

J. Alejandra Rodriguez

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RESEARCHER

Ph.D. Candidate in Immunology with extensive experience in *in vivo* mouse models and *ex vivo* immune assays investigating the roles of T cells, NK cells, and macrophages in mucosal and reproductive immunity. My research focuses on how cytotoxic lymphocyte pathways, regulate inflammatory signaling, tissue homeostasis, and immune-mediated disease. My work aims to identify immune effector mechanisms relevant to inflammatory and autoimmune disorders and to support the development of future therapeutic strategies.

EDUCATION

Immunology Ph.D. Candidate

Dept of Biological Sciences, Purdue University, West Lafayette, Indiana, United States.

Aug 2022 - Exp. Aug 2027

Master's in Biochemical Sciences

Dept of Chemistry, National University of Colombia, Bogotá.

Aug 2019 - Apr 2022

B.S Biology

Dept of Biology, National University of Colombia, Bogotá.

Feb 2013 - Apr 2019

TECHNICAL SKILLS

- **Cell & Molecular Biology:** Mammalian cell culture (cancer cell lines, immune cells, primary cells), cell transfection, lentiviral and retroviral production, molecular cloning, PCR, qPCR, DNA/RNA extraction.
- **Immunology Assays:** Multicolor flow cytometry, PBMC and immune cell isolation, monocyte-to-macrophage differentiation, T cell activation and differentiation, ELISA, MSD, multiplex cytokine assays (LEGENDplex), cytokine profiling assays.
- **Animal & Disease Models:** Mouse models (IACUC), GVHD mouse models (bone marrow transplantation, irradiation), animal dosing and necropsy, tissue processing, histology (H&E, immunofluorescence).
- **Protein & Microbiology:** Recombinant protein expression (*E. coli*), protein purification, SDS-PAGE, Western blot, bacterial culture.
- **Data Analysis & Software:** FlowJo, GraphPad Prism, ImageJ, SnapGene, PyMOL.

RESEARCH EXPERIENCE

Discovery Immunology, Merck | Research Intern

Jul 2026 - Dec 2026

Merck Research Laboratories, Cambridge, Massachusetts, United States.

- Selected for a competitive six-month research internship in Discovery Immunology.
- Conducted translational immunology research focused on inflammatory bowel disease (IBD) and rheumatoid arthritis (RA), investigating disease-associated immune mechanisms and evaluating potential therapeutic targets for the development of new treatments.

Immunology and Infectious Disease, Dr. Matthew Olson Lab | Ph.D. research student

Apr 2023 – Present

Dept of Biological Sciences, Purdue University, United States.

- Profile inflammatory cytokine responses in primary human PBMCs using multiplex immunoassays (LEGENDplex) and multicolor flow cytometry.
- Engineer mammalian cells through transfection and viral transduction to express fluorescent reporters (GFP, mCherry) and transcription factors (TOX) to study immune regulatory pathways.
- Perform macrophage infection and immune stimulation assays with bacterial pathogens (*Salmonella*, *Listeria*) and LPS to analyze inflammatory signaling and cytokine production.
- Study the role of granzymes in host-microbiota interactions using *in vivo* mouse models of intestinal inflammation to characterize immune responses during infection and tissue inflammation.

- Investigate immune regulation in the female reproductive tract by analyzing how granzymes influence uterine immune homeostasis, fertility, and inflammatory responses.

Bioinformatics and Systems Biology, Dr. Andrés M. Pinzón V. Lab | Master's research student **Aug 2019 - Dec 2021**
Institute of Genetics, National University of Colombia, Colombia.

- Performed molecular docking of SARS-CoV-2 spike variants and ACE2 polymorphisms using HADDOCK and PRODIGY, integrating genomic data from GISAID and NCBI GenBank to assess variability and binding affinity.

Cancer Biology, Dr. Michael K. Wendt Lab | Visiting Undergraduate Scholar **Aug 2018 - Dec 2018**
Dept of Medicinal Chemistry and Molecular Pharmacology, Purdue University, United States.

- Assisted in the study of determining the mechanisms of FGFR1 expression and post-translational modifications, focused on the glycosylation of FGFR1 and how that affects the ability of breast cancer cells to respond to FGF ligands.

Laboratory of Molecular Phytopathology, Dr. Mariana Schuster | Visiting Scholar **Jan 2017 - Feb 2017**
Max Planck Institute for Terrestrial Microbiology, Marburg, Germany.

- Assisted in the study to establish the CRISPR-Cas9 system in *U. maydis* and apprenticed in laboratory techniques.

Cancer Biology, Dr. Jean Paul Vernot. Lab | Research Student **Jan 2016 - Aug 2018**
Faculty of Medicine, National University of Colombia, Colombia.

- Conducted a study on the stromal molecular signals responsible for tumorigenesis in an aggressive breast cancer cell line (MDA-MB-231). Developed a new protocol for osteogenic, adipogenic, and chondrogenic differentiation *in vitro* in mesenchymal cells from bone marrow.

SCHOLARSHIPS AND HONORS

- **Bilsland Dissertation Fellowship**, Purdue University (2026-2027)
Awarded Purdue University's most prestigious dissertation fellowship, recognizing outstanding Ph.D. candidates and supporting dissertation completion and full-time research.
- **Participant, 72nd Lindau Nobel Laureate Meeting (Physiology & Medicine)**, Lindau, Germany (2023)
Selected among approximately 650 outstanding young scientists worldwide to participate in scientific exchanges with Nobel Laureates.
- **Gusdon Trainee Award**, American Society for Reproductive Immunology, Lexington, KY (2026)
Awarded for outstanding trainee research; included an invited oral presentation at the annual meeting of the American Society for Reproductive Immunology.
- **AAI Young Investigator Award**, Autumn Immunology Conference, Chicago, IL (2025)
Awarded for outstanding trainee research; included an invited oral presentation at the Autumn Immunology Conference.
- **InnovatED Featured Scholar**, Purdue University (2025–2026)
Selected as one of 10 featured scholars among Purdue University's graduate students and postdoctoral researchers for InnovatED, a competitive program recognizing research with significant societal impact and excellence in science communication.
- **Baden-Württemberg Post-Conference Fellow**, Baden-Württemberg Stiftung, Germany (2023)
Selected for a fully funded fellowship to visit leading German research institutions following the Lindau Nobel Laureate Meeting.
- **Frederick N. Andrews Fellowship**, Purdue University (2022–2024)
Awarded a two-year fully funded doctoral fellowship recognizing exceptional academic achievement, research potential, and overall application excellence among incoming Ph.D. students.
- **PULSe Excellence in Research Award**, Purdue University (2023)
Recognized for outstanding research achievements in Purdue University's Interdisciplinary Life Science Program.

- **Best Poster Presentation Award**, 150th Anniversary of Purdue Biological Sciences, Purdue University (2025)
- **Master's Scholarship**, National University of Colombia (2019–2021)
Awarded a two-year fully funded teaching assistantship for achieving the highest score on the graduate admission examination.
- **Graduated in the Top 5% of Biology Graduates**, National University of Colombia (2019)

PUBLICATIONS

Peer-reviewed Publications

- Yeo FJ, Wang M, Park S, **Rodriguez JA**, Anderson NL, Khandelwal P, Rust RL, Allen-Petersen B, Kazemian M, Olson MR. Donor cell GATA3 is critical for gut pathogenic T cell effector function and intestinal eosinophilia after hematopoietic cell transplantation. *The Journal of Immunology* 215(7), vkag190 (2026). doi: 10.1093/jimmun/vkag190.
- Samal, S., Xiao, S., Nelson, S., Kolhe, O., Khan, H.F., Habibi Matin, M., Lee, W.J., Ahmed, M., Wang, D., Wang, T., Pikes, T., Scott, A.N., **Rodriguez, J.A.**, et al. Blood-Catalyzed n-Doped Polymers for Reversible Optical Neural Control. *Science* 392, eadu5500 (2026). DOI:10.1126/science.adu5500.
- Abutaleb NS, Holly KJ, Metcalfe CK, Abouelkhair AA, Tharra PR, Shrinidhi A, Abdelsattar AS, Burgo V, Melotte G, Akin-Olabiyi T, Knoblauch S, Ramaswamy R, Woodson C, Thirumalaikumar VP, **Rodriguez JA**, et al. Bacterial Carbonic Anhydrase Inhibitor CAI0019 Demonstrates Efficacy in *Enterococcus faecium* Septicemic Peritonitis Mouse Model While Sparing the Microbiome. *ACS Infect Dis* (2026). doi: 10.1021/acsinfecdis.5c00736.
- **Rodriguez JA**, Habib H, Olson MR. Three's company: The cooperative signals behind the differentiation of Th9 cells. *Seminars in Immunology* (2025). doi: 10.1016/j.smim.2025.101999.
- Canaria DA, **Rodriguez JA**, et al. Tox induces T cell IL-10 production in a BATF-dependent manner. *Front Immunol* (2023). doi: 10.3389/fimmu.2023.1275423.
- **Rodriguez JA**, Gonzalez J, Arboleda-Bustos CE, Mendoza N, Martinez C, Pinzon A. Computational modeling of the effect of five mutations on the structure of the ACE2 receptor and their correlation with infectivity and virulence of some emerged variants of SARS-CoV-2 suggests mechanisms of binding affinity dysregulation. *Chem Biol Interact* (2022). doi: 10.1016/j.cbi.2022.110244.

Published Conference Abstracts

- **Rodriguez Osorio JA**, Clapp A, Cross TW, Olson M. Granzyme A Regulates Uterine Immune-Endocrine Homeostasis in the Female Reproductive Tract. *The Journal of Immunology* 215(Suppl. 1), vkag141.1252 (2026). doi: 10.1093/jimmun/vkag141.1252.
- Comboni L, **Rodriguez JA**, Glover ES, Foti D, Fleet JC, Olson MR, Campbell WW. Does Consuming Ultraviolet Light-Exposed Mushrooms Improve Immune Cell Function and Inflammation Status in Adults? Results From a Randomized Controlled Trial. *Current Developments in Nutrition* 10, Supplement 1, 108263 (2026).

Book Chapters

- Leal, M.; Méndez, Y.; Sánchez, J.; Infante, A.; **Rodriguez, J.A.**, et al. Microorganisms in extreme environments: The desert as a case study [in Spanish]. In: Case Studies and Applications in Microbial Ecology. National University of Colombia, 2017.
- Villalba, L.; Sánchez, J.; Patiño, M.; Campos, S.; Villalba, C.; Delgadillo, N.; Montaña, S.; **Rodriguez, J.A.**, et al. Biodeterioration and research perspectives [in Spanish]. In: Microbial Ecology: Microorganisms and Some of Their Applications. National University of Colombia, 2017.

SELECTED PRESENTATIONS

- **American Society for Reproductive Immunology (ASRI).** Alejandra Rodriguez, Matthew R. Olson, “Granzyme A Regulates Uterine Immune-Endocrine Homeostasis in the Female Reproductive Tract with Implications in Endometriosis and PMOS”. Lexington, KY,. Oral presentation. May 2026.
- **Immunology (AAI).** Alejandra Rodriguez, Matthew R. Olson, “Granzyme A Regulates Uterine Immune-Endocrine Homeostasis in the Female Reproductive Tract”. Boston, MA. Poster Presentation. April 2026.
- **Autumn Immunology Conference (AIC).** Alejandra Rodriguez, Matthew R. Olson, “Granzyme A Regulates Uterine Immune-Endocrine Homeostasis in the Female Reproductive Tract”. Chicago, IL. Oral presentation. Nov 2025.
- **150th Anniversary Symposium, Purdue Department of Biological Sciences.** Alejandra Rodriguez, Dr. Olson, “Granzyme A Regulates Uterine Immune–Endocrine Homeostasis in the Female Reproductive Tract.” Purdue University, West Lafayette, IN. Poster presentation. Oct 2025.
- **PULSe Interdisciplinary Life Sciences 20th Anniversary.** Alejandra Rodriguez, Matthew R. Olson, “Granzyme-microbe interactions as a driver of immune-related adverse effects during cancer immunotherapy.” Purdue University, West Lafayette, IN. Poster presentation. Sep 2024.
- **Purdue Cancer Research Day Symposium.** Alejandra Rodriguez, Matthew R. Olson, “Granzyme-microbe interactions as a driver of immune-related adverse effects during cancer immunotherapy.” Purdue University Institute for Cancer Research, West Lafayette, IN. Poster presentation. Apr & Oct 2024.
- **Purdue Institute for Drug Discovery 8th Annual Symposium.** Alejandra Rodriguez, Matthew R. Olson. “Immune-derived Granzyme A directly interacts with commensal and pathogenic microbes.” Purdue University, West Lafayette, IN. Poster presentation. Oct 2023.
- **BSGSA Research Symposium.** Alejandra Rodriguez, Matthew R. Olson, “Granzyme A Binding Alters Gut Microbial Function.” Purdue University, West Lafayette, IN. Poster presentation. Aug 2023.
- **IAU Symposium 328: Living Around Active Stars.** Reyes, R.; Mejia, L.; Ballesteros, D.; Gonzales, L.; Miranda, L.; Bolivar, H.; Tamayo, P.; Rodriguez, J.; Torres, J.; Suarez, J.; Mendez, Y.; Leal, M.; Tovar, D.; Saavedra, F.; Ruiz, E.; and Sanchez, J. “Extremophile microorganism of the xerophytic region of La Tatacoa (Villavieja, Huila–Colombia), with nitrogen fixation activity and solubilization of phosphate, and its possible applications in astrobiology.” Maresias, São Paulo, Brazil. Oral presentation. Oct 2016.

LEADERSHIP & COMMUNITY ENGAGEMENT

Purdue University - West Lafayette, IN

Board Member - Colombian Student Association at Purdue (CSAP).

Apr 2023 - Apr 2025

Vice President of the Board Apr 2023 - Apr 2025

- Led the planning and execution of 30+ professional, academic, and cultural events for the Colombian graduate and undergraduate community at Purdue University.
- Co-organized the 2nd Colombian Academic Diaspora Symposium, a two-day international event that brought together 120+ attendees and 15 distinguished Colombian professionals, including senators, ambassadors, and former university presidents.
- Coordinated speaker outreach, event logistics, and attendee engagement to promote international collaboration, mentorship, and professional development.
- Directed internal communications and team coordination to ensure successful event execution and sustained member engagement across two academic years.

TEACHING ASSISTANT EXPERIENCE

Purdue University, United States

- **BIOL 221 - Introduction to Microbiology**

Aug 2027 - Present

Lab Teaching Assistant.

Purdue University, United States

- **BIOL 14504** - Year 1 Biology Lab: Diet, Inflammation, Immunity and Disease

Jan 2025 - May 2025

Lab Teaching Assistant.

Instructed Biology to undergrad students.

LANGUAGES

- Spanish: Native. English: Advanced.