

Frank Urena, Ph.D



Biographical Data

Citizenship: **United States**

Education

2023-Present	St. George's University School of Medicine St. George, Grenada <u>Doctor of Medicine (Expected May 2028)</u>
2019-2022	The University of Hawaii at Manoa Honolulu, HI, USA <u>Ph.D., Molecular Biosciences and Bioengineering</u>
2017-2019	Arizona State University Tempe, AZ, USA <u>M.S. Biomedical Diagnostics</u>
2006-2011	Northeastern University Boston, MA, USA <u>Bachelor of Science Liberal Studies</u>

Honors and Awards

2020	AAI Minority Scientist Travel Award, American Association of Immunologists Carl Storm Underrepresented Minority Fellowship, Gordon Research Conferences
------	--

Certifications

USMLE Step 1: pending
USMLE Step 2 CK: pending

Research Experience

2022-2023	Mechanobiology of cancer-associated fibroblast in pancreatic ductal adenocarcinoma. (Dr. David Lagares. Massachusetts General Hospital/ Harvard Medical School, Boston, MA) - Investigated genetic markers of cancer-associated fibroblasts (CAFs) in pancreatic ductal adenocarcinoma (PDAC). Genetic drivers of AT2 alveolar cell differentiation using human-derived AT2 organoids. (Dr. Benjamin Medoff) Massachusetts General Hospital/ Harvard Medical School, Boston. MA - Collaborated with Dr. Benjamin Medoff to study immune-epithelial interactions using patient-derived alveoli organoids.
-----------	---

- 2019-2022 **microRNA 15a/16-1 as Post-Transcriptional Regulators of T Cell Activity and Proliferative Capacity.** (Dr. Peter Hoffman) University of Hawaii at Manoa, Honolulu. HI
- Demonstrated that T-cell activation decreases miRNA-15a/16 levels, enhancing MEK1–ERK1/2–Elk1 signaling and proliferative capacity. Work resulted in a first-author publication in JBC (2022).
- 2016-2018 **Adapting the innate immune system to develop long-lived vaccines to bacterial pathogens.** (Dr. David Mooney/ Dr. Donald Ingber) Wyss Institute/ Harvard Medical School, Boston. MA
- Co-authored IACUC protocols, performed minor survival surgeries, and contributed to Attivare Therapeutics' vaccine platform.

Publications: (* Indicates First Authorship)

Loop-mediated isothermal amplification (LAMP) assay for specific and rapid detection of *Dickeya fangzhongdai* targeting a unique genomic region. Scientific Reports, November 2022.

Anuhe DeLude*, Riley Wells*, Sherine Boomla*, Shu-Cheng Chuang*, **Frank Urena***, Aaron Shipman*, Noelle Rubas*, Donna Lee Kuehu*, Buster Bickerton*, Taylor Peterson*, Mohammad Arif, et al.

<https://www.nature.com/articles/s41598-022-22023-4>

Selenoprotein I deficiency in T cells promotes differentiation into tolerant phenotypes while decreasing Th17 pathology—Journal of Leukocyte Biology, August 2022.

Chi Ma*, FuKun W. Hoffmann, Lance G. Nunes, **Frank Urena**, Anastasia Andrukhiv, Mariana Gerschenson, Matthew W. Pitts, Peter R. Hoffmann.

<https://jlb.onlinelibrary.wiley.com/doi/abs/10.1002/JLB.1A0122-080R>

T-cell activation decreases miRNA-15a/16 levels, promoting MEK1–ERK1/2–Elk1 signaling and enhancing proliferative capacity—Journal of Biological Chemistry, March 2022.

Frank Urena*, Chi Ma*, FuKun W. Hoffmann, Lance G. A. Nunes, Johann Urschitz, Stefan Moisyadi, Vedbar S. Khadka, Youping Deng, and Peter R. Hoffmann.

[https://www.jbc.org/article/S0021-9258\(22\)00074-6/fulltext](https://www.jbc.org/article/S0021-9258(22)00074-6/fulltext)

Biomaterial vaccines capturing pathogen-associated molecular patterns protect against bacterial infections and septic shock. Nature Biomedical Engineering, January 2022.

Michael Super*, Edward J. Doherty*, Mark J. Cartwright, Benjamin T. Seiler, Fernanda Langellotto, **Frank R. Urena**, Donald E. Ingber & David J. Mooney, et al.

<https://www.nature.com/articles/s41551-021-00756-3>

Abstracts/Conference Proceedings:

May 2020

Kennedy pathway regulation by miR-16-1/15a cluster family during T cell activation

The journal of immunology 204 ((1 Supplement)), 78:8

Frank R Urena*, F David Horgen, Chi Ma, Fukun W. Hoffmann, Peter R. Hoffmann.

May 2017

Adapting the innate immune system to develop long-lived vaccines to bacterial pathogens.

The Journal of Immunology 198 (1_Supplement), 73.7-73.7

Michael Super*, Edward Doherty*, Mark Cartwright, Alexander Stafford, Omar Ali, Des White, Amanda Graveline, **Frank Urena**, Chloe MacDonald, Alexandre Dinis, Shannon Duffy, Benjamin Duckless, Benjamin Seiler, Donald Ingber, David Mooney.

Oral Presentations:

- **WINDREF Oral Seminar:** Implementing Innovative Public Health-Driven Hurricane Disaster Preparedness Strategies in a Changing Global Climate. (March 2024), St George, Grenada. West Indies (In person)
- **4th International Conference on Epigenetics & Bioengineering. (EpiBio)**
T-cell activation decreases miRNA-15a/16 levels to promote MEK1-ERK1/2-Elk1 signaling and proliferative capacity (October 2020) Virtual event. (Virtual)
- **JABSOM Annual Biomedical Sciences & Health Disparities Symposium.**
T-cell activation decreases miRNA-15a/16 levels to promote MEK1-ERK1/2-Elk1 signaling and proliferative capacity (April 2021), Honolulu. HI (In person+ virtual)
- **2021 Albert L. Tester Memorial Symposium.**
T-cell activation decreases miRNA-15a/16 levels to promote MEK1-ERK1/2-Elk1 signaling and proliferative capacity (April 2021), Honolulu. HI (In person+ virtual)

Poster Presentations:

Kennedy pathway regulation by miR-16-1/15a cluster family during T cell activation (12th International Symposium on Selenium in Biology and Medicine, Honolulu, HI, USA, February 2022) (in person)

Work Experience

- | | |
|-----------|--|
| 2022-2023 | <p>Post-doctoral Research Fellow, Harvard Medical School / Massachusetts General Hospital, Boston, MA, USA.</p> <ul style="list-style-type: none">• Investigated genetic markers of cancer-associated fibroblasts (CAFs) in pancreatic ductal adenocarcinoma using patient-derived CAF samples under the mentorship of Dr. David Lagares.• Collaborated with Dr. Benjamin Medoff's group to examine immune cell integration and genetic drivers in type II pneumocytes utilizing patient-derived alveolar organoids as a model system.• Applied molecular and cellular assays to characterize CAF-immune and epithelial interactions within the tumor microenvironment. |
| 2019-2023 | <p>Graduate Research Assistant, John A. Burns School of Medicine, Honolulu, HI, USA.</p> |

- Developed a genetically engineered gain-of-function mouse model to study microRNA-15a/16-1 overexpression in T-cell function and proliferation as part of PhD research under Dr. Peter Hoffmann.
 - Demonstrated that T-cell activation downregulates miRNA-15a/16, enhancing MEK1–ERK1/2–Elk1 signaling and promoting proliferative capacity.
 - Findings established a novel post-transcriptional regulatory mechanism linking microRNA signaling to T-cell activation dynamics.
- 2019-2019 **Scientific Assistant, Washington State University, Pullman, WA, USA.**
- Prepared DNA and RNA guides for CRISPR genome editing via embryonic delivery.
 - Generated and validated custom knockout/knock-in mouse lines through genotyping and sequencing.
 - Ensured genetic integrity and reproducibility across multiple engineered strains.
- 2018-2019 **Graduate Research Assistant, University of Hawaii Cancer Center, Honolulu, HI, USA.**
- Led cell culture maintenance and viral transfection workflows for bladder cancer diagnostic assay development.
 - Optimized multiplex molecular diagnostics using lentiviral and adenoviral transfection systems.
 - Enhanced assay specificity and sensitivity for early detection of bladder cancer.
- 2016-2018 **Research Assistant III Wyss Institute/Harvard Medical School Boston, MA**
- Designed and conducted immune-materials and biocompatibility studies in rodent and swine models to evaluate biomaterial-based vaccines.
 - Co-developed pathogen-associated molecular pattern (PAMP) biomaterial vaccines, published in Nature Biomedical Engineering (2022).
 - Authored IACUC protocols, performed minor survival surgeries, and contributed to Attivare Therapeutics' vaccine development platform.
- 2015-2016 **Research Associate (CRO): Toxicon Corp, Bedford, MA, USA**
- Led toxicokinetic/pharmacokinetic (TK/PK) and toxicology studies across rodents and non-human primates under GLP and GMP standards.
 - Designed and executed study protocols, managed anesthesia and analgesia monitoring, and ensured full regulatory compliance for FDA validation.
 - Coordinated histopathology, clinical pathology, and necropsy data integration, producing comprehensive reports for regulatory submission.
 - Maintained cross-departmental coordination between veterinary, surgical, and analytical teams to ensure study accuracy and consistency.
- 2014-2015 **Pathology Technician: Lahey Clinic and Medical Center, Burlington, MA, USA**
- Assisted during autopsies and processed surgical specimens for histopathological and cytological evaluation.

- Prepared urine cytology samples, FISH tests, and GYN ThinPrep smears for diagnostic review.
- Maintained laboratory inventory and ensured rapid specimen transport and accessioning from operating rooms to pathology units.

2012-2013	Laboratory Assistant: Converge Diagnostic Services. Peabody MA, USA. • Conducted routine and STAT testing in clinical chemistry and microbiology with validated QA/QC procedures. • Performed DNA extractions for HPV testing and assisted in GYN-Pap specimen processing. • Operated, calibrated, and maintained laboratory analyzers, ensuring accuracy and reliability of results. • Mentored new hires in laboratory workflow and safety compliance, contributing to team efficiency.
2012-2012	Risk Reduction Counselor: Greater Lawrence Family Health Center, Lawrence, MA • Provided HIV, STI, and viral hepatitis counseling and testing to high-risk populations. • Collected and analyzed epidemiological data for reporting to the Massachusetts Department of Public Health. • Designed and implemented community outreach programs at shelters, clinics, and correctional facilities to promote disease prevention and community wellness.
2008-2008	Chemical Reagent Coordinator (Summer Intern): Joule Scientific Staffing, Cambridge, MA • Managed chemical inventory and accessioning for laboratory distribution across multiple research teams. • Ensured proper labeling, tracking, and disposal of hazardous materials in compliance with Environmental Health and Safety (EHS) standards. • Streamlined chemical ordering and documentation workflows, reducing delivery discrepancies and improving operational efficiency.

Extracurricular & Volunteer Activities

2024-2025	SGU Dermatology Interest Group Research Coordinator. • Research training and education, with a focus on systematic review/meta-analysis development. St George, Grenada.
2023-2025	Humanitarian Service Organizations • Volunteer weekend homework tutor at Bel Air and Father Mulligan Orphanages. St George, Grenada.

- 2021-2022 **Covid Testing Volunteer, Pacific Alliance Against Covid. Honolulu, Hawaii, USA.**
- Covid testing for high-risk native Hawaiian population in the region of West Oahu.
- 2020-2020 **Molecular Workshop Instructor, Science Symposium for Girls. Honolulu, HI, USA.**
- Provided a day-long workshop on basic molecular biology and DNA fingerprinting as a part of a symposium for girls in grades 5-8 from schools all over the island of Oahu.
 - Followed by a brief discussion about women in STEM and STEM careers.
-

Professional Organizations

- American Academy of Hospice and Palliative Medicine (AAHPM) — 2024–Present
 - American College of Radiology (ACR) — 2024–Present
 - Society of Interventional Radiology (SIR) — 2024–Present
 - American College of Physicians (ACP) — 2023–Present
 - American Thoracic Society (ATS) — 2022–2023
 - American Society for Clinical Pathology (ASCP) — 2019–Present
 - American Association of Immunologists (AAI) — 2019–2022
 - Biomedical Engineering Society (BMES) — 2019–2022
 - American Society for Microbiology (ASM) — 2019–2022
-

Interests

Primary Interest: Internal Medicine – Oncology Focus (PSTP / ABIM Research Track) Secondary

Interest: Academic Internal Medicine – Translational or Fellowship-Undetermined Track

Languages

Native proficiency in Reading/writing/speaking English & Spanish.

LinkedIn: <https://www.linkedin.com/in/frankurena/>

Google Scholar: <https://scholar.google.com/citations?user=ZPZXIB8AAAAJ&hl=en>

ORCID: <https://orcid.org/0000-0002-0589-2963>