

BIOGRAPHICAL SKETCH

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NAME:

Davis, Christiana Wara

eRA COMMONS USER NAME (credential, e.g., agency login):

warachr

POSITION TITLE:

Project Manager Translational & Immunotherapy Collaborations

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 MM/YYYY	FIELD OF STUDY
Volgograd State Medical Institute, U.S.S.R	MD	1989	6 Year Program in Medicine
University of Pennsylvania, Philadelphia, PA	Postdoctoral	2004	Molecular and Cellular Biology

A. Personal Statement

With a distinguished scholar award from my native country Sierra Leone, West Africa, I completed my medical training in Russia. I immigrated to the United States during a period of civil unrest in my native country. As an immigrant, my career opportunities were limited. I became a permanent U.S. Resident by marriage, and later a U.S. Citizen. With marriage came significant family obligations while my husband, a Judge Advocate General (JAG) ran his own law practice and fulfilled his active military duties. Determined to rebuild my medical career and motivated by a high risk pregnancy, I elected to enter the Biomedical Sciences and accepted a position in the Department of Pediatrics (Neonatology) at the Children's Hospital of Philadelphia. The research experience I acquired built my confidence; I successfully competed for NIH support, and I became a recipient of NIH's National Research Service Award, one of the most prestigious awards for postdoctoral training. Being acutely aware of the challenges international medical graduates (IMGs) face in the U.S., I became a career consultant for IMGs.

I later joined a Global Regulatory Company, a Consultant to the Pharmaceutical, Device & Biotechnology Industries, where I acquired experience writing regulatory documents and providing up-to-date regulatory advice to clients. A logical progression after my industry experience was to join Penn Medicine's Abramson Cancer Center, a world leader in cancer research, patient care and education. When former Cancer Center Director Dr. Chi Dang joined the Abramson Cancer Center, one of his key priorities was to create flagship medical programs that would bring together experts from diverse fields to address major challenges in cancer care. He invited faculty from the Penn community to form teams and develop multidisciplinary, disease-specific Translational Centers of Excellence (TCEs) aimed at finding solutions to the most pressing issues confronting cancer patients. Each team had three years of funding. That was in 2013. The Lung TCE actively sought extramural funding, foundation grants and philanthropic donations. Investigator-initiated projects developed in concert with pharmaceutical companies had significant pharmaceutical support. This allowed us to carry out innovative research, pilot studies, generate valid data, organize retreats attended by our collaborators and donors, publish findings, and seek additional federal funding to take these promising results from bench to

clinic. After ten years of advancing our knowledge of immunotherapy in lung cancer, the Lung TCE shifted its focus to Precision Medicine, including ctDNA, Artificial Intelligence, and Radiomics, under the new leadership of Drs. Charu Aggarwal and Melina Marmarelis, and the new name, Translational Center of Excellence for Thoracic Oncology Precision Program (TCE-TOPP). The TCE-TOPP aspires to establish the Abramson Cancer Center as a global leader in biomarker-based precision medicine for lung cancer.

1. Jeffrey C. Thompson, Caitlin Tilsed, **Christiana Davis**, Aasha Gupta, Bihui Melidosian, Chifei Sun, Michael E. Kallen, Cynthia Timmers, Corey J. Langer and Steven M. Albelda. Predictive Signatures for Responses to Checkpoint Blockade in Small-Cell Lung Cancer in Second-Line Therapy Do Not Predict Responses in First-Line Patients. *Cancers* 2024, 16, 2795. <https://doi.org/10.3390/cancers16162795>
2. Divij Mathew, Melina E. Marmarelis, Caitlin Foley, Joshua M. Bauml, Darwin Ye, Reem Ghinnagow, Shin Foong Ngiow, Max Klapholz, Soyeong Jun, Zhaojun Zhang, Robert Zorc, **Christiana W. Davis**, Maximillian Diehn, Josephine R. Giles, Alexander C. Huang, Wei-Ting Hwang, Nancy R. Zhang, Adam J. Schoenfeld, Erica L. Carpenter, Corey J. Langer, E. John Wherry, Andy J. Minn. Combined JAK inhibition and PD-1 immunotherapy for non-small cell lung cancer patients. *Science*. 21 Jun 2024. Vol 384, Issue 6702. DOI: 10.1126/science.adf1329.
3. David J. Cantor, MD, PhD, **Christiana Davis, MD**, Christine Ciunci, MD, MSCE, Charu Aggarwal, MD, MPH, Tracey Evans, MD, Roger B. Cohen, MD, Joshua M. Bauml, MD, Corey J. Langer, MD. Brief Report: Long-Term Follow-Up of Adjuvant Pembrolizumab After Locally Ablative Therapy for Oligometastatic NSCLC. *JTO Clin Res Rep*. 2024;5:100667.
4. Cole Friedes, Nikhil Yegya-Raman, Siqi Zhang, Michelle Iocolano, Roger B. Cohen, Charu Aggarwal, Jeffrey C. Thompson, Melina Elpi Marmarelis, William C. Levin, Keith A. Cengel, Christine Agnes Ciunci, Aditi Puri Singh, Christopher Davella, **Christiana Davis**, Corey J. Langer, and Steven J Feigenberg. Patterns of failure in metastatic non-small cell lung cancer (mNSCLC) treated with first line pembrolizumab and use of local therapy in patients with oligoprogression. *Clinical Lung Cancer* (2023) <https://doi.org/10.1016/j.clcc.2023.09.002>
5. Kathryn F Mileham, Suanna S Bruinooge, Charu Aggarwal, Alicia L Patrick, **Christiana Davis**, Daniel J Mesenhowski, Alexander Spira, Eric J Clayton, David Waterhouse, Susan Moore, Abdul-Rahman Jazieh, Ronald C Chen, Melinda Kaltenbaugh, Jen Hanley Williams, Julie R Gralow, Richard L Schilsky, Elizabeth Garrett-Mayer. Changes Over Time in COVID-19 Severity and Mortality in Patients Undergoing Cancer Treatment in the United States: Initial Report From the ASCO Registry. *JCO Oncol Pract* 2022 Apr;18(4):e426-e441. doi: 10.1200/OP.21.00394. Epub 2021 Oct 25
6. Jeffrey C. Thompson, MD, MTR, **Christiana Davis, MD**, Charuhas Deshpande, MD, Wei-Ting Hwang, PhD, Seth Jeffries, BS, Alexander Huang, MD, Tara C. Mitchell, MD, Corey J. Langer, MD, Steven M. Albelda. MD. A gene signature of antigen processing and presentation machinery (APM) predicts response to checkpoint blockade in Non-Small Cell Lung Cancer (NSCLC) and melanoma. *Journal of Clinical Oncology* 38, May 2020; DOI: 10.1200/JCO.2020.38.15_suppl.3121
7. Joshua Bauml, MD; Rosemarie Mick, MS; Christine Ciunci, MD, MSCE; Charu Aggarwal, MD, MPH; **Christiana Davis, MD**; Tracey Evans, MD; Charuhas Deshpande, MD; Linda Miller, RN; Pooja Patel; Evan Alley, MD, PhD; Christina Knepley, CRNP; Faith Mutale, CRNP; Roger B. Cohen, MD; Corey J. Langer, MD. Pembrolizumab After Completion of Locally Ablative Therapy for Oligometastatic Non-Small Cell Lung Cancer: A Phase 2 Trial. *JAMA Oncol*. Published online July 11, 2019;9(9):1283–1290. doi:10.1001/jamaoncol.2019.1449
8. Charu Aggarwal, **Christiana W. Davis**, Rosemarie Mick, Jeffrey C. Thompson, Saman Ahmed, Seth Jeffries, Stephen Bagley, Peter Gabriel, Tracey L. Evans, Joshua M. Bauml, Christine Ciunci, Evan Alley, Jennifer J. D. Morrisette, Roger B. Cohen, Erica L. Carpenter, and Corey J. Langer. Influence of TP53 Mutation on Survival in Patients With Advanced EGFR-Mutant Non-Small-Cell Lung Cancer. DOI: 10.1200/PO.18.00107 *JCO Precision Oncology* - Published online August 31, 2018

B. Positions and Honors

1990-1996	Freelance Health Worker, Philadelphia, PA
1996-2002	Medical Consultant, Law Offices, Philadelphia, PA
2002-2004	Research Intern/Technician, Children's Hospital of Philadelphia, Philadelphia, PA
2004-2007	NRSA Fellow, University of Pennsylvania, Philadelphia, PA
2007-2010	Postdoctoral Fellow, University of Pennsylvania, Philadelphia, PA
2010-2013	Professional Freelancer, Philadelphia, PA
2013-2013	Intern, Regulatory Affairs; DJA Global Pharmaceuticals, Chadds Ford, PA
2013-	Consultant, Consult To Aspire, Philadelphia, PA
2015-	Project Manager Translational & Immunotherapy Collaborations, Penn Medicine, Phila. PA

Other Experience and Professional Memberships

2000-2002	Editorial, Amicable Publishing, Philadelphia, PA
2014-	Member, Regulatory Affairs Professionals Society
2014-	Member, American Medical Writers Association
2017-	Member, American Society of Clinical Oncology
2019-	Member, The International Association for the Study of Lung Cancer (IASLC)
2019-	Reviewer Science Journal

Honors

1982	Outstanding Student Award to Study Medicine Abroad, Sierra Leone, West Africa
2004	National Research Service Award (NHLBI)
2007	NHLBI Supplement for Underrepresented Minority
2009	Travel Award (NIGMS)

C. Contributions to Science

At the Children's Hospital of Philadelphia, I contributed to the development of novel techniques for the assessment of S-Nitrosylation (a nitric oxide-mediated protein redox modification) within pathological samples. Under the guidance of Dr. Andrew J. Gow and Dr. Phillip Ballard, I examined samples of lung tissue from infants with and without Chronic Lung Disease (CLD) for markers of Oxidative Stress and Nitric Oxide (NO) Metabolism. We showed that with end stage CLD the enzymes that produce NO are altered.

1. **Christiana W. Davis MD**, Linda W. Gonzales PhD, Roberta A. Ballard MD, Philip L. Ballard MD; Changjiang Guo MD, Andrew J. Gow PhD. Expression of Nitric Oxide Synthases and endogenous NO metabolism in Bronchopulmonary Dysplasia. *Pediatric Pulmonology* 43:703-709 (2008) <https://doi.org/10.1002/ppul.20848>

2. Gow AJ, **Davis CW**, Munson D, Ischiropoulos H. Immunohistochemical detection of S-nitrosylated proteins. *Methods Mol Biol.* 279:167-72 (2004)

Towards the end of my NRSA Postdoctoral Fellowship, my mentor, Dr. Gow accepted a position at another institution. Encouraged by the overwhelming enthusiasm from Dr. Muniswamy, I joined his laboratory at the University of Pennsylvania in 2007. My research interests were focused on three areas: 1. Mechanism(s) of tumor evasion. 2) Mitochondrial and nitric oxide interplay in pathophysiology. 3) Mitochondrial CI subunit NDUFB8 in cancer. These studies led to one novel finding; Nitration of the previously un-described mitochondrial Complex 1 subunit, NADH dehydrogenase (ubiquinone) 1 beta subcomplex 8.

1. **Christiana W. Davis**, Brian J. Hawkins, Subbiah Ramasamy, Krishna M. Irrinki, Bruce A. Cameron, Khalid Islam, Varsha P. Daswani, Patrick J. Doonan, Yefim Manevich, Muniswamy Madesh. Nitration of mitochondrial complex I subunit NDUFB8 elicits RIP1- and RIP3- mediated necrosis; *Free Rad. Biol. Med.* 48: 306-17 (2009)

2. Brian J Hawkins, Mark D Levin, Patrick J Doonan, Nataliya B Petrenko, **Christiana W Davis**, Vickas V Patel, Muniswamy Madesh. Mitochondrial complex II prevents hypoxic but not calcium- and proapoptotic Bcl-2 protein-induced mitochondrial membrane potential loss. *J Biol Chem* 2010 Aug 21;285(34):26494-505

Other contributions to science and medicine include assisting rotating medical students in our research laboratory. Furthermore, in 2008, under the aegis of our research lab, my daughter, a 5-th grade student in one

of Philadelphia's underprivileged schools completed a science project. She presented her work at the **George Washington Carver, Jr. Science fair**, and won first place.

In my current role as a Project Manager, I have contributed to several pre-clinical and clinical trials. Immunotherapy has demonstrated remarkable clinical results in a subpopulation of patients with advanced NSCLC, and more recently small cell lung cancer. The ability to determine which patients are more likely to respond to such therapy has become a critical objective in lung cancer research. I have established several project-based databases to track response of patients to immunotherapy, and those who have acquired resistance to novel targeted therapies. These databases have become a crucial link in the identification and development of novel markers of outcome. Some ongoing translational studies include:

- a. Markers of Tumor Infiltrating Lymphocyte Function in Early-Stage Non-Small Cell Lung Cancer. Here, we are studying the T cell function in tumor infiltrating lymphocytes (TILs) and resident T cells in fresh resected lung specimens from patients with early-stage non-small cell lung cancer (NSCLC), tumor free lungs (TFLs), distant from tumor lung specimens (distant lung associated lymphocytes, DLALs) malignant pleural effusions, and from mesothelioma debulking surgical specimens. Information on the tumor mutation burden (TMB), and presence of major oncogenic driver mutations (EGFR, TP53, KRAS, LKB1), known to correlate with response to checkpoint inhibitors will be included in the final dataset.
- b. T Cell Exhaustion Profiles of Patients with Non-Small Cell Lung Cancer. To define a pre-treatment T Cell phenotype in non-small cell lung cancer (NSCLC) patients, blood samples are acquired from patients before and after initiation of immunotherapy and/or chemotherapy. This will be valuable in assessing the effect of the drug on T cell exhaustion, as well as changes in the pattern of inhibitory molecule expression, which can provide novel ideas for combination immunotherapies.
- c. Radiomic Analysis of NSCLC Patients receiving Immune Checkpoint Inhibitors. To build a prognostic radiomic signature of NSCLC patients receiving immune checkpoint inhibitor therapy. In particular, correlations between potential prognostic radiomic signatures in NSCLC and measures of therapy response including RECIST1.1, recovery from T Cell exhaustion, and changes in ctDNA mutational profile.

More recently, the COVID-19 Pandemic presented a unique opportunity to capture information on how a disease outbreak affects delivery of high-quality cancer care and decision-making for future disease outbreaks. I have helped spearhead both national and international COVID-19 registries.

1. ASCO Survey on COVID-19 in Oncology Registry (Abstract: "Mortality risk for patients undergoing cancer treatment who acquire SARS-CoV-2: ASCO Registry")
2. TERA-VOLT- International Registry on Thoracic Cancer Patients with COVID-19

I am looking forward to contributing to a number of exciting new research projects that are being initiated by TCE members and collaborators. In one project, we are partnering with Professor Drew Weissman at Penn, an expert in mRNA therapeutics who was instrumental in developing the technology used in the mRNA COVID vaccine. We plan to take advantage of this new technology to develop novel therapeutic agents for lung cancer.

In another project, we plan on using fresh lung cancer tumors to perform sophisticated analyses that help us understand how the immune system is suppressed; in particular, natural killer cells, and determine ways to "awaken them" to target specific cancer cells.

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

TCE-TOPP	PIs: Aggarwal/Marmarelis	2025-Present
R01 NIH RESEARCH PROJECT GRANT	PIs: Kontos/Katz	2021-Present

Completed Research Support

LUNG CANCER TRANSLATIONAL CENT Pls: Langer/Albelda 2015-2025

CANCER SERVICE LINE Pls: Aggarwal/Marmarelis 2020-2022

LUNGEVITY FOUNDATION PI: Thompson 2018-2021

RESEARCH GRANT PI: Katz 2019-2020

NHLBI; PO1-HL19737 PI: Fisher 2007-2012

Postdoctoral Supplement for Underrepresented Minority

The goal of this project is to elucidate the role macrophage-derived nitric oxide play in the alveolar epithelium and to develop a successful research career for candidate

Role: Postdoctoral Fellow (2007)

NIH-NRSA Training Grant 5-T32-HL-07748-11 PI: Fisher 2004-2009

Training in Lung Cell and Molecular Biology: To give postdoctoral fellows specialized advanced training in the field of lung cell and molecular biology in order to prepare them for independent research careers.

The goal of this project was to investigate the effects of altered nitric oxide chemistry within an animal model of pulmonary inflammation (Surfactant protein-D ablation), and to determine the molecular mechanism of nitric oxide-induced endothelial cell death.

Role: NRSA Postdoctoral Fellow (2004)

Center for Research on Women and Newborn Health PI: Gow 2001-2002

Role of Nitric Oxide reactivity in Acute Lung Injury and Bronchopulmonary Dysplasia (BPD)

The goal of this project was to assess the balance between nitrosylation and nitration in the etiology of BPD

Role: Intern (2002)