THE OHIO STATE UNIVERSITY COMPREHENSIVE CANCER CENTER – ARTHUR G. JAMES CANCER HOSPITAL AND RICHARD J. SOLOVE RESEARCH INSTITUTE

Pelotonia Institute for Immuno-Oncology

2022 Annual Report

The James

The Ohio State University
COMPREHENSIVE CANCER CENTER

FROM THE DIRECTOR

Zihai Li, MD, PhD
Klotz Memorial Chair in Cancer Research
Professor and Founding Director
Pelotonia Institute for Immuno-Oncology
OSUCCC – James

I am delighted to present the 2022 annual report for the Pelotonia Institute for Immuno-Oncology (PIIO) at The Ohio State University Comprehensive Cancer Center – James Cancer Hospital and Solove Research Institute (OSUCCC – James). This report chronicles our progress both over the past year and since the OSUCCC – James and Pelotonia made their historic pledge in July 2019 to launch a comprehensive bench-to-bedside immuno-oncology (IO) research institute focused on life-saving breakthroughs to fight cancer.

The generosity of Pelotonia Riders, Challengers, Volunteers and Donors, along with the diligence of IO researchers, has facilitated our efforts to use a systems-wide strategy in holistically studying the body's anticancer immune response (Systems IO), to transform tumor immunology discoveries into cancer therapeutics (Translational IO), to provide resources to help researchers determine which patients will respond well to specific immunotherapy drugs (Immune Monitoring and Discovery) and develop computational approaches for novel insights in cancer immunotherapy (Immuno-Oncology Informatics).

To that end, 2022 research accomplishments included the launch of our cell therapy program's first-in-human triple CAR T-cell clinical trial and a study that has revealed male sex hormones as new targets for cancer immunotherapy. We also received an NIH grant to study the impact of cancer therapy on COVID-19 primary vaccine- and booster-induced antibody responses.

In addition, we launched our Immunology and Immunotherapeutics PhD Program (I2GP), which received more than 70 applications in its inaugural year.

Our faculty members' collective annual extramural funding stands at $36 million, including $18 million from the National Cancer Institute (NCI). They have published more than 800 manuscripts in peer-reviewed journals and have disclosed more than 80 patents and technologies since 2019. Also, nearly 90 IO clinical trials are underway.

Your generosity, energy and ingenuity have fueled our efforts to become a leader in driving IO breakthroughs. In this report, we summarize our progress toward accomplishing our goals pertaining to talent, research, honors and resources.

THE OHIO STATE UNIVERSITY COMPREHENSIVE CANCER CENTER – ARTHUR G. JAMES CANCER HOSPITAL AND RICHARD J. SOLOVE RESEARCH INSTITUTE (OSUCCC – JAMES) LEADERSHIP TEAM

(listed alphabetically)

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James Cancer Hospital and
Solove Research Institute

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Chief Financial Officer

DAVID GOSKY, MA, MBA
Executive Director for Research Administration

MELISSA HALL
Associate Vice President, Growth Marketing and Reputation Strategy

WILLIAM "SKIP" HIDLAY
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KRIS KIPP, MSN, RN
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Assistant Vice President, Development

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Director, Drug Development Institute

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RAPHAEL E. POLLOCK, MD, PhD, FACS
Director, The Ohio State University Comprehensive Cancer Center

PETER SHIELDS, MD
Deputy Director, The Ohio State University Comprehensive Cancer Center

NANCY SINGLE, PhD
Director, Clinical Research Operations

CORRIN STEINHAUER, DNP, RN, NEA-BC, CPPS
Chief Nursing Officer, James Cancer Hospital and Solove Research Institute

TED YANK, MHA
Senior Director for Research Administration

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TALENT

The PIIO aims to become an institute of choice for IO talent. To accomplish this, it is recruiting a diverse team of top-tier talent, developing programs to train the next generation of IO researchers, providing robust mentorship and professional development for faculty and staff to increase IO knowledge, promoting innovation and embodying a culture of multidisciplinary teamwork and excellence that empowers faculty and staff to be successful. Below are updates regarding talent added to the PIIO, as well as select scientific accomplishments.

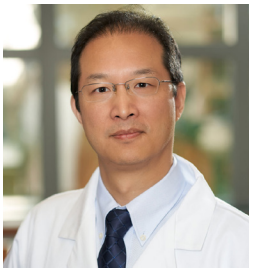
FACULTY RECRUITS IN 2019 (listed in chronological order)

2019
Zihai Li, MD, PhD – Professor, Division of Medical Oncology; Founding Director of the PIIO

Dr. Li focuses on research and clinical trials primarily in the fields of chaperone biology, immune tolerance and cancer immunology, particularly related to the roles of GRP94 (also known as gp96), which is a major chaperone in the endoplasmic reticulum (ER).

2019
Ephraim Ansa-Addo, PhD – Assistant Professor, Department of Internal Medicine, Division of Medical Oncology

Dr. Ansa-Addo seeks to understand how cellular and molecular regulators, including RNA-binding proteins and chromatin-modifying proteins, determine the functions of Treg cells in the tumor micro-environment.



2019
Feng Hong, MD – Assistant Professor, Division of Medical Oncology

Dr. Hong is developing a new class of therapeutics for cancer based on the rational design of unfolded protein response (UPR) inhibitors against the pathological ER stress in cancer and cancer immunology.

FACULTY RECRUITS IN 2019 (listed in chronological order cont.)

2019
Yiping Yang, MD, PhD – Professor and Director, Division of Hematology

Dr. Yang's research interests focus on tumor immunology and viral immunity, with the ultimate goal of developing effective immunotherapy approaches for treating cancer.

2019
Xiaopei Huang, PhD - Associate Professor, Division of Hematology

Dr. Huang is interested in the tumor microenvironment and the role that tumor-associated neutrophils play in cancer development and progression.

FACULTY RECRUITS IN 2020 (listed in chronological order)

2020
Dongjun Chung, PhD – Associate Professor, Department of Biomedical Informatics

Dr. Chung focuses on network-based analysis and deep learning modeling of the T-cell receptor (TCR) repertoire data, and on comprehensive analytical workflow for spatially resolved transcriptomics data.

2020
Gang Xin, PhD – Assistant Professor, Department of Microbial Infection and Immunity

Dr. Xin is working to metabolically reprogram macrophages to restore sensitivity to immunotherapy.

2020
Bei Liu, MD, MPH – Professor, Division of Hematology

Dr. Liu focuses on regulation of tumor-infiltrating dendritic cells by chaperone GRP94 to overcome resistance to immune checkpoint blockade in triple-negative breast cancer.

FACULTY RECRUITS IN 2020 (listed in chronological order cont.)

2020
Margaret Gatti-Mays, MD, MPH, FACP – Associate Professor, Division of Medical Oncology

Dr. Gatti-Mays is assessing peripheral immune responses after combination immunotherapy with dinutuximab, gemcitabine and autologous natural killer (NK) cells in patients with GD2-expressing breast cancers on the DiGNK clinical trial.

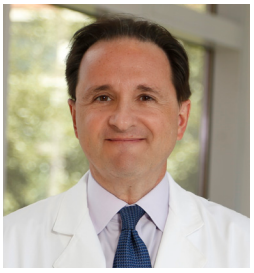
2020
Chan-Wang "Jerry" Lio, PhD – Assistant Professor, Department of Microbial Infection and Immunity

Dr. Lio is interested in the role of T cells in TET-deficient B-cell lymphoma.

FACULTY RECRUITS IN 2021 (listed in chronological order)

2021
Mark Rubinstein, PhD – Associate Professor, Division of Medical Oncology

Dr. Rubenstein is assessing mechanisms of resistance to immune checkpoint therapy and the role of major histocompatibility complex (MHC) class I molecules in this process.



2021
Marcos de Lima, MD – Professor, Division of Hematology; Clinical Director of the Blood and Marrow Transplant and the Cellular Therapy (BMT/CT) programs

Dr. de Lima studies strategies to expand transplantation of blood stem cells from one patient to another, and the treatment and prevention of posttransplant leukemia relapse.

2021
Brian Searle, PhD – Assistant Professor, Department of Biomedical Informatics

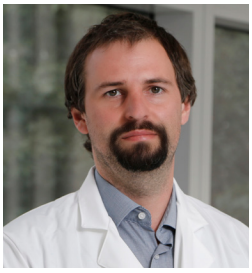
Dr. Seale is identifying tumor-specific splice junctions as potential immunotherapeutic targets in glioblastoma.

FACULTY RECRUITS IN 2021 (listed in chronological order cont.)

2021
Nandini Acharya, PhD – Assistant Professor, Department of Neurology
Dr. Acharya studies neuro-immune circuits controlling antitumor immunity and response to immune checkpoint blockade therapy.

2021
Billur Akkaya, MD, DPhil – Assistant Professor, Department of Neurology
Dr. Akkaya is identifying the role of lymphocyte-activation protein 3 (LAG3) in the tumor microenvironment and is characterizing the therapeutic effects of targeting its activity.

2021
Munir Akkaya, MD, DPhil – Assistant Professor, Department of Internal Medicine, Division of Rheumatology
Dr. Akkaya is performing a multilevel investigation in collaboration with experts who use solid tumor models and patient specimens to characterize the types and functions of tumor-infiltrating B cells.



2021
Andreas Wieland, PhD – Assistant Professor, Department of Otolaryngology – Head and Neck Surgery, Division of Head and Neck Cancer
Dr. Wieland works to define the immunological landscape of human papillomavirus (HPV)-positive head and neck cancer and its implications for novel therapeutic interventions.

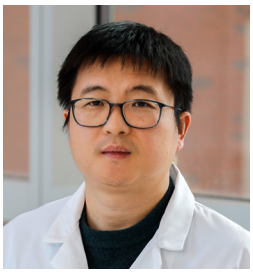
2021
Joyce Wu, PhD – Professor, Department of Internal Medicine, Division of Rheumatology
Dr. Wu's research interests include microbiomes, immune regulation, auto immunity and cancer.

FACULTY RECRUITS IN 2022 (listed in chronological order)

2022
Andrew J. Gunderson, PhD – Assistant Professor, Division of Surgical Oncology
Dr. Gunderson's research focuses on understanding how B cells regulate immune responses and therapeutic efficacy in various cancer types.

2022
Xue Han, PhD – Assistant Professor, Department of Microbial Infection and Immunity
Dr. Han is targeting programmed death 1 homolog (PD-1H, also called VISTA) in basic and translational immunological studies.

2022
Patrick Collins, PhD – Assistant Professor, Department of Microbial Infection and Immunity
Dr. Collins focuses on the genetic and epigenetic mechanisms that govern NK cells, and the mechanisms that stabilize DNA breaks during adaptive lymphocyte development.

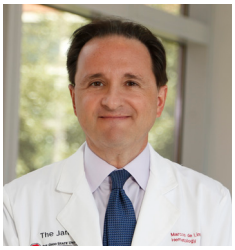


2022
Linghua Zheng, PhD – Assistant Professor, Division of Medical Oncology
Dr. Zheng is interested in identifying novel signaling pathways mediated by cell surface proteins that regulate T-cell homeostasis, activation and tolerance in physiological and pathological conditions.

FACULTY RECRUITS IN 2023

2023
Stanley Huang, PhD – Associate Professor, Department of Microbial Infection and Immunity
Dr. Huang seeks to understand the interplay between cellular signaling and metabolic regulation that dictates immune cell activation during inflammation.

SCIENTIFIC ACCOMPLISHMENTS


Marcos de Lima, MD


Sumithira Vasu, MBBS


Lynn O'Donnell, PhD

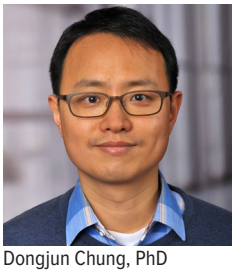

Lapo Alinari, MD, PhD

Triple CAR T-cell trial started: A first-in-human trial targeting three antigens for B-cell malignancies

Researchers have found that cancer cells learn to evade trained T lymphocyte cells by halting the production of a key target antigen, CD19. To thwart these escape tactics, researchers have designed a chimeric antigen receptor T-cell (CAR T-cell) therapy to target CD19, CD20 and CD22. The research team has launched a phase I clinical trial to test the safety, side effects and best infusion dose of this triple CAR T-cell product. Lymphoid malignancies eligible for this trial are non-Hodgkin lymphoma (NHL), acute lymphoblastic leukemia (ALL), chronic lymphocytic leukemia (CLL) and B-prolymphocytic leukemia (B-PLL). The research team includes **Drs. Sumithira Vasu** (principal investigator), **Marcos de Lima** (investigational new drug [IND] sponsor), **Lynn O'Donnell** (manufacturing lead), **Lapo Alinari** (correlatives studies) and **Lentigen/Miltenyi** (industry partner).


Qin Ma, PhD


Debasish Sundi, MD


Dongjun Chung, PhD


Zihai Li, MD, PhD


Margaret Gatti-Mays, MD, MPH


Chelsea Bolyard, PhD

Sex bias in cancer immunotherapy

Sex bias exists in the development and progression of nonreproductive organ cancers, but the underlying mechanisms are enigmatic. Led by Dr. Zihai Li, this research team has discovered a role for CD8+ T cell-dependent antitumor immunity in mediating sex differences in tumor aggressiveness, which is driven by the gonadal androgen but not sex chromosomes (*Science Immunology*). The team established T-cell intrinsic function of androgen receptor (AR) in promoting CD8+ T-cell exhaustion *in vivo* and found that ablation of the androgen-AR axis rewires the tumor microenvironment to favor effector T-cell differentiation and potentiates the efficacy of anti-PD-1 immune checkpoint blockade. Collectively, their findings highlight androgen-mediated promotion of CD8+ T cell dysfunction in cancer and imply broader opportunities for therapeutic development from understanding sex disparities in health and disease.

This work was the topic of a sponsored seminar at the 37th Annual Meeting for the Society for the Immunotherapy of Cancer (SITC) in Boston, Massachusetts. Titled *Sex Bias and Cancer Immunotherapy*, the seminar addressed the striking sex-dependent discrepancies in incidence, progression, response to treatment and survival outcomes for patients with cancers stemming from non-reproductive organs, such as bladder, prostate and brain. The seminar was organized by **Drs. Zihai Li, Margaret Gatti-Mays** and **Chelsea Bolyard**. Speakers included **Drs. Li, Amy Moran** (Oregon Health and Science University) and **Justin Lathia** (Cleveland Clinic).


Haitao Wen, PhD

SUSD2: A new potential cancer immunotherapy target

While immune checkpoint blockade (ICB) is a groundbreaking cancer treatment that has revolutionized the way many patients are treated, it remains an uncommon therapy from which only a small percentage of patients experience long-term clinical benefits. A decline in immune function prevents many patients with cancer from achieving durable clinical responses. Immune checkpoint molecules exist in multiple forms, which means that single targeting of these proteins cannot override the immune system's compensatory signals. This leaves researchers searching for new targets to improve antitumor immunity. **Dr. Haitao Wen** and colleagues at Ohio State, University of North Carolina - Chapel Hill and University of Michigan reported in the journal *Nature Immunology* that Susd2−/− effector CD8+ T cells showed enhanced production of antitumor molecules, which consequently blunted tumor growth in multiple syngeneic mouse tumor models. In addition, adoptive transfer of Susd2-/- CAR T cells caused a vigorous antitumor response in a mouse model. These findings suggest that targeting Susd2 could be a powerful new strategy for cancer immunotherapy.


Eugene Oltz, PhD


Zihai Li, MD, PhD


Mark Rubinstein, PhD


Shan-Lu Liu, MD, PhD

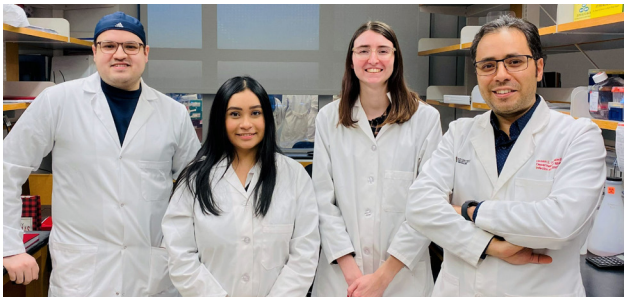

Dongjun Chung, PhD

SIIREN/STOP-COVID teams awarded a U54 supplement

Cancer patients, especially those receiving active immune suppressive or altering therapy, represent a highly vulnerable population with increased risk of SARS-CoV2 breakthrough infection despite mRNA vaccination and boosters. Researchers in the PIIO hypothesized that variability in the durability and memory of T-cell and antibody responses following booster immunization in solid tumor and hematologic cancer patients will be driven primarily by type and timing of treatment. Furthermore, key parameters driving heterogeneity in SARS-CoV2 mRNA booster responses can be identified by tracking clonal T-cell populations and epitope-specific antibody responses within individual cancer patients. The aim of this study is to determine the impact of cancer therapy (immune suppressive and altering) on primary vaccine- and booster-induced T-cell memory, as well as on primary vaccine- and booster-induced antibody responses. The study team includes **Drs. Eugene Oltz** (principal investigator) and co-Investigators **Zihai Li, Mark Rubinstein, Shan-Lu Liu** and **Dongjun Chung**.

Restoring the ability of exhausted T cells to respond to immune checkpoint blockade

T cell dysfunction is a common cause of immune system failure, which in turn limits the effectiveness of immunotherapies. Additionally, epigenetic programming within dysfunctional CD8+ T cells impedes their response to ICB therapies. To clarify which upstream signals drive acquisition of dysfunctional epigenetic programs and to determine whether these signals could be therapeutically targeted to return dysfunctional T cells to an ICB-responsive state, **Dr. Hazem Ghoneim** and his team revolutionized an in vitro model system of stable T-cell dysfunction. The team published a paper in *Nature Immunology* detailing their findings on how rebalancing TGFβ1/bone morphogenetic protein signals can help unleash dysfunctional CD8+ cells and improve immunotherapy treatments.


From left are Amir Yousif (Molecular, Cellular and Developmental Biology student), Chelsea Castillo (Research Assistant II), Abbey Saadey (Biomedical Sciences Graduate Program student) and Hazem Ghoneim, PhD (Lab PI). Yousif and Saadey are co-first authors. (Castillo is not an author on the paper, as she only recently joined the laboratory.)

Cell therapy pilot grants awarded

The PIIO, Nationwide Children's Hospital, and the divisions of Hematology and Medical Oncology in the Ohio State College of Medicine, along with the Blood and Marrow Transplant Program and Cell Therapy Program at the OSUCCC – James, invited applications for the newly announced Cellular Therapy Pilot Study Program. This program funds projects that propose clinical trials evaluating cell therapies in cancer patients. The following projects were funded in 2022:

PHASE I

A phase I, single-center study of anti-glycoprotein A repetition predominant (GARP)-specific chimeric antigen receptor T cells (CAR T Cells) in patients with progressive glioblastoma (PI: Xingjun Wu, PhD).

PHASE II

A phase 2 study to evaluate the efficacy and safety of adoptive transfer of autologous tumor infiltrating lymphocytes in patients with advanced solid cancers and treatment of non-small cell lung cancer (NSCLC) patients with tumor-infiltrating lymphocyte (TIL) therapy: IL-15/IL-15Ra complexes (N-803) will allow improved T-cell persistence and antitumor efficacy in comparison with high-dose IL-2 (MPI: Joal Beane, MD; Kai He, MD, PhD; Mark Rubinstein, PhD). A phase I trial of IL-21 expanded, off-the-shelf third-party NK cells (IL21-alloNK) in combination with tafasitamab and lenalidomide in relapsed and refractory diffuse large B-cell lymphoma (PI: John Reneau, MD).

PHASE I/II

A phase I/II study of ex-vivo expanded allogeneic universal donor (UD)TGFβi NK cell infusions in combination with temozolomide as a cell lymphodepleting agent in patients with melanoma metastatic to the brain (PI: Kari Kendra, MD, PhD).

Funding and resources are available to support costs associated with investigational new drug (IND)-enabling laboratory studies and GMP cell manufacturing for pilot studies opened at the OSUCCC – James or Nationwide Children's Hospital. Awardees will be granted $50,000 with a one-time renewal opportunity available following submission of a progress report, which will be reviewed by the Cell Therapy Pilot Committee. The maximum award is $100,000.

New Grants Awarded (2022)

Principal investigator	Sponsor	Title
Akkaya, B	NIAID	Deciphering the specificity and molecular mechanisms of regulatory T cells using novel approaches
Baiocchi, R	Am Soc of Hematology	ASH medical student physician-scientist award
Baiocchi, R	HHV-6 Foundation	Immunomodulatory mechanisms of HHV-6B infection in acute graft-vs.-host disease
Baiocchi, R; Long, M	NCI	Characterization of resistance to PRMT5 inhibitor therapy in mantle cell lymphoma
Burd, C	NCI	Diversity supplement R01CA237213 – mechanisms of UV-mediated melanoma development
Carbone, D	Genentech Inc	OSUCCC lung cancer prevention and early-detection project
Carson, W	Alkermes Inc	Determine the effects of nemvaleukin on antitumor effects of NK cells
Cassady, K; Maris, J (Children's Hospital of Philadelphia)	NCI; Children's Hospital of Philadelphia	Engaging and enhancing neuroblastoma immune targeting
Choe, H	Fred Hutchinson Cancer Research Center	OSU-21348: Acalabrutinib for chronic graft-vs.-host disease
Choe, H	Medpace Inc	OSU-21316: A randomized, double-blind trial to evaluate the safety and efficacy of apraglutide in subjects with grade II to IV (MAGIC) steroid refractory gastrointestinal (GI) acute graft-vs.-host disease on best available therapy
Chung, D; Ma, Q	NHGRI; Univ of Cincinnati	Statistical power calculation framework for spatially resolved transcriptomics experiments
Cosgrove, C	Gynecologic Oncology Group	OSU-21367: A phase 3, randomized, open-label, active-comparator controlled clinical study of pembrolizumab versus platinum doublet chemotherapy in participants with mismatch repair-deficient (dMMR) advanced or recurrent endometrial carcinoma in the first-line setting
Lessnick, S; Cripe, T	NCI	Training program in basic and translational pediatric oncology research
Cripe, T; Lincoln, S (Ontario Institute for Cancer Research); Sorensen, P (Univ of British Columbia)	NCI	Childhood high-risk sarcoma-derived human satellite (HSAT) and endogenous retroviral (ERV) RNAs in systemic immunosuppression and inflammation (SUPPLEMENT 4)
Cripe, T; Mardis, E	NCI	Diversity supplement: Hernandez-Aguirre-Cripe U54 (SUPPLEMENT 5)
Cripe, T	NCI	Overcoming immunological tumor microenvironment resistance in Ewing sarcoma (SUPPLEMENT 6)
Cripe, T	Vironexis Biotherapeutics Inc.	TransJoin proof-of-concept and IND-enabling studies
Dong, Y	Green Cross Corporation	Development of novel lipid nanoparticles
Dong, Y	NIGMS	Construction of in vivo mRNA delivery systems
Eisfeld, A; Mardis, E; Mims, A	NCI	Understanding treatment response patterns and therapy resistance in IDH-mutant AML
Freud, A; Lordo, M; Mundy-Bosse, B	NCI	Group 1 innate lymphoid cell dysregulation in acute myeloid leukemia
Ganju, R	Army Medical Res Acquisition Activity	Inhibition of RET proto-oncogene as novel immune-based strategy against SCLC
Green, P	NCI	32nd international workshop on retroviral pathogenesis
He, K	Iovance Biotherapeutics, Inc.	OSU-21139: A phase II multicenter study of autologous tumor infiltrating lymphocytes (LN-145) in patients with metastatic non-small-cell lung cancer
Hong, F	NCI	Defining the role of CNPY2 in promoting tumor progression through mediation of macrophages
Jaglowski, S	Kite Pharma, Inc.	OSU-21152: Long-term follow-up study for participants of Kite-sponsored interventional studies treated with gene-modified cells

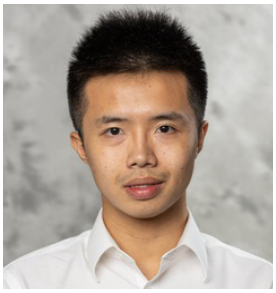
New Grants Awarded (2022)

Principal investigator	Sponsor	Title
Liu, X; Zhou, L; Shih-Hsin Yang, E (UAB Comprehensive Cancer Center – University of Alabama at Birmingham)	NCI	Combine mitochondrial gene therapy and synthetic lethal chemotherapy to treat triple-negative breast cancer
Liu, X; Liu, R (UAB Comprehensive Cancer Center – University of Alabama at Birmingham); Wang, L (UAB Comprehensive Cancer Center – University of Alabama at Birmingham)	NCI - UAB Comprehensive Cancer Center-University of Alabama at Birmingham	Identifying a new biological target for breast cancer therapy that contributes to disparities for African-American women
Lorch, G	Grayson-Jockey Club Res Fdn Inc	Pharmacokinetics of oral mycophenolate mofetil in horses
Chung, D; Ma, Q	NHGRI; Univ of Cincinnati	Statistical power calculation framework for spatially resolved transcriptomics experiments
Phelps, A; Coss, C; Mace, T; Owen, D	NCI; Univ of Melbourne	Cachexia-mediated FcRn modulation and its impact on anti-PD1 therapy in lung cancer
Papandreou, I	NCI	Metabolic modulation of alkylating agent efficacy in MEK inhibitor-resistant thyroid cancers
Pollock, R	Army Medical Res Acquisition Activity	Extracellular vesicle MDM2 DNA cargo: New methods to access a novel liposarcoma candidate biomarker
Pollock, R; Arthur, E	NCI	Cancer Center Support Grant: Sexual orientation and gender identity (SOGI) data collection program implementation and evaluation (SUPPLEMENT 3)
Ranganathan, P	ACS Inc	Role of PRMT5 in acute graft-vs.-host disease (aGVHD)
Ranganathan, P	Am Assn of Immunologists, Inc	Role of PHB in acute graft-vs.-host disease
Dorrance, A; Garzon, R; Ranganathan, P	NHLBI	Developing novel therapies to improve blood stem cell transplantation outcomes
Ringel, M	Army Medical Res Acquisition Activity	Mechanisms of metastasis suppression and translational applications in thyroid cancer
Searle, B; Cobbs C (Swedish Med Ctr)	NCI	Using proteogenomics to assess the functional impact of alternative splicing events in glioblastoma
Shields, P; Agudelo Garcia, P	NCI	Metabolic regulation of the epigenetic landscape in T-cell exhaustion
Stover, D	Susan G. Komen Breast Cancer Foundation	Treatment response detection for bone-only metastatic breast cancer
Skardal, A; Tsung, A	NCI	Organoid modeling of pre-metastatic niche formation in the liver by primary colorectal tumor-secreted factors
Skardal, A; Beane, J	NCI	Ex vivo generation of tumor-reactive T cells for adoptive cell transfer using an immune enhanced, patient-derived tumor organoid-on-a-chip (iTOC)
Vilgelm, A	Army Medical Res Acquisition Activity	W81XWH2210019: Harnessing innate immunity to improve metastatic breast cancer therapy
Wu, H	NHLBI	Microbiota control lung Th17 cell response and plasticity leading to autoimmune lung disease
Wu, H	NIAID	Tfh cells: linking the gut microbiota to a gut-distal autoimmune disease

HONORS

Joseph Azar, MD

Dr. Joseph Azar was selected as a **Pelotonia Postdoctoral Scholar**. His research project titled "Profiling TCF1+CD8+ T cells in neoadjuvant FOLFIRINOX and PD-1 blockade in pancreatic cancer" hypothesizes that immunotherapy can be combined with chemotherapy and given to patients before surgery to increase the growth of beneficial progenitor immune cells in pancreatic cancer. Dr. Azar is a postdoctoral scholar in the laboratory of Dr. Mark Rubinstein.



Tong Xiao, MS

Tong Xiao was selected as a **Pelotonia Graduate Scholar** for his project titled "Dissecting the molecular mechanism of androgen signaling in driving CD8+ T-cell dysfunction." This study aims to understand the molecular mechanism that androgen uses to drive CD8+ T-cell dysfunction, which dampens tumor control and leads to male-biased tumor growth in bladder cancer. Xiao is a PhD student in the Biomedical Sciences Graduate Program and a graduate research associate in the laboratory of Dr. Zihai Li.

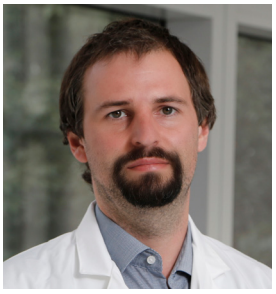
Steve Oghumu, PhD

Dr. Steve Oghumu received Ohio State's **Early Career Distinguished Scholar Award**. He is making groundbreaking discoveries in cellular, molecular and immunological mechanisms of oral carcinogenesis. His lab team's study of how PI3Kγ inhibitor potentiates anti-PD-L1 checkpoint immunotherapy against head and neck squamous cell carcinoma won first place in the undergraduate/laboratory staff category of the PIIO's Fourth Annual IO Symposium poster session. As an Early Career Distinguished Scholar, Dr. Oghumu received one of the highest annual honors bestowed by Ohio State.

Margaret E. Gatti-Mays, MD, MPH, FACP

Dr. Margaret Gatti-Mays was appointed co-chair of **SITC's Breast Clinical Practice Guidelines Committee**. Dr. Gatti-Mays was a member of the group that generated the first professional guidelines for immunotherapy use in breast cancer. As the co-chair, she is responsible for leading revisions and updates to these guidelines. She specializes in immunotherapy, side effects from immunotherapy and rare subtypes of breast cancer, such as small-cell breast cancer.

HONORS



Andreas Wieland, PhD

Dr. Andreas Wieland was accepted to the **Arthur and Sandra Irving Cancer Immunology Symposium** in July 2022 in Boston, Massachusetts. Dr. Wieland was selected from a strong group of applicants based on his impressive research achievements, recommendations from his mentors and ambitious goals for his future. The symposium united more than 15 accomplished faculty mentors who are excited to share their discoveries and research-career experience in cancer immunology with approximately 45 promising young scientists (postdocs and starting PIs).

Zihai Li, MD, PhD

Dr. Zihai Li received the **Mount Sinai Graduate School Alumni Award from the Mount Sinai Alumni Association**. The 2022 field of nominees was the largest in history, but Dr. Li's outstanding credentials and accomplishments, as well as his commitment to excellence in science and medicine, solidified the award committee's decision. In addition to this honor, Dr. Li and his lab received an **Ohio State University Accelerator Award** for his project titled "Anti-GARP monoclonal antibodies for cancer immunotherapy." This project seeks to complete the preclinical translational activities required to move a novel therapeutic into the clinic. The therapeutic targets the latent TGFβ receptor GARP.

Eugene Oltz, PhD

Dr. Eugene Oltz received the College of Medicine **BSGP Graduate Research Mentor Award**. Dr. Oltz chairs the Department of Microbial Infection and Immunity and serves as the Samuel Saslaw Professor of Infectious Diseases, Microbial Infection and Immunity. He also chairs the PIIO Internal Scientific Advisory Board (ISAB). A world-renowned immunologist with expertise in basic lymphocyte biology and developmental regulation, Dr. Oltz is passionate about mentoring researchers at all levels.

2022 Kadir Has Promising Scientist Award

Billur Akkaya, MD, DPhil

Münir Akkaya, MD, DPhil

Drs. Billur Akkaya and **Münir Akkaya** received the 2022 Kadir Has Promising Scientist Award. The award goes to researchers with significant achievements in the study of infectious diseases and immunology. **Dr. Billur Akkaya** received the award for her research on how T cells are neutralized by regulatory T cells. **Dr. Münir Akkaya** won for his research on how the immune response is reprogrammed by various microbial factors during infectious diseases and how this process affects communication between natural and acquired immune elements.

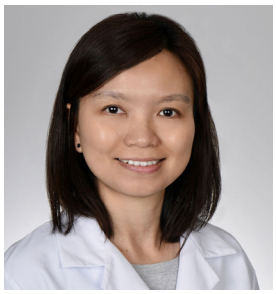
American Association of Immunologists (AAI) Awards

Haitao Wen, PhD

Dr. Haitao Wen won the 2022 AAI Lustgarten-Thermo Fisher Scientific Memorial Award. This award, established in honor of AAI Member Dr. Joseph Lustgarten, helps advance the career of a mid-career scientist who attends the AAI annual meeting and presents an abstract on immune regulation.

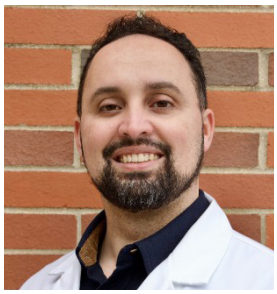
Hazem Ghoneim, PhD

Dr. Hazem Ghoneim received the 2022 Chambers-Thermo Fisher Scientific Award. This award helps advance the career of an early-career scientist who attends the AAI annual meeting and presents an abstract on cancer biology.



Soo Ngoi, PhD

Dr. Soo Ngoi, research assistant professor in the Division of Hematology, received an AAI Early Career Faculty Grant and was selected to make an oral presentation. **Dr. Luciano Mazzoccoli**, postdoctoral fellow, received an AAI Minority Scientist Award and was selected for a poster presentation. Drs. Ngoi and Mazzoccoli are members of the laboratory of **Dr. Bei Liu**.



Luciano Mazzoccoli, PhD

Dr. Mazzoccoli received his PhD in oncology at Brazilian Cancer Institute, where he focused on molecular and epigenetics events in cancer. During his postdoctoral training at Washington University in Saint Louis, he studied the immune response in glioblastoma by oncolytic virus strategy. Since joining the Bei Liu lab in 2021, Dr. Mazzoccoli seeks to identify the mechanisms by which the molecular chaperone GRP94 regulates dendritic cell functions and T-cell programming in the tumor microenvironment. He hopes to become an independent scientist in immunology.

EDUCATION UPDATES

Immunology and Immunotherapeutics PhD Program Launched

The Ohio State University College of Medicine has launched an Immunology and Immunotherapeutics Graduate PhD Program (I2GP). The I2GP is an 80-semester-hour post-bachelor's program focused on educating future generations of immunological researchers. Coursework includes recent discoveries in immunology and microbial pathogenesis; advanced immuno-oncology (IO); cellular and molecular immunology; selected topics in advanced immunology; methods in biomedical informatics and data science; and professional and ethical issues in biomedical science. Developed with the Department of Microbial Infection and Immunity (MI&I) and the PIIO, the I2GP is directed by **Ken Oestreich, PhD,** associate professor in the Department of MI&I.

Ohio State projects that enrollment will grow from six full-time-equivalent students in the first year to 20 full-time-equivalent students by the beginning of the fourth year. Two slots per year will be dedicated to IO. There will also be space for candidates who are admitted into a principal investigator's laboratory. More than seventy candidates applied to the program in its inaugural year. Eighteen candidates visited Ohio State in February 2023 for dinner with graduate students from other programs, an I2GP information session, faculty interviews, facility tours and a tour of the city for applicants new to Columbus.

PIIO Fourth Annual Symposium

On Nov. 15-16, the PIIO hosted its Fourth Annual IO Symposium at the Grand Event Center at Grandview Yard, Columbus. The symposium theme, "Beyond Checkpoints: A Journey to Expand Horizons of Immuno-Oncology," embodied the PIIO's commitment to accelerate advanced cancer immunotherapies. External speakers and their lecture titles were:

Immunotherapy Targeting the Tumor Site

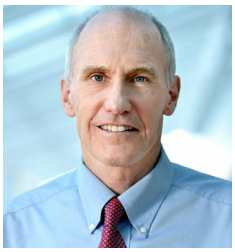
Lieping Chen, MD, PhD
United Technologies Corporation Professor in Cancer Research; Professor of Immunobiology, Dermatology and Medical Oncology; Yale School of Medicine

Integrating Genomics and Computation for Cancer Target and Drug Discovery

Xiaole "Shirley" Liu, PhD
Chief Executive Officer and Co-Founder of GV20 Therapeutics

Co-Opting Tissue Resident Macrophages in Cancer Through Metabolic Reprogramming

Susan Kaech, PhD
Professor and Director, NOMIS Center for Immunobiology and Microbial Pathogenesis; Salk Institute for Biological Studies



Updates With CAR T cells

Carl June, MD
Richard W. Vague Professor in Immunotherapy and Director of the Center for Cellular Immunotherapies, Perelman School of Medicine; Director, Parker Institute for Cancer Immunotherapy, University of Pennsylvania

The **Fourth Annual IO Symposium Poster Session** was held Nov. 15. First, second and third top-scoring posters in each category were:

Postdoc, Residents, Fellows
- First Place: Luciano Mazzoccoli, PhD – Mentor, Bei Liu, MD, MPH
- Second Place: Dr. No-Joon Song, PhD – Mentor, Zihai Li, MD, PhD
- Third Place: Joseph Azar, MD – Mentor, Mark Rubinstein, PhD

Graduate Students
- First Place: Yinchong Wang – Mentor, Anna Vilgelm, MD, PhD
- Second Place: Jianying Li – Mentors, Gang Xin, PhD, and Qin Ma, PhD
- Third Place: Jessica Wedig – Mentor, Thomas Mace, PhD

Undergraduates, Laboratory Staff
- First Place: Pete Jordanides – Mentor, Steve Oghumu, PhD
- Second Place: Nyelia Williams – Mentor, Daniel Spakowicz, PhD
- Third Place: Mikayla Bull – Mentor, Susheela Tridandapani, PhD

Immuno-Oncology Informatics Group (IOIG)

The IOIG has assembled a team of experts in biostatistics, bioinformatics and deep learning to develop computational approaches for novel insights in cancer immunotherapy and to build collaborations around immuno-oncologic single-cell multi-omics, spatial transcriptomics and computational biology. Directed by **Qin Ma, PhD**, and composed of leading faculty from Ohio State's Department of Biomedical Informatics (BMI), the IOIG provides data analytics for flow cytometry and mass cytometry, cytokine and chemokine studies, bulk and single-cell RNA-Seq and ATAC-Seq, bulk ChIP-Seq, T-cell receptor repertoire sequencing, spatial transcriptomics and the mining of publicly available datasets.

The IOIG published 13 papers in 2022. These include publication of scDEAL (single-cell Drug rEsponse AnaLysis), which predicts single-cell drug responses in cancer by integrating single-cell and bulk RNA-seq data using a deep-transfer learning framework (*Nature Communications*); pipelines for single-cell clustering and signature gene identification in Susd2−/− CD8+ T cells (*Nature Immunology* and an awarded NCI-R01); and applying in-house tools to identify sex-biased regulatory mechanisms (*Science Immunology* and an awarded NCI-R01). The IOIG also received a grant from the National Human Genome Research Institute (NHGRI) for spatially resolving transcriptomics experiments, and a fundable score from the NCI for a project identifying IO therapeutic protein targets in glioblastoma that are derived from alternative splicing using genomics and proteomics. In addition, the IOIG had two new hires (with another hire pending) and received 10 terabytes of storage granted by the Ohio Supercomputer Center (OSC).

Qin Ma, PhD
Core leader
Associate Professor
Department of Biomedical Informatics

Dongjun Chung, PhD
Associate Professor
Department of Biomedical Informatics

Brian Searle, PhD
Assistant Professor
Department of Biomedical Informatics

Anjun Ma, PhD
Research Scientist
Department of Biomedical Informatics

Jordan Krull, PhD
Postdoc Fellow
Department of Biomedical Informatics

Hyeongseon (Sammy) Jeon, PhD
Postdoc Fellow
Department of Statistics

Yuzhou Chang
PhD Candidate
Department of Biomedical Informatics

Juan Xie, MS
PhD Candidate
Biostatistics, College of Public Health

RESOURCES

The PIIO Immune Monitoring Discovery Platform, Immuno-Oncology Network (IMDP-ION)

Established with the OSUCCC – James Biospecimen Services Shared Resource (BSSR) and with assistance from the OSUCCC – James Tissue Procurement Service, the IMDP-ION helps researchers monitor post-treatment immune responses to better understand how tumors subvert normal immune regulation and to develop better cancer immunotherapies. The IMDP-ION accelerates human translational IO research through the acquisition, preparation and analysis of malignant, benign and normal fresh human tissue specimens, etc., in a centralized manner that includes high-quality specimen annotation to enhance understanding of clinical outcomes and to facilitate multi-omics-based discovery.

Pelotonia Research Center

The new Pelotonia Research Center, a state-of-the-art facility centered on collaboration and cohesiveness, will become the headquarters for the PIIO in 2023. The five-story facility will be an anchor for the Carmenton innovation district on Ohio State's west campus. At full occupancy, the Pelotonia Research Center will house 18 research neighborhoods, a vivarium and space for shared resources.

Planning for the PIIO's space in the Pelotonia Research Center (PRC) has involved input from PIIO internal and external scientific advisory boards, teams of PIIO members that have prepared research-planning documents, and more than 10 tours for faculty, their lab members and recruits.

The PIIO will be housed on the third floor. Its research neighborhoods will include:

- Systems IO (a systems-wide strategy to study the anticancer immune response holistically to discover the next IO breakthroughs);
- Basic and Clinical IO (focusing on the fundamentals of immune regulation in cancer with the goal of clinical application);
- Cancer Immuno-Microbiome (studying microbiota/immune system interaction relating to cancer);
- The IOIG (developing computational approaches for novel insights in cancer immunotherapy);
- The IMDP (with specialized resources to help researchers predict which patients will respond well to specific immunotherapy drugs based on their individual immune cell characteristics).

The PIIO floor contains nearly 36,000 square feet of programmable space, including three wet lab neighborhoods, a computation lab, core space PI offices, open trainee areas and common meeting space. More than 70 employees will work in this space, with room for additional recruitment.

One aim of the PIIO is to form strategic industry partnerships to develop early-phase first-in-class cancer immunotherapies. The majority of the PIIO faculty members who will occupy the PRC have a depth of experience working with industry to move bench discoveries to bedside therapies.

One example is a partnership with OncoC4, Inc. to advance clinical knowledge of ONC-392, a next-generation anti-CTLA-4 antibody designed to mediate antitumor efficacy without the toxicities typically associated with anti-CTLA-4 antibodies. This partnership is part of a clinical trial that was recently fast-tracked by the FDA. PIIO members look forward to being in the center of a facility built to accelerate discovery through collaboration.

PIIO SCORECARD

108
Members

$36M+
Annual funding
($18M from NCI)

834
Publications in peer-reviewed journals, 2019-2022

87
Human clinical trials underway in IO

53 & 32
Patents Technologies
disclosed, 2019-2022

One vision
To work toward cancer cures by advancing IO

Thank you!

To learn more about the PIIO, visit
cancer.osu.edu/PIIO

To learn more about Ohio State's cancer program, visit
cancer.osu.edu

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soundcloud.com/thejamescancerfreeworld

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The James

The Ohio State University
COMPREHENSIVE CANCER CENTER