My research interests are focused on developing novel methods for detecting, monitoring, and treating hematologic malignancies; particularly non-Hodgkin lymphomas (NHLs). I aim to create tools to rapidly detect and quantify tumors and their response to chemotherapy and immunotherapy, thereby enabling personalized therapies. Toward this end, I utilize tools from a wide range of disciplines, including bioengineering, computational biology, and medical oncology. I previously implemented high-throughput sequencing of the immunoglobulin genes from plasma cell-free DNA for detection of diffuse large B cell and follicular lymphomas (DLBCL and FL), the two most common types of lymphoma. This work demonstrated the superior efficacy of this assay from cell-free DNA as compared to circulating white blood cells, and has led to its translation to the clinic. Recently, I have implemented targeted next-generation sequencing for ultra-sensitive detection of circulating tumor DNA utilizing Cancer Personalized Profiling by Deep Sequencing, or CAPP-Seq, for use in NHLs. This work has led to a number of important applications in the field, including early detection of disease relapse, non-invasive genotyping of tumors, and detection of transformation of follicular lymphoma into DLBCL.
CURRENT RESEARCH AND SCHOLARLY INTERESTS

Implementation of noninvasive detection of malignancies in the clinic remains difficult due to both technical and clinical challenges. These include necessary improvements in sensitivity and specificity of biomarkers, as well as demonstration of clinical utility of these assays. My research focuses on technical development and implementation of assays to detect and track cancers in order to facilitate personalized disease management. This includes development of methods to detect non-Hodgkin lymphoma through circulating tumor DNA (ctDNA), as well as defining the clinical utility of this assay. My current research is focused on utilizing ctDNA to answer clinically relevant questions, enabling personalized treatment paradigms.

Publications

PUBLICATIONS

• Dynamic Risk Profiling Using Serial Tumor Biomarkers for Personalized Outcome Prediction. *Cell*
  2019

• Reply to J. Wang et al. *Journal of clinical oncology: official journal of the American Society of Clinical Oncology*
  2019: JCO1801907

• Lymphoma Virome Dynamics Revealed By Cell-Free DNA Sequencing
  AMER SOC HEMATOLOGY.2018

• Distinct Chromatin Accessibility Profiles of Lymphoma Subtypes Revealed By Targeted Cell Free DNA Profiling
  AMER SOC HEMATOLOGY.2018

• Noninvasive Genotyping and Monitoring of Classical Hodgkin Lymphoma
  AMER SOC HEMATOLOGY.2018

• Circulating Tumor DNA Measurements As Early Outcome Predictors in Diffuse Large B-Cell Lymphoma. *Journal of clinical oncology: official journal of the American Society of Clinical Oncology*
  2018: JCO2018785246

• Early detection of molecular residual disease in localized lung cancer by circulating tumor DNA profiling. *Cancer discovery*
  2017

• High-throughput sequencing for noninvasive disease detection in hematologic malignancies. *Blood*
  Scherer, F., Kurtz, D. M., Diehn, M., Alizadeh, A. A.
  2017; 130 (4): 440–52
- Molecular profiling of single circulating tumor cells from lung cancer patients. *Proceedings of the National Academy of Sciences of the United States of America*
  2016; 113 (52): E8379-E8386

- Distinct biological subtypes and patterns of genome evolution in lymphoma revealed by circulating tumor DNA. *Science Translational Medicine*
  2016; 8 (364)

- Circulating tumour DNA profiling reveals heterogeneity of EGFR inhibitor resistance mechanisms in lung cancer patients. *Nature Communications*
  2016; 7

- Integrated digital error suppression for improved detection of circulating tumor DNA. *Nature Biotechnology*
  2016; 34 (5): 547-555

- Organocatalytic removal of formaldehyde adducts from RNA and DNA bases. *Nature Chemistry*
  2015; 7 (9): 752-758

- Organocatalytic removal of formaldehyde adducts from RNA and DNA bases. *Nature Chemistry*
  2015; 7 (9): 752-758

- Next-generation surveillance strategies for patients with lymphoma. *Future Oncology*
  Cohen, J. B., Kurtz, D. M., Staton, A. D., Flowers, C. R.

- Noninvasive monitoring of diffuse large B-cell lymphoma by immunoglobulin high-throughput sequencing. *Blood*
  2015; 125 (24): 3679-3687

- Tracking Cellular and Immune Therapies in Cancer. *Emerging Applications of Molecular Imaging to Oncology*
  Kurtz, D. M., Gambhir, S. S.
  2014; 124: 257-296

- Tracking cellular and immune therapies in cancer. *Advances in Cancer Research*
  Kurtz, D. M., Gambhir, S. S.
  2014; 124: 257-296