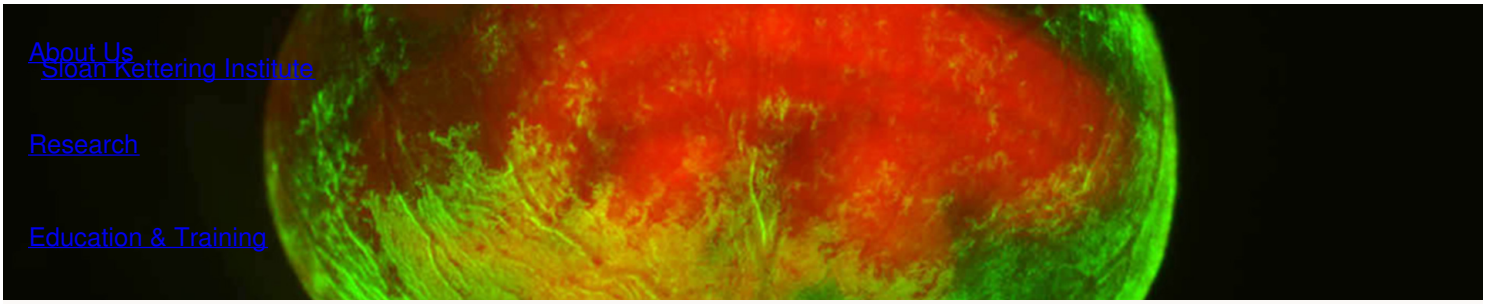


DEVELOPMENTAL BIOLOGY PROGRAM

The Anna-Katerina Hadjantonakis Lab

Developmental Biology Program

Research

Anna-Katerina Hadjantonakis, PhD
Chair, Developmental Biology Program, SKI; Alfred P. Sloan Chair

Cancer is a condition arising when cells undergo an identity crisis. Understanding of how cells control their identity, and how they assemble into tissues with normal organization and function during embryonic development provides the essential blueprint for gaining insights into the fundamental biological processes that become deregulated in disease states such as cancer.

Our research focus and goals - how cells form tissues . We are interested in how cells become specialized, and how they collaborate at the population level to collectively build organs. Our focus is on the endoderm, the progenitor tissue that gives rise to respiratory and digestive tracts, and associated organs such as the lung, liver and pancreas. Our overarching goal is to understand how endodermal organs form - in time and space - from populations of uncommitted progenitor cells in the embryo.

Repair, replace, and regenerate. An aspiration is to develop knowledge that will facilitate future efforts to repair, replace or regenerate diseased or damaged tissues. Our research seeks to gain fundamental insights into the processes by which tissues and organs arrise in their native context - the embryo - and consequently, how these mechanisms can be contextually recapitulated or adapted. Furthermore, understanding the processes taking place during normal development paves the way for understanding the mechanisms of cancers in children and young adults (Developmental Oncology).

A multi-disciplinary approach bridging scales. We use mammalian embryo, embryo-derived stem cell, and organoid models, as experimentally tractable platforms for our studies. We have a history of applying cutting-edge high-resolution quantitative methods – from light microscopic imaging to single-cell genomics approaches - to investigate mechanisms driving: (1) the acquisition of cell states and fates leading to the emergence of an endoderm identity, (2) the plasticity and differentiation of endoderm cells and their neighbors, and, (3) the organization and growth of tissue as organs start to take shape from communities of cells.

Three-dimensional visualization of nerves (green) and blood vessels (magenta) in a mouse embryo.

View Lab Overview →

VIDEO | 02:18

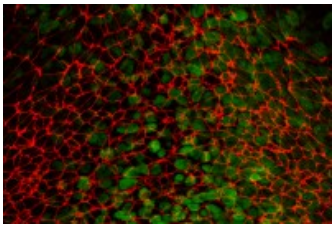
Go inside the lab of Anna-Katerina Hadjantonakis from SKI's Developmental Biology Program.

Video Details →

Featured News

[At Work: Developmental Biologist Anna-Katerina Hadjantonakis]

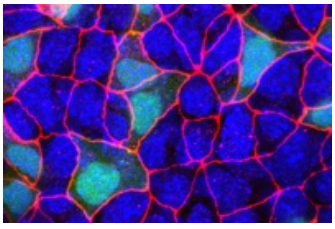
Developmental biologist Kat Hadjantonakis works to gain insights into the critical events that direct the formation and shape of mammalian embryos.



[The Right Moves: How Studying Cell Movement During Embryonic Development May Offer New Insights Into Cancer Metastasis]

New insights into the way cells break away from a tissue during embryonic development may also shed new light on the same process in the context of cancer metastasis.

IN THE LAB



[Scientists Rewrite the Textbook of Organ Development, One Cell at a Time]

A large study that analyzed nearly 120,000 cells in a developing mouse embryo is full of surprises.

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Publications Highlights

Abuhashem A, Lee AS, Joyner AL, Hadjantonakis AK. Rapid and efficient degradation of endogenous proteins in vivo

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Morgani SM, Su J, Nichols J, Massagué J, Hadjantonakis AK The transcription factor Rreb1 regulates epithelial architecture, invasiveness and vasculogenesis in early mouse embryos Elife. 2021 Apr 30;10:e64811. doi: 10.7554/eLife.64811. Epub ahead of print. PMID: 33929320

Simon CS, Rahman S, Raina D, Schröter C, Hadjantonakis AK. Live Visualization of ERK Activity in the Mouse Blastocyst Reveals Lineage-Specific Signaling Dynamics. Dev Cell. 2020 Oct 16; S1534-5807(20)30762-0. doi: 10.1016/j.devcel.2020.09.030

Saiz N, Mora-Bitria L, Rahman S, George H, Herder J, Garcia-Ojalvo J, Hadjantonakis AK. Growth factor-mediated coupling between lineage size and cell fate choice underlies robustness of mammalian development. Elife. 2020 Jul 28;9:e56079. doi: 10.7554/eLife.56079.

Nowotschin S, Setty M, Kuo YY, Liu V, Garg V, Sharma R, Simon CS, Saiz N, Gardner R, Boutet SC, Church DM, Hoodless PA, Hadjantonakis AK, Pe'er D. The emergent landscape of the mouse gut endoderm at single-cell resolution. Nature. 2019 May;569(7756):361-367. doi: 10.1038/s41586-019-1127-1.

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People

Anna-Katerina Hadjantonakis, PhD

Chair, Developmental Biology Program, SKI; Alfred P. Sloan Chair

The Hadjantonakis laboratory studies pluripotency, cell lineage commitment, tissue patterning, and morphogenesis in mammalian embryos and in stem cell and organoid models.

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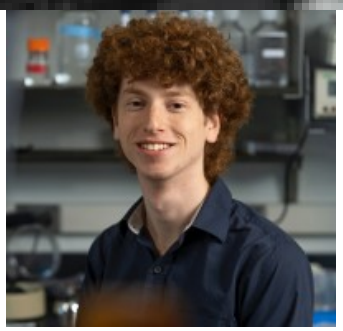
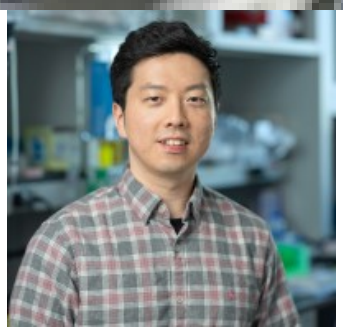


David Godovich



Woonyung Hur

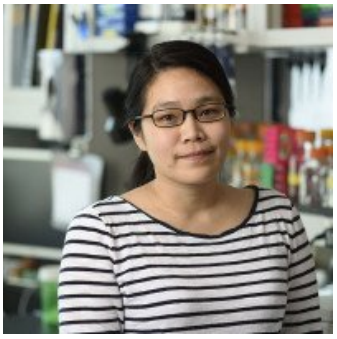
Postdoctoral Research Fellow - joint with Dr. Eric

Research Technician

Siggia at Rockefeller University

Svetlana Jovanic

Postdoctoral Research Scholar - NYSTEM Training Award at the CSCB

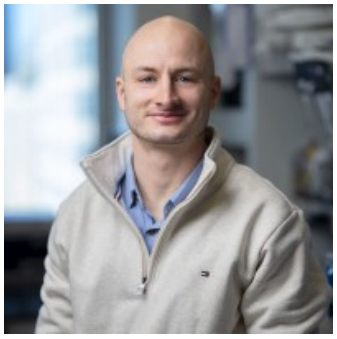


Ying-Yi Kuo

Research Assistant

Sonja Nowotschin

Senior Research Scientist



Lucas Schroefl

Research Assistant

Lab Alumni
+

Lab Affiliations
+

Lab News & Events

UPCOMING EVENT

Mechanical Force, Metabolism, and Cancer Progression

Tuesday, June 11, 2024 - 4:00 PM to 5:00 PM

Memorial Sloan Kettering Cancer Center
Zuckerman Research Center
417 East 68th Street
Room ZRC-105
New York, NY 10065

View all upcoming events

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Doctors and faculty members often work with pharmaceutical, device, biotechnology, and life sciences companies, and other organizations outside of MSK, to find safe and effective cancer treatments, to improve patient care, and to educate the health care community.

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Anna-Katerina Hadjantonakis discloses the following relationships and financial interests:

No disclosures meeting criteria for time period

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