Paul L. Maurizio

Contact Information

NIH/NIAID, Vaccine Research Center
Bethesda, Maryland 20892

https://mauriziopaul.github.io
paul.maurizio@nih.gov, (914) 610-3984

Education

DOCTOR OF PHILOSOPHY (Ph.D.), Bioinformatics & Computational Biology 2018
- The University of North Carolina at Chapel Hill; Department of Genetics

MASTER OF SCIENCE (Sc.M.), Molecular Microbiology & Immunology 2011
- Johns Hopkins Bloomberg School of Public Health
- Certificate in Vaccine Science & Policy, Department of International Health

BACHELOR OF ARTS (B.A.), Double Major: Biochemistry; Religion
- Swarthmore College
- Deans' Award

Professional Employment

NATIONAL INSTITUTES OF HEALTH, Vaccine Research Center 2023–Present
National Institute of Allergy & Infectious Diseases (NIAID); Kelly Government Solutions
- **Bioinformatics Scientist [C]**, Cellular Immunology Section
  Federal Task Leader: Robert A. Seder, M.D.
  Research Areas: single-cell transcriptomics and cell surface protein analysis; intravenous BCG vaccination response and *M. tuberculosis* (MTB) challenge in rhesus macaques; cell-cell interaction analysis for MTB-infected lung imaging study; cancer vaccine analysis in mice

THE UNIVERSITY OF CHICAGO, Section of Genetic Medicine, Dept. of Medicine
Supervisor: Luis B. Barreiro, Ph.D.
Research Areas: scRNA-seq; dynamic eQTLs analysis of human macrophage MTB infection response; immunogenomics; gene regulatory networks analysis; mapping social stress effects
- **Postdoctoral Fellow** 2020–2023
- **Postdoctoral Scholar** 2018–2020

JOHNS HOPKINS UNIVERSITY, Dept. of Molecular Microbiology & Immunology
- **Visiting Scholar**, Bloomberg School of Public Health 2011–2012
  Supervisor: Fidel Zavala, M.D.
  Research Areas: molecular parasitology; transgenesis; preclinical vaccine & adjuvant studies

Graduate Research

UNC-CHAPEL HILL 2013–2018
- Advisors: Mark T. Heise, Ph.D. & William Valdar, Ph.D.
- Committee: Terrence S. Furey, Ph.D. (chair); Fernando Pardo-Manuel de Villena, Ph.D.; Ralph S. Baric, Ph.D.; Jeremy E. Purvis, Ph.D.

UNC-CHAPEL HILL (Rotations) 2012–2013
- Advisors: David M. Margolis, M.D.; Aravinda M. de Silva, Ph.D.; Kristina De Paris, Ph.D.

JOHNS HOPKINS UNIVERSITY 2009–2011
- Advisor: Douglas E. Norris, Ph.D.

Grants, Fellowships & Scholarships

Awardee, NIH/NIAID LRP, Loan Repayment Program 2022–2023
- Research in Emerging Areas Critical to Human Health (L70)

PI, NIH/NIA F32, Ruth L. Kirschstein National Research Service Award 2020–2023
- Sponsors: Luis B. Barreiro, Ph.D.; Matthew Stephens, Ph.D. (Statistics)
- Title: "Quantifying gene expression and network regulation in single cells to reveal the consequences of stress on the immune response" (#F32AG064883)

PI, UChicago Pilot Grant, Department of Medicine 2019–2023
- Advisors: Luis B. Barreiro, Ph.D.; Patrick Wilson, Ph.D. (Rheumatology)
- Title: "Modeling the effects of social stress on cell-to-cell variation in the immune response to influenza vaccination"

Fellow, NIH T32 Fellowship, Virology Training Grant, UNC-CH 2015–2016

Scholar, Master's Tuition Scholarship, JHU 2010–2011
Fellow, Joshua Lippincott Fellowship, Swarthmore College 2009–2010
Fellow, NSF Summer REU in Prokaryotic Biology, University of Georgia
• Advisor: Juergen Wiegel, Ph.D., Department of Microbiology
Fellow, NASA Astrobiology Summer Program, Penn State University
• Advisor: Hiroshi Ohmoto, Ph.D., Department of Geosciences

Honors & Awards

Award, Distinguished Achievement, Kelly Government Solutions, Rockville, MD 2024
Award, Travel and Lodging, New Investigators Forum, Bethesda, MD 2024
NIH/NIA, Division of Aging Biology *(declined)*
Award, Diversity, Equity & Inclusion, Biological Sciences Division, UChicago 2022
Associate, Intersections Science Fellows Symposium (ISFS) 2021
Award, Travel, 2nd Annual Symposium, National Science Policy Network, NYC, NY 2018
Award, Travel, 2nd Penn Symposium on Math. & Comp. Bio, Phila, PA *(declined)* 2017
Award, Notable Poster, 1st Annual Research Computing Symposium, UNC-CH 2014
Award, Student Membership, Tropical Medicine Dinner Club of Baltimore 2010 & 2011
Award, Blue Ribbon Poster, Johns Hopkins Global Health Day, JHU 2011
Award, Global Health Field Research, JHU Center for Global Health 2010
Award, Simpson Student Fund, Tropical Medicine Dinner Club of Baltimore 2010

Peer-Reviewed Publications

Parrett JM, Lukasiewicz A, Chmielewski S, Szubert-Kruszynska A, **Maurizio PL**, Grieshop K and Radwan J. **2023**. A sexually-selected male weapon characterised by strong additive genetic variance and no evidence for sexually antagonistic polyphenic maintenance. *Evolution*. 77(6):1289-1302. doi:10.1093/evolut/qpad039. PMID: 36848265.

Grieshop K, **Maurizio PL**, Arnqvist G and Berger D. **2021**. Selection in males purges the mutation load on female fitness. *Evol Letters*. 5(4):328-343. doi:10.1002/evl3.239. PMID: 34367659.

Sanz J, **Maurizio PL**, Snyder-Mackler N, Simons ND, Voyles T, Kohn J, Michopoulos V, Wilson M, Tung J and Barreiro LB. **2020**. Social history and exposure to pathogen signals modulate social status effects on gene regulation in rhesus macaques. *Proc Natl Acad Sci USA*. 117(38):23317-22. doi:10.1073/pnas.1820846116. PMID:31611381.

Maurizio PL†, Fuseini H, Tegha G, Hosseinipour M and De Paris K. **2019**. Signatures of divergent anti-malarial treatment responses in peripheral blood from adults and young children in Malawi. *Malaria J*. 18(1):205. doi:10.1186/s12936-019-2842-7. PMID:31234875. († = corresp. author)

Shorter JR*, **Maurizio PL***, Bell TA, Shaw GD, Miller DR, Gooch TJ, Spence JS, McMillan L, Valdar W and Pardo-Manuel de Villena F. **2019**. A diallel of the mouse Collaborative Cross founders reveals strong strain-specific maternal effects on litter size. *G3: Genes, Genomes, Genetics*. 9(5):1613-1622. doi:10.1534/g3.118.200847. PMID:30877080. (* = equal contribution)

Maurizio PL, Ferris MT, Keele GR, Miller DR, Shaw GD, Whitmore AC, West A, Morrison CR, Noll KE, Plante KS, Cockrell AS, Threadgill DW, Pardo-Manuel de Villena F, Baric RS, Heise MT and Valdar W. **2018**. Bayesian diallel analysis reveals *Mx1*-dependent and *Mx1*-independent effects on response to influenza A virus in mice. *G3: Genes, Genomes, Genetics*. 8(2): 427-445. doi:10.1534/g3.117.300438. PMID:29187420.

Turner SD, **Maurizio PL**, Valdar W, Yandell BS and Simon PW. Dissecting the genetic architecture of shoot growth in carrot (*Daucus carota* L.) using a diallel mating design. **2018**. *G3: Genes, Genomes, Genetics*. 8(2): 411-426. doi:10.1534/g3.117.300235. PMID:29187419.

Espinosa DA, Yadava A, Angov E, **Maurizio PL**, Ockenhouse CF and Zavala F. **2013**. Development of a chimeric *Plasmodium berghei* strain expressing the repeat region of the *P. vivax* circumsporozoite protein for in vivo evaluation of vaccine efficacy. *Infection and Immunity*. 81(8):2882-2887. doi:10.1128/IAI.00461-13. PMID:23716612.

Walsh MC, Kim GK, **Maurizio PL**, Molnar EE and Choi Y. **2008**. TRAF6 auto-ubiquitination-independent activation of the NFκB and MAPK pathways in response to IL-1 and RANKL. *PLoS One*. 3(12):e4064. doi:10.1371/journal.pone.0004064. PMID:19112497.

Preprints, Abstracts & Other Contributions (selected)

Maurizio PL, Dahlvang JD, Bucsan AN, Lehman CC, Robertson M, Roederer M, Darrah PA and Seder RA. **2024**. Single cell analysis reveals gene regulatory impacts of IV BCG on blood and airway immune cell populations before and after Mtb challenge in macaques. NIH/FDA Immunology Interest Group Annual Retreat, Washington, DC, Jan 29th–30th. (*abstract*)

Maurizio PL, Aguirre-Gamboa R, Sanz J, Giraud-Gatineau A, Randolph HE, Von Platen C, Loulergue P, Launay O, Yotova V, Dumaine A, Brosch R, Tailleux L* and Barreiro LB*. **2022**. Dynamic genetic control of the gene expression response to *Mycobacterium tuberculosis* infection in human macrophages. Biology of Genomes, May 10th–14th. (*abstract*; * co-senior)

Hampton BK, Jensen KL, Whitmore AC, Gralinski LE, Leist SR, Linnertz CL, **Maurizio P**, Menachery VD, Morrison CR, Noll KE, Plante KS, Shaefer A, Shaw GD, West A, Pardo-Manuel de Villena F, Baric RS, Heise MT and Ferris MT. **2021**. Genetic regulation of immune homeostatic lung leukocyte populations influences respiratory virus induced disease in collaborative cross mice. *J Immunol*. 206(Supplement 1):24.05-24.05. (*abstract*)

Campbell CR, **Maurizio PL**, Simons ND, Batista J, Voyles T, Cobb M, Dumaine A, Michopoulos V, Barreiro L and Tung J. **2021**. Social behavioral control of cell-to-cell gene expression variance in rhesus macaque immune cells. Biology of Genomes, May 11th–14th. (*abstract*)

Hampton BK, Jensen KL, Whitmore AC, Linnertz CL, **Maurizio P**, Miller DR, Morrison CR, Noll KE, Plante KS, Shaw GD, West A, Baric RS, Pardo-Manuel de Villena F, Heise MT and Ferris MT. **2021**. Genetic regulation of homeostatic immune architecture in the lungs of Collaborative Cross mice. bioRxiv 2021.04.09.439180. doi:10.1101/2021.04.09.439180. (*preprint* 2021-04-10)

Lee J, Strattan JS, Kagda M and **Maurizio P**. **2020**. ENCODE-DCC/chip-seq-pipeline2: Zenodo integration for citation purposes (v1.5.2). Zenodo. doi:10.5281/zenodo.3978629. (*software contribution*)

Simons ND, **Maurizio PL**, Batista J, Michopoulos V, Barreiro LB and Tung J. **2020**. Parallel gene regulatory signatures of social stress and aging in rhesus macaques. 289th Annual Meeting of the American Association of Physical Anthropologists, April 15th–18th. (*abstract*)

Keele GR, **Maurizio PL**, Oreper D and Valdar W. **2018**. Bayesian decision theoretic design of two-founder experimental crosses given diallel data. bioRxiv 489682. doi:10.1101/489682. (*working paper* 2018-10-07)

Maurizio PL. **2018**. Modeling the Host Genetic Determinants of Influenza Virus Pathogenesis in Mice. Doctor of Philosophy (Ph.D.) Dissertation. University of North Carolina at Chapel Hill. 270 pp. (*dissertation*)

Maurizio PL and Ferris MT. **2017**. "The Collaborative Cross Resource for Systems Genetics Research of Infectious Diseases." *Methods in Molecular Biology: Systems Genetics - Methods and Protocols*. Springer/Humana Press: New York, NY. Editors: Klaus Schughart, Robert Williams. doi:10.1007/978-1-4939-6427-7_28. PMID:27933545. (*chapter*)

Maurizio PL. **2011**. Detection and vertical transmission of *Culex* flavivirus in *Culex quinquefasciatus* (Diptera: Culicidae) mosquitoes from Zambia, Africa. Master of Science (Sc.M.) thesis. Johns Hopkins University. 127 pp. (*thesis*)

Kendall GC, Mokhonova E, Moran M, **Maurizio P**, Spencer M, Nelson S, Miceli MC. **2010**. High throughput screening for the identification of small molecules that modulate exon skipping on the *DMD* gene. Ottawa Conference on New Directions in Biology and Disease of Skeletal Muscle, Ottawa, Canada, May 5^{th}-8^{th}. (*abstract*)

Mesbah NM, **Maurizio P**, Zhang CL, Romanek CS, Mills G and Wiegel J. **2005**. Isolation of halophilic thermophilic '*Caloramator halophilus*' sp. nov. from salt flats of Northern Nevada. American Society for Microbiology 105^{th} General Meeting. Atlanta, GA, June 5^{th}-9^{th}. (*abstract*)

Additional Professional Experience

Bioinformatics Consultant, Teiko Bio Inc., Salt Lake City, UT (remote) 2021
- Analysis of human mass cytometry data (CyTOF) for clinical cancer research clients

Staff Research Associate, University of California, Los Angeles, CA 2007–2009
- Department of Microbiology, Immunology & Molecular Genetics
- Supervisor: M. Carrie Miceli, Ph.D.

Research Specialist, University of Pennsylvania, Philadelphia, PA 2005–2007
- Department of Pathology & Laboratory Medicine
- Supervisor: Yongwon Choi, Ph.D.

Ecological Field Assistant, Grand Canyon Trust, Flagstaff, AZ 2005
- Supervisor: Ethan Aumack, Sc.M.

Conference Abstracts & Presentations (selected)

Abstract, Tuberculosis: The Host-Pathogen Interface, Keystone, CO 2024
"Single cell analysis of blood and airway cells uncovers IV BCG specific gene regulatory impacts on immune cell populations before and after *Mtb* challenge"

Poster, Biology of Genomes, Cold Spring Harbor, NY 2022
"Dynamic genetic control of the gene expression response to *Mycobacterium tuberculosis* infection in human macrophages"

Flash Talk, Intersections Science Fellows Symposium (virtual) 2021
"Uncovering cell-type-specific effects of social stress on the immune response in macaques"

Talk, Division of Aging Biology New Investigators Forum, NIH/NIA 2021
"Uncovering cell-type-specific effects of social stress on the immune response"

Talk (*), 15^{th} Complex Trait Community Meeting: Memphis, TN 2017
"Diallel analysis reveals *Mx1*-dependent and independent effects driving influenza virus severity"

Poster, Gordon Research Conference: Lucca (Barga), Italy 2015
Quantitative Genetics & Genomics; "Characterization of parent-of-origin effects on host response to influenza A virus in reciprocal cross mice."

Oral, Southeastern Regional Virology Conference: Atlanta, GA. 2014
"Influenza infections in a diallel cross of mice reveal parent-of-origin effects influencing viral pathogenesis"

Poster (*), Entomological Society of America Eastern Branch 2011
82nd Annual Meeting: Harrisburg, PA.
(*)=Presentation Award

Campus Presentations (selected)

Panelist, Virtual Alumni Panel, University Career Services, UNC-CH 2024

Panelist, Sharing of Diverse Perspectives: Postdoc Edition, UChicago 2021
- Graduate Recruitment Initiative Team

Presenter, Committee on Immunology Work-in-Progress, UChicago 2021

Panelist, Postdoctoral Association Seminar on Postdoc Fellowships, UChicago 2021

Presenter, Department of Human Genetics Work-in-Progress, UChicago 2019
Keynote Speaker, Midwest FLI Summit, Socioeconomic Diversity Alliance, UChicago 2019
Panelist, Carolina Grad Student Firsts, UNC-CH and Duke University 2018

Teaching & Mentorship

Mentor, Hopkins Connect Spring Virtual Mentorship Summit, JHU 2025
Mentor, Future Leaders Mentoring Fellowship, American Society for Microbiology 2023–2024
Champion Mentor, First-Generation, Low-Income, Immigrant (FLI) Network 2018–2023
- Mentored two undergraduate STEM majors at UChicago during monthly meetings
- Advised on research mentor searches and successful applications to doctoral programs

Guest Speaker, Skype-A-Scientist (virtual) 2020–2021
- Ericson Elementary, 5th grade, San Diego, CA
- The Liberi School, 7th grade, Hudson, NY
- Leitch Elementary, 2nd grade, Fremont, CA

Coding Instructor, Introduction to R, How to Learn to Code, UNC-CH 2016
- Course overview: https://bit.ly/IntroToR-HTLTC

Coding Helper, Software Carpentry Workshop (Git, SQL), UNC-CH 2016
Teaching Assistant, Foundations in Population Genomics, UNC-CH 2014
Teaching Assistant, Global TEFL Network, Zhejiang University, Hangzhou, China 2007
Teaching Assistant, Biological Chemistry Laboratory, Swarthmore College

Professional Development

Student, Foundation for Advanced Education in the Sciences (FAES), Bethesda, MD
- Advanced Applications of Artificial Intelligence 2024
- Applied Machine Learning 2024

Selected Participant, Leadership U for Humanity (LUFH), Korn Ferry 2023
Selected Participant, Grant Writing Coaching Groups, The Leadership Alliance 2021–2022
Selected Participant, University of Pittsburgh Study 2020–2022
- Building up a diverse pipeline for the biomedical research workforce

Participant, Academic Job Market Working Groups, UChicagoGRAD 2021
Selected Participant, *GENETICS* Peer Review Training Program 2018–2020
Attendee, The Allied Genetics Conference 2020 (TAGC), April 22nd-25th (virtual) 2020
Attendee, The Genetics of Human Disease, Cell Press Symposium, Chicago, IL 2019
Participant, Scientific Writing from the Reader's Perspective Workshop, UNC-CH 2017
Participant, Rigor & Reproducibility Workshop, UNC-CH 2016
Student, Systems Genetics Course, The Jackson Lab, Bar Harbor, ME 2014
Participant, Next Generation Sequencing Workshop, UNC-CH 2014

Peer-Review

Review Editor, Systems Immunology, *Frontiers in Immunology* 2023–Present
Reviewer, *PLoS Pathogens* 2023–Present
Reviewer, *Heredity* (Genetics Society) 2022–Present
Reviewer, *Microbiology Spectrum* (American Society for Microbiology) 2021–Present
Reviewer, *Journal of Virology* (American Society for Microbiology) 2020–Present
Reviewer, *Database* (Oxford University Press) 2019–Present
Reviewer, *Genetics* (Genetics Society of America) 2018–Present
Reviewer, Travel Awards, UChicago BSD Career Advancement for Postdocs 2021

Service & Outreach

Volunteer, UChicago-DuSable Museum of African American History Collab. 2021–2023
Co-founder, Pan-Asian Resource Group, UChicago 2021–2023
Co-founder, Pan Asian Coalition, Biological Sciences Division, UChicago 2021–2023
Member, Committee on Immunology DEI Subcommittee, UChicago 2021–2023
Member, Postdoctoral Association (PDA) Steering Committee, UChicago 2020–2023
- **Chair**, Policy Committee
- **Co-organizer**, Fellowship Writing Accountability Group
- **Co-organizer**, Postdoc Support Survey

Invited Moderator, Office of Multicultural Student Affairs 2022
• Creating Chicago's 1st Asian American Majority Ward
Presentation Judge, Chicago EYES on Cancer/Diversity Research Symposium 2021
Board of Directors, Universities Allied for Essential Medicines, 501(c)(3) 2015–2019
Session Chair, Virology Colloquium, UNC-Chapel Hill, Chapel Hill, NC 2015
Session Chair, Evolution 2014 Conference, Raleigh, NC 2014
Peer Mentor, 1st-Year Group, Biol. & Biomed. Sci. Program, UNC-CH 2013
Guest Blogger, 12th Annual World Vaccine Congress, National Harbor, MD 2012
HIV Tester & Counselor, Institute for Human Virology, Baltimore, MD 2010–2012
Tutor, Health Professions Recruitment and Exposure Program, JHU 2010

Quantitative Skills & Training

Programming & Computing: R, RStudio, Python, Pandas, NumPy, TensorFlow, Scikit-learn, Keras, SQL, Matlab, Mathematica, Seurat, Homebrew, Docker, JAGS, BUGS, Stan, bash, Unix, git, GitHub, STATA, MCMCglmm, EMMREML, matrixEQTL, coloc, mashr, plotly, R Shiny, R Markdown, Azure

Statistical & Machine Learning: k-means clustering, dimensionality reduction, artificial neural networks, non-negative matrix factorization, imputation, logistic regression, generalized linear mixed modeling, Gibbs sampling, Bayesian analysis, variance component analysis

NGS, Genomics & Epigenetics Analysis: RNA-seq, ATAC-seq, ChIP-seq, scRNA-seq, CITE-seq

Graduate Quantitative Courses Taken: Bayesian Statistics, Databases, Mathematical Modeling, Sequence Analysis, Infectious Disease Dynamics, Introduction to Statistical Modeling, Statistical Methods in Public Health, Structural Bioinformatics, Topics in Computer Science: Computational Genetics, Topics in Population Genetics