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Memorial Sloan Kettering
Cancer Center

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CANCER BIOLOGY & GENETICS PROGRAM

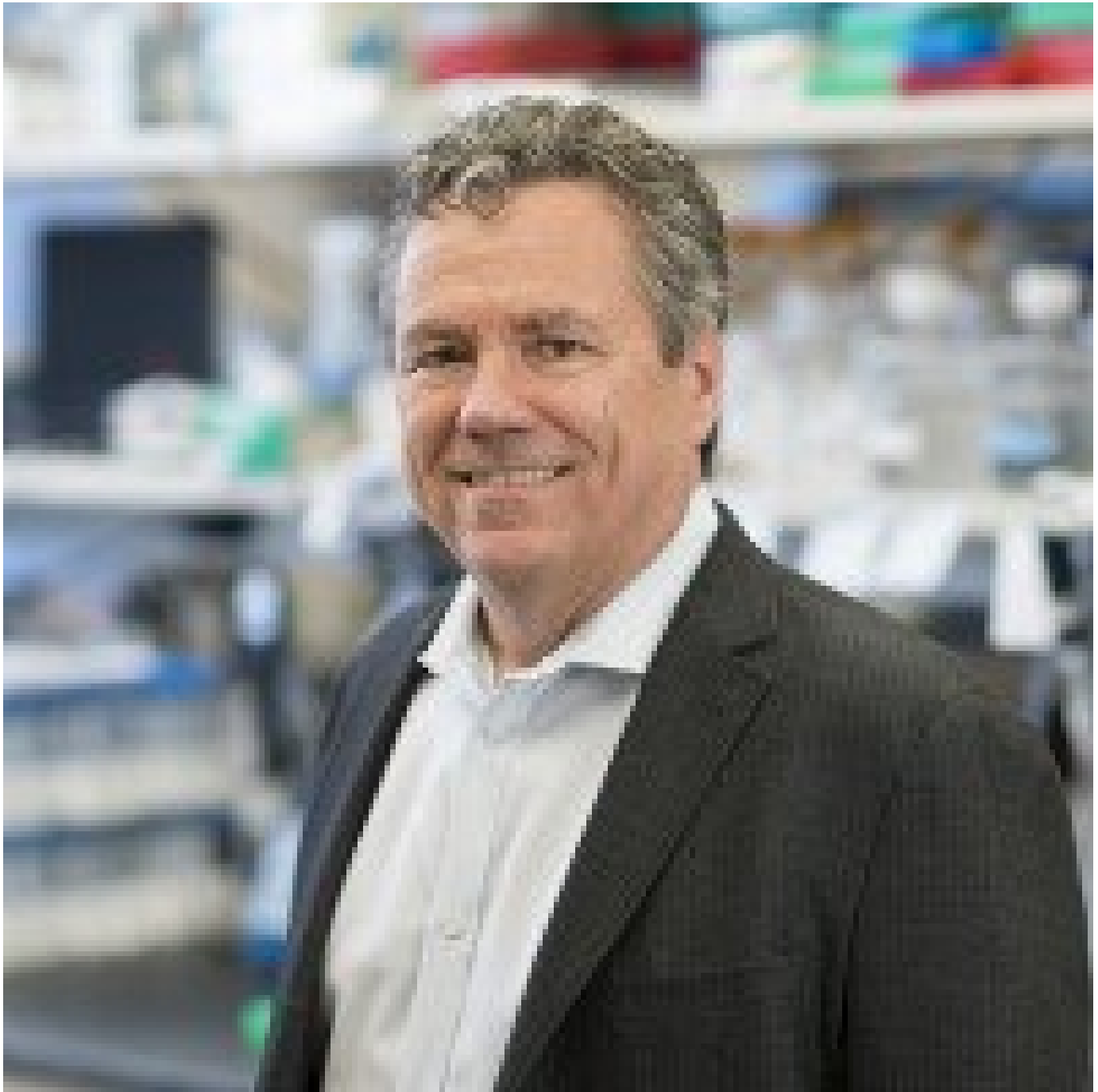
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Scott W. Lowe, PhD
Chair, Cancer Biology & Genetics Program, SKI; Chair, Geoffrey Beene Cancer Research Center; Investigator, Howard Hughes Medical Institute

About the Scott Lowe Lab

Cancer biologist Scott Lowe uses genetically engineered mouse models to study how the genetic alterations in cancer cells contribute to tumorigenesis, alter treatment response, and create molecular vulnerabilities that may be targeted therapeutically.

Cancer arises through an evolutionary process whereby normal cells acquire mutations that erode growth controls. Still, cancer is not an inevitable consequence of mutation, but is kept in check by intrinsic tumor-suppressor programs activated in damaged cells. We study such programs to reveal, and ultimately exploit, the strategies nature uses to combat cancer.

Our early studies focused on *cell-intrinsic* programs that prevent tumorigenesis (e.g., apoptosis, senescence), and have broadened to *cell-extrinsic* mechanisms (e.g., immune surveillance). New areas of interest include how tumor-suppressive programs are blunted by environmental factors known to increase cancer incidence (e.g., obesity, aging) and how excessive activation of tumor-suppressive programs (e.g., senescence) can harm function of normal tissue. To gain a mechanistic understanding of these phenomena, we apply mouse models in which cancer arises in an intact tissue ecosystem, which is a long-standing strength of our program. Our affiliation with Memorial Sloan Kettering Cancer Center enables us to probe human systems as well.

Another major goal is to harness our knowledge of tumor suppression therapeutically. We and others have shown that reengaging tumor-suppressive programs in established cancer cells can coordinate tumor regression through both cell-intrinsic and cell-extrinsic components (1-5), so these programs represent attractive strategies for tumor control. With Michel Sadelain, we have also developed a cell therapy approach to remove excessive senescent cells from tissues (6); this therapy may have beneficial effects on cancer and non-cancer pathologies. Advancing these concepts are major goals of our current research.

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Research Projects

[Developing Technologies that Reveal New Biology](#)

[The p53 Tumor Suppressor Network](#)

[Understanding and Targeting Cellular Senescence](#)

[Gene-Environment Interactions in Cancer Initiation and Progression](#)

VIDEO | 02:17

Go inside the lab of Scott Lowe from SKI's Cancer Biology & Genetics Program.

[Video Details](#) →



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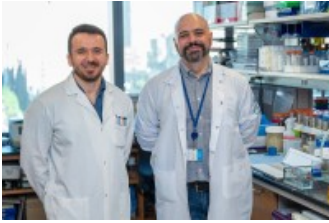
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Featured News



[Expansion of Cell-to-Cell Communication Drives the Early Development of Pancreatic Cancer, New Research in Mice Finds](#)

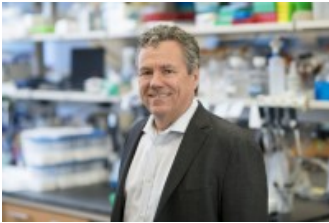
New MSK research combined sophisticated genetically engineered mouse models and advanced computational methods to map the earliest cell states leading to pancreatic ductal adenocarcinoma (PDAC), the most common type of pancreatic cancer.



[New MACHETE Technique Slices Into Cancer Genome To Study Copy Number Alterations](#)

Learn why MSK researchers developed MACHETE, a new CRISPR-based technique to study large-scale genetic deletions efficiently in laboratory models.

IN THE LAB



[SKI Scientists Solve 30-Year-Old Mystery About p53 Protein — Dubbed ‘Guardian of the Genome’](#)

Rather than promoting genetic chaos, loss of p53 leads to an orderly progression of genetic changes that no one saw coming.

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Publications Highlights

[Epigenetic plasticity cooperates with cell-cell interactions to direct pancreatic tumorigenesis.](#)

Burdziak C, Alonso-Curbelo D, Walle T, Reyes J, Barriga FM, Haviv D, Xie Y, Zhao Z, Zhao CJ, Chen HA, Chaudhary O, Masilionis I, Choo ZN, Gao V, Luan W, Wuest A, Ho YJ, Wei Y, Quail DF, Koche R, Mazutis L, Chaligné R, Nawy T, Lowe SW, Pe'er D. Science. 2023 May 12;380(6645):eadd5327. doi: 10.1126/science.add5327. Epub 2023 May 12. PMID: 37167403

[Senescence Rewires Microenvironment Sensing to Facilitate Antitumor Immunity.](#)

Chen HA, Ho YJ, Mezzadra R, Adrover JM, Smolkin R, Zhu C, Woess K, Bernstein N, Schmitt G, Fong L, Luan W, Wuest A, Tian S, Li X, Broderick C, Hendrickson RC, Egeblad M, Chen Z, Alonso-Curbelo D, Lowe SW. Cancer Discov. 2023 Feb 6;13(2):432-453. doi: 10.1158/2159-8290.CD-22-0528. PMID: 36302222 Free PMC article.

[MACHETE identifies interferon-encompassing chromosome 9p21.3 deletions as mediators of immune evasion and metastasis.](#)

People



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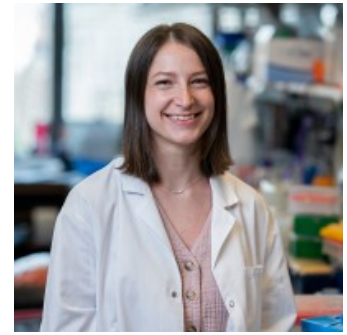
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Members



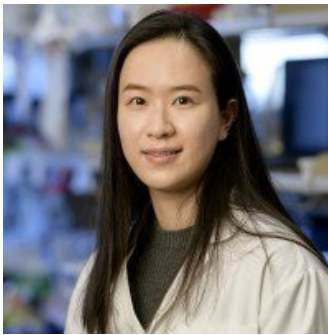
Almudena Chaves
Perez

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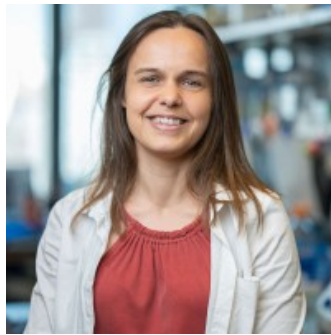
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Xin
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Research Technician



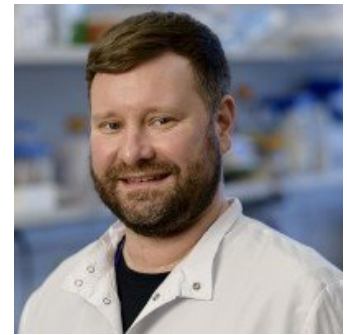
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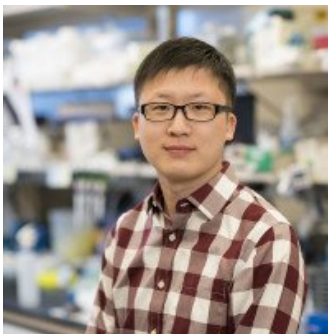
Hailey V. Goldberg

Graduate Student



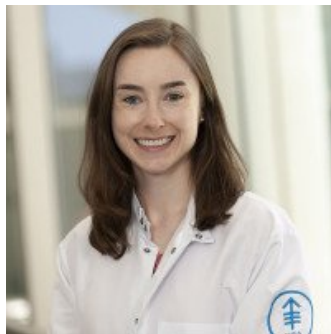
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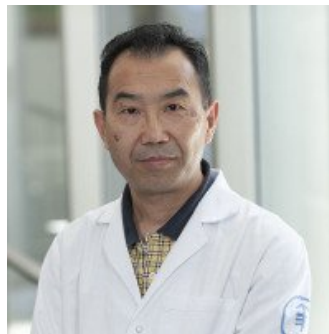
Yu-Jui (Ray)
Ho

Computational Biologist



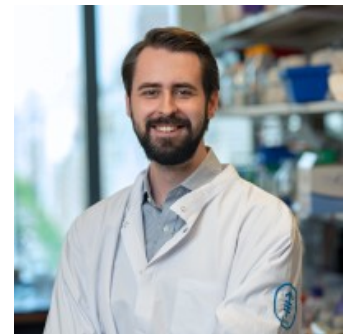
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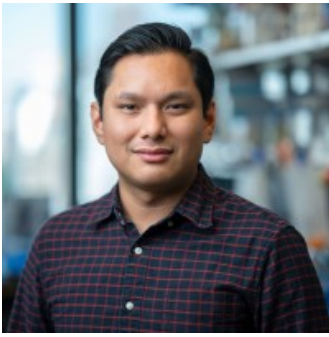
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Riccardo Mezzadra

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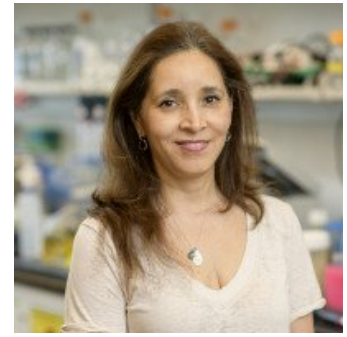
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José
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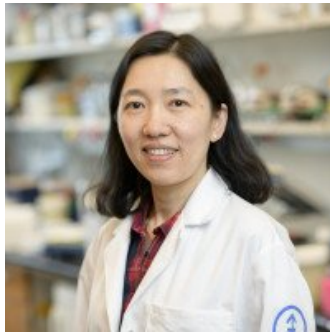
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Assistant to Chair



Janelle
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Mouse Colony Manager



Exequiel
Sisso
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Sha Tian
Senior Research
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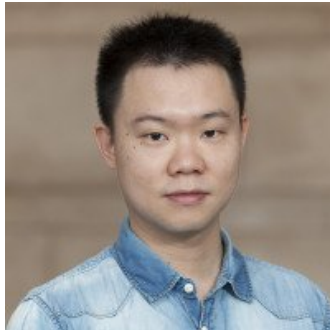
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MSK requires doctors and faculty members to report (“disclose”) the relationships and financial interests they have with external entities. As a commitment to transparency with our community, we make that information available to the public.

Scott W. Lowe discloses the following relationships and financial interests:

Blueprint Medicines

Equity; Professional Services and Activities

Eli Lilly and Company

Equity

Faeth Therapeutics, Inc

Equity; Professional Services and Activities (Uncompensated)

Fate Therapeutics

Intellectual Property Rights; Professional Services and Activities

Geras Bio Inc

Equity; Professional Services and Activities (Uncompensated)

Mirimus

Equity; Professional Services and Activities

Oric Pharmaceuticals

Equity; Professional Services and Activities

PMV Pharma

Equity; Professional Services and Activities

Senescea Therapeutics

Equity; Intellectual Property Rights; Professional Services and Activities (Uncompensated)

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