Three Physical Sciences Faculty Awarded Funding in 2024 UC Irvine Anti-Cancer Challenge

This year’s selected projects aim to transform the landscape of cancer diagnosis, treatment and potential cures.

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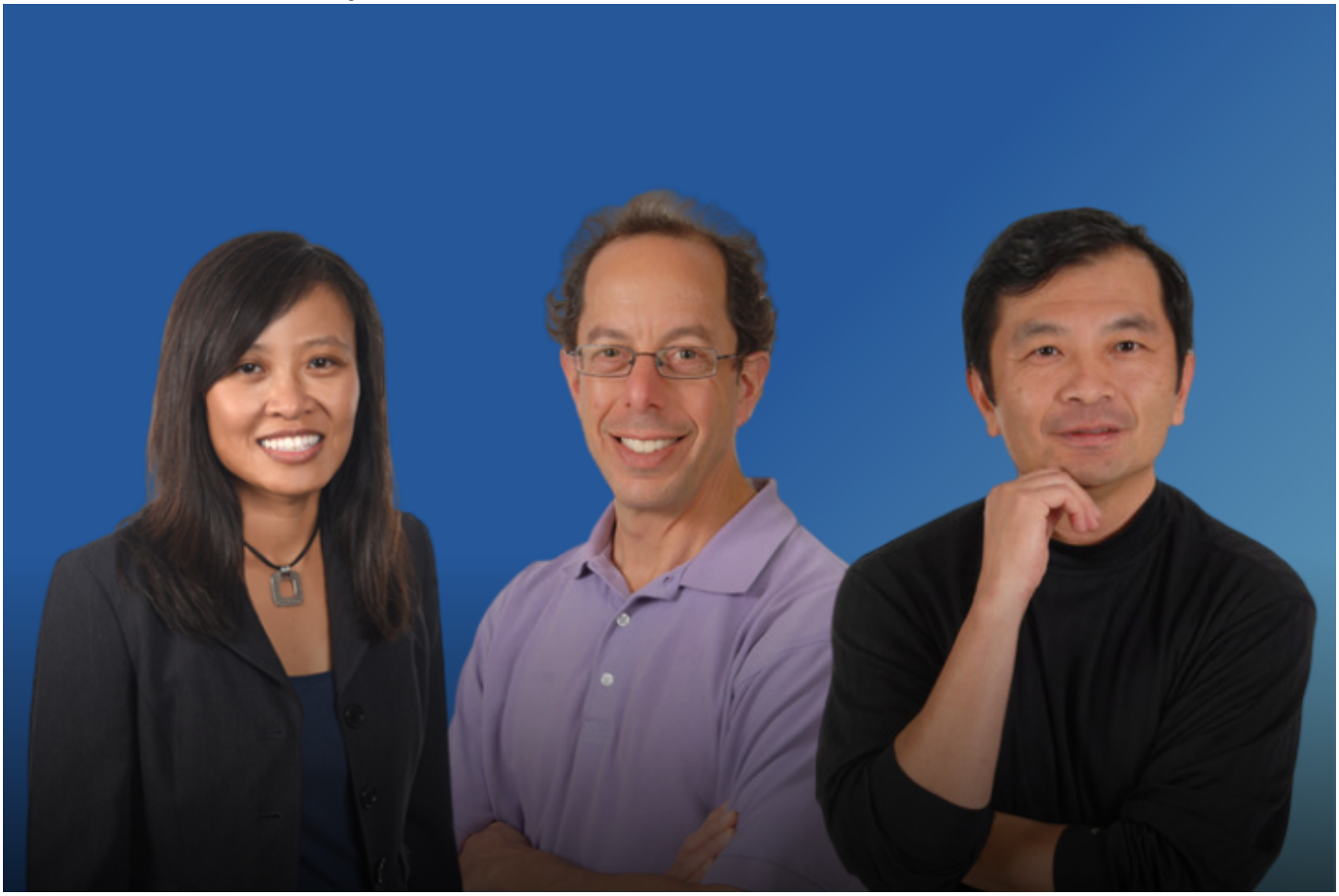
UC Irvine School of Physical Sciences



Vy Dong, Ph.D., John Lowengrub, Ph.D. and Qing Nie, Ph.D. (from left)

Three faculty members from the UC Irvine School of Physical Sciences have been awarded funding from the 2024 UC Irvine Anti-Cancer Challenge. Launched in 2017, the challenge is a peer-to-peer fundraising initiative that supports innovative pilot studies and early-phase clinical trials in cancer research. To date, it has raised more than $6.2 million for cancer research and funded 155 groundbreaking projects.

This year’s selected projects aim to transform the landscape of cancer diagnosis, treatment and potential cures. Congratulations to the following recipients:

Vy Dong, Ph.D.
Chancellor’s Professor, Department of Chemistry
Project Title: Unleashing Innate Immunity with Novel STING and TLR Agonist Prodrugs

Professor Dong is developing new small molecule anti-cancer drugs to treat a range of solid tumors. These novel drugs target multiple arms of the innate immune system, the body's first line of defense against pathogens, and therefore work in concert with existing immunotherapies that activate adaptive immunity, such as FDA-approved checkpoint inhibitors. Her research seeks to establish new frameworks for targeting multiple arms of innate immunity and advancing these promising drug candidates toward clinical application.

Dong is co-principal investigator with Thomas Burke, Ph.D. (Co-Principal Investigator), Department of Microbiology and Molecular Genetics, UC Irvine School of Medicine.

John Lowengrub, Ph.D.
Distinguished Professor, Department of Mathematics
Project Title: Optimization of Checkpoint Immunotherapy Using Biological and Mathematical Models

Professor Lowengrub’s project addresses the complex interplay between many immune reactions, drug dosage and treatment timing in blockade immunotherapy, a treatment that allows T cells to recognize and destroy cancer cells. By leveraging a newly developed mathematical model of tumor-immune interactions, followed by experimental validation, the research aims to identify the most effective immunotherapy regimens for melanoma. More broadly, the project aims to accelerate cancer treatment discovery through math-aided immunological research.

Lowengrub is co-principal investigator with Francesco Marangoni, Ph.D., Department of Physiology & Biophysics, UC Irvine School of Medicine.

Qing Nie, Ph.D.
Distinguished Professor, Department of Mathematics
Project Title: Lineage Tracing of Breast Cancer Metastasis-Initiating Cells

Professor Nie is leading the first study to use cutting-edge technology to map the ancestry tree of tumor and metastatic cells in breast cancer using patient-centric animal models. This research will fill critical gaps in the understanding of how cancer stem cells drive tumor progression towards metastasis. This knowledge will ultimately inform the development of therapies and biomarker testing.

Nie is co-principal investigator with Olga Razorenova, Ph.D., Department of Molecular Biology and Biochemistry, UC Irvine Charlie Dunlop School of Biological Sciences, Theresa Loveless, Ph.D., Department of Biosciences, Rice University, Shaheen Sikandar, Ph.D., Department of Molecular, Cell & Developmental Biology, UC Santa Cruz.

Full list of 2024 awardees
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