, A., Fernandez, A., Fernandez, M., **Carmona, E. M.**, Pupo, A., Neely, A., Alvarez, O., Garate, J., Barajas-Martinez, H., Larsson, H. P., Lopez-Rodriguez, A., Latorre, R. & Gonzalez, C. (2022). Expression of Hv1 proton channels in myeloid-derived suppressor cells (MDSC) and its potential role in T cell regulation. *Proceedings of the National Academy of Sciences*, 119(15), e2104453119.

Carmona, E. M., Fernandez, M., Alvear-Arias, J. J., Neely, A., Larsson, H. P., Alvarez, O., Garate, J.A., Latorre, R., & Gonzalez, C. (2021). The voltage sensor is responsible for ΔpH dependence in Hv1 channels. *Proceedings of the National Academy of Sciences*, 118(19).

Granados, S.T., Castillo, K., Bravo-Moraga, F., Sepúlveda, R.V., Carrasquel-Ursulaez, W., Rojas, M., **Carmona, E.**, Lorenzo-Ceballos, Y., González-Nilo, F., González, C., Latorre, R., & Torres, Y.P. (2019). The molecular nature of the 17β-Estradiol binding site in the voltage-and Ca 2+-activated K+(BK) channel β1 subunit. *Scientific reports*, 9(1), 9965.

Carmona, E.M., Larsson, H.P., Neely, A., Alvarez, O., Latorre, R., & Gonzalez, C. (2018). Gating charge displacement in a monomeric voltage-gated proton (Hv1) channel. *Proceedings of the National Academy of Sciences*, 115(37), 9240-9245.

Paillamanque, J., Sanchez-Tusie, A., **Carmona, E. M.**, Treviño, C. L., Sandoval, C., Nualart, F., Osses, N., and Reyes, J. G. (2017). Arachidonic acid triggers $[Ca^{2+}]_i$ increases in rat round spermatids by a likely GPR activation, ERK signalling and ER/acidic compartments Ca^{2+} release. *PloS one*, *12*(2), e0172128.

Paillamanque, J., Madrid, C., **Carmona, E.M.**, Osses, N., Moreno, R.D., Oresti, G.M., Pino, J.A., and Reyes, J.G. (2016) Effects of fatty acids on intracellular $[Ca^{2+}]$, mitochondrial uncoupling and apoptosis in rat pachytene spermatocytes and round spermatids. PloS one, 11(7), e0158518.

PREPRINTS

DeFreest, C., **Carmona, E.M.**, Gordon, S. E., & Zagotta, W. N. (2026). Measuring protein conformational changes with genetically encoded bipyridylalanine and transition-metal ion FRET. *bioRxiv*, 2026-10.

BOOK CHAPTERS

Alvarez O., Castillo K., **Carmona E.**, Gonzalez C., Latorre R. (2019). Methods for Investigating TRP Channel Gating. In: Ferrer-Montiel A., Hucho T. (eds) TRP Channels. *Methods in Molecular Biology*, vol 1987. Humana, New York, NY.

ABSTRACTS

Carmona, E. M., DeFreest, C., Zagotta, W. N., & Gordon, S. E. (2026). BPS2026–The fluorescent noncanonical amino acid acridonylalanine reported conformational changes in the human voltage-gated proton channel (hHv1). *Biophysical Journal*, 125(4), 230a.

Carmona, E. M., Elberson, B. W., Cortes, D. M., & Cuello, L. G. (2022). Structural dynamics of the ELIC's M4 membrane-spanning segment depend on the membrane lipid composition. *Biophysical Journal*, 121(3), 467a.

Carmona, E.M., Alvarez, O., Neely, A., Larsson, P.H., Garate, J.A., Fernandez, M., Latorre, R., & Gonzalez, C. (2021). The pH Modulation of the Voltage Sensor in the Voltage-Gated Proton Channel (Hv1). *Biophysical Journal*, 120(3), 157a.

Carmona, E.M., Alvarez, O., Neely, A., Latorre, R., & Gonzalez, C. (2019). pH Dependence of a Monomeric Non-Conducting Voltage-Gated Proton Channel (Hv1). *Biophysical Journal*, 116(3), 302a.

Carmona, E.M., Baez-Nieto, D., Pupo, A., Castillo, K., Alvarez, O., Neely, A., Latorre R., Gonzalez, C. (2018). Properties of the Voltage-Gated Proton Channel Gating Currents. *Biophysical Journal*, 114(3), 546a.

INVITED TALKS AND PRESENTATIONS

2024: The incorporation of acridonylalanine in the human voltage-gated proton channel for studying its structural dynamics using transition metal ion FRET. **Department of Chemistry and Pharmacy, Universidad Catolica de Chile, Santiago, Chile.**

2024: The incorporation of acridonylalanine in the human voltage-gated proton channel for studying its structural dynamics using transition metal ion FRET. **Department of Neurosciences, Universidad de Valparaiso, Valparaiso, Chile.**

2023: Structural Biology of Membrane Proteins in Chile. **Institute of Biomedical Sciences, Universidad Andres Bello, Santiago, Chile.**

2023: Structural Biology of Membrane Proteins in Chile. **Department of Biochemistry and Molecular Biology, Universidad de Chile, Santiago, Chile.**

2023: My biochemical journey between protons and electrons. **Department of Chemistry, Pontificia Universidad Catolica de Valparaiso, Valparaiso, Chile.**

2021: The voltage sensor is responsible for ΔpH dependence in Hv1 channels. **Young Scientist Program Webinar Series, 2021 IUPAB-SBBq-SBBf virtual meeting.**

CONFERENCE AND MEETING PRESENTATIONS

2025 **2025 BPS Annual Meeting (poster).** Incorporation of acridonylalanine into the human voltage-gated proton channel to study its structural dynamics by FRET. Emerson M. Carmona, William N. Zagotta, Sharona E. Gordon. **Los Angeles, CA.**

2024 **XLVII Annual Meeting Sociedad de Bioquimica y Biología Molecular de Chile (talk).** Shedding light into the structural dynamics of the human voltage-gated proton channel by using transition metal ion FRET and genetic code expansion. Emerson M. Carmona, William N. Zagotta, Sharona E. Gordon. **Coquimbo, Chile.**

Genetic Code Expansion Conference and Workshop 2024 (poster). Exploring the conformational dynamics of the human voltage-gated proton channel by inserting acridonylalanine with genetic code expansion in *E. coli*. **Emerson M. Carmona**, William N. Zagotta, Sharona E. Gordon. **Corvallis, OR.**

2022 **66th Annual Meeting Biophysical Society (poster).** Structural dynamics of the ELIC's M4 membrane-spanning segment depend on the membrane lipid composition. **Emerson M. Carmona**, Benjamin W. Elberson, Doris M. Cortes, Luis G. Cuello. **San Francisco, CA.**

2021 **2021 IUPAB-SBBq-SBBf Virtual Meeting (poster).** Transitions during the voltage sensor activation in the voltage-gated proton channel (Hv1) changed according to the pH. **Emerson M. Carmona**, Osvaldo Alvarez, Alan Neely, Carlos Gonzalez. **Virtual Meeting.**

SGP 73rd Annual Symposium. Ion Channels & Transporters In Immunity, Inflammation & Antitumor Immunity (poster). Understanding the voltage-gated proton channel (Hv1) pH dependence to gain insights into its function in the immune system. **Emerson M. Carmona**, Miguel Fernandez, Alan Neely, H. Peter Larsson, Osvaldo Alvarez, Jose A. Garate, Ramon Latorre, Luis G. Cuello, Carlos Gonzalez. **Marine Biological Laboratory, Woods Hole, MA.**

2021 **FASEB SRC. The Ion Channel Regulation Conference (poster).** The structural dynamics of the membrane-spanning segment M4 of the prokaryotic pentameric ligand-gated ion channel ELIC is particularly sensitive to changes in the lipid bilayer composition. **Emerson M. Carmona**, Benjamin W. Elberson, D. Marien Cortes, Luis G. Cuello. **Virtual Meeting.**

65th Annual Meeting Biophysical Society (poster). The pH Modulation of the Voltage Sensor in the Voltage-Gated Proton Channel (Hv1). **Carmona, E. M.**, Alvarez, O., Neely, A., Larsson, P. H., Garate, J. A., Fernandez, M., Latorre, R., & Gonzalez, C. **Virtual Meeting.**

2019 **SGP 73rd Annual Symposium / SOBLA Annual Meeting (poster).** ΔpH modulates the voltage sensor domain in voltage-gated proton channel (Hv1). **Emerson M. Carmona**, Miguel Fernández, Juan José Alvear, Osvaldo Alvarez, Alan Neely, Ramon Latorre, Carlos Gonzalez. **Valparaíso, Chile.**

63rd Annual Meeting Biophysical Society (talk). pH Dependence of a Monomeric Non-Conducting Voltage-Gated Proton Channel (Hv1). **Carmona, E. M.**, Alvarez, O., Neely, A., Latorre, R., & Gonzalez, C. **Baltimore, MD.**

2018 **XIV Annual Meeting Chilean Society of Neuroscience (talk).** Gating charge displacement in a monomeric voltage-gated proton (Hv1) channel. **Carmona Emerson M.**, Larsson H. Peter, Neely Alan, Alvarez Osvaldo, Latorre Ramon, Gonzalez Carlos. **Puerto Varas, Chile.**

62nd Annual Meeting Biophysical Society (talk). Properties of the voltage-gated proton channel gating currents. **Carmona, E.M.**, Baez-Nieto, D., Pupo, A., Castillo, K., Neely, A., Alvarez, O., Latorre, R., González, C. **San Francisco, CA.**

2017 **Annual Meeting of The Brazilian Biophysics Society (poster).** Gating currents are a new tool to understand how voltage-gated proton channel work. **Carmona, E.M.**, Baez-Nieto, D., Pupo, A., Castillo, K., Latorre, R., González, C. **Santos, São Paulo, Brazil.**

2016 **III Latin American Federation of Biophysical Societies, Ix Iberoamerican Congress of Biophysics (poster).** Gating currents of voltage-gated proton channel. **Carmona, E.M.**, Pupo, A., Baez-Nieto, D., Latorre, R., González, C. **San Miguel de Tucumán, Argentina.**

2015 **Joint Conference of Chilean Society of Neuroscience, Chilean Society of Physiological Sciences and Society of Pharmacology of Chile (poster).** Organotypic culture as an in vitro spermatogenesis model: comparison between rat and mouse. **Carmona-Rojas E.**, Berrios-Amaro C., Moreno R.D., Reyes J.G. Expression of uncoupling protein 2 and 3 during rat spermatogenesis. Paillamanque, J., **Carmona, E.**, Osses, N., Santibañez, C., Moreno, R., Pino, J., Bernales, S., Gomez, F., & Reyes J.G. **Coquimbo, IV Region, Chile.**

2014 **XXXVI Annual Meeting of The Society of Pharmacology of Chile (poster).** Intracellular oxidation of 2',7'-Dichlorodihydrofluorescein diacetate not mediated by reactive oxygen species: Possible role of peroxidase activity. **Carmona, E.M.**, Pino J.A., Reyes, J.G. **Chillán, Chile.**

2013 **XXVIII Annual Meeting of The Chilean Society of Physiological Sciences (poster).** Arachidonic Acid and a GPR120 Agonist Activate Several Physiological Processes in PC12 Cells. Jose A Pino, **Emerson Carmona**, Nelson Osses, and Juan G Reyes. **Catillo, Chile.**

2012 **XXVI Annual Meeting Chilean Society for Cell Biology (poster).** 2',7'-Dichlorodihydrofluorescein Diacetate: A Good Indicator of Intracellular Reactive Oxygen Species? Pino JA, **Carmona E**, Reyes JG. **Puerto Varas, Chile.**

SCHOLARSHIPS AND AWARDS

2026: Biophysical Society Travel Award. **70th Annual Meeting Biophysical Society, U.S.**

2022: Biophysical Society Travel Award. **66th Annual Meeting Biophysical Society, U.S.**

2021: Pew Latin American Fellow. **The Pew Charitable Trusts, U.S.**

2020: Young Scientific Program Awardee. **2021 IUPAB-SBBq-SBBf, Brazil.**

2019: Doctoral International Internship. **CONICYT, Chile.**

2018: Best presentation. **XIV Annual Meeting of the Chilean Society of Neuroscience, Chile.**

2018: Biophysical Society Travel Award. **62nd Annual Meeting Biophysical Society, U.S.**

2017: Poster Award. **XLII Brazilian Biophysical Society Congress, Brazil.**

2017: National Doctoral Fellowship. **CONICYT, Chile.**

2016: Poster Award. **IX Iberoamerican Congress of Biophysics, Argentina.**

2016: FIBUV Doctoral Fellowship. **Universidad de Valparaiso, Chile.**

2016: Best graduate of Biochemistry. **Pontificia Universidad Católica de Valparaíso, Chile.**

2013: Spring Semester Dean's list. **University of Montana, U.S.**

2013: Fellowship for International Mobility. **Santander Bank, Chile.**

2009: Honor Fellowship Rector Ruben Castro. **Pontificia Universidad Católica de Valparaíso, Chile.**