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UNIVERSITÄT  
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SEIT 1386

MARSILIUS-ACADEMY | SEPTEMBER 10TH – 15TH 2023

# [AT THE] LIMITS OF LIFE

DEALING  
WITH BIOFACTS,  
EMBRYOIDS, AND  
HYBRIDS  
PERSPECTIVES  
FROM SCIENCES  
AND HUMANITIES

10.9. –  
15.9.  
2023

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Marsilius-Kolleg, Heidelberg University,  
Im Neuenheimer Feld 130.1, 69120 Heidelberg

EMBL



MAX PLANCK INSTITUTE  
FOR MEDICAL RESEARCH



# [AT THE] LIMITS OF LIFE

**Dealing with Biofacts, Embryoids  
and Hybrids – Perspectives from  
Sciences and Humanities**

Transgressing the boundary between the living and the non-living - reshaping the early development of organisms - blurring the boundaries between species: In recent years, life science research has increasingly challenged limits of life that were once considered inescapable. Exciting new opportunities are emerging, as well as ethical, legal and societal issues that require comprehensive and critical examination. This Marsilius Academy brings together outstanding early career researchers from the life sciences, the natural sciences, the social sciences and the humanities for interdisciplinary exchange and discussion. Drawing on the expertise of internationally renowned scholars and scientists, it addresses fundamental challenges arising from recent developments in biology, biomedicine and bioengineering.



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**Organizers**   **Marsilius-Kolleg**, Heidelberg University | European  
Molecular Biology Laboratory (EMBL) Heidelberg |  
Max Planck Institute for Medical Research (MPIMR)  
Heidelberg

**Venue**         **Marsilius-Kolleg**, Heidelberg University, Im  
Neuenheimer Feld 130.1, 69120 Heidelberg,  
Germany

# CONTENTS

**Marsilius Summer Academy  
September 10th-15th 2023**

Program.....	4 – 9
Lead Scientists.....	10 – 13
Masterclass Speakers.....	14 – 16
Keynote Speakers .....	17 – 19
Science Communication Speaker .....	20
EMBL.....	21 – 22
MPIMR.....	23 – 24
Marsilius Kolleg.....	25 – 26
Health and Life Science Alliance / 3DMM20.....	27 – 28
Further Information.....	29

# PROGRAM

## SUNDAY

September 10th 2023

19.00 – 20.30 .....**City Tour**

Meeting point: “Löwenbrunnen  
am Universitätsplatz”

20.30.....**Pub Crawl**



# MONDAY

September 11th 2023

08.15 – 09.00 .....*Breakfast*

09.00 – 10.30 .....**Introduction** (J. Wittbrodt,  
T. Moos, N. Schütz)

10.30 – 11.00 .....*Coffee Break*

11.00 – 12.30 .....**Understanding Life I** (E. Furlong)

12.30 – 14.00 .....*Lunch*

14.00 – 15.30 .....**Understanding Life II** (E. Furlong)

15.30 – 16.00 .....*Coffee Break*

16.00 – 18.00 .....**Sci-Com Train. I** (E. Wolfangel)

18.00 – 19.00 .....*Dinner*

19.00 – 21.00 .....**Sci-Com Train. II** (E. Wolfangel)

# TUESDAY

September 12th 2023

08.15 – 09.00 .....*Breakfast*

09.00 – 10.30 .....**On the Boundaries I**  
(C. Selhuber-Unkel)

10.30 – 11.00 .....*Coffee Break*

11.00 – 12.30 .....**On the Boundaries II**  
(C. Selhuber-Unkel)

12.30 – 13.30 .....*Lunch*

13.30 – 15.30 .....**Guided Tour at MPImR**

15.30 – 16.00 .....*Coffee Break*

16.00 – 18.00 .....**Masterclass 1 & 2**  
(N. Karafyllis & B. Hurlbut)

18.00 – 19.00 .....*Dinner at Bräustadel*  
(not included)

19.00 – 21.00 .....**Free Evening**

# WEDNESDAY

September 13th 2023

08.15 – 09.00 .....*Breakfast*

09.00 – 10.30 .....**Developing Life I**  
(F. Molnár-Gábor)

10.30 – 11.00 .....*Coffee Break*

11.00 – 12.30 .....**Developing Life II**  
(F. Molnár-Gábor)

12.30 – 13.30 .....*Lunch*

13.30 – 15.30 .....**Twinning I**

15.30 – 16.00 .....*Coffee Break*

16.00 – 18.00 .....**Masterclass 3** (J. Hanna)

18.00 – 19.00 .....*Dinner to go*

19.30 – 21.00 .....**Public Session: “Synthetic  
Human Embryos”** at Alte Aula  
(J. Hanna/ B. Hurlbut)

21.00.....**Official Reception**

# THURSDAY

September 14th 2023

08.15 – 09.00 .....*Breakfast*

09.00 – 10.30 .....**Twinning II**

10.30 – 11.00 .....*Coffee Break*

11.00 – 12.30 .....**Twinning III**

12.30 – 13.00 .....*Lunch to go*

13.00 – 18.30 .....**Excursion to EMBL**

18.30.....*Conference Dinner at EMBL*

# FRIDAY

September 15th 2023

08.15 – 09.00 .....*Breakfast*

09.00 – 10.30 .....**Where does Consciousness begin?**  
(K. Tanner)

10.30 – 11.00 .....*Coffee Break*

11.00 – 12.30 .....**Economy of the Living** (K. Tanner)

12.30 – 14.00 .....*Lunch*

14.00 – 15.30 .....**Twinning IV – final presentation**

15.30 – 16.00 .....*Coffee Break*

16.00 – 18.00 .....**Twinning V – final presentation**

18.00 – 19.00 .....*Dinner*

19.00 .....**Participants' Eve**

# LEAD SCIENTISTS



**Eileen Furlong** is the Head of the Genome Biology Unit at the European Molecular Biology Laboratory (EMBL) in Heidelberg. She obtained a PhD in Pharmacology and Biotechnology at the University College Dublin before joining the Department of Developmental Biology at Stanford University as a post-doctoral researcher. In 2002, she became group leader at the EMBL and has stayed there, ever since. Eileen Furlong is both a Fellow of the Royal Society and a recipient of the Gottfried Wilhelm Leibniz Prize. Her group dissects fundamental principles of genome regulation and how that drives cell fate decisions during development, focusing on organisational and functional properties of the genome.



**Thorsten Moos** is a full professor of Systematic Theology/Ethics at Heidelberg University and current Marsilius Fellow. He holds diplomas in Physics and Protestant Theology. Thorsten Moos received a PhD from the Martin-Luther-University Halle-Wittenberg and led the research unit “Religion, Law, and Culture” at the Research Center of the Protestant Academic Community (FEST) in Heidelberg. Prior to his appointment to the Theological Faculty in Heidelberg, he was a professor at the Institute for Diaconal Sciences of Wuppertal Theological University, whose director he was. He is mainly concerned with questions of bioethics, medical ethics, and theological anthropology that arise in the context of the empirical sciences.

# LEAD SCIENTISTS



**Joachim Spatz** is a full professor for Biophysical Chemistry at the Institute for Molecular Systems Engineering and Advanced Materials (IMSEAM) of Heidelberg University, Director of the MPI for Medical Research, and Speaker of the Max Planck School Matter to Life. He studied Physics at Ulm University (mainly), where he received diplomas, a PhD, and a habilitation. Joachim Spatz worked at the Institut Curie in Paris, the Jackson Laboratory in Bar Harbor, and the MPI for Metals Research/Intelligent Systems in Stuttgart. In 2017 he was awarded the Gottfried Wilhelm Leibniz Prize. His many fields of interest include Cellular Biophysics, Material Science, Cell Biology, Interface Science, and the Physics of Soft Matter.



**Joachim/Jochen Wittbrodt** is a full professor at the Centre for Organismal Studies (COS) of Heidelberg University and current Marsilius Fellow. He holds both a diploma and a PhD from the Max Planck Institute for Biochemistry in Martinsried as well as a habilitation in Developmental and Cell Biology from Braunschweig University. Preceding/ during his professorship in Heidelberg, Jochen Wittbrodt has worked at the Biocentre of Basel University, the MPI for Biophysical Chemistry Göttingen, the EMBL Heidelberg, and the KIT in Karlsruhe. His lab focuses on combining genetic, molecular and cell biological approaches with advanced imaging approaches to decipher the basic mechanisms that govern the balance of cell proliferation and differentiation *in vivo*.

# MASTERCLASS SPEAKERS



**Jacob Hanna** is an associate professor of Stem Cell Biology at the Weizmann Institute of Science in Rehovot, Israel. They obtained a diploma, a PhD, and a MD from the Hebrew University of Jerusalem, before becoming a postdoctoral researcher at the Whitehead Institute for Biomedical Research of the MIT in Cambridge, MA. Jacob Hanna cofounded the Department of Molecular Genetics in Rehovot, whose Chief Scientific Advisor they are. Their Lab is interested in understanding embryonic stem cell biology, modeling early embryo development and advance stem-cell-based human disease platforms.



**Ben Hurlbut** is an associate professor in the School of Life Sciences at Arizona State University in Tempe. He holds an A.B. from Stanford University and a Ph.D. in the History of Science from Harvard University. He was a postdoctoral fellow in the program on Science, Technology and Society at the Harvard Kennedy School. He studies the changing relationships between science, politics and law in the governance of biomedical research and innovation, examining the interplay of science and technology with democracy, religious and moral pluralism, and public reason.

# MASTERCLASS SPEAKERS



**Nicole Karafyllis** is a full professor of Philosophy at the Technical University Braunschweig. She received a combined Master's degree in Biology and Philosophy from the University of Erlangen-Nuremberg, a PhD from the International Center for Ethics in the Sciences and Humanities (IZEW) in Tübingen, and a habilitation from Stuttgart University. Nicole Karafyllis was an assistant professor at the Goethe University in Frankfurt am Main and a full professor at the United Arab Emirates University in Abu Dhabi. Her research focuses on Philosophy of Science and Technology, with a particular emphasis on the interface of Biotech and Engineering.

# KEYNOTE SPEAKERS



**Christine Selhuber-Unkel** is one of the founders of the Institute for Molecular Systems Engineering and Advanced Materials (IMSEAM) of Heidelberg University, where she holds a full professorship. She is also the Heidelberg Spokesperson for the cluster of excellence 3DMM20. Christine Selhuber-Unkel obtained a diploma in Physics at Uppsala University and a PhD from Heidelberg University. She held positions at Copenhagen University and Kiel University. Her group works on the biophysics of cells, nano- and microstructured biomaterials, as well as responsive and adaptive materials.

# KEYNOTE SPEAKERS



**Fruzsina Molnár-Gábor** is a full professor at the Faculty of Law of Heidelberg University and a Research Group Leader at the BioQuant Center. She received a diploma and a doctorate of law from the University of Heidelberg and was a research group leader at the Heidelberg Academy of Sciences. Fruzsina Molnár-Gábor worked at the Max Planck Institute for Comparative Public Law and International Law in Heidelberg while doing her doctorate. Her research focuses on medical and data protection law, international and European law, and comparative public law.



**Klaus Tanner** is the predecessor of Thorsten Moos as professor of Systematic Theology/Ethics at Heidelberg University. He received consecutive Marsilius Fellowships from 2010-2012, led the EURAT project concerned with the ethical and legal aspects of total genome sequencing and currently is a Fellow of the Max Planck School Matter to Life. Klaus Tanner holds a PhD and a habilitation from LMU Munich. He was appointed to professorships in Dresden and Halle-Wittenberg before coming to Heidelberg, and is primarily concerned with the history and foundation of theological, medical, and bioethics.

# SCIENCE COMMUNICATION SPEAKER



**Eva Wolfangel** holds a degree in cultural studies (Humboldt University Berlin), and used to be the third Marsilius Visiting Professor for Science Communication. She has been working as a freelance science journalist since 2014 and writes for major magazines and newspapers in Germany and Switzerland. In her articles, she focuses in particular on key technologies such as artificial intelligence and virtual reality. Among many awards, she has received the „European Science Writer of the Year 2018“ prize and the „Georg von Holtzbrinck Prize for Science Journalism 2020“. In 2019/20, Eva Wolfangel was part of the Knight Science Journalism Fellowship program at the Massachusetts Institute of Technology (MIT).

# EUROPEAN MOLECULAR BIOLOGY LABORATORY



The European Molecular Biology Laboratory aims to promote molecular biology across Europe, and to create a centre of excellence for training Europe's leading young molecular biologists. It has five missions: 1. To perform fundamental research in molecular biology, 2. To offer vital services to scientists in the member states and the world, 3. To train scientists, students, and visitors at all levels, 4. To actively engage in technology transfer and industry relations, 5. To coordinate and integrate European life science research. With 28 member states, EMBL has more than 110 independent research groups and service teams at six sites in Barcelona, Grenoble, Hamburg, Heidelberg, EMBL-EBI Hinxton, and Rome. EMBL Heidelberg is the organisation's main Laboratory and serves as its headquarters. It was inaugurated in 1978 as the first

EMBL facility dedicated to basic molecular biology research, technology development, service provision and advanced training. Nowadays it is home to, among others: the Director General's Office and Council Secretariat; the EMBL International Centre for Advanced Training (EICAT); and the following five research units: Cell biology and biophysics, developmental biology, director's research, genome biology, structural and computational biology.



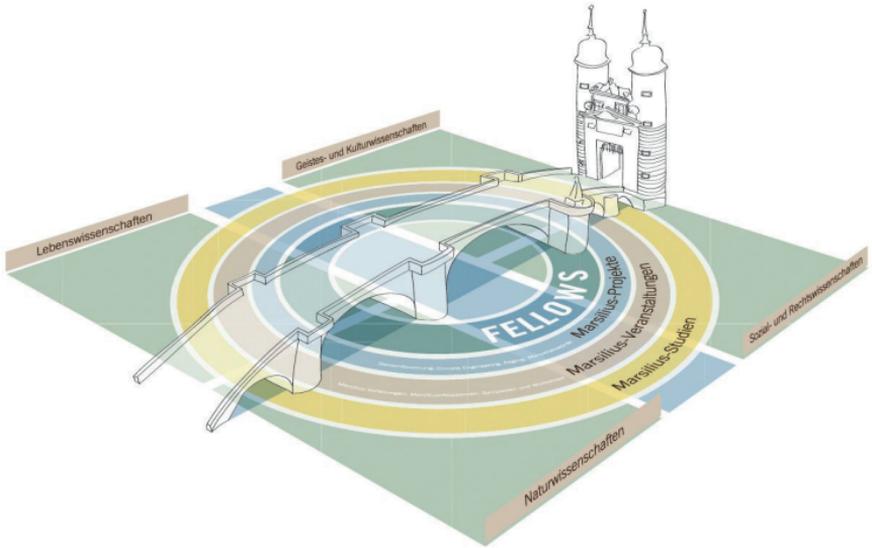
# MAX-PLANCK INSTITUTE FOR MEDICAL RESEARCH



The Max-Planck Institute for Medical Research (former Kaiser Wilhelm Institute) is one of currently 85 Institutes and Facilities of the Max Planck Society that are tasked with conducting basic research in the service of the general public in the natural sciences, life sciences, social sciences, and the humanities. Since its inception in 1927, it has been shaped by outstanding scientists and their research teams at the interface of physiology, physics, chemistry and biology. With the appointment of three new directors in the last few years, the institute has experienced a major reorientation. The new, central topic of research is to observe in real time and manipulate the complex dynamics of the interactions between macromolecules in the living cell, in health and disease. The four departments contribute their unique expertise in complementary areas:

the determination of atomic structures (Ilme Schlichting), optical nanoscopy (Stefan Hell), design of new reporter molecules (Kai Johnsson) and cellular material research and biophysics (Joachim Spatz). This involves developing tools for biomedical research which could lead to new knowledge, insights and medical advances. In doing this, the institute upholds the vision of the founder, Ludolf von Krehl, to advance medical research through the collaboration of physiology, biology, physics and chemistry under one roof.

# MARSILIUS KOLLEG



As an Institute for Advanced Study (IAS), the Marsilius-Kolleg at Heidelberg University promotes new forms of interdisciplinary research. The focus is on the exchange and cooperation between natural, life and engineering sciences on the one hand and humanities, cultural and social sciences on the other. The college aims to develop, implement and communicate overarching research perspectives. In doing so, it also pursues the goal of contributing to a successful exchange between science and society. The Marsilius-Kolleg is an integral part of the Heidelberg concept “The Comprehensive Research University” in the Excellence Strategy of the German Federal and State Governments. Structurally, the Marsilius-Kolleg is designed to organize interdisciplinarity between different disciplines and “scientific cultures”. In doing so, it

is guided by three principles: (1) The appointment of Fellows and Young Fellows, who are given freedom to conduct unconstrained research (IAS principle). (2) The promotion of exchange and cooperation between different scientific cultures (bridge principle). Derived from this, the Kolleg is also dedicated to the topic of science communication. (3) The support of activities centered on scientists at Heidelberg University and the surrounding research institutions (location principle).



## **Health + Life Science Alliance Heidelberg Mannheim**

The Alliance connects the Heidelberg University of Excellence, the two medical faculties and two university hospitals in Heidelberg and Mannheim as well as the German Cancer Research Center (DKFZ), the European Molecular Biology Laboratory (EMBL), the Max Planck Institute for Medical Research (MPIMR) and the Central Institute of Mental Health (ZI). It appoints top scientists, supports junior researchers with cross-institutional programs, and taps new potential, especially for the translation of research to patient care and the transfer into technological applications. In doing so, the partners aim to develop the life sciences into an innovative lighthouse discipline and lay the foundation for a new leading industry.



## **3D MATTER** MADE TO ORDER

The Cluster of Excellence is a collaboration of Karlsruhe Institute of Technology (KIT) and Heidelberg University. It pursues an interdisciplinary approach through conjunction of natural, engineering, and social sciences. 3DMM20 establishes scalable digital 3D Additive Manufacturing transcending from the molecular to the macroscopic scale. This approach converts digital information into functional materials, devices and systems “made to order.” 3DMM20 creates a powerful technology push and pull by treating molecular materials, technologies and applications as indissolubly intertwined. On the technology side, the scientific challenges consist in advancing molecular materials and technologies in terms of resolution, speed, and multi-material printing by orders of magnitude. On the application side, we aim at functional 3D hybrid optical and electronic systems, 3D artificial materials called metamaterials, and at reconstructing functioning organotypic systems by using 3D scaffolds for cell culture.