

## Ludwig Center for Molecular Oncology at MIT: Updates 2019

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The **Ludwig Center for Molecular Oncology at MIT** is focused on understanding and addressing the processes associated with malignant progression, specifically the mechanisms that allow cancer cells originating in primary tumors to disseminate and ultimately form metastatic colonies. This multi-step process involves a series of cell-biological and biochemical changes in malignant cells, which are being investigated at several levels. Our research includes identifying and characterizing the biological determinants that allow disseminated cancer cells to gain a foothold in foreign tissue microenvironments, and then to succeed in spawning rapidly growing metastatic colonies.

The **Ludwig Center for Molecular Oncology at MIT** supports the research of 11 faculty members whose work focuses on the critical problems of cancer progression and metastasis. These include Drs. Robert Weinberg and Tyler Jacks, who serve as co-directors of the Center, as well as Drs. Angelika Amon, Sangeeta Bhatia, Frank Gertler, Michael Hemann, Richard Hynes, Jacqueline Lees, Scott Manalis, Aviv Regev, and Matthew Vander Heiden. Leaders in their field, Center faculty members regularly receive national and international recognition for their research.

The work of Ludwig Center members, and their laboratories, is greatly enhanced by the shared sense of mission and community fostered by a program of regular engagement and support from Center colleagues, administrators, and research and financial resources. The impact of Ludwig Center support can be seen most notably in the research productivity of Center members. Programmatic highlights, along with research publications and expenditures, are outlined below.

Highlights of faculty awards and honors received by Ludwig Center members over the past year:

Name	Awards and Honors
Angelika Amon	Received the Vilcek Prize in Biomedical Science (2019) and was added to the Carnegie Corporation <i>Great Immigrants</i> , <i>Great Americans</i> List
Sangeeta Bhatia	Inducted into the National Academy of Medicine; received the Othmer Gold Medal, Science History Institute
Aviv Regev	Inducted into the National Academy of Sciences

Highlights from Center activities over the past year:

- The annual **Ludwig Center Retreat** was held at MIT's Endicott House on May 7, 2019. This event is an outstanding opportunity for Ludwig Center faculty and researchers to share updates, shape future directions for their labs and the Center, and explore opportunities for collaborations through scientific presentations and a poster session; 76 faculty and researchers were in attendance.
- **Ludwig Center Principal Investigators** meet on a quarterly basis to discuss ongoing research. Investigators, and their trainees, benefit from multiple additional opportunities to discuss Ludwig-supported research, including weekly "floor meetings" and "Friday Focus" seminars.

- **Ludwig Graduate Fellowships** were awarded to two graduate students.

Name	Project Title
<b>Theresa Hwang</b>	“Proteomic screening to functionally differentiate and inhibit the Ena/VASP family”
<b>Catherine Henry</b>	“Targeting FOXA1 to modulate chromatin accessibility and transcriptional reprogramming in metastatic cancer”

- **Ludwig Center Postdoctoral Fellowships** were awarded to eight postdoctoral associates.

Name	Project Title
<b>Jonathan Braverman</b>	“Examining the role of ammonia metabolism in stem cells and metastatic colon cancer”
<b>Brice Curtin</b>	“Targeting Myc-dependent human cancers through development of next generation small molecule Max homodimer stabilizers”
<b>Banu Eskiocak</b>	“Delineating the role of natural killer cells during lung cancer progression and metastasis”
<b>Sonia Iyer</b>	“Inherent and dynamic changes in the tumor microenvironment of high-grade serous ovarian genetic subtypes”
<b>Lu Xueguang</b>	“Single injection drug delivery system for cancer therapy”
<b>Enrico Moiso</b>	“Identification of rare metastatic cell states in cholangiocarcinoma and other tumors”
<b>Alina Starchenko</b>	“Construction and validation of a single cell RNAseq-based metastasis fingerprint to study immune cell contributions to invasion in colorectal cancer”
<b>Zhengpeng Wen</b>	“Development of long-term physiologic metastasis models with blood and lymphatic vessels”

## Publications

The most important highlight to report is always the research that comes from Ludwig Center members, as demonstrated in the following publications since our last update:

Alspach E, Lussier DM, Miceli AP, Kizhvatov I, DuPage M, Luoma AM, Meng W, Lichti CF, Esaulova E, Vomund AN, Runci D, Ward JP, Gubin MM, Medrano RFV, Arthur CD, White JM, Sheehan KCF, Chen A, Wucherpennig KW, **Jacks T**, Unanue ER, Artyomov MN, Schreiber RD. MHC-II neoantigens shape tumour immunity and response to immunotherapy. *Nature*, 574:696-701, 2019. PMID31645760; PMC6858572; 10.1038/s41586-019-1671-8

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### Expenditures

Use of **Ludwig Center for Molecular Oncology at MIT** funds is focused on direct support for faculty research, which includes not only funding for investigators, but also research services provided through the Koch Institute's Robert A. Swanson (1969) Biotechnology Center Core Facilities, pilot project awards to support novel research efforts, and fellowships for graduate students and postdoctoral associates. Support for the Ludwig Center in fiscal year (FY) 2019 was appropriated as indicated in the chart below.

