



# Symposium

Jonathan Kraft Prize for Excellence in Cancer Research  
*Presented by the Massachusetts General Hospital Cancer Center*

Keynote Speaker/Prize Recipient

**Aviv Regev, PhD**

*Head, Genentech Research and Early Development  
Core member (on leave), Broad Institute of MIT and Harvard  
Professor of Biology (on leave), MIT*

**Cell Atlases as Roadmaps to  
Understand and Treat Cancer**

**Thursday, November 4, 2021  
1:00pm – 5:00pm**

Symposium Speakers

**Fei Chen, PhD**

*Broad Institute of MIT & Harvard*

**Mario L. Suvà, MD, PhD**

*Massachusetts General Hospital*

**Caroline Uhler, PhD**

*Massachusetts Institute of Technology*

**Alexandra-Chloé Villani, PhD**

*Massachusetts General Hospital*

Register in advance for this Virtual Symposium:

[https://partners.zoom.us/webinar/register/WN\\_hLTAcSa7TZCnt6pGClRr\\_g](https://partners.zoom.us/webinar/register/WN_hLTAcSa7TZCnt6pGClRr_g)

Visit [www.massgeneral.org/kraftsymposium](http://www.massgeneral.org/kraftsymposium) for additional information.

**Questions?** Contact: Sophia Sid | [ssid@mgh.harvard.edu](mailto:ssid@mgh.harvard.edu) | 617.726.6015

# Jonathan Kraft Award for Excellence in Cancer Research

Since 2006, the MGH Center for Cancer Research has annually honored a luminary in the field - an extraordinary scientist, who has made major advances in our understanding of cancer and its treatment, and has been recognized as a true mentor by teaching and inspiring the next generation of cancer researchers. This year, the 2021 Kraft Award will be presented to Aviv Regev, PhD, Head of Genentech Research and Early Development, for her groundbreaking work in cancer heterogeneity and single cell genomics. Previous recipients of the MGH Award in Cancer Research (preceding the endowment of this award in honor of Jonathan Kraft) include: Drs. Anton Berns, Joan Massague, Titia de Lange, Bert Vogelstein, Charles Sawyers, Michael Stratton, Craig Thompson, James Allison, and Hans Clevers. In 2015, Dr. David Allis was the first recipient of the named Jonathan Kraft Award. In subsequent years, the Award has been given to Drs. Joan Steitz, Kevan Shokat, Charles Swanton, and Carl June.

## Keynote Speaker/Prize Recipient

### **Aviv Regev, PhD**

*Head, Genentech Research and Early Development*

*Core member (on leave), Broad Institute of MIT and Harvard*

*Professor of Biology (on leave), MIT*

## Symposium Speakers

### **Fei Chen, PhD**

*Assistant Professor, Harvard Department of Stem Cell and Regenerative Biology*

*Core member, Broad Institute of MIT & Harvard*

### **Mario L. Suvà, MD, PhD**

*Massachusetts General Hospital Cancer Center and Harvard Medical School*

*Institute Member, Broad Institute of MIT & Harvard*

### **Caroline Uhler, PhD**

*Associate Professor, Department of Electrical Engineering and Computer Science and the Institute for Data, Systems, and Society, Massachusetts Institute of Technology*

*Co-Director, Eric and Wendy Schmidt Center, Broad Institute of MIT & Harvard*

### **Alexandra-Chloé Villani, PhD**

*Assistant Professor of Medicine Massachusetts General Hospital Cancer Center, Center for Immunology & Inflammatory Diseases, Broad Institute, and Harvard Medical School*

## Thursday, November 4, 2021 AGENDA

- 1:00 pm **Welcome and opening remarks**  
Daniel A. Haber, MD, PhD  
*Director, Mass General Cancer Center*
- Introductions**  
Nir Hacohen, PhD  
*Director, Center for Cancer Immunology,  
Mass General Cancer Center*
- 1:10 pm **"Next generation tools for tissue genomics"**  
Fei Chen, PhD  
*Assistant Professor, Department of Stem Cell &  
Regenerative Biology, Harvard University*
- 1:40 pm **"Dissecting the biology of gliomas by single-cell genomics"**  
Mario L. Suvà, MD, PhD  
*Associate Professor of Pathology  
Massachusetts General Hospital Cancer Center and  
Harvard Medical School  
Institute Member, Broad Institute of MIT & Harvard*
- 2:10 pm **Break**
- 2:30 pm **"Causal inference in the light of drug repurposing for COVID-19"**  
Caroline Uhler, PhD  
*Henry L. and Grace Doherty Associate Professor  
Dept. of Electrical Engineering and Computer Science  
Massachusetts Institute of Technology*
- 3:00 pm **"Unraveling the underpinnings of irAEs to immune checkpoint inhibitor therapy through the lenses of single-cell genomics"**  
Alexandra-Chloé Villani, PhD  
*Assistant Professor of Medicine, Massachusetts General  
Hospital Cancer Center, Center for Immunology & Inflammatory  
Diseases, Broad Institute, and Harvard Medical School*
- 3:30 pm **Break**
- 3:50 pm **Keynote Speaker Introduction & Prize Presentation**  
Daniel A. Haber, MD, PhD
- 4:00 pm **Keynote Address:**  
**"Cell atlases as roadmaps to understand and treat cancer"**  
Aviv Regev, PhD  
*Head, Genentech Research and Early Development  
Core member (on leave), Broad Institute of MIT and Harvard  
Professor of Biology (on leave), MIT*

## Keynote Speaker/Prize Recipient



### Aviv Regev, PhD

*Head, Genentech Research and Early Development*

*Core member (on leave), Broad Institute of MIT and Harvard*

*Professor of Biology (on leave), MIT*

### Biography:

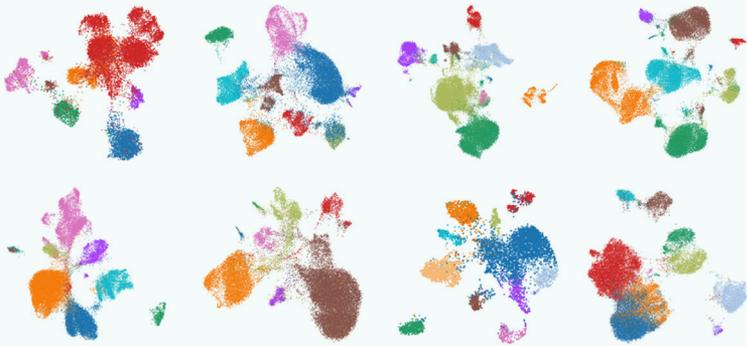
Dr. Aviv Regev is a computational and systems biologist, a pioneer in single-cell genomics, and leading expert on how to combine computational algorithms, biological experiments and patient data to discover new mechanisms in cells and tissues in health and disease. As Global Head and Executive Vice President, Genentech Research and Early Development (gRED), she is responsible for the management of all aspects of Genentech's drug discovery and drug development activities. She is a member of the expanded Corporate Executive Committee for Roche.

Prior to Genentech, Regev served as Chair of the Faculty, Core Institute Member (now on leave), and founding director of the Klarman Cell Observatory, as well as Professor of Biology at MIT (now on leave) and Investigator at the Howard Hughes Medical Institute. She is a founding co-chair of the Human Cell Atlas.

Dr. Regev has a PhD in computational biology and a Master of Science from Tel Aviv University. She is a member of the National Academy of Sciences and National Academy of Medicine, and a Fellow of the International Society of Computational Biology and of the American Association for Cancer Research (AACR).

### Research Overview:

The Regev lab develops and applies genomic and computational approaches to the study of cells, their intracellular circuits and their interactions in tissues, in both health and disease. Dr. Regev's group has been a pioneer and leader in the development and application of experimental and computational methods for single-cell genomics, especially single cell RNA-seq, for combining perturbations with single-cell RNA-seq for complex combinatorial screens and dissection of cell circuits and tissues and for developing key algorithms to glean biological insight from such data.



*Cross tissue atlas of 8 human tissues maps gene expression patterns of individual cell types in tissues across the human body.*

Dr. Regev demonstrated the power of these approaches to build revealing “cell atlases” in multiple seminal studies, showing single-cell genomics can recover cell types, transitions between them, their development, location, and the gene and molecular programs that govern these behaviors. She led the application of this approach to yield important insights into systems including innate and adaptive immune cell responses, cancer, autoimmunity and inflammatory disease, neuroscience, and COVID-19.

In particular, Dr. Regev is a pioneer of the study of tumor ecosystems through scRNA-Seq, and built a community that helped initiate the Cancer Moonshot’s Human Tumor Atlas Network. Her first study, a collaboration with MGH scientists on glioblastoma (GBM), showed that single-cell gene expression data allowed the inference of cancer cells functional and genetic state, and identification of key gene programs. Further studies with these collaborators showed general principles of tumor organization and origin across different gliomas. Dr. Regev and colleagues also mapped the first full ecosystem of a solid tumor, melanoma, by scRNA-seq, and later discovered an intrinsic malignant program controlled that underlies and predicts resistance to checkpoint immunotherapy, that can be reverted by combination therapy.

Through these and other studies, Dr. Regev’s work has ushered in the era of single cell and spatial genomics, using high resolution and massively parallel lab methods and computational algorithms to provide an unprecedented view of biology in health and disease.

## Speakers



### Fei Chen, PhD

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Dr. Fei Chen is currently an Assistant Professor at the Harvard Department of Stem Cell and Regenerative Biology, and a Core Faculty member at the Broad Institute.

At Harvard and as a Core Member of the Broad Institute, Dr. Chen's laboratory sets out to build a set of tools which will bridge single-cell genomics with space and time - to enable discoveries of where cell types are localized within intact

tissues, when relevant transcriptional modules are active. To do this, the lab is developing novel technologies at the intersection of microscopy, genomics, and synthetic biology.

The lab is applying these tools to learn organizational principles governing development, and cellular mechanisms of disorganization during injury and disease.

Dr. Chen obtained his Ph.D. in biological engineering from the Massachusetts Institute of Technology, and was a Schmidt Fellow at the Broad Institute. His awards include the National Institutes of Health Director's Early Independence Award and the Allen Distinguished Investigator Award.



### Mario L. Suvà, MD, PhD

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Dr. Mario L. Suvà is an Associate Professor in the Department of Pathology and the Center for Cancer Research at MGH and an Institute Member at the Broad Institute of MIT & Harvard. His expertise is in neuro-oncology and single-cell genomics.

Dr. Suvà obtained his MD and PhD in Lausanne, Switzerland, studying cancer stem cells in gliomas and sarcomas. He did his post-doctoral research at MGH with Brad Bernstein, applying chromatin analysis and functional approaches to identify master regulators of glioma stem cell programs. Dr. Suvà's laboratory focuses on diffuse gliomas in adults and children. A particular effort of the laboratory is on dissecting the heterogeneity of patient tumors and relating transcriptional and genetic programs of individual cancer cells. Dr. Suvà directed pioneering studies characterizing glioblastoma, oligodendroglioma, astrocytoma and pediatric gliomas with single-cell genomic technologies, shedding light on tumor heterogeneity, tumor classification, glioma cell lineages, cancer stem cell programs, tumor evolution and the composition of the tumor microenvironment.

## Speakers



### Caroline Uhler, PhD

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Dr. Caroline Uhler co-directs the newly-launched Eric and Wendy Schmidt Center at the Broad Institute and is an Associate Professor in the Department of Electrical Engineering and Computer Science and the Institute for Data, Systems, and Society at MIT. She holds an MSc in mathematics, a BSc in biology, and an MEd all from the University of Zurich. She obtained her PhD in statistics from UC Berkeley in 2011 and then spent three years as an Assistant Professor at IST Austria before joining MIT in 2015. She is a Simons Investigator, a Sloan Research Fellow, and an elected member of the International Statistical Institute. In addition, she received an NSF Career Award, a Sofja Kovalevskaja Award from the Humboldt Foundation, and a START Award from the Austrian Science Foundation. Her research lies at the intersection of machine learning, statistics, and genomics, with a particular focus on causal inference and gene regulation.



### Alexandra-Chloé Villani, PhD

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Dr. Alexandra-Chloé Villani is a Principal Investigator at the MGH Cancer Center and the Center for Immunology and Inflammatory Diseases, where she is the Director of the Single Cell Genomics Research Program. She is an Assistant Professor of Medicine at Harvard Medical School and an Associate Member of the Broad Institute. She received her Ph.D. in Experimental Medicine from McGill University and her postdoctoral training at the Broad Institute. Her laboratory aims at achieving a higher resolution definition and characterization of cellular subsets and rules governing human immune response regulation to decipher how immunity is dysregulated in diseases. They are using single-cell 'multi-omics' strategies, unbiased systems immunology approaches, and integrative computational frameworks to model the immune system as a function of "healthy" and inflammatory states, disease progression, and response to treatment, with the ultimate goal of developing a comprehensive human immune lexicon that is key to promoting bench-to-bedside translation of findings.

## Previous Award Recipients

### Jonathan Kraft Award for Excellence in Cancer Research

- 2019** Carl June, MD  
*Richard W. Vague Professor in immunotherapy  
Director, Center for Cellular Immunotherapies, Perelman School of Medicine, University of Pennsylvania*
- 2018** Charles Swanton, MD, PhD  
*The Francis Crick Institute  
Chair, Personalized Cancer Medicine, UCL Hospitals Cancer Research UK  
Lung Cancer Centre of Excellence*
- 2017** Kevin M. Shokat, PhD  
*Professor, Department of Cellular and Molecular Pharmacology  
University of California, San Francisco*
- 2016** Joan A. Steitz, PhD  
*Sterling Professor of Molecular Biophysics and Biochemistry  
Yale School of Medicine*
- 2015** C. David Allis, MD, PhD  
*Joy and Jack Fishman Professor, Laboratory of Chromatin Biology and Epigenetics  
Rockefeller University*

### The Annual MGH Award in Cancer Research *In memory of Nathan and Grace Shiff*

- 2014** Hans Clevers, MD, PhD  
*President of the Royal Netherlands Academy of Arts and Sciences  
Professor of Molecular Genetics  
University Utrecht, Netherlands*
- 2013** James Allison, PhD  
*Chair, Department of Immunology  
MD Anderson Cancer Center, Houston, TX*
- 2012** Craig Thompson, MD  
*President and Chief Executive Officer  
Memorial Sloan-Kettering Cancer Center, New York*
- 2011** Michael Stratton, MD, FRS  
*Director, Wellcome Trust Sanger Institute, Cambridge, UK*
- 2010** Charles Sawyers, MD  
*Chairman of the Human Oncology and Pathogenesis Program  
Memorial Sloan-Kettering Cancer Center, New York*
- 2009** Bert Vogelstein, MD  
*Director of the Ludwig Center for Cancer Genetics & Therapeutics  
Sidney Kimmel Comprehensive Cancer Center  
Johns Hopkins University, Maryland*
- 2008** Titia de Lange, PhD  
*Associate Director of the Anderson Cancer Center, Rockefeller University, New York*
- 2007** Joan Massague, PhD  
*Chairman of the Cancer Biology and Genetics Program  
Memorial Sloan-Kettering Cancer Center, New York*
- 2006** Anton Berns, PhD  
*Director of Research and Chairman of the Board of Directors, Netherlands Cancer Institute and Antoni van Leeuwenhoek Hospital, The Netherlands*



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