BUSINESS OF REGENERATIVE MEDICINE
Defining and Creating Value

Hosted by the Harvard Stem Cell Institute
Harvard Business School, Boston MA
July 15–16, 2019
BUSINESS OF REGENERATIVE MEDICINE
Defining and Creating Value

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The BRM meeting series is organized and managed collaboratively by:
- Harvard Stem Cell Institute
- National Center for Regenerative Medicine, Case Western Reserve University
- Centre for Commercialization of Regenerative Medicine
- Parker H. Petit Institute for Bioengineering and Bioscience, Georgia Tech
- Institute for Regenerative Medicine and Center for Cellular Immunotherapies, University of Pennsylvania

Cover image: Douglas Melton's laboratory at Harvard University is developing a cell therapy for patients with type 1 diabetes by converting stem cells into insulin-producing beta cells.

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Program information is online at brm2019.hsci.harvard.edu

#BRM2019
KEYNOTE SPEAKERS

Mark Fishman, M.D.
Harvard Stem Cell and Regenerative Biology
“A shared mission: discovery, development, repeatability, and commercialization in academia and business”

Nancy Koehn, Ph.D.
Harvard Business School
“Leadership in high-risk environments”

Sangeeta Bhatia, M.D., Ph.D.
Massachusetts Institute of Technology/Brigham and Women’s Hospital
“Tiny technologies: Big impact”

George Church, Ph.D.
Harvard Medical School
“The future of regenerative medicine: the intersection of genetic engineering and cell therapy”
# AGENDA

All sessions are held in Aldrich Hall 112 at Harvard Business School, unless otherwise noted.

## JULY 14

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| 4–6 p.m. | Welcome Reception in the HBS Spangler Center, Williams Room  
George Q. Daley, M.D., Ph.D., Dean of the Faculty of Medicine, Harvard Medical School  
*Sponsored by Fujifilm* |

## JULY 15  
**DEFINING VALUE**

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| 8–9 a.m.  | Breakfast  
*Sponsored by Cell and Gene Therapy Catapult and IQVIA* |
| 9–9:30 a.m. | Opening Keynote | A shared mission: discovery, development, repeatability, and commercialization in academia and business  
Mark Fishman, M.D., Harvard University |
| 9:30–10:15 a.m. | Talk | Investing in talent to scale your company  
Sarah Larson, Third Rock Ventures |
| 10:15–10:30 a.m. | Break |
| 10:30–11:30 a.m. | Panel | Turning early scientific value into commercial value  
Amritha Jaishankar, Ph.D., MD Stem Cell Research Fund  
Curtis Keith, Ph.D., Blavatnik Accelerator  
Roger Kitterman, Partners Innovation Fund  
Keith Thompson, Cell and Gene Catapult |
11:30 a.m.–12:30 p.m. Panel | How is value defined by different types of investors?
Amir Nashat, Sc.D., Polaris Partners
Jason Hafler, Ph.D., Sanofi
Thomas Needham, M.B.A., Broadview
Ann DeWitt, Ph.D., M.B.A., The Engine, MIT

12:30–1:30 p.m. Lunch
*Sponsored by BlueRock Therapeutics, Morse, and Pepper Hamilton LLP*

1:35–1:45 p.m. Talk | Industry overview
Janet Lambert, Alliance for Regenerative Medicine

1:45–2:30 p.m. Panel | Generating value: what different investors expect
Moderator: Janet Lambert, Alliance for Regenerative Medicine
Whitney Ijem, Guggenheim Securities
Imran Nasrullah, M.S., J.D., C.L.P., Boehringer Ingelheim

1:30–1:35 p.m. Talk | Introduction of the ARM Foundation for Cell & Gene Medicine’s economic impact study
David Smith, J.D., Pepper Hamilton LLP

2:30–3:30 p.m. Panel | Measuring value: Developing a macroeconomic model to understand potential impact of cell and gene medicine on healthcare systems
Moderator: Morrie Ruffin, ARM Foundation for Cell & Gene Medicine
Amitabh Chandra, Ph.D., Harvard Business School
John Doyle, Dr.P.H., M.P.H., Pfizer Healthcare Innovation Center
Eric Faulkner, M.P.H., Evidera
Michael Sherman, M.D., Harvard Pilgrim Healthcare
David Smith, J.D., Pepper Hamilton LLP

*Biographies for all speakers are online at brm2019.hsci.harvard.edu*
3:30–3:40 p.m.  Break

3:50–4:30 p.m.  Closing Address | Leadership in high-risk environments  
Nancy Koehn, Ph.D., Harvard Business School

5–6 p.m.  Reception in the HBS Spangler Center, Williams Room

6–8 p.m.  Dinner in the HBS Spangler Center, Williams Room  
Perspectives on disease: researcher and patient advocate  
Jayaraj Rajagopal, M.D., Massachusetts General Hospital  
Joan Finnegan Brooks  
*Sponsored by bluebird bio*

**JULY 16**  CREATING VALUE: CASE STUDIES

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| 8–9 a.m.   | Breakfast  
*Sponsored by MSCRF and Phacilitate*                                                      |
| 9–9:30 a.m.| Opening Address | Tiny technologies: Big impact  
Sangeeta Bhatia, Ph.D., Massachusetts Institute of Technology/Brigham and Women’s Hospital |
| 9:30–10 a.m.| Talk | Suiting technology to business model and financing  
Luk Vandenberghe, Ph.D., Massachusetts Eye and Ear |
| 10–10:30 a.m.| Talk | The steps from academic studies to SRA to venture incubation to public company  
Jason Gardner, Ph.D., Magenta Therapeutics |
| 10:30–10:45 a.m. | Break                                                                                   |
| 10:45–11:15 a.m. | Talk | Why replace cells when you can turn them on or off?  
Albert Edge, Ph.D., Massachusetts Eye and Ear |
AGENDA

11:15–11:45 p.m. Talk | Why use cells when you can use their output?
Steven Stice, Ph.D., ArunA Biomedical, University of Georgia

11:45 a.m.–12:30 p.m. Panel | Value of in vitro models
Vikram Khurana, M.D., Ph.D., Brigham and Women’s Hospital, Yumanity
Geraldine Hamilton, Ph.D., Emulate
Mark Skylar-Scott, Ph.D., Jennifer Lewis Laboratory, Harvard University

12:30–1:30 p.m. Lunch
Sponsored by Alexandria, GE Healthcare, and Orig3n

12:45-1:15 p.m. Discussion | The Prospects for iPS-based Therapies-The View from the US and Japan
Marcie Glicksman, Ph.D., Orig3n
Hiroto Bando, Ph.D., Fujifilm

1:30–2:45 p.m. Panel | How do biomaterials work with cells and genes to provide better solutions?
Daniel Anderson, Ph.D., Massachusetts Institute of Technology
Jennifer Elisseeff, Ph.D., Johns Hopkins University
Paula Hammond, Ph.D., Massachusetts Institute of Technology

2:45–3:15 p.m. Talk | The CEO’s perspective
Geoffrey MacKay, AVROBIO

3:15–4 p.m. Closing Address | The future of regenerative medicine: the intersection of genetic engineering and cell therapy
George Church, Ph.D., Harvard Medical School

Biographies for all speakers are online at brm2019.hsci.harvard.edu
Sangeeta Bhatia is a biomedical researcher, MIT professor, and biotech entrepreneur who works to adapt technologies developed in the computer industry for medical innovation. Trained as both a physician and engineer at Harvard, MIT, and Brown University, Bhatia leverages ‘tiny technologies’ of miniaturization to yield inventions such as human microlivers that model human drug metabolism and liver disease, as well as responsive nanoparticles and nanoporous materials that can be engineered to diagnose, study, and treat a variety of diseases, including cancer. She and her >150 trainees have launched multiple biotechnology companies to improve human health. As a passionate inventor and advocate for diversity in science and engineering, Bhatia has been honored by the Lemelson-MIT Prize, known as the ‘Oscar for inventors,’ and the Heinz Medal for groundbreaking inventions and advocacy for women in STEM fields. She is a Howard Hughes Medical Institute Investigator, the Director of the Marble Center for Cancer Nanomedicine at the Koch Institute for Integrative Cancer Research at MIT, and an elected member of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Science, the National Academy of Inventors, and Brown University’s Board of Trustees.

Image credit: Flynn Larset for Ludwig Cancer Research
George M. Church, PhD ’84, is professor of genetics at Harvard Medical School, a founding member of the Wyss Institute, and director of PersonalGenomes.org, the world’s only open-access information on human genomic, environmental, and trait data. Church is known for pioneering the fields of personal genomics and synthetic biology. He developed the first methods for the first genome sequence & dramatic cost reductions since then (down from $3 billion to $600), contributing to nearly all “next generation sequencing” methods and companies. His team invented CRISPR for human stem cell genome editing and other synthetic biology technologies and applications – including new ways to create organs for transplantation, gene therapies for aging reversal, and gene drives to eliminate Lyme Disease and Malaria. Church is director of IARPA & NIH BRAIN Projects and National Institutes of Health Center for Excellence in Genomic Science. He has coauthored 450 papers, 105 patents, and one book, “Regenesis”. His honors include Franklin Bower Laureate for Achievement in Science, the Time 100, and election to the National Academies of Sciences and Engineering.

Image credit: Wyss Institute at Harvard University
Mark Fishman is Professor in the Harvard Department of Stem Cell and Regenerative Biology and Chief of the Pathways Consult Service at the MGH for patients with complex medical disorders. His current research focus is on the genes that guide social behavior, using genetics of the zebrafish.

In the 1990’s, by harnessing the first large-scale genetic screens in zebrafish (performed in collaboration with W. Driever and contemporaneously with C. Nuesslein-Volhard), and by providing much of the early genomic infrastructure, Fishman’s lab helped to make the zebrafish a cornerstone of developmental biology, and led to revelation of many of the pathways that guide vertebrate organ development, particularly the heart and vessels.

From 2002-2016 Fishman was the founding President of the Novartis Institutes for BioMedical Research (NIBR). During his tenure, NIBR discovered and brought through successful clinical trials 90 new medicines in more than 120 indications. He brought a particular focus on regenerative medicines as treatments for disorders of aging.

Fishman graduated from Yale College and Harvard Medical School and trained in medicine and Cardiology at the MGH. Prior to his time at NIBR, he was the Founding Director of the Cardiovascular Research Center and Chief of Cardiology at the Massachusetts General Hospital. Fishman sits on the Executive Committee and Council of the National Academy of Medicine, and is a Fellow of the American Academy of Arts and Sciences.
Nancy F. Koehn is a historian at the Harvard Business School (HBS), where she holds the James E. Robison chair of Business Administration. Koehn’s research focuses on effective leadership, and how leaders craft lives of purpose, worth, and impact. Her book Forged in Crisis: The Power of Courageous Leadership in Turbulent Times spotlights how five of history’s greatest leaders navigated crises successfully, and what we can learn from their experience.

Koehn is the author of many books, including Ernest Shackleton: Exploring Leadership; The Story of American Business: From the Pages of the New York Times; and Brand New: How Entrepreneurs Earned Consumers’ Trust from Wedgwood to Dell, as well as a contributor to several books including Management Past and Present: A Casebook on American Business History. Koehn has written and supervised HBS cases, for example on Starbucks Coffee Company, Henry Heinz, Milton Hershey, and Madam CJ Walker.

Koehn is a consultant and has spoken at the World Economic Forum in Davos, the Aspen Institute Ideas Festival, and the World Business Forum. She is a frequent contributor to American Experience and the PBS NewsHour, has appeared on many high-profile television programs, and is a weekly commentator on NPR. Koehn writes for the New York Times, the Washington Post, Huffington Post, and the Harvard Business Review.

A Phi Beta Kappa graduate of Stanford University, Koehn earned her Master of Public Policy degree from Harvard Kennedy School before obtaining her M.A. and Ph.D. degrees in History from Harvard. Before moving to HBS, she was a lecturer in the History and Literature concentration and Department of Economics in Harvard’s Faculty of Arts and Sciences.
ABOUT THE ORGANIZERS

Welcome to the 12th annual Business of Regenerative Medicine conference at Harvard Business School. Our theme this year is “Defining and Creating Value.” The BRM meeting series is organized and managed collaboratively by:

- **Arnold Caplan, Ph.D.**, Case Western Reserve University School of Medicine
- **Andres Garcia, Ph.D.**, Parker H. Petit Institute for Bioengineering & Bioscience
- **Bruce Levine, Ph.D.**, University of Pennsylvania Perelman School of Medicine, Center for Cellular Immunotherapies
- **Michael May, Ph.D.**, Centre for Commercialization of Regenerative Medicine
- **Brock Reeve, M.Phil., M.B.A.**, Harvard Stem Cell Institute
- **Kenneth Zaret, Ph.D.**, University of Pennsylvania Perelman School of Medicine, Institute for Regenerative Medicine
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We don't accept that the way things are is the way they need to be. If we can recode the very building blocks of life, we should be able to recode everything about healthcare: the science, the system, even the status quo. Are you a recoder too? Jump in and help us create a world where everyone can live their lives more fully.

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We’re applying our photographic film innovations to help advance new treatments in the revolutionary field of regenerative medicine. Over the last 80-plus years, we’ve developed advanced technology that controls complex chemical reactions in photographic film that’s a mere 20 microns(*1) thick. And today, that technology is being applied to research and the world’s first clinical trial(*2) of medical treatments that use high-quality iPS cells. And in the future, we’ll strive to help those suffering from a range of medical conditions, such as those of the eyes, nerves, heart and more. Of course, the challenges are endless, but so are the possibilities. Which is why we’ll never stop accelerating regenerative medicine to help build a stronger, healthier future for all.

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Value from Innovation

*1 Thickness of layers excluding the base. 20 microns thick means nearly 20 layers included.
*2 Fujifilm’s iPS cells are being utilized in the world’s first clinical trial using iPS cells conducted in the UK by the Australian company Cynata.

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For GPS directions to the Kresge Way/Soldiers Field Park Garage, use the address 111 Western Avenue, Boston.

To access the Harvard Business School guest wireless, select the network “HBSGUEST.” This is an open network that does not require a password.