AACR American Association for Cancer Research®

ANNUAL MEETING 2025 CHICAGO

APRIL 25–30

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#AACR25

The Human Tumor Atlas Network:

Charting Tumor Transitions Across Space and Time

Session Title: Resources from the NCI-Sponsored Human Tumor Atlas Network

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National Institutes of Health (NIH)
Bethesda, Maryland

Disclosure Information

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Sharmistha Ghosh-Janjigian

I have no financial relationships to disclose.

The NCI Human Tumor Atlas Network (HTAN)*

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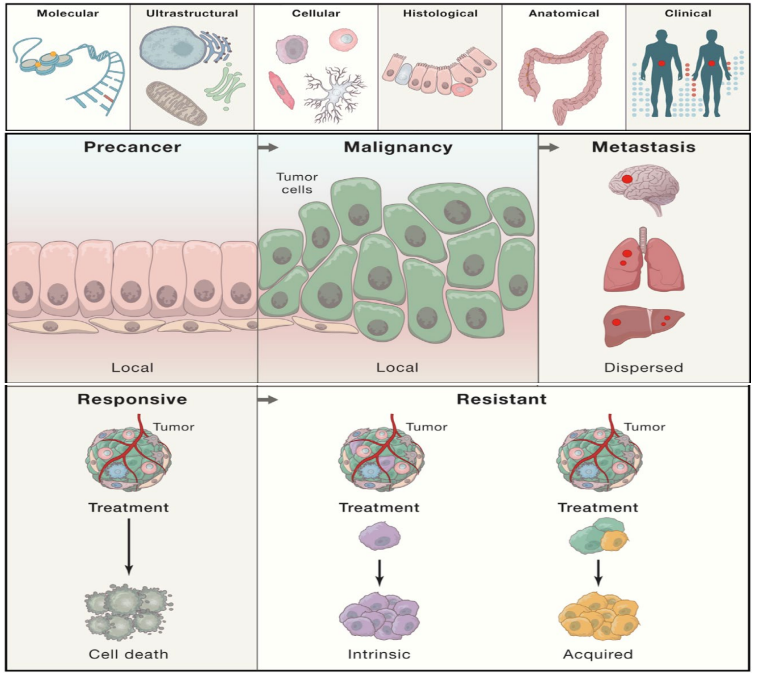
Overarching program goal: Construct dynamic 2D and 3D atlases of human cancers

- ***Integrate*** molecular, cellular, and tumor tissue composition and architecture, including the microenvironment and immune milieu
- Describe ***transitions during cancer****:* pre-malignant lesions to malignancy, locally invasive to metastatic cancer
- Enable ***predictive modeling*** to refine detection and therapeutic choices

*HTAN Phase 1: 2018–2024
*HTAN Phase 2: Launched in Fall 2024



HTAN Marker Paper, Cell 2020: https://doi.org/10.1016/j.cell.2020.03.053

Tumor Atlases: Facilitating an Era of Precision Medicine

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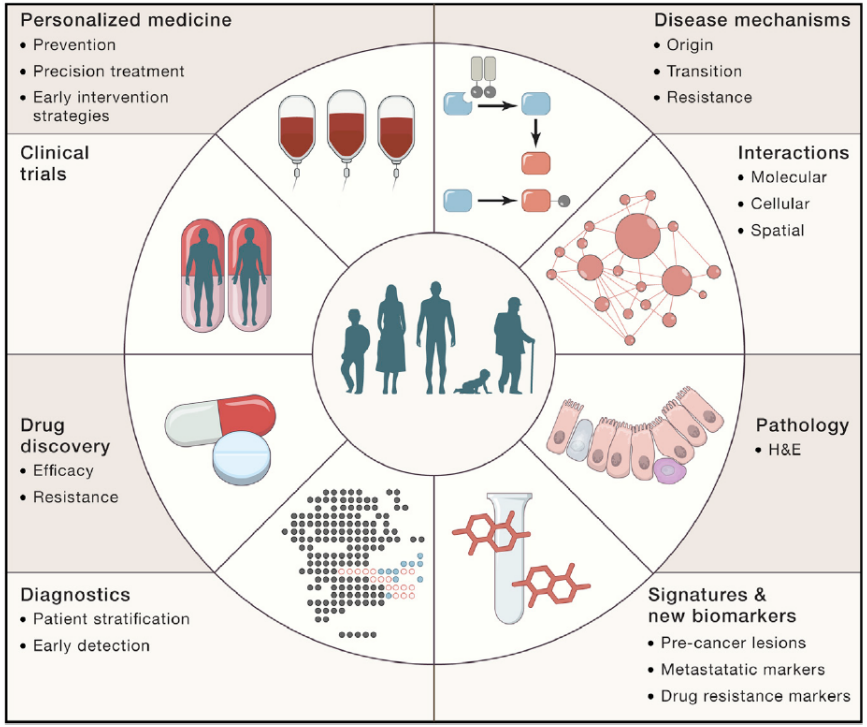

HTAN Marker Paper, Cell 2020: https://doi.org/10.1016/j.cell.2020.03.053

HTAN Principles

- **Community Resource** – create a community resource that catalyzes cancer research across disciplines
- **Complementary Approaches** – strengths and weaknesses will be discovered as a Network; expect to work together
- **Open Communication** – accelerate science by breaking down walls; strive towards interoperability
- **Data and Resource Sharing** – requirement for success; expect aggressive public data/resource release timelines

Multimodal and Spatial Atlases

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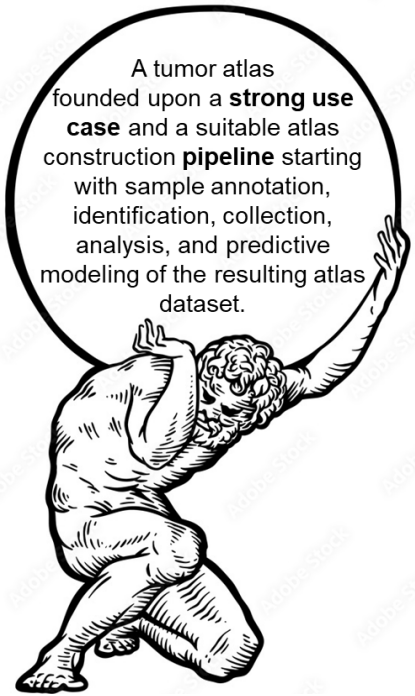

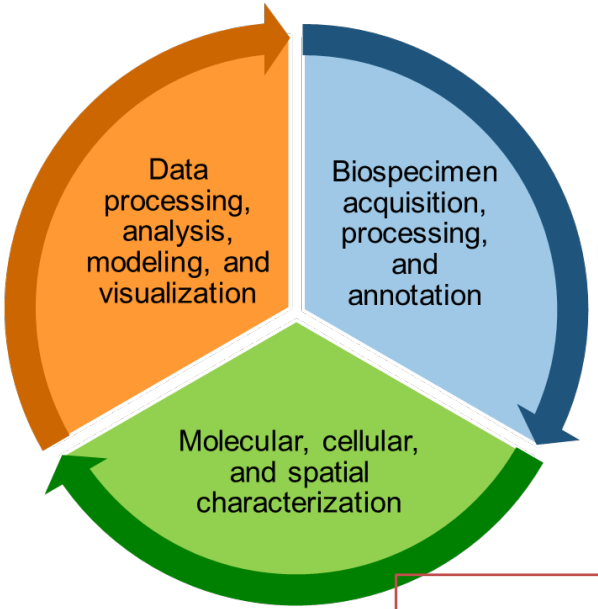

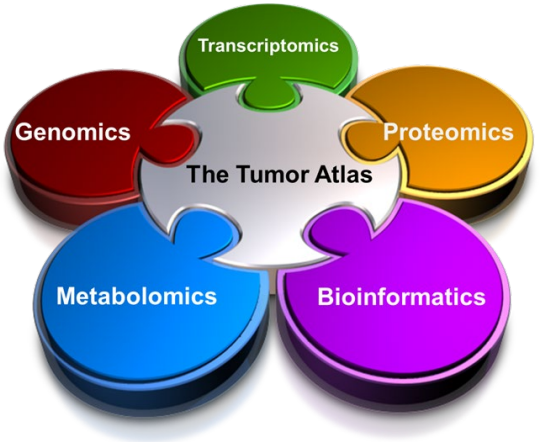

Steering Committee

HTAN Components:

- 5 Precancer Atlas Research Centers (PCA)
- 5 Human Tumor Atlas Research Centers (HTA)
- Data Coordinating Center (DCC)

HTAN Phase 1 Tumor Types (2018–2024)

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LUNG

Avrum Spira and Steven Dubinett
Boston Univerity and University of California Los Angeles

Dana Pe'er and Christine Icabuzio-Donahue
Memorial Sloan Kettering Cancer Center

Molecular and Cellular Characterization of Screen Detected Lesions (MCL) Consortium Pre-Cancr Atlas Pilot

PANCREAS

Dana Pe'er and Christine Icabuzio-Donahue
Memorial Sloan Kettering Cancer Center

MCL Consortium Pre-Cancr Atlas Pilot

Li Ding, Ryan Fields, William Gillanders and Samuel Achilefu
Washington University in St. Louis

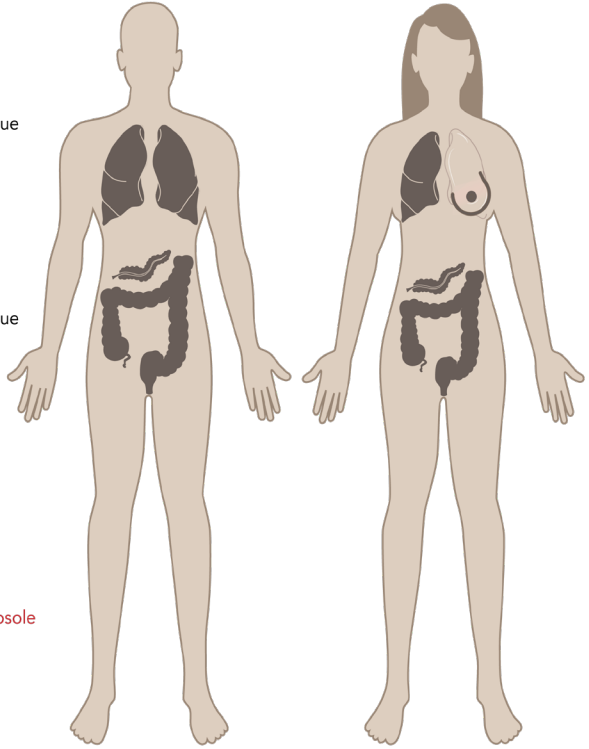
COLON

Michael Snyder and James Ford
Stanford University

Robert Coffey, Ken Lau and Martha Shrubsole
Vanderilt University

Bruce Johnson and Aviv Regev
Dana-Farber Cancer Institute and Broad Institute

FNLCR and Broad Institute
Tumor Atlas Pilot



BREAST

Shelley Hwang, Carlo Maley and Robert West
Duke University, Arizona State University and Stanford University

Joe Gray, Gordon Mills, Jeremy Goecks and George Thomas
Oregon Health and Science University

Bruce Johnson and Aviv Regev
Dana-Farber Cancer Institute and Broad Institute

Li Ding, Ryan Fields, William Gillanders and Samuel Achilefu
Washington University in St. Louis

Frederick National Laboratory for Cancer Research (FNLCR) and Broad Institute Tumor Atlas Pilot

MCL Consortium Pre-Cancr Atlas Pilot

SKIN

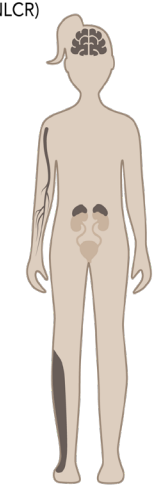
Peter Sorger, Sandro Santagata an Jon Aster
Harvard University and Brigham and Women's Hospital

Bruce Johnson and Aviv Regev
Dana-Farber Cancer Institute and Broad Institute

PEDIATRIC

FNLCR and Broad Institute
Tumor Atlas Pilot
glioma / neuroblastoma / sarcoma

Kai Tan and Stephen Hunger
Children's Hospital of Philadelphia
glioma / neuroblastoma /
very high risk acute lymphoblastic leukemia



HTAN Phase 2 Tumor Types (Launched in Fall 2024)

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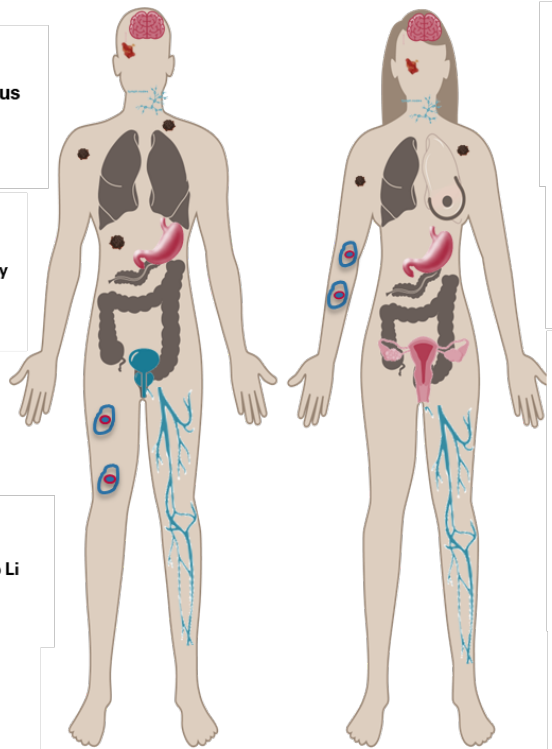
SKIN
Melanoma and Cutaneous Squamous Cell Carcinoma
Alan Shain, Boris Bastian and Iwei Yeh
University of California, San Francisco

PANCREAS
Rosalie Sears, Elana Fertig, Jonathan Brody and Laura Wood
Oregon Health & Science University

BRAIN
Long Cai, Richard Everson, Matthew Thomson and Barbara Wold
California Institute of Technology

GASTRIC
Linghua Wang, Tae Hyun Hwang, Mingyao Li and Paul Mansfield
MD Anderson

MYELOMA
Irene Ghobrial
Dana Farber Cancer Institute



PROSTATE
Li Ding, Feng Chen, Eric Kim and Russell Pachynski
Washington University in St. Louis

COLON
Ken Lau and Jeffery Spraggins
Vanderbilt University

OVARY
Samuel Mok, Michael Birrer and Sammy Ferri-Borgogno
MD Anderson

LYMPHOMA
Rong Fan, Stephanie Halene, Zongming Ma and Mina Xu
Yale University

PEDIATRIC SOLID TUMORS
Rhabdomyosarcoma, Neuroblastoma and Wilms Tumor
Shahab Asgharzadeh, James Amatruda and Long Cai
University of California, Los Angeles

https://data.humantumoratlas.org/

Interconnectivity Within HTAN

HTAN Phase 1 Collaborative Projects

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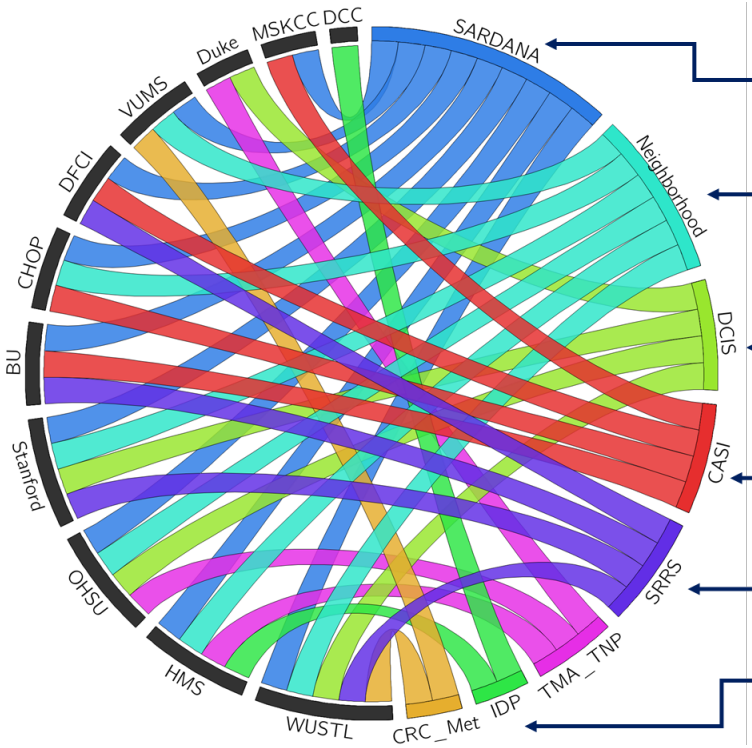


Comparing imaging modalities across HTAN

What defines a "Cell Neighborhood"?

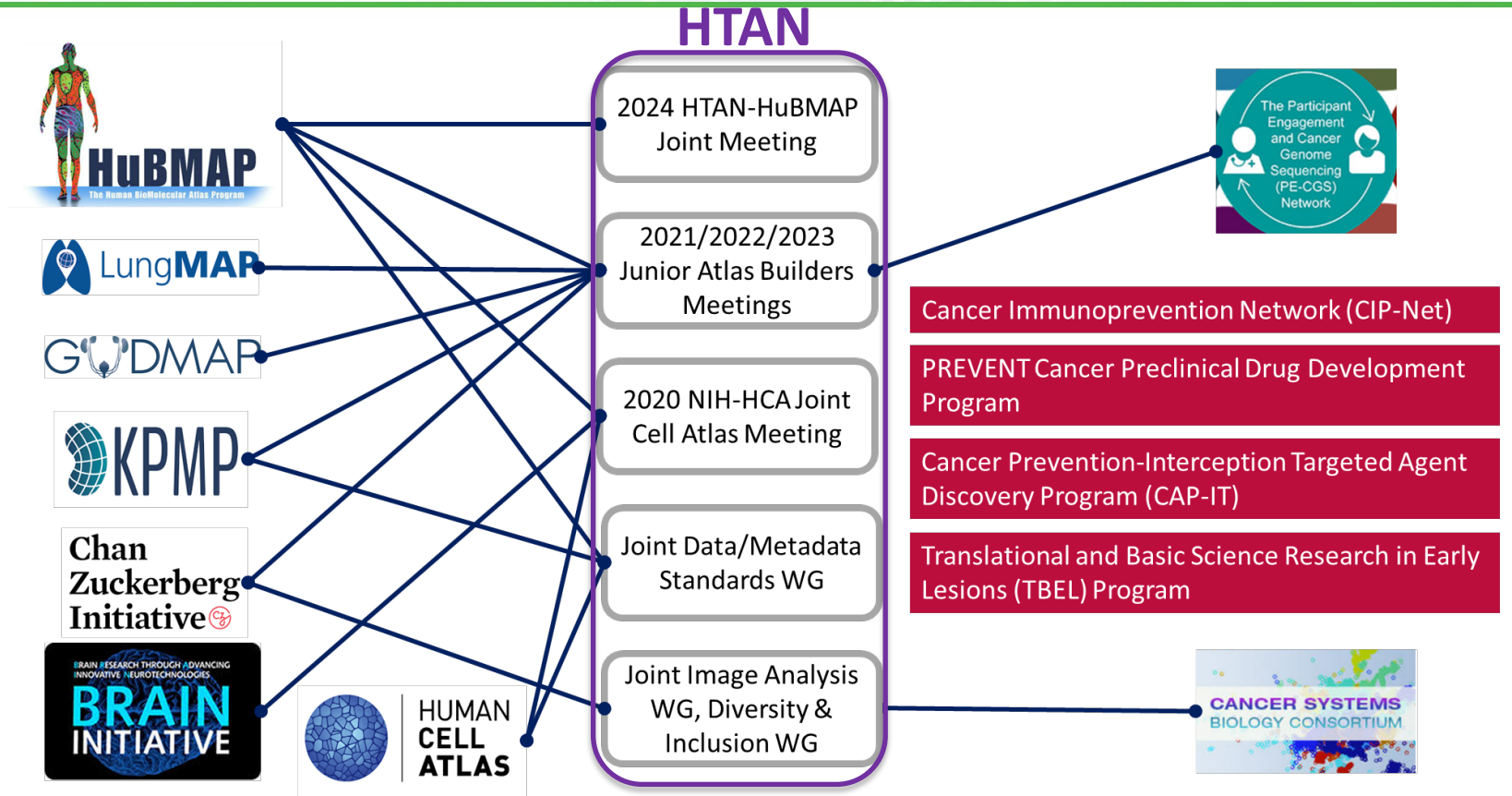
Optimizing assays for small lesions

Standards for immune cell identification

Adding information about social determinants of health

Creating resources for sharing highly multiplexed HTAN imaging data

Interconnectivity Across Community



HTAN Data Jamborees

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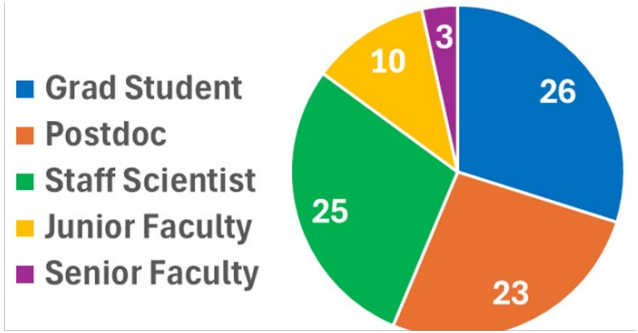
- Virtual HTAN Jamboree, Dec 2023, and In-Person HTAN Jamboree, Nov 2024
  - ~200 total participant applications
  - ~30 total project pitch submissions

- 87 participants were selected to work on 12 projects, each addressing a specific scientific question or technical challenge using available HTAN data
  - Promote access and reuse of HTAN data
  - Promote collaborations to expand the HTAN community
  - Promote development of new methods and tools for HTAN data analysis
  - Identify gaps and limitations of existing HTAN data and resources



November 2024 Data Jamboree Participants

HTAN Associate Membership

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- Associate Members are expected to contribute to HTAN by:
  - generating, sharing or analyzing data;
  - jointly developing software or algorithms;
  - developing mutually beneficial resources, protocols or reagents;
  - and/or coordinating development of standards, formats or metadata.
- Applications for Associate Membership require:
  - a letter of support from a current HTAN member;
  - a recent biosketch;
  - a letter of intent from the applicant describing their planned contributions to HTAN.
- Associate Members are encouraged to actively engage in HTAN activities
- Associate Member must abide by all HTAN policies

HTAN *Nature* Bundle

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Watch accompanying webcast that explored:

Li Ding, PhD, WashU

Shannon Hughes, PhD NCI

Ken S. Lau, PhD Vanderbilt

Michael Snyder, PhD Stanford

Alexia-Ileana Zaromytidou, PhD (Moderator)

- The history of HTAN
- The goals of assembling cancer atlases
- Functioning of a successful multi-institution consortium
- In numbers: HTAN's scope and scale
- The power of spatial technologies
- Applying evolutionary principles in cancer research
- The importance of understanding the cancer microenvironment
- How you can use HTAN's resources for your own research
- The future of the field

Thank You