PARKER
INSTITUTE
FOR CANCER
IMMUNOTHERAPY

2024
Impact Report

A Radically Collaborative Force in Immunotherapy

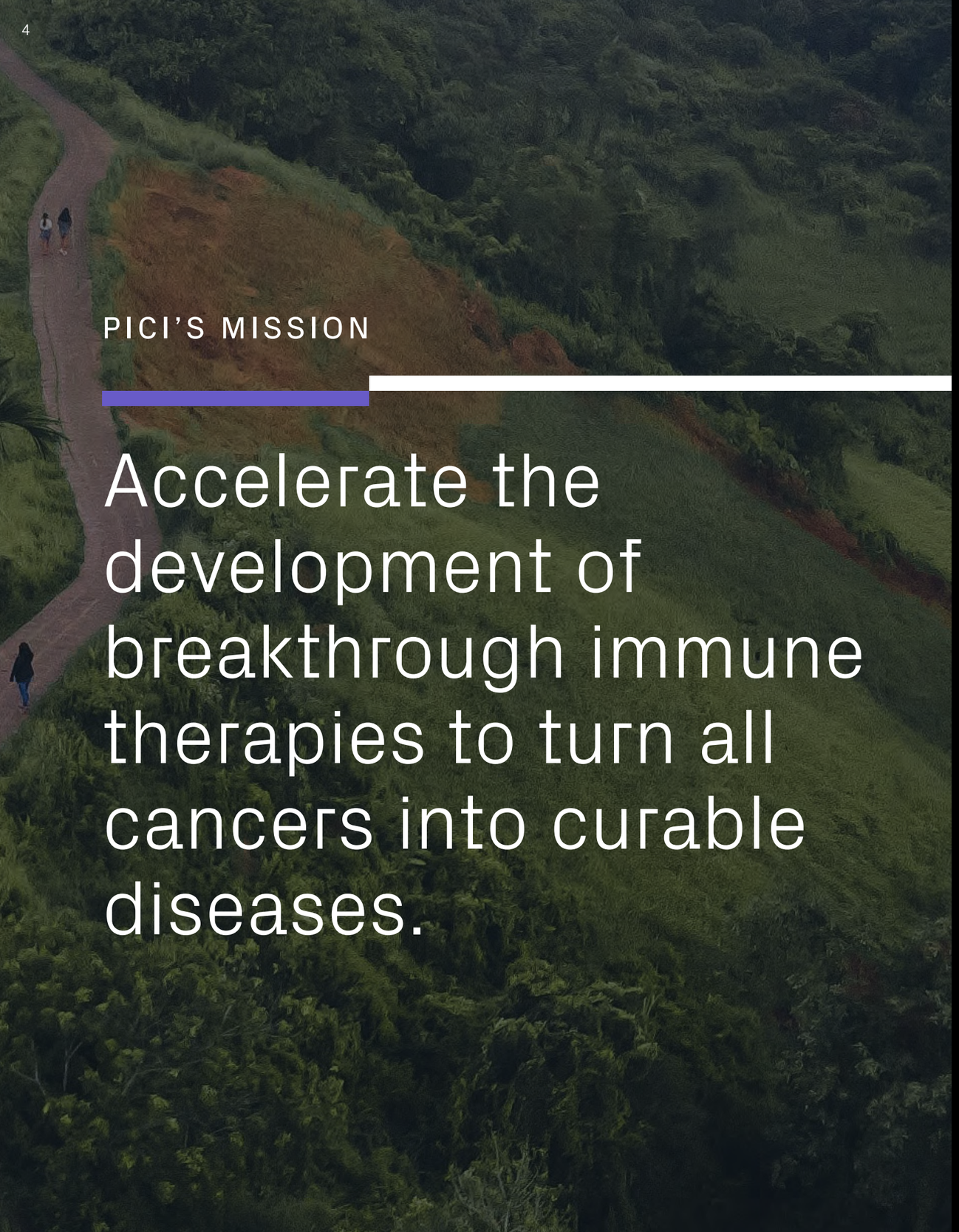
At the Parker Institute for Cancer Immunotherapy (PICI), 2024 has been a pivotal year of breakthrough discoveries and clinical advances. Across our expansive Network of world-class institutions, researchers are pushing boundaries, accelerating discovery and transforming patient care. From pioneering CAR T-cell therapies for aggressive tumor types to launching groundbreaking biotech ventures, the PICI Network represents a powerful engine of collaboration forging ahead on every front.

PICI investigators' contributions extend far beyond what can be captured here—but these examples showcase the extraordinary momentum we've built. With more than 100 active research studies spanning clinical trials, preclinical breakthroughs and emerging technologies, our efforts are reshaping the cancer landscape. This year alone, PICI-funded research delivered over 50 high-impact scientific publications alongside significant advancements in combination immunotherapy, pediatric cancer treatment and cell-based gene therapies.

Deepening our commitment, we announced an additional $125 million to fuel our collaborative research model and welcomed Weill Cornell Medicine to our Network. Our Early Career Researchers are pursuing bold new studies while PICI portfolio companies continue to translate discoveries into life-saving therapies.

These achievements highlight the power of the PICI Model to advance science and redefine what's possible in cancer care. We invite you to explore these pages for stories of progress and impact—each one bringing us closer to turning all cancers into curable diseases.

Stanford Medicine · UCLA · UCSF · Penn · Dana-Farber Cancer Institute · Gladstone Institutes · Weill Cornell Medicine · City of Hope · Fred Hutch Cancer Center · Icahn School of Medicine at Mount Sinai · MGH 1811 · MD Anderson Cancer Center · Memorial Sloan Kettering Cancer Center · Washington University in St. Louis School of Medicine



PICI'S MISSION

Accelerate the development of breakthrough immune therapies to turn all cancers into curable diseases.

By the Numbers

920+
INVESTIGATORS ON PICI FUNDED PROJECTS

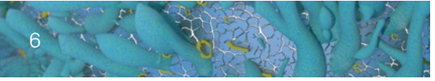
53
EARLY CAREER RESEARCHER AWARDS

4000+
PUBLICATIONS

460+
PICI SUPPORTED PROJECTS AND CLINICAL TRIALS

17
CURRENT COMPANY INVESTMENTS

370+
CURRENT INVENTION PORTFOLIO



Immuno-Oncology: Precision, Progress, and the Path Forward

JOHN CONNOLLY, PHD
PICI Chief Scientific Officer

Cancer has long been a formidable adversary, adapting to evade even our most advanced therapies. Today, however, immunotherapy is shifting this balance. Patients are outliving their prognoses, children are exceeding survival expectations and families are experiencing renewed hope. PICI Investigators are at the center of this transformation, translating pioneering discoveries into lifesaving treatments for patients. Since 2016, PICI has driven this progress by uniting top scientists, clinicians and collaborators in a robust Network dedicated to advancing cancer treatment. PICI's collaborative model integrates expertise across academia, industry and clinical research, equipping us to tackle cancer's most challenging barriers with precision and speed. Each breakthrough brings us closer to realizing our mission: to turn all cancers into curable diseases.

FROM DISCOVERY TO PATIENT IMPACT

While immunotherapy has led to life-changing remissions for some patients, it does not work for everyone. Some patients do not respond to treatment, while others see their cancer return after an initial response. To address these challenges, researchers are taking a multi-faceted approach, such as understanding why resistance develops, designing new treatments tailored to individual patients, and finding ways to make immunotherapy more effective across different types of cancer.

Investigations into the tumor microenvironment—a complex ecosystem where cancer evades and reshapes immune responses—are revealing how cancer builds protective barriers. These insights are enabling PICI Investigators to design combination therapies that increase response rates in tumors previously resistant to treatment. PICI Centers at Dana-Farber Cancer Institute and Weill Cornell Medicine, for example, are advancing combination strategies that pair immune checkpoint inhibitors with novel T cell enhancers, showing powerful preclinical effects and paving the way for more effective treatment options.

Another area of focus at PICI Centers, including UCLA, Weill Cornell Medicine and Dana-Farber, is personalized cancer vaccines, which are designed to train the immune system to recognize and attack mutations unique to each patient's tumor. Initial results, especially in melanoma and pancreatic cancer, show strong potential. Meanwhile, Gladstone's CRISPR-based mapping tool, CRISPRi, is helping PICI Investigators analyze millions of immune cells, uncovering critical circuits that drive T cell activation. This work is advancing our understanding of CAR T-cell functionality and laying the groundwork for adaptable cellular therapies within dynamic tumor environments.

PICI Investigators at UCSF, Stanford and Fred Hutchinson Cancer Research Center are furthering T-cell therapies specifically engineered to counteract cancer's evolving defenses. Notably, Stanford Cancer Institute, UCLA and City of Hope are planning California's first multi-institutional CAR T cell trial, aiming to expand access to novel therapies for melanoma and advanced solid tumors. Additionally, "universal" CAR T cells are being developed across our Network to broaden accessibility, bringing these therapies to a wider patient population.

HIGHLIGHTS FROM THE PICI NETWORK: ACCELERATING PROGRESS THROUGH COLLABORATION

The strength of the PICI Network lies in its unique model, bringing together leading research institutions to translate discoveries into clinical impact and improve patient care.

The PICI Center at the University of Pennsylvania, known for its leadership in cell therapy manufacturing, is developing advanced platforms to scale CAR T cell production, supporting the rapid transition of research from lab to clinic. At UCLA, PICI Investigators are creating "Trojan horse" CAR T cells that reprogram immune-suppressing proteins within the tumor microenvironment, a significant advancement for

The strength of the PICI Network lies in its unique model, bringing together leading research institutions to translate discoveries into clinical impact and improve patient care.

cancers like glioblastoma. Dana-Farber is pioneering optimized combination therapies targeting multiple pathways to amplify patient response rates and overcome immune resistance.

At the PICI Center at Gladstone, genomic technology accelerates the development of therapies tailored to individual tumor profiles. Stanford Medicine's work on enhancing CAR T cells' metabolic function is making these therapies more resilient in nutrient-limited environments, strengthening their persistence. Weill Cornell Medicine is advancing immunotherapies accessible to genetically diverse populations, helping ensure inclusivity in precision medicine.

In addition, PICI Investigators at City of Hope and Memorial Sloan Kettering Cancer Center are advancing first-in-human trials, while MD Anderson Cancer Center incorporates novel immunotherapies within comprehensive cancer care protocols. UCSF's and Fred Hutchinson's work in adaptive T-cell therapies and synthetic biology, along with biomarker research at the Icahn School of Medicine at Mount Sinai, exemplifies the extensive expertise within the PICI Network.

Through this collaborative model, PICI is advancing a framework for immunotherapy that combines scientific rigor with real-world application, setting new standards in cancer treatment and underscoring our commitment to improving patient outcomes.

ENSURING SAFETY AND EXPANDING THE THERAPEUTIC WINDOW

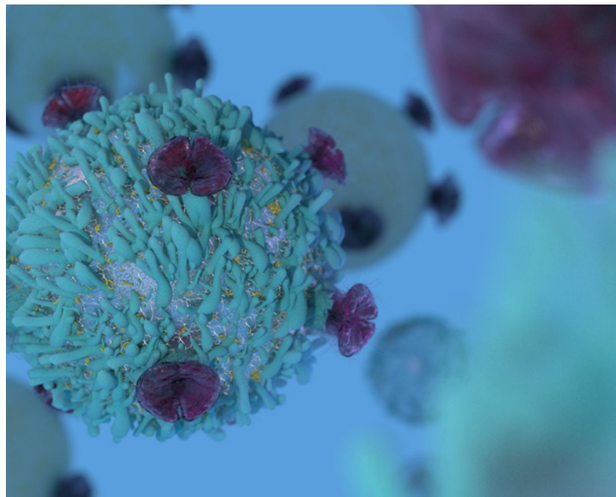
As immunotherapies grow more potent, ensuring their safety remains essential. PICI Investigators are advancing the understanding of immune mechanisms that drive both the efficacy and potential toxicity of CAR T-cell therapies. These findings are refining CAR T cell designs and protocols to balance therapeutic benefits with patient safety—a vital step in expanding these therapies to wider use.

Our commitment to safety extends into regulatory collaboration. PICI researchers from across the Network are collaborating with the FDA to understand how existing regulatory frameworks can be applied to groundbreaking immunotherapy advancements. This effort was highlighted by a workshop held in May with Friends of Cancer Research in Washington, D.C. This collaboration provides regulatory clarity, ensuring that these novel treatments reach patients responsibly and safely.

THE NEXT CHAPTER IN CANCER IMMUNOTHERAPY

As we look to 2025, PICI's priorities are clear: decoding and overcoming treatment resistance, leveraging AI and emerging technologies for precision therapy selection, and creating integrated therapeutic systems for enhanced efficacy. By uniting rigorous science with translational expertise, we are bringing effective treatments into patient care more rapidly.

PICI has demonstrated that immunotherapy can fundamentally transform cancer treatment, and our most significant breakthroughs lie ahead. With millions of patients awaiting better options, we have both the opportunity and responsibility to make these therapies accessible for all who need them.



Milestones & Momentum

PICI funding extends beyond financial support to include invaluable resources like data access, enabling strategic alliances with industry to further advance immuno-oncology

Weill Cornell Medicine

DECEMBER 2023

WCM joins the PICI Network, expanding our collaborative reach

MOONLIGHT

FEBRUARY 2024

Moonlight Bio, a PICI Portfolio company, launches with seminal *Nature* publication

MAY 2024

PICI hosts “Unlocking Complex Cell-based Gene Therapies”

with Friends of Cancer Research in Washington, DC, actively shaping the future of cell-based gene therapies

$125M

JULY 2024

PICI commits $125M, our largest funding commitment since 2016

to support our collaborative research model and accelerate the translation of scientific discoveries into treatments

ArsenalBio™

SEPTEMBER 2024

ArsenalBio, a PICI-founded company, announces $325M in new funding

THE PICI NETWORK DRIVES IMPACT AT 2024 MEDICAL MEETINGS

PICI Investigators made significant contributions to the 2024 ASCO, AACR and SITC Annual Meetings, showcasing the impact of the PICI Network.

THOUGHT LEADERSHIP
5 keynotes and special sessions

INDUSTRY RECOGNITION
1 Distinguished Award recipient
3 award committees chaired

SCIENTIFIC DISCOVERY
20+ oral presentations
75+ posters

FACILITATING DIALOGUE
10+ sessions chaired

PICI EXPANDS EFFORTS TO UNCOVER IMMUNOTHERAPY RESPONSE MECHANISMS THROUGH COLLABORATIONS

By leveraging cutting-edge technologies and pairing comprehensive multiomics data with clinical annotations, these initiatives will reveal actionable molecular insights, driving precision medicine and accelerating therapeutic development for diverse cancer types.

RADIOHEAD

Our RADIOHEAD program is a pan-tumor cohort study of 1070 patients that integrates molecular profiling across 3500+ longitudinal clinical data points to uncover drivers of immunotherapy resistance, adverse events and treatment response.

GUARDANT

Using Guardant Health’s GuardantInfinity™ platform, we are identifying genomic and epigenomic biomarkers from the circulating tumor DNA of RADIOHEAD’s longitudinal plasma samples.

BostonGene

We are collaborating with BostonGene to comprehensively analyze the immune cells isolated from the full RADIOHEAD cohort, including RNA sequencing, high-dimensional flow cytometry and whole exome sequencing.

nomic

In partnership, we are deploying Nomic’s nELISA™ platform to support large-scale profiling of over 600 secreted proteins in RADIOHEAD’s serum samples.

Highlighted Honors

Trailblazers in Cancer Research: PICI's investment in the brightest scientific minds is reflected in their achievements.

James P. Allison, PhD

DIRECTOR OF PICI CENTER AT MD ANDERSON

Inducted into National Inventors Hall of Fame

Katie Campbell, PhD

PICI INVESTIGATOR AND 2022 PARKER BRIDGE FELLOW AT UCLA

Named a Rising Star by *Immuno-oncology Insights*

Howard Chang, MD, PhD

PICI INVESTIGATOR AT STANFORD MEDICINE

Received the Lurie Prize in Biomedical Sciences

Justin Eyquem, PhD

PICI INVESTIGATOR AT UCSF, 2019 PARKER SENIOR FELLOW

Selected as a 2024 Pew-Stewart Scholar for Cancer Research

Carl June, MD

DIRECTOR OF PICI CENTER AT THE UNIVERSITY OF PENNSYLVANIA

Won 2024 Breakthrough Prize in Life Sciences and 2024 Warren Alpert Foundation Prize for developing CAR T-cell therapy

Catherine J. Wu, MD

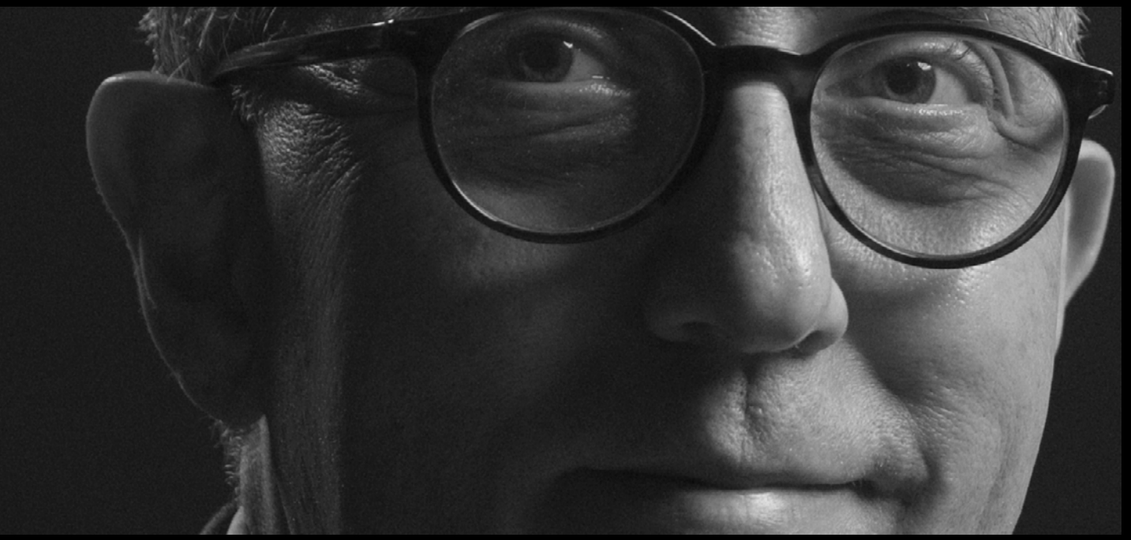
PICI INVESTIGATOR AT DANA-FARBER CANCER INSTITUTE

Awarded the Sjöberg Prize for personalized cancer vaccine research

The Breakthrough Prize not only honors our past achievements but also shines a light on the potential for future innovations in the fight against cancer. Together, I am confident we will continue to advance the field and bring hope to those affected by this disease.

CARL JUNE, MD

Director of the PICI Center at the University of Pennsylvania



JEDD WOLCHOK, MD, PHD

Director of the PICI Center at
Weill Cornell Medicine

Welcoming Our Newest Center

Just one year ago, we welcomed Weill Cornell Medicine into the PICI Network, and the results have been remarkable. Under the leadership of PICI Center Director Jedd Wolchok, MD, PhD, and Center Co-Director Taha Merghoub, PhD, the Center has made significant strides in advancing immuno-oncology research, training future researchers and contributing to health equity initiatives.

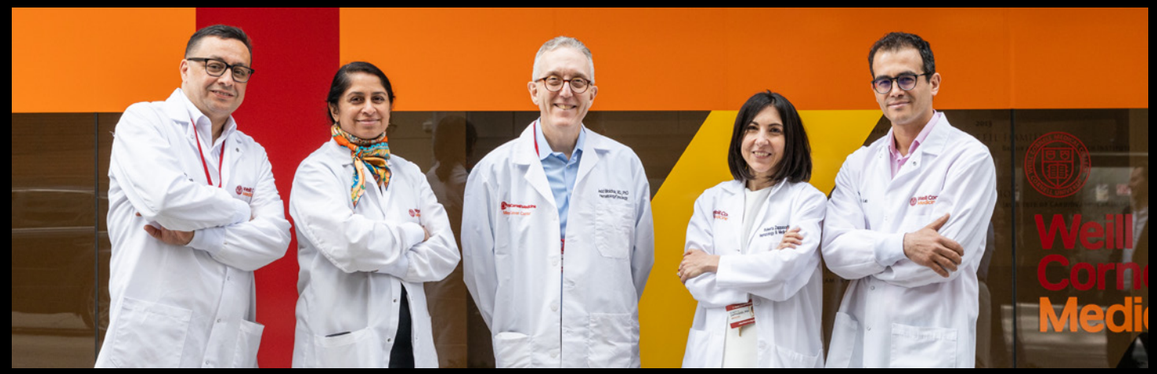
For example, Mohamad Hamieh, PhD, is developing innovative CAR T-cell therapies, while Roberta Zappasodi, PhD (2016 Parker Scholar, 2019 Parker Bridge Fellow), is investigating mechanisms of resistance to immunotherapy. Niroshana Anandasabapathy, MD, PhD, is advancing research on dendritic cell biology to improve cancer vaccine efficacy. These are important examples of the type of research that PICI funding enables.

“The collaborative nature of the PICI Network has already accelerated our research in ways I couldn’t have imagined,” said Dr. Wolchok. “We’re leveraging PICI’s resources to pursue high-risk, high-reward studies that could lead to breakthroughs in patient care.”

We’re tackling some of the biggest challenges in cancer immunotherapy. With PICI’s support, we have the tools and the team to make a real difference.

JEDD WOLCHOK, MD, PHD

Director of the PICI Center at
Weill Cornell Medicine



PICI Network's New Co-Directors

PICI doesn't just identify brilliant scientific minds; we cultivate leaders who can translate scientific discoveries into impactful new therapies and technologies. These newly appointed Co-Directors exemplify this commitment:

Ansuman Satpathy, MD, PhD

CO-DIRECTOR, PICI CENTER AT STANFORD MEDICINE

Stanford MEDICINE

CURRENT ROLE: Associate Professor of Pathology and Immunology, Stanford University; Investigator, Gladstone-UCSF Institute of Genomic Immunology and Stanford Cancer Institute

TRANSLATIONAL IMPACT: Co-Founder of Cartography Biosciences, Immunai, Santa Ana Biosciences and Prox Biosciences; Partner at Wing Venture Capital

Julia Carnevale, MD

CO-DIRECTOR, PICI CENTER AT UCSF

UCSF

CURRENT ROLE: Researcher at the Gladstone-UCSF Institute for Genomic Immunology; Assistant Professor of Hematology and Oncology, Department of Medicine, UCSF; Attending in the UCSF GI Oncology Clinic

TRANSLATIONAL IMPACT: Inventor of patented genome-wide CRISPR screening method in primary human T cells

Saar Gill, MBBS, PhD, FRACP

CO-DIRECTOR, PICI CENTER AT THE UNIVERSITY OF PENNSYLVANIA

Penn

CURRENT ROLE: Associate Professor of Medicine in the Division of Hematology-Oncology, Penn; Scientific Co-Director, Cell Therapy and Transplant Program at Penn

TRANSLATIONAL IMPACT: Co-founder of Carisma Therapeutics and Interius Biotherapeutics, advancing next-generation CAR T-cell therapies and leading clinical trials for hematologic malignancies

In Drs. Satpathy, Carnevale and Gill, we have leaders who bridge the gap between scientific discovery and advancing new treatments to patients. Each is a leading expert in their field, with a shared passion for advancing cancer immunotherapy and a commitment to collaborating across institutions to accelerate the development of breakthrough immune therapies.

JOHN CONNOLLY, PHD
PICI Chief Scientific Officer

Early Career Researchers

PICI's commitment to nurturing the next generation of researchers is a cornerstone of our long-term strategy. Our program provides emerging investigators with essential support and mentorship, empowering them to pursue bold ideas and shape the future of immunotherapy.

Zachary Steinhart, PhD

The interrogation of gene networks controlling human cytotoxic T cell function with next-generation CRISPR screens.

PARKER BRIDGE FELLOW,
GLADSTONE INSTITUTES

"This award from PICI is instrumental in advancing my research in gene editing. I'm using CRISPR technologies to better assess large numbers of genes to determine the best candidates to put forward for clinical development."

Maxwell Foisey

How novel hybrid synthetic receptors deliver immunomodulatory payloads, enhancing solid tumor T-cell therapy.

PARKER SCHOLAR
PHD CANDIDATE, THE UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

"As a Parker Scholar, I gain access to resources and opportunities I wouldn't have otherwise had, particularly collaborating with the PICI Network, full of research pioneers working on bold ideas at the cutting-edge of science."

Debolina Ganguly, PhD

Identifying the mechanistic underpinnings by which metastatic stem cells promote systemic tolerance to tumor antigens and suppress responses to immunotherapy.

PARKER SCHOLAR
DANA-FARBER CANCER INSTITUTE

"My selection as a Parker Scholar is accelerating our work at Dana-Farber to understand how different metastatic sites differ in their ability to mount immune responses. As cancer spreads, it breaks down organ-specific immune barriers, impacting the anti-tumor immune response."

Sean Yamada-Hunter, PhD

Harnessing engineered CD47 to develop T cell and macrophage combination immunotherapy for rapid clinical translation.

PARKER SCHOLAR
STANFORD MEDICINE

"In our study published in *Nature*, we found that combining CAR T-cell therapy and anti-CD47 therapies causes macrophages to target T cells, limiting this combination's efficacy. We developed a novel solution, and the PICI award allows me to continue this research, potentially laying the groundwork for a new therapeutic approach."

CRYSTAL MACKALL, MD

Director of the PICI Center at Stanford Medicine

Accelerating the fight against pediatric brain cancer

For parents of children diagnosed with diffuse midline gliomas (DMG), time has always been the cruelest enemy. With no approved therapies and a median survival of just 9-11 months, this aggressive pediatric brain cancer has left families grasping at precious moments.[1] But in October 2024, a breakthrough in the battle against DMG emerged: an innovative therapy, born from the collaboration of Stanford Medicine, PICI and other key partners, achieved an important milestone that could one day transform the future of pediatric cancer treatment.

The FDA's Regenerative Medicine Advanced Therapy (RMAT) designation granted to GD2-CAR T cell therapy marks a pivotal turning point. This innovative treatment, developed under the leadership of Crystal Mackall, MD, Director of the PICI Center at Stanford Medicine, and PICI Project Member Michelle Monje, MD, PhD, represents more than a scientific breakthrough—it could enable the faster advancement of a promising new treatment for families who have faced limited options.

"This breakthrough is rewriting what's possible for children with diffuse midline gliomas," says Dr. Mackall. "Working with Dr. Monje, we've turned scientific insights into real hope — seeing responses that last not just months, but years."

DMGs are the leading cause of brain tumor-related death in children, representing approximately 10-15% of childhood brain tumors and affecting 200-400 young lives annually in the U.S.[1] The PICI-co-funded, first-in-child trial at Lucile Packard Children's Hospital, conducted by Dr. Monje as principal investigator, has shown significant results in early testing. Of 13 patients enrolled and 11 patients treated, several experienced improved neurological function, significant tumor reduction (>50% reduction in four treated patients), and in one remarkable case, a complete, durable response lasting over three years—a milestone almost unimaginable just years ago.[2] While additional studies are needed to establish the treatment's full safety and efficacy profile, the early results represent a promising step toward an approved therapy for children with DMG.

This RMAT designation opens doors to closer collaboration with the FDA, potentially accelerating the journey from laboratory discovery to clinical impact. This accelerated pathway could dramatically reduce the time needed to bring new treatments to patients.

Since 2016, PICI's mission has been steadfast: turn all cancers into curable diseases. This advancement, made possible through collaboration with Stanford, CIRM and CureSearch, exemplifies what's achievable when scientific brilliance meets bold collaboration. It shows us that the impossible is within reach.

While we celebrate this milestone, somewhere, another family is receiving a devastating diagnosis. That's why we push forward. That's why we innovate. That's why we collaborate. For every child facing DMG, for every family praying for more time, for every future that hangs in the balance — we won't stop until we've turned all cancers into curable diseases.

Join us in accelerating the next generation of cancer breakthroughs.

REFERENCES

[1]Jovanovich, N., Habib, A., Head, J., Hameed, F., Agnihotri, S., & Zinn, P. O. (2023). Pediatric diffuse midline glioma: Understanding the mechanisms and assessing the next generation of personalized therapeutics. Neuro-oncology advances, 5(1), vdad040. https://doi.org/10.1093/noajnl/vdad040

[2]Monje, M., Mahdi, J., Majzner, R. et al. Intravenous and intracranial GD2-CAR T cells for H3K27M+ diffuse midline gliomas. Nature (2024). https://doi.org/10.1038/s41586-024-08171-9

Don’t just imagine a world without cancer—help us build it.

PICI’s unique approach is driving unprecedented progress in cancer immunotherapy. Your donation empowers leading scientists, fuels innovation and translates groundbreaking research into life-saving therapies.

Give to PICI today at parkerici.org/donate and together, we’ll turn all cancers into curable diseases.