

Alberto Cruz-Martín
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Curriculum Vitae

Education

- 2000-2006 Ph.D. in Neuroscience, University of California Los Angeles, David Geffen School of Medicine at UCLA, Department of Neurobiology and Interdepartmental Program for Neurosciences
- 1995-2000 B.S. in Biology, University of Puerto Rico, Río Piedras, Department of Biology

Positions

- 2015-present Assistant Professor of Biology and Pharmacology, Boston University, Boston, MA
Project: Understanding the role of neuroimmune interactions in brain development and disease
- 2010-2014 Postdoctoral fellow, University of California, San Diego, CA
Advisors: Anirvan Ghosh and Andrew Huberman
Project: Dissecting visual circuits involved in the detection of directional motion
- 2006-2010 Postdoctoral fellow, University of California, Los Angeles, CA
Advisor: Carlos Portera-Cailliau
Project: In vivo imaging of dendritic spines during early development in a mouse model of Fragile X Syndrome
- 2000-2006 Graduate student, University of California, Los Angeles, CA
Advisor: Felix E. Schweizer
Project: Examining the interaction of excitation and inhibition in synapses between CA3 pyramidal neurons of hippocampal organotypic cultures

Publications (*co-corresponding author)

<https://www.ncbi.nlm.nih.gov/myncbi/1jO5mvBjjylQz/bibliography/public/>

Comer AL, Carrier M, Tremblay ME, **Cruz-Martín A**. The inflamed brain in schizophrenia: the convergence of genetic and environmental risk factors that lead to uncontrolled neuroinflammation (*In Preparation*). Invited review article.

Ashley L. Comer, Tushare Jinadasa, Balaji Sriram, Rhushikesh A. Phadke, Lisa N. Kretsge, Thanh P. H. Nguyen, Giovanna Antognetti, James P. Gilbert, Jungjoon Lee, Elena R. Newmark, Frances S. Hausmann, SaraAnn Rosenthal, Kevin Liu Kot, Yenyu Liu, William W. Yen, Borislav Dejanovic, **Alberto Cruz-Martín** (2020) Increased expression of schizophrenia-associated gene C4 leads to hypoconnectivity of prefrontal cortex and reduced social interaction. *PLoS Biology*, <https://doi.org/10.1371/journal.pbio.3000604> **18**(1):e3000604. doi: 10.1371/journal.pbio.3000604 (**January Cover**).

Sriram S, Li L, **Cruz-Martín A***, Ghosh A* (2019) A Sparse probabilistic code underlies the limits of behavioral discrimination. *Cerebral Cortex*, *bhz147*, <https://doi.org/10.1093/cercor/bhz147>

Shen J, Blute TA, Liberti WA, Yen W, **Cruz-Martín A***, Gardner TJ* (2017) Songbird organotypic culture as an *in-vitro* model for interrogating sparse sequencing networks. *BioRxiv*. doi: <https://doi.org/10.1101/164228>

Cruz-Martín A, El-Danaf RN, Osakada F, Sriram B, Ghosh A, Dhande O, Nguyen P, Huberman AD (2014). A dedicated circuit linking direction-selective retinal ganglion cells to primary visual cortex. *Nature* **507**: 358-361

Cruz-Martín A, Portera-Cailliau C (2014). In vivo imaging of axonal and dendritic structures in neonatal mouse cortex. In *Imaging in Developmental Biology: A Laboratory Manual. Cold Spring Harb Protoc* 57-64. doi: 10.1101/pdb.prot080150

Cruz-Martín A, Huberman AD (2012). Visual cognition: Rats compare shapes among the crowd. *Curr Biol* **22**: P18-20

Cruz-Martín A, Crespo M, Portera-Cailliau C (2012). Glutamate induces the elongation of early dendritic protrusions via mGluRs in wild type mice, but not in fragile X mice. *PLoS One* **7**: e32446 Epub 2012 Feb 27

Cruz-Martín A, Crespo M, Portera-Cailliau C (2010). Delayed stabilization of dendritic spines in fragile X mice. *J Neurosci* **30**: 7793-7803

Chowdhury T, Jimenez JC, Bomar J, **Cruz-Martín A**, Cattle JP, Portera-Cailliau C (2010). Fate of Cajal-Retzius neurons in the postnatal mouse neocortex. *Front in Neuroanat.* **4**: 10. doi: 10.3389/neuro.05.010.2010

Cruz-Martín A, Schweizer FE (2008). Imbalance between excitation and inhibition among synaptic connections of CA3 pyramidal neurons in cultured hippocampal slices. *Eur J Neurosci* **27**: 1353-1363

Sippy T, **Cruz-Martín A**, Jeromin A, Schweizer FE (2003). Acute changes in short-term plasticity at synapses with elevated levels of neuronal calcium sensor-1. *Nat Neurosci* **6**: 1031-1038

Cruz-Martín A, Mercado JL, Rojas LV, McNamee M, Lasalde-Dominicci JA (2001). Tryptophan substitutions at lipid-exposed positions of the gamma M3 transmembrane increase the macroscopic ionic current response of the *Torpedo californica* nicotinic acetylcholine receptor. *J Membr Biol* **183**: 61-70

Grants

Cruz-Martín	TBD	0.1 academic
R01 NIH (Mertz PI)	TBD	0.1 summer

“Fast, large-scale neuronal imaging with multi-z confocal microscopy”

Role: Co-investigator

Cruz-Martín	02/15/2019-02/15/2021	0.0 academic
Biogen Inc.	\$334,774	0.1 summer

“In Vivo Dissection of the Effect of AMPA-PAM on the Excitatory/Inhibitory Balance of Cortical Neurons.”

The goal of this Biogen proposal is to elucidate the effect of an AMPA PAM on the excitatory drive of different populations of inhibitory neurons in the prefrontal cortex.

Role: PI

Cruz-Martín	01/02/2019 – 01/02/2021	0.0 academic
Biogen Inc.	\$334,774	0.3 summer

“Elucidating the Role of the Complement System in the Pathophysiology of Schizophrenia.”

The overall goal of this project is two-fold: (1) to determine whether developmental overexpression of complement C4 leads to deficits in cortical connectivity and cognitive behavior consistent with the pathophysiology observed in SCZ, and (2) to determine whether knockdown of specific genes prevents and/or

reverses these deficits caused by overexpression of C4.

Role: PI

Cruz-Martín	01/15/2019 – 01/14/2021	0.0 academic
Brain & Behavior Research Foundation	\$70,000	0.1 summer

“The Role of Complement Component 4 in Cortical Developmental Dynamics”

The goal of this NARSAD project is to determine how C4 induces changes in neuronal connections and information processing in the prefrontal cortex, which leads to cognitive impairments observed in schizophrenic patients.

Role: PI

Bifano	09/01/2016 – 08/31/2021	0.0 academic
NRT-UtB: Neurophotronics	\$3,000,000	0.1 summer

“NRT-UtB: Neurophotronics”

The goal of this project is to create an innovative educational program within a thriving interdisciplinary research environment, using photonics as an enabler for understanding and influencing cell-scale brain function.

Role: Senior Key Personnel

Awards and honors

2019-2021	NARSAD Young Investigator Award (\$70,000)
2015	Early Career Institute in Neuroscience Award (NIH)
2007-2009	President's Postdoctoral Fellowship Program, University of California, CA
2003-2006	NASA Harriet G. Jenkins Predoctoral Fellowship
2001-2003	Achievement Rewards for College Scientists Award
2000	Magna cum laude, University of Puerto Rico, Río Piedras, PR

Invited talks

06/2019	GRC on Excitatory Synapses and Brain Function, Manchester, NH, USA
05/2019	Department of Biochemistry and Molecular Medicine, University of California, Davis, CA, USA
03/2019	Ponce Health Sciences University, Ponce, PR, USA
10/2018	Department of Immunology, Biogen, Cambridge, MA, USA
08/2018	Center for Molecular Neurobiology (ZMNH), Hamburg, Germany
02/2018	Department of Pharmacology, Boston University, Boston, MA, USA
11/2016	Department of Biology, University of Puerto Rico, Río Piedras, USA
11/2016	College of Engineering, University of Puerto Rico, Mayagüez, USA
05/2016	Buck Institute for Research on Aging Research, Novato, CA, USA
03/2014	Department of Molecular, Cell and Developmental Biology, UCSC, Santa Cruz, CA, USA
03/2014	Department of Biology, University of Puerto Rico, Río Piedras, PR, USA
03/2014	Department of Neuroscience and Psychiatry, Columbia University, New York, NY, USA
03/2014	Department of Ophthalmology, Yale University, New Haven, CT, USA
02/2014	Department of Biology, Boston University, Boston, MA, USA
02/2014	Department of Anatomical Sciences and Anatomy, University of Louisville, Louisville, KY, USA
01/2014	Department of Neurobiology and Anatomy, University of Utah, Salt Lake City, UT, USA

Teaching

- NSF Research Training grant (NRT) in Neurophotonics workshop: “Monitoring Activity in Neural Circuits with Fluorescent Indicators” (4 hour workshop, 1 hour lecture with lab demonstration, summer 2017, 2018, 2019)
- CAS BI325 (Spring 2016-present) - Principles of Neuroscience (4 credits, 27 lectures undergraduate level, developed by **Alberto Cruz-Martín**)
- CAS BI 581 (Fall 2015) - Seminar in Biology (2 credits, 11 lectures, undergraduate/graduate level, developed by **Alberto Cruz-Martín**)
- CAS BI 598 (Fall 2016-present) - Neural circuits (4 credits, 27 lectures, undergraduate/graduate level, developed by **Alberto Cruz-Martín**)

Outreach and mentoring

2016-present	Mentor for Neuroscience Scholars Program (NSP, Society for Neuroscience) mentoring program. NSP is an extensive two-year training program open to underrepresented and diverse neuroscience graduate students and postdoctoral fellows (Sofia Beas, PhD, Penzo lab; Cristina Maria Rios, Morrow/Murphy lab).
2016	Seminar and recruitment activities for NSF NRT “Understanding the Brain, Neurophotonics “, Universidad de Puerto Rico, Mayagüez and Río Piedras campuses
2016	Speaker for <i>Conversations with Scientists</i> , part of the Yale Ciencia Academy for Career Development - NIH funded initiative to provide graduate students with opportunities for mentoring, peer support and networking and to develop skills important for career advancement
2010	Mentor for UCLA’s Undergraduate Research Center for Sciences, Engineering and Mathematics and the Center for Academic and Research Excellence (URC/CARE) program
2010	Mentor for UCLA’s Maximizing Access to Research Careers (MARC) program

Academic service

2019-2020	Neuroimmunology Faculty Search Committee, Department of Anatomy and Neurobiology, Boston University
2018-present	Diversity Recruitment Committee of Boston University (with University Provost Jean Morrison), Boston University
2015-present	Biology Department Seminar Series Committee, Boston University
2016	Mentor - Responsible Conduct of Research (RCR) Education workshop on Collaborative Research, Boston University
2016-present	Neurophotonics Bootcamp Coordinator (NSF Research Training grant (NRT) in Neurophotonics)
2016-2019	Laser Safety Subcommittee Member, Boston University
2015-2016	Addiction Faculty Search Committee, Department of Pharmacology and Experimental Therapeutics & Psychiatry, Boston University

PhD thesis committee member

Ashley Comer (2020 (expected)), Cruz-Martín lab, BU), Ellen Witkowski (2019, Davison lab, BU), Mariel Seigle (2018, Sabino lab, BU), James JP Gilbert (2016, Man lab, BU), William A. Liberti, III (2015, Gardner lab, BU), Meaghan Cogswell (2015, Russek lab, BU)

PhD qualifying exam committee member

Johan Sebastian Martinez-Fuentes (2020, Russek lab, BU), Caroline Habjan (2019, Chen lab, BU), Lisa Kretdge (2019, Cruz-Martín lab, BU), Yuan Tian (2019, Man lab, BU), Ashley Comer (2017, Cruz-Martín lab, BU), Margaret Lee O'Connor (2017, Man lab, BU)

Undergraduate senior thesis committee member

Kevin Liu Kot (2019, Cruz-Martín lab, BU), Olivia H. Nguyen (2017, BU), Laura Marshall (2015, BU)

Masters students in the Cruz-Martín lab

Yenyu Liu (2019, BA in Biochemistry & Molecular Biology/MA in Biotechnology), Sky Ruichen (2019, MSSP)

Other service

2020-present Editorial Board of *Synapse*, a Wiley neuroscience journal.
2019 On-site Panelist - National Science Foundation's Neural Systems Cluster Organization Program.
2019-2020 Program Committee for The 22nd Annual Meeting of the International Behavioural and Neural Genetics Society (IBANGS). Woods Hole, MA, USA

Reviewer

2015-present Reviewer for The Neuroscience Scholars Program
2019 Reviewer for The SACNAS Summer Travel Scholarship
2017-2018 National Fellowships Committee for Graduate Women in Science (www.gwis.org)
2017 Postdoctoral Fellow applications to the Research Foundation Flanders – FWO (Fonds Wetenschappelijk Onderzoek - Vlaanderen)
2015-2016 The Puerto Rico Science Technology and Research Trust's Science and technology grant program, Subprogram (EPSCoR-style grants program to stimulate competitive research)
2015-2016 Louisiana Board of Regents' Research Competitiveness

Reviewer for scientific Journals

Science, Neuroscience Research, Current Biology, Journal of Comparative Neurology, Journal of Neuroscience, Scientific Reports, JoVE, Frontier