Name: José Enrique Lizardi Ortiz
Birthdate: August 5, 1974
Birthplace: Bayamón, Puerto Rico
Citizenship: U.S. Citizen
jose.lizardi1@upr.edu
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FIELD OF SPECIALIZATION

Neurophysiology, pharmacology, and structural biology, focusing on the cholinergic and dopaminergic systems in the basal ganglia, and their connection to disorders such as drug addiction and movement disorders.

EDUCATION

University of Puerto Rico, Río Piedras Campus, San Juan, PR
Doctor in Philosophy, Biochemistry
Thesis title: Structural and Functional Studies of the Muscle-Type and Neuronal Nicotinic Acetylcholine Receptors

University of Puerto Rico, Río Piedras Campus, San Juan, PR
Bachelor in Science, Chemistry

RESEARCH EXPERIENCE

University of Puerto Rico, Medical Sciences Campus, San Juan, PR
The Institute of Neurobiology
Adjunct Professor January 2019 – Present

Columbia University, New York, NY
Department of Psychiatry
Associate Research Scientist November 2011 – June 2017

Columbia University, New York, NY
Department of Neurology
Postdoctoral Research Scientist November 2008 – October 2011

Technical Expertise:

- Electrophysiological techniques, including [1] single-channel analysis, [2] two-electrodes voltage clamp, [3] *in vitro* and *ex vivo* patch clamp recordings, and [4] *in vivo* extracellular recording in anesthetized mice.
- Electrochemical techniques, including *ex vivo* cyclic voltammetry recordings and *in vivo* recordings in anesthetized mice.
- Calcium imaging, including *in vitro* and *ex vivo* imaging using confocal and two-photon microscopy and *in vivo* imaging using time-correlated single photon counting.
- Molecular biology and biochemical techniques, including recombinant DNA, binding studies,

immunocytochemistry, immunofluorescence, heterologous expression systems, protein purification, and crystallization.
- Knowledge of X-ray diffraction. Experiments are expected to be performed during 2026.
- Molecular docking, molecular dynamics, and virtual screening.
- Behavioral test in mice to assess disruptions in drug addiction phenotypes and movement disorders.
- Created user-customized macros for acquiring and analyzing electrophysiological and electrochemical data.
- Designing and construction of electronic circuits for electrophysiological experiments.
- Revision of manuscripts for peer-reviewed journals, including the Journal of Neuroscience, eNeuro, and Central Nervous System Agents in Medicinal Chemistry.

Completed Projects:
- Lipid-protein interactions of the lipid-exposed domain of nicotinic receptors.
- Discovered proteins that interact and modulate muscarinic receptor activity in dopamine neurons.
- Characterized the role of dopamine receptors in regulating dopamine release, medium spiny neurons, and cholinergic interneurons in the striatum.
- Developed use of glycine transporter inhibitors as a therapeutic approach for Parkinson's disease.
- Improved the design of positive allosteric modulators that work on muscarinic receptors.
- Developed novel imaging technology for studying neurotransmitter release at individual synapses.
- Refined the hypothesis that ethanol inhibits glutamate receptors.

Ongoing Projects:
- Understand the physiological role of nicotinic acetylcholine receptors and dopamine receptors in the striatum and their contribution to the development or expression of addictive behaviors to amphetamine-type stimulants and Parkinsonian symptoms, especially L-DOPA-induced dyskinesia, using the mouse as a model.
- Polypharmacology: Structure–activity relationship studies and structure-based drug design of drugs that simultaneously target nicotinic receptors and monoamine transporters using heterologous expression systems and computational chemistry. A collaboration has been established with Dr. Eduardo Caro from the University of Puerto Rico, School of Pharmacy, to synthesize pharmacological tools and discover potential drugs candidates.

Future Projects:
- Uncover new receptors targeted by amphetamine-type stimulants to unveil new therapeutic approaches for psychostimulant addiction using Drosophila as a model. Studying genetic changes during co-administration of amphetamine and alcohol in Drosophila to discover new mechanisms and targets for polysubstance use.
- Collaboration with Dr. Keven Laboy from the Molecular Sciences Research Center to develop a high-throughput behavioral phenotyping rig for drug discovery on rodent animal models using artificial intelligence.

- Collaboration with Dr. Pablo Vivas from the University of Puerto Rico, Centro Comprensivo de Cancar, to develop selective brain-targeting nanoparticles as a novel approach for treating glioblastomas.

OTHER APPOINTMENTS & LICENSES

University of Puerto Rico, San Juan, PR
Drug Enforcement Agency (DEA)
License for Controlled Substances II–V November 2022 – Present

Molecular Sciences Research Center, San Juan, PR
Institutional Animal Care and Use Committee (AICUC)
Chair July 2022 – Present

University of Puerto Rico, The Institute of Neurobiology, San Juan, PR
Molecular Sciences Research Center, San Juan, PR
Neuroimaging & Electrophysiological Facility (NIEF)
Coordinator July 2019 – Present

Colegio de Químicos de Puerto Rico, San Juan, PR
Chemist License 6089 December 2017 – Present

TRAINING FELLOWSHIPS

2002–2006 NIGMS–*Research Initiative for Scientific Enhancement* Program, University of Puerto Rico, Grant 5 R25 GM061151
2008–2009 NIDA–*Training Program in Basic Neuroscience and Addiction*, Columbia University, Grant 5 T32 DA 016224
2009–2011 NIMH–*Fellowship in Schizophrenia Research*, Columbia University, Grant 5 T32 MH018870
2012–2013 NINDS–*Supplement in Mechanisms of Dopamine Neuron Degeneration*, Columbia University, Grant 3 P50 NS 038370-13S1

FUNDING

Title V Grant Award P031S200104, US Department of Education
Pilot Projects for Established Researchers (PiPs-ER)
Lizardi-Ortiz, José E (PI)
Valdés-Fernández, Bianca N (Co-PI)
05/20/2024–09/30/2025
10/01/2025–09/30/2026 (No-cost extension)
Structure-activity of Amphetamine-type Stimulants on Nicotinic Receptors.
The primary goal of this project is to determine the binding mechanisms of amphetamine-type stimulants in the α7 nAChR/AChBP chimera as a model describing the binding on native α7 nicotinic receptors.

University of Puerto Rico, Medical Sciences Campus
Deanship of Research Pilot Program
Lizardi-Ortiz, José (PI)
07/01/2022-06/30/2023
Pharmacological Characterization of Amphetamine-type Stimulants on β2 Nicotinic Receptors.
The primary goal of this project is to determine the pharmacological parameters of amphetamine-type stimulants in α4β2, α4α5β2, and α6β2β3 nicotinic receptors as a potential therapeutic approach for psychostimulant addiction.

5P20GM103642, NIH/NIGMS
COBRE Pilot Project Program (CP3)
Lizardi-Ortiz, José (PI)
07/01/2019-06/30/2022
Role of Nicotinic Alpha 7 Autoreceptors in Striatal Cholinergic Interneurons.
The major goal of this project is to uncover an α7-mediated response with potential modulatory action on the mesolimbic circuitry.

TEACHING EXPERIENCE

- Postdoctoral training: Taught students, postdoctoral fellows, collaborators, and visiting investigators how to perform electrochemical and electrophysiological experiments in acute brain slices and anesthetized mice.
- Principal investigator:
  - *Past*: One visiting postdoctoral trainee (Ohio State University), one medical student (San Juan Bautista School of Medicine), one graduate student (UPR-Río Piedras), and seven undergraduate students (UPR-Bayamon, UPR-Río Piedras, and Sacred Heart University).
  - *Currently*: One graduate (UPR-Intercampus program), three undergraduate (UPR-Bayamón and Sacred Heart University), and one high school (University Gardens) student.

Other Experience:

UNIVERSITY OF PUERTO RICO, Medical Sciences Campus, San Juan, PR April 2025
Lecturer
FISA8532: Instrumentation & Methodologies Used in Biomedical Research
Electrochemistry for Monoamine Detection

UNIVERSITY OF PUERTO RICO, Río Piedras Campus, San Juan, PR April 2025
Lecturer
BIOL4350: Cell Biology
Molecule Transport across Membranes & Cells of the Nervous System

UNIVERSITY OF PUERTO RICO, Medical Sciences Campus, San Juan, PR 2022 – Present
Lecturer
FISA8525: Neurophysiology
Topics on Drugs of Abuse

UNIVERSITY OF PUERTO RICO, Molecular Sciences Research Center, San Juan, PR — July 2023
Lecturer & Wet-lab
Universidad del Sagrado Corazón's ESTEMS Summer Intership

UNIVERSITY OF PUERTO RICO, Medical Sciences Campus, San Juan, PR — 2023 – Present
Lecturer
Electrochemistry for Monoamine Detection Workshop

UNIVERSITY OF PUERTO RICO, Medical Sciences Campus, San Juan, PR — 2020 – Present
Lecturer & Wet-lab
Basic Concepts on Electrophysiology Workshop

UNIVERSITY OF PUERTO RICO, Río Piedras Campus, San Juan, PR
Teaching Assistant
General Chemistry Laboratory — 2006 – 2008
Analytical Chemistry Laboratory — 2001 – 2002
Organic Chemistry Laboratory — 2000 – 2001

ACCOMPLISHMENTS

- Awarded four NIH-based training fellowships in addiction, schizophrenia, and Parkinson's disease.
- Reviews: One co-first author publication on schizophrenia therapeutic strategies.
- Peer-reviewed publications: One first author, one co-first author, seven co-authors, and one principal investigator (and corresponding author).
- Four manuscripts are in preparation for submission: one as first author, two as co-author, and one as principal investigator.

OTHERS

Languages: Spanish and English
Computer Skills: Igor Pro (Data Acquisition and Analysis), R (Statistics), Adobe Animation (former Flash), Python (General Coding), C# (General Coding), AutoDock4 (Docking), Discovery Studio 4 (Docking and Structural Analysis), PyMol (Structural Analysis), Gromacs (Molecular Dynamics), Cura Lulzbot (3D Printing), KiCad (Circuit Board Designing)

Additional Training/Continuing Education:

- Canvas Foundations for Teaching, Universidad del Sagrado Corazón, September 2025.
- *IACUC 101 Plus* course, IACUC101, April 2024.
- *Expression, Purification, & Analysis of Protein & Protein Complexes* course, Cold Spring Harbor Laboratory, April 2023.
- *Fase1 Intensive*, a business incubator that selected 50 companies from 250 applications, The Puerto Rico Science, Technology, & Research Trust and Puerto Rico Department of Housing's Small Business Incubators and Accelerators Program, June – September 2022.

- *Fase1 Lab*, a business incubator sponsored by The Puerto Rico Science, Technology, & Research Trust and Puerto Rico Department of Housing's Small Business Incubators and Accelerators Program, January – May 2022.
- *Drug Development – From Basic Science to Clinical Applications* course, Columbia University, September – December 2014.
- *In vivo Electrophysiological and Electrochemical Recordings*, visiting scholar, Dr. Mark Wightman Laboratory, University of North Carolina at Chapel Hill, April – May 2014.
- *Statistics for Psychiatry Fellows* course, Psychiatry Institute of New York, September – December 2009.
- *Continuing Education in Neurology,* Columbia University, 2008 – 2010.
- *Analysis and Interpretation of Single Channel Records and Macroscopic Current using Matrix Methods* course, University College London, July 2005.

PUBLICATIONS (* First Author, ‡ Principal Investigator)

Peer Reviewed Articles:

Lopez-Hernández, G.Y., Sanchez-Padilla, J., Ortiz-Acevedo, A., **Lizardi-Ortiz, J.E.**, Salas-Vincenty, J., Rojas, L.V., Lasalde-Dominicci, J.A. *Nicotine-induced Up-regulation and Desensitization of α4β2 Neuronal Nicotinic Receptors Depend on Subunit Ratio*. Journal of Biological Chemistry, 2004, 279(36), 38007–15. DOI: 10.1074/jbc.M403537200

***Lizardi-Ortiz, J.E.**, Hyzinski-García, M.C., Fernández-Genera, J.L., Osorio-Martínez, K.M., Velásquez-Rivera, E., Valle-Avilés, F.L., Lasalde-Dominicci, J.A. *Aromaticity at the Water/Hydrophobic Core Interface of the Membrane: Consequences on the Nicotinic Acetylcholine Receptor*. 2008, Channels, 2(3), 191–201. PMCID: PMC3132569

Bendor, J., **Lizardi-Ortiz, J.E.**, Westphalen, R.I., Brandstetter, M., Hemmings Jr, H.C., Sulzer, D., Flajolet, M., and Greengard, P. *AGAP1/AP-3-dependent endocytic recycling of M5 muscarinic receptors promotes dopamine release*. 2010, 29(16), The EMBO Journal, 2813–26. DOI: 10.1038/emboj.2010.154

*Anzalone, A., ***Lizardi-Ortiz, J.E.**, Ramos, M., De Mei, C., Hopf, F., Iaccarino, C., Halbout, B., Jacobsen, J., Kinoshita, C., Welter, M., Caron, M., Bonci, A., Sulzer, D., and Borrelli, E. *Dual control of dopamine synthesis and release by presynaptic and postsynaptic dopamine D2 receptors*. 2012, 32(36), Journal of Neuroscience, 9023-34. DOI: 10.1523/JNEUROSCI.0918-12.2012

Schmitz, Y., Barnard, C., Mrejeru, A., **Lizardi-Ortiz, J.E.**, Klein, Z., Lindsley, C.W., and Sulzer, D. *Glycine transporter-1 inhibition promotes striatal axon sprouting via NMDA receptors in dopamine neurons*. 2013, 33(42), Journal of Neuroscience, 16778-89. DOI: 10.1523/JNEUROSCI.3041-12.2013

Foster, D.J., Gentry, P.R., **Lizardi-Ortiz, J.E.**, Bridges, T.M., Wood, M.R., Niswender, C.M., Sulzer, D., Lindsley, C.W., Xiang, Z. Conn, P.J. *M5 Receptor Activation Produces Opposing Physiological Outcomes in Dopamine Neurons Depending on the Receptor's Location*. 2014, 34(9), Journal of Neuroscience, 3253-62. DOI: 10.1523/JNEUROSCI.4896-13.2014

Pereira, D., Schmitz, Y., Mészáros, J., Merchant, P., Hu, G., Li, G., Henke, A., **Lizardi-Ortiz, J.E.**, Karpowicz Jr., R., Sonders, M., Kanter, E., Rodriguez, P., Mosharov, E., Sames, D., and Sulzer, D. *Fluorescent false neurotransmitter reveals functionally silent dopamine vesicle clusters in the striatum,* 2016, 19(4), Nature Neuroscience, 578-586. DOI: 10.1038/nn.4252

Kharkwal, G., Brami-Cherrier, K., **Lizardi-Ortiz, J.E.**, Nelson, A., Ramos, M., Del Barrio, D., Sulzer, D., Krietzer, A., and Borrelli, E. *Parkinsonism Driven by Antipsychotics Originates from Dopaminergic Control of Striatal Cholinergic Interneurons*, 2016, 91(1), Neuron, 67-78. DOI: 10.1016/j.neuron.2016.06.014

Mingote, S., Chuhma, N., Kalmbach, A., Thomsen, G.M., Wang, Y., Mihali, A., Sferrazza, C.E., Zucker-Scharff, I., Siena, A.C., Welch, M.G., **Lizardi-Ortiz, J.**, Sulzer, D., Moore, H., Gaisler-Salomon, I., Rayport, S. *Dopamine neuron dependent behaviors mediated by glutamate cotransmission*. 2017, eLife, 6:e27566. DOI: 10.7554/eLife.27566

Garton, D.R., Ross, S.G., Maldonado-Hernández, R., Quick, M., Lasalde-Dominicci, J.A., and **Lizardi-Ortiz, J.E.‡** *Amphetamine Isomers Inhibit Homomeric α7 Nicotinic Receptor through a Competitive Mechanism and within the Intoxication Levels in Humans*. 2019, Neuropharmacology, 144, 172−183. DOI: 10.1016/j.neuropharm.2018.10.032.

Rodríguez-Cordero, J.A., Dorta Avilés, M., Rodriguez-Fernandez, I.A., Ghezzi, A., **Lizardi-Ortiz, J.E.**, Agosto-Rivera, J.L. *Peripheral modulation of Pumilio in Intestinal Stem Cells and Corpus Allatum Affects Sleep Latency in Drosophila* (Manuscript submitted to PLOS One, November 2025). BioRχiv DOI: 10.1101/2025.11.09.687465

***Lizardi-Ortiz, J.E.**, Marti-Prats, L., Sung, K.W., and Choi, S.J. *Acute Ethanol Inhibits Ionotropic Glutamate Synaptic Transmission in Dorsolateral Striatum by a Dopamine- and Acetylcholine-Independent Mechanism* (Manuscript in preparation. To be submitted: Channels, Winter 2025-26).

Garton, D.R., and **Lizardi-Ortiz, J.E.‡** *D-Amphetamine Modulation of Dorsal Striatal Dopamine Release is Temperature Dependent: Experimental Considerations* (Manuscript in preparation. To be submitted: Frontiers in Neuroscience, Winter 2025-26).

Reviews:

*Karam, C.S., *Ballon, J.S., *Bivens, N.M., *Freyberg, Z., *Girgis, R.R., ***Lizardi-Ortiz, J.E.**, *Markx, S., Lieberman, J.A., and Javitch, J.A. *Signaling pathways in schizophrenia: emerging targets and therapeutic strategies*. 2010, Trends in Pharmacological Sciences, 31(8), 381–390. DOI: 10.1016/j.tips.2010.05.004

SEMINARS

Are Dopamine-subtype 2 Heteroreceptors Involved in the Control of Dopamine Release in the Striatum? 14/February/2011. Host: Molecular Imaging and Neuropathology division, Department of Psychiatry, Columbia University.

Dual Control of Dopamine Synthesis and Release by Pre- and Postsynaptic Dopamine D2 Receptors. 01/March/2012. Host: Movement Disorder Division, Department of Neurology, Columbia University.
Modulation of Nicotinic Acetylcholine Receptors by Substituted Amphetamines. 12/June/2015. Host: Dr. John A. Dani, Department of Neuroscience, Perelman School of Medicine, University of Pennsylvania.

Modulation of the α7 Nicotinic Receptor by Amphetamine. 30/Oct/2018. Host: Dr. María Sosa and Dr. Cristina Velázquez, The Institute of Neurobiology, University of Puerto Rico.

α7 Nicotinic Receptor Regulates Amphetamine Physiological Effects. 23/Agu/2019. Host: RISE Program, University of Puerto Rico, Río Piedras campus.

Nicotinic Receptors: A Potential Target for Amphetamine-Type Stimulant Addiction. 24/Feb/2020. Host: Chemistry Department, University of Puerto Rico, Río Piedras campus.

Nicotinic Acetylcholine Receptors as Potential Targets for Amphetamine-type Stimulant Addiction. 20/Nov/2025. Host: Department of Pharmaceutical Sciences, School of Pharmacy, University of Puerto Rico, Medical Sciences campus.