

Yanelli Nunez, PhD

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Education & Training

- Oct. 2020–present **Postdoctoral Research Scientist.**
Climate & Health Program in Columbia University, New York, NY
- Oct. 2020 **Doctor of Philosophy, Environmental Health Sciences.**
Columbia University, New York, NY
- Aug. 2017 **Master of Philosophy & Master of Arts, Environmental Health Sciences.**
MPhil/MA/PhD program, Columbia University, New York, NY
- Aug. 2011 **Bachelor of Science in Biology with Minor in Public Health.**
San Diego State University (SDSU), San Diego, CA

Awards

- April 2021 **The I. Bernard Weinstein Award.**
Award for Academic Excellence in Environmental Health Sciences for the PhD
Columbia University
- March 2020 **Outstanding Officer Award.**
Hispanic Organization of Toxicologists
Society of Toxicology
- June 2019 **Career Development Award.**
Society of Toxicology

Leadership

- Nov. 2020–present **Steering Committee Member.**
Students and New Researchers Network
International Society For Environmental Epidemiology
- 2018–2020 **Graduate Student Representative.**
Hispanic Organization of Toxicologists
Society of Toxicology
- 2018-2020 **Graduate Student Leadership Committee.**
Society of Toxicology

Fellowships & Scholarships

- Sept. 2021–present **Science Communication Fellowship.**
Science Communication Network
Nine-month program for early career PhD scientists who want to maximize the impact of their science to benefit public health and the environment
- 2018–2020 **Diversity Supplement Training Fellowship.**
NIEHS, PRIME R01 grant ES028805
Project: Exposure to Air Pollution and Neurodegeneration: A Mixtures Approach
Mailman School of Public Health, Columbia University
- 2015–2017 **Student Development Research Fellowship.**
NIH, R25
Initiative for Maximizing Student Development
Mailman School of Public Health, Columbia University

2010–2011 **SDSU S-STEM Research Internship Program.**

Dr. Alysson Muotri's Lab
University of California, San Diego

2009–2010 **SDSU Stem Cell Research Internship Program.**

California Institute for Regenerative Medicine
Dr. Alysson Muotri's Lab
University of California, San Diego

Jan. 2009 **SMART Scholarship.**

San Diego State University

Aug. 2006 **BECA Scholarship.**

San Diego State University

Aug. 2006 **William and Edna Rope-Barber Scholarship.**

San Diego State University

Technical Skills

Pgrm. Langs: **R**

Tools: **QGIS, PostgreSQL, L^AT_EX, Git/DVCS**

Langs: **Spanish, Pulaar**

Work Experience

Oct. 2020–**Postdoctoral Research Scientist.**

Present Climate and Health Program, Mailman School of Public Health at Columbia University

Mentor: Dr. Marianthi-Anna Kioumourtzoglou

Objective: Evaluate health impacts of source-specific air pollutants and assess inequities in air pollution exposure. I aim to (1) characterize the association between specific PM_{2.5} chemical components and neurodegenerative diseases using modeled air pollution data and medical registries from New York and Denmark; (2) identify air pollution sources associated with stroke using pattern recognition statistical methods and air pollution data from monitoring stations; and (3) evaluate spatio-temporal patterns of air pollution emissions to uncover inequities in air pollution exposure across the United States.

- Design epidemiologic studies
- Statistical analysis of data
- Statistical analysis of geospatial data
- Select appropriate statistical models for analyses and interpret results
- Summarize data into visualizations
- Organize layers of information into visuals to communicate discoveries
- Coordinate collaborations and lead meetings with collaborators
- Communicate research findings through presentations in seminars and conferences
- Write manuscripts for publication
- Mentor master's and PhD students in their research projects

2015–2020 **Graduate Researcher.**

Environmental Health Sciences Dept., Mailman School of Public Health at Columbia University

Mentors: Drs. Marianthi-Anna Kioumourtzoglou and Diane B. Re

Objective: Characterized exposure–response relationships between PM_{2.5} and disease aggravation in three neurodegenerative diseases: Parkinson's disease, amyotrophic lateral sclerosis, and Alzheimer's disease. I also compared and evaluated various statistical methods used for assessment of exposure to environmental mixtures. My PhD work resulted in multiple publications in high impact peer-reviewed journals.

- Compiled and prepared data for statistical analysis
- Gathered, organized, and mapped geospatial air pollution data
- Performed epidemiological studies
- Statistical analysis of health and air pollution data (e.g. generalized mixed models, weighted quantile regression, Bayesian Kernel machine regression, dimensionality reduction methods, and others)
- Created data visualizations from statistical analyses to convey results
- Wrote manuscripts for peer-reviewed publications
- Completed coursework on data science, environmental epidemiology, statistics, neurosci, and toxicology

- 2013–2015 **Public Health Agent.**
Peace Corps Senegal, West Africa
Supervisor: Vanessa Dickey
Objective: Collaborated with Senegalese counterparts to develop and implement programs that promoted and supported public health
- Coordinated the development and implementation of public health workshops focused on disseminating information about maternal and children’s nutritional health
 - Planned and led a community gardens initiative in partnership with local community leaders
 - Assisted in vaccination campaigns
 - Served as liaison between Peace Corps volunteers in the Senegal, Podor region and Peace Corps Headquarters
- 2011–2013 **Research Assistant II.**
Dr. Fred Gage’s Lab, Salk Institute for Biological Studies, La Jolla, CA
Mentor: Dr. Maria Carolina Marchetto
Objective: Developed induced pluripotent stem cell (iPSC) lines to help characterized autism neuronal pathology in vitro. My work contributed to peer-reviewed publications and the cell lines I created are still being used by my colleagues in the Salk.
- Derived and characterized iPSC lines by reprogramming fibroblasts from autistic patients and controls
 - Developed in vitro neuronal models from iPSC to study the genetics and cell pathology of autism
 - Created and maintained stem cell inventories and biobank
- 2009–2011 **Research Intern.**
University of California San Diego, La Jolla, CA
Mentor: Dr. Alysso Muotri
Objective: Quantified cell proliferation rates of neuronal progenitor stem cells derived from iPSC of autistic patients. My research work contributed to peer-reviewed publications.
- Learned state of the art techniques for in vitro disease modeling of neurological diseases using stem cells
 - Differentiated iPSCs into neuronal progenitor stem cells
 - Quantified cell proliferation of neuronal stem cells using flow cytometry
 - Presented in laboratory meetings and local conferences

Teaching and Mentoring

- Sept. 2020–present **Mentor, Tow Doctoral Scholars Pilot Program.**
Environmental Health Sciences Dept. Columbia University
- Summer 2021 **Workshop Guide, Machine Learning Boot Camp.**
Environmental Health Sciences Dept. Columbia University
- Spring 2019 **Teaching Fellow, Analysis of Environmental Health Data.**
Environmental Health Sciences Dept. Columbia University
- Summer 2019 **Workshop Guide, The Exosome Boot Camp.**
Environmental Health Sciences Dept. Columbia University
- Summer 2018 **Workshop Guide, Methods in Analysis of Environmental Mixtures.**
2019 & 2020 Environmental Health Sciences Dept. Columbia University
- Spring 2018 **Teaching Fellow, Fundamentals of Toxicology.**
Environmental Health Sciences Dept. Columbia University
- 2017–2019 **High School Mentor, Science Matters Research Internship.**
Columbia University in collaboration with local high schools
- Fall 2016 & 2017 **Teaching Fellow, Laboratory Methods in Environmental Health Sciences.**
Environmental Health Sciences Dept. Columbia University
- 2008–2009 **High School Science Tutor.**
Hoover High School, San Diego CA

Professional Affiliations

- 2020–present **National Science Policy Network.**

- 2019–present **International Society of Environmental Epidemiology.**
- 2019–present **WE ACT for Environmental Justice.**
- 2017–2020 **Society of Toxicology.**
- 2017–2018 **International Neurotoxicology Association.**

Professional Development Courses

- July 2021 **Python Data Wrangling Boot Camp.**
Environmental Health Sciences Dept. Columbia University
Two-day workshop of hands-on analytical sessions to provide an introduction to data wrangling, cleaning, and manipulation with the Python programming language
- July 2020 **Causal Mediation Analysis Training: Methods and Applications Using Health Data.**
Environmental Health Sciences Dept. Columbia University
Three-day workshop of seminars and hands-on analytical sessions to provide an overview of concepts and data analysis methods used to investigate mediating mechanisms
- July 2019 **GIS Workshop: Visualizing & Analyzing Spatial Data.**
Environmental Health Sciences Dept. Columbia University
Two-day workshop on handling spatial data using QGIS and R
- Nov. 2019 **Pharmacometric Dose-Response Analyses in Clinical Trials Using R.**
Foundation for Advanced Education in Science, NIH
Four-day workshop on methodology for the analysis of dose-responses using R

Publications

- Peer-Rev. 11 **Nunez Y**, Perez-Benavides J, Daouda M, Goldsmith J, Casey J, Henneman L, Randall M, and Kioumourtzoglou M-A. Inequities in air pollution exposure across the United States: a 40-years assessment of emission trends. *Work in progress*
- 10 **Nunez Y**, Balilian A, Parks MR, Hansen J, Raaschou-Nielsen O, Ketzel M, Khan J, Vermeulen R, Peters S, Re BD, and Kioumourtzoglou M-A. Critical windows of exposures in the association between PM_{2.5} and amyotrophic lateral sclerosis: a case-control study in Denmark. *Manuscript in preparation*
- 9 **Nunez Y**, Boehme AK, Li M, Goldsmith JA, Donkelaar A, Weisskopf MG, Re DB, Martin RV, and Kioumourtzoglou M-A. PM_{2.5} composition and disease aggravation in amyotrophic lateral sclerosis: an analysis of long-term exposure to components of fine particulate matter in New York State. *Under review*
- 8 Shearston JA, Martinez ME, **Nunez Y**, Hilpert M. Social-distancing fatigue: Evidence from real-time crowd-sourced traffic data. *Science of the Total Environment*. 2021 Oct
- 7 **Nunez Y**, Boehme AK, Li M, Goldsmith JA, Weisskopf MG, Re DB, Navas-Acien A, Donkelaar A, Martin RV, and Kioumourtzoglou M-A. Parkinson's disease hospitalizations in association with fine particle components in New York State. *Environmental Research*. 2021 Oct.
- 6 **Nunez Y**, Boehme AK, Weisskopf MG, Re DB, Martin RV, Navas-Acien A, and Kioumourtzoglou M-A. Fine Particle Exposure and Clinical Aggravation in Neurodegenerative Diseases in New York State. *Environmental Health Perspectives*. 2021 Feb.
- 5 **Nunez Y**, Gibson AE, Gennings C, Tanner EM, Goldsmith JA, Coull AB, and Kioumourtzoglou M-A. Good Practices for Applied Statistical Learning in Epidemiology. *International Journal of Epidemiology*. 2021 Jan.
- 4 Gibson AE*, **Nunez Y***, Abuawad A, Zota RA, Renzetti S, Devick LK, Gennings C, Goldsmith JA, Coull AB, and Kioumourtzoglou M-A. An Overview of Methods to Address Distinct Research Questions on Environmental Mixtures: An Application to Persistent Organic Pollutants and Leukocyte Telomere Length. *Environmental Health*. 2019 Aug. *Equal contribution. Article selected as NIEHS Extramural Paper of the Month.
- 3 Merwin JS, Obis T, **Nunez Y**, Re BD. Organophosphate Neurotoxicity to the Voluntary Motor System on the Trail of Environment-caused Amyotrophic Lateral Sclerosis: the known, the misknown, and the unknown. *Archives of Toxicology*. 2017 Jan.

- 2 Marchetto MC, Belinson H, Tian Y, Freitas BC, Fu C, Vadodaria K, Beltrao-Braga P, Trujillo CA, Mendes APD, Padmanabhan K, **Nunez Y**, Ou J, Ghosh H, Wright R, Brennand K, Pierce K, Eichenfield L, Pramparo T, Eyley L, Barnes CC, Courchesne E, Geschwind DH, Gage FH, Wynshaw-Boris A, Muotri AR. Altered Proliferation and Networks in Neural Cells Derived from Idiopathic Autistic Individuals. *Molecular Psychiatry –Nature*. 2017 Jun.
- 1 Griesi-Oliveira K, Acab A, Gupta RA, Sunaga YD, Chailangkarn T, Nicol X, **Nunez Y**, Walker FM, Murdoch DJ, Sanders JS, Fernandez VT, Ji W, Lifton PR, Vadasz E, Dietrich A, Pradhan D, Song H, Ming G, Guoe X, Gabriel Haddad G, Marchetto, CM, Spitzer N, Passos-Bueno MR, State WM, and Muotri RA. Modeling Non-syndromic Autism and the Impact of TRPC6 Disruption in Human Neurons. *Molecular Psychiatry –Nature*. 2015 Nov.

Selected Presentations

- Orals:
- 9 *The effect of air pollution on aggravation of neurodegenerative diseases: an analysis of long-term exposure to fine particulate matter and its components*. Oral presentation at: Environmental Health Sciences dept. Seminar, Columbia University. 2020 September 9; virtual
 - 8 *Good Practices for Applied Statistical Learning in Epidemiology*. Oral presentation at: Powering Research Through Innovative Methods for Mixtures in Epidemiology (PRIME) Program Meeting, National Institute of Environmental Health Sciences. 2020 October 15; virtual
 - 7 *An Overview of Methods to Address Distinct Research Questions on Environmental Mixtures: An Application to Persistent Organic Pollutants and Leukocyte Telomere Length*. Oral presentation at: International Society for Environmental Epidemiology Annual Meeting. 2019 Aug. 25-28; Utrecht, Netherlands
 - 6 *Unraveling Gene-Environment Interactions and Window(s) of Exposure in TDP-43-ALS*. Oral presentation at: The University of Milan, Dept. of Neurology. 2017 Aug.; Milan, Italy
 - 5 *Neurotoxicology in the Field of Environmental Health Sciences*. Oral presentation at: Summer Public Health Scholars Program, Columbia University. 2016 May; New York, NY, USA
- Posters:
- 4 **Nunez Y**, Balilian A, Parks MR, Hansen J, Raaschou-Nielsen O, Ketzler M, Khan J, Vermeulen R, Peters S, Re BD, and Kioumourtzoglou M-A. Long-term PM_{2.5} exposure and diagnosis of amyotrophic lateral sclerosis: a population-based case-control study in Denmark. Poster presented at: International Society for Environmental Epidemiology Annual Meeting. 2021 Aug. 23-26
 - 3 **Nunez Y**, Boehme AK, Weisskopf MG, Re DB, Martin RV, Navas-Acien A, and Kioumourtzoglou M-A. Association between exposure to PM_{2.5} components and disease aggravation in amyotrophic lateral sclerosis: an analysis in New York State. Poster presented at: International Society for Environmental Epidemiology Annual Meeting. 2021 Aug. 23-26
 - 2 **Nunez Y**, Boehme AK, Weisskopf MG, Re DB, Martin RV, Navas-Acien A, and Kioumourtzoglou M-A. Fine Particle Exposure and Clinical Aggravation in Neurodegenerative Diseases in New York State. Poster presented at: International Society for Environmental Epidemiology Annual Meeting. 2020 Aug. 23-26
 - 1 **Nunez Y**, Gibson AE, Abuawad A, Zota RA, Renzetti S, Devick LK, Gennings C, Goldsmith JA, Coull AB, and Kioumourtzoglou M-A. An Overview of Methods to Address Distinct Research Questions on Environmental Mixtures: An Application to Persistent Organic Pollutants and Leukocyte Telomere Length. Poster presented at: Powering Research Through Innovative Methods for Mixtures in Epidemiology (PRIME) Program Meeting, National Institute of Environmental Health Sciences. 2019 April 29-30; Research Triangle Park, NC, USA