

BIOGRAPHICAL SKETCH

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NAME: Paula D. Bos

POSITION TITLE: Associate Professor, Department of Pathology

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date	FIELD OF STUDY
National University of Misiones, Argentina	MSc	2000	Genetics
Weill Cornell Medical College, New York	MSc	2005	Cancer Biology
Weill Cornell Medical College, New York	PhD	2009	Cancer Biology
Memorial Sloan Kettering Cancer Center, New York	Postdoctoral	2014	Tumor Immunology
Memorial Sloan Kettering Cancer Center, New York	Res. Associate	2015	Tumor Immunology

A. Personal Statement

I am Associate Professor of Pathology, Cancer Biology Program Co-Leader at the Virginia Commonwealth University (VCU) Massey Comprehensive Cancer Center (MCCC), Assistant Director of Basic Science for Global Health at MCCC, and principal investigator of the Integrative Training Program in Cancer Biology at VCU. I am standing member and Co-Chair of the Tumor Immune Regulation Study Section at NCI, and the Metastasis and Microenvironment Study Section at ACS. In addition, I am member of the Board of the Metastasis Research Society. My laboratory investigates the tumor microenvironmental (TME) interactions that drive breast cancer progression and metastasis, and brain metastasis TME from various primary origins. I trained with Dr. Joan Massagué at the Sloan Kettering Institute, where I investigated molecular mechanisms of organ-specific cancer metastasis with emphasis on the interactions between metastatic cells and target-organ endothelium, and developed the first experimental breast cancer xenograft models of brain metastasis from cell lines and clinical samples that became widely used by the scientific community (*Bos et al, Nature 2009*). With support from an American Cancer Society postdoctoral fellowship, I utilized genetic mouse modeling to dissect mechanistic immunological studies in oncogene-driven breast cancer models under the guidance of Dr. Alexander Rudensky, Chair of Immunology at the Sloan Kettering Institute, where I established the Tumor Immunology field in my mentor's lab and identified function of regulatory T cells in cancer progression and preclinical immunotherapeutic strategies (*Bos et al, JEM, 2013*). My research group in the department of Pathology remains focused on these biological processes, with particular attention to the crosstalk between immune and stromal cells at the metastatic site. My laboratory has been funded by METAvivor, Susan G. Komen, the V Foundation, the American Brain Tumor Association, the American Cancer Society and the National Cancer Institute (NIH).

Associated Citations:

- Garcia-Santillan AD, Lichtenberg JY, Shen H, Rodriguez JM, Barra J, Clark NM, Du W, Martinez LM, Hadjis AD, Calicchia T, Dozmorov MG, Bravo-Cordero JJ, Olex AL, Hwang PY, and **Bos PD**. Regulatory T cells contribute to tumor cell dissemination by extracellular matrix remodeling. *JITC, Under review*.
- Clark NM, Martinez LM, Murdock S, deLigio JT, Olex AL, Effi C, Dozmorov MG, **Bos PD**. Regulatory T cells support breast cancer progression by opposing IFN- γ -dependent functional reprogramming of myeloid cells *Cell Reports*, 2020; 33(10):108482. PMID: 33296659.
- Martinez MM, Robila V, Clark NM, Du W, Idowu M, Rutkowski MR, and **Bos PD**. Regulatory T cells control the switch from in situ to invasive breast cancer. *Front Immunol*. 2019; 10:1942. PMID: 31555258.
- Bos PD**, Zhang XH, Nadal C, Shu W, Gomis RR, Nguyen DX, Minn AJ, van de Vijver MJ, Gerald WL, Foekens JA, Massague J. Genes that mediate breast cancer metastasis to the brain. *Nature*. 2009; 459(7249):1005-1009. PMCID: PMC2698953.

B. Positions, Scientific Appointments, and Honors

Positions

2025–present PI Integrative Training Program in Cancer Biology (T32) T32CA272382
2025–present Associate Professor, VCU Institute for Women's Health
2024–present Assistant Director for Basic Science, Global Oncology Program, Massey Comprehensive Cancer Center, Virginia Commonwealth University, Richmond, VA
2023–present Associate Professor, Department of Pathology (tenured), Department of Immunology and Microbiology, and Department of Biochemistry, Virginia Commonwealth University, Richmond, VA
2022–present Cancer Biology Program Co-Leader, Massey Comprehensive Cancer Center, Virginia Commonwealth University, Richmond, VA
2015–2023 Assistant Professor; Department of Pathology, Department of Immunology and Microbiology, and Department of Biochemistry, Virginia Commonwealth University, Richmond, VA
2015–present Member, Massey Comprehensive Cancer Center, Virginia Commonwealth University, Richmond, VA
2014–2015 Research Associate, Immunology, Memorial Sloan Kettering Cancer Center, NY, Laboratory of Alexander Rudensky
2010–2014 Postdoctoral fellow, Immunology, Memorial Sloan Kettering Cancer Center, NY, Laboratory of Alexander Rudensky
2003–2009 Graduate student, Weill Cornell Graduate School of Medical Sciences/Sloan Kettering Institute, New York, Laboratory of Joan Massagué
2000–2003 Research Coordinator, Mount Sinai School of Medicine, New York, USA
2000 Visiting student, Laboratory of Oncologic Viruses, National Institute of Infectious Diseases "C. Malbrán", Buenos Aires, Argentina
1998–2000 Teaching Assistant, Department of Biology, National University of Misiones, Argentina
1998–2000 Teaching Assistant, Department of Genetics, National University of Misiones, Argentina
1995–2000 Undergraduate student, National University of Misiones, Argentina

Scientific Appointments

2025 Research Training and Education Advisory Committee (RTEAC), CRTEC, Massey Comprehensive Cancer Center
2025 NCI T32 Integrative Training Program in Cancer Biology Principal Investigator, VCU Massey Comprehensive Cancer Center
2025–2027 Basic Cancer Research Grants Scientific Review Committee, AACR
2024–2028 Metastasis Research Society Advisory Board Member
2024 Susan G Komen Career Transition Award Peer Review
2023 AACR Annual Meeting 2024 Program Committee, Tumor Biology Subcommittee
2023–2029 Standing Member, Therapeutic Immune Regulation (TIR) Study Section, NIH
2023–present Advisory Board Member, Trials of Color
2023 Reviewer, ZRG1 TIR-W (01) Q Therapeutic Immune Regulation Special Emphasis Panel, NIH
2022 Reviewer, ZRG1 BTC-W (80) Basic Tumor Immunology Special Emphasis Panel, NIH
2022–2025 Member, Metastasis and Microenvironment Study Section, American Cancer Society
2022–2025 Steering Committee, Tumor Microenvironment Working Group, AACR
2022 Ad Hoc Reviewer, American Brain Tumor Association
2021–2023 Institutional ACS Review Committee Member, Massey Cancer Center
2021, 2011 Reviewer, ZCA1 RTRB-Y (M1) Metastasis Research Network Study Section, NIH
2020–2021 Co-Chair, Seminars and Symposium Committee, Massey Cancer Center
2020–present GRASP Cancer Scientist Member
2020–present MD/PhD Steering Committee, School of Medicine, Virginia Commonwealth University
2020 Ad Hoc Reviewer, Tumor Microenvironment (TME) Study Section, NIH
2020 Ad Hoc Reviewer, French Cancer Institute (INCa)
2020–present Ad Hoc Reviewer, Spanish Science and Innovation Ministry
2019 CSR Early Career Reviewer (ERC) Program, NIH
2019 Ad Hoc Reviewer, Breast Cancer Now – UK
2019 Ad Hoc Reviewer, Clinical and Translational Science Awards (CTSA) Program, NIH
2018 Ad Hoc Reviewer, METAvivor

2018 Ad Hoc Reviewer, Austrian Science Fund
 2018–present Graduate Women in Science
 2017 Ad Hoc Reviewer, American Cancer Society–Tumor Biology and Genomics Panel
 2017 Ad Hoc Reviewer, AVON Foundation
 2016–present Editor, *Discoveries*
 2016–present Reviewer, Breast Cancer Research Program, Department of Defense
 2015–present Member, Metastasis Research Society
 2014 Ad Hoc Reviewer, German-Israeli Foundation for Scientific Research and Development
 2009 TMEN Junior Investigator Meeting Co-Chair, Tumor Microenvironment Network, NCI, NIH, USA
 2005–present Member, American Association for Cancer Research (AACR)

Journal Referee

2023–present *Cell, Cell Reports Medicine*
 2022–present *Cancer Cell, Science Immunology, Breast Cancer*
 2021–present *Science Advances, JCI Insight, Journal of Experimental Medicine, Clinical and Translational Medicine, Journal of Immunotherapy of Cancer, Guest Editor – Frontiers of Immunology - Non-Lymphoid Functions of Regulatory T cells in Health and Disease*
 2020–present *Nature Communications, Cell Reports, Clinical and Translational Medicine, Cell and Tissue Research, Cancer Reports*
 2019–present *Nature Cancer, Science Signaling, Scientific Reports, Frontiers in Immunology, Immunology Letter*
 2018–present *Nature Cell Biology*
 2017–present *eLife, Oncogene, Cytokine, Cancer Biotherapy and Radiopharmaceuticals*
 2016–present *Nature Medicine*
 2014–present *Molecular Neurobiology*
 2013–present *Glia*
 2010–present *Clinical and Experimental Metastasis*

Honors

2024 National/International Recognition Award (NIRA) – VCU
 2024 AACI Distinguished Investigator Award
 2024 Susan G. Komen ASPIRE Award
 2023 Susan G. Komen Rising Star Researcher Nominee – VCU
 2022 R37 MERIT Award, National Cancer Institute
 2021 American Cancer Society Scholar
 2021 Faculty Success Program Awardee – VCU
 2019 Outstanding Early Career Faculty Nominee – VCU School of Medicine
 2018 V Foundation Scholar
 2018 Susan G. Komen Career Catalyst Award
 2014 Methods and compositions for regulatory T-cell ablation, PCT/US14/60069, **Bos PD** & Rudensky AY.
 2010 Co-Chair Tumor Microenvironment Junior PI Group, National Cancer Institute, NIH
 2010 American Cancer Society Fellow Award
 2010 T32 Immunology Training Grant, Immunology Program, Memorial Sloan-Kettering Cancer Center.
 2009 Metastasis promoting genes and proteins”, SK1375-02, 2009, **Bos PD** & Massagué J.
 2000 Gold medal Best GPA Class 2000, National University of Misiones, Argentina
 1999 National Senate of Argentina Award, Buenos Aires, Argentina.
 1998 XIV Latin American Congress of Microbiology Prize, Asuncion, Paraguay
 1999 Rotary Club Special Mention, Woman of the year. Rotary Club Misiones, Argentina

C. Contributions to Research Education and Mentoring

Student mentorship is a critical component of my research program. I am the Principal Investigator for Massey’s NCI T32 Integrative Training Program in Cancer Biology. I have supervised the training of 4 postdoctoral fellows, 6 graduate, 2 masters, 2 postbacc, 6 medical, and 11 undergraduate students, and 3 high school interns (see table below). High school interns in my lab will learn to do basic literature searches, interpret scientific research papers, basic lab organizational skills and techniques as they study how immune

cells interact with other cells in the breast tumor microenvironment, particularly in the brain metastatic niche, influence cancer cell survival, outgrowth and therapeutic resistance.

D. Contributions to Science

1. **Molecular epidemiology of cervical cancer in Argentina:** The northeast of Argentina is a region characterized by a high incidence of cervical cancer. As an undergraduate student, I conducted some of the molecular epidemiology studies that demonstrated a correlation between this cervical cancer observation and a high prevalence of human papillomavirus (HPV) infection, in particular the high-risk type 16, among caucasian and guarani aborigens. Moreover, we found a progressive loss of integrity with cervical lesion severity assessed by physical status of the viral E2 gene. These findings allowed for the implementation of frequent follow-up for patients with normal cytology with HPV 16 infection and/or disruption of E2. In the long term, this approach is expected to lower the incidence of cervical cancer in the Posadas region, Argentina, and it was awarded a National Senate recognition for its significance.
 - a. Tonon SA, Picconi MA, Zinovich JB, Liotta DJ, **Bos PD**, Galuppo JA, Alonio LV, Ferreras JA, Teyssie AR. Human papillomavirus cervical infection and associated risk factors in a region of Argentina with a high incidence of cervical carcinoma. *Infect Dis Obstet Gynecol*. 1999; 7(5):237-243. PMCID: PMC1784749.
 - b. Tonon SA, Picconi MA, **Bos PD**, Zinovich JB, Galuppo J, Alonio LV, Teyssie AR. Physical status of the E2 human papilloma virus 16 viral gene in cervical preneoplastic and neoplastic lesions. *J Clin Virol*. 2001; 21(2):129-134. PMID: 11378493.
 - c. Tonon SA, Picconi MA, Zinovich JB, Nardari W, Mampaey M, Galuppo JA, **Bos PD**, Badano I, Di Lello FA, Basiletti J, Gonzalez JV, Alonio LV, Teyssie AR. [prevalence of cervical infection by human papilloma virus (HPV) in the Caucasian and Guarani populations residing in the province of Misiones, Argentina]. *Rev Argent Microbiol*. 2003; 35(4):205-213.
 - d. National Senate of Argentina Award, in recognition for early detection and prevention of cervical cancer in Misiones, Argentina. June 2000, Senate Chamber, Argentina.
2. **Metastasis:** Metastasis is responsible for most cancer-related death. During my PhD training in the group of Joan Massagué, I contributed to the functional studies of lung specific metastasis genes, and developed brain metastasis xenograft models that are now widely used in the field, pioneering the study of a complex, previously unexplored metastatic site. My initial studies identified genes that are required for tumor cell crossing of the blood brain barrier, with potential for the development of early therapeutic strategies aimed at preventing CNS metastasis. A patent was obtained for this work (Bos, P.D. and Massagué, J., "Metastasis promoting genes and proteins", SK1375-02, 2009).
 - a. Minn AJ, Gupta GP, Siegel PM, **Bos PD**, Shu W, Giri DD, Viale A, Olshen AB, Gerald WL, Massague J. Genes that mediate breast cancer metastasis to lung. *Nature*. 2005; 436(7050):518-524. PMCID: PMC1283098.
 - b. Gupta GP, Nguyen DX, Chiang AC, **Bos PD**, Kim JY, Nadal C, Gomis RR, Manova-Todorova K, Massague J. Mediators of vascular remodelling co-opted for sequential steps in lung metastasis. *Nature*. 2007; 446(7137):765-770. PMID: 17429393.
 - c. Tavazoie SF, Alarcon C, Oskarsson T, Padua D, Wang Q, **Bos PD**, Gerald WL, Massague J. Endogenous human microRNAs that suppress breast cancer metastasis. *Nature*. 2008; 451(7175):147-152. PMCID: PMC2782491.
 - d. **Bos PD**, Zhang XH, Nadal C, Shu W, Gomis RR, Nguyen DX, Minn AJ, van de Vijver MJ, Gerald WL, Foekens JA, Massague J. Genes that mediate breast cancer metastasis to the brain. *Nature*. 2009; 459(7249):1005-1009. PMCID: PMC2698953.
3. **Treg cells in cancer:** Breast cancer has long been considered a poorly immunogenic tumor type. During my postdoctoral studies, I showed that in a murine breast tumor type resistant to immune checkpoint blockade, ablation of regulatory T cells is a powerful strategy that results in tumor and metastasis inhibition. These studies led to the development of an ongoing phase I/II clinical trial at the Memorial Sloan Kettering using CCR4 antibody to target Treg cells in solid tumors. A second interest during my post-doctoral training was to evaluate the consequences of immune-modulation on lymphocytes in tumor environments. With my colleagues, we demonstrated that Treg ablation unleashes immature NK cell expansion. Furthermore, by deleting the hypoxia inducible factor 1 (Hif-1a), I demonstrated that hypoxia-driven effects in the Treg cell

compartment are dispensable for their function. However, effector T cell survival is compromised when Hif-1a responses are abolished, providing a cautionary note for the development of anti-Hif-1a therapies. A patent was obtained for this work (Bos, P.D. and Rudensky, A.Y. “Methods and compositions for regulatory T-cell ablation”, PCT/US14/60069, 2014).

- a. **Bos PD**, Rudensky AY. Treg cells in cancer: A case of multiple personality disorder. *Sci Transl Med*. 2012; 4(164):164fs144.
 - b. Gasteiger G, Hemmers S, **Bos PD**, Sun JC, Rudensky AY. IL-2-dependent adaptive control of NK cell homeostasis. *J Exp Med*. 2013; 210(6):1179-1187. PMCID: PMC3674698.
 - c. **Bos PD**, Plitas G, Rudra D, Lee SY, Rudensky AY. Transient regulatory T cell ablation deters oncogene-driven breast cancer and enhances radiotherapy. *J Exp Med*. 2013; 210(11):2435-2466. PMCID: PMC3804934.
 - d. Plitas G, Konopacki C, Wu K, **Bos PD**, Morrow M and Rudensky AY. Distinct features of regulatory T cells in human breast cancer. *Immunity*. 2016; 45(5):1122-1134. PMID: 27851913
4. **Treg cells in cancer progression:** While the relevance of Treg cells in cancer has been undoubtedly established, it is yet incompletely understood what their mechanistic contribution to cancer progression is. As an independent group leader, I have continued dissecting Treg role in cancer by genetic modeling their interactions with other immune and non-immune cells in the primary and metastatic microenvironment, and establishing relevant protocols for tracking, identifying and functionally probing cell fate and function.
- a. Clark NM, Martinez MM, Murdock S, DeLigio JT, Olex AL, Dozmorov MG and **Bos PD**. (2020) Regulatory T cells support breast cancer progression by opposing IFN- γ -dependent functional reprogramming of macrophages. *Cell Rep*. 2020; 33(10):108482. PMCID: PMC7811278.
 - b. Martinez MM, Robila V, Clark NM, Du W, Idowu M, Rutkowski MR, and **Bos PD**. (2019) “Regulatory T cells control the switch from in situ to invasive breast cancer” – *Front. Immunol.* | doi: 10.3389/fimmu.2019.01942
 - c. Du W and **Bos PD**. (2020) “Tracing bone marrow derived microglia in brain metastatic tumors” - *Methods Enzymol*. 2020;635:95-110. doi: 10.1016/bs.mie.2019.08.017. Epub 2019 Sep 13. PMID: 32122556
 - d. Clark NM and **Bos PD**. (2019) “Tumor-Associated Macrophage isolation and in vivo analysis of their tumor promoting activity”, Cancer Immune surveillance, *Methods in Molecular Biology*, 1884:151-160. PMID: 30465201

Complete List of Published Work in MyBibliography:

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

Citations (As of 3/2026): 16096