ANNUAL REPORT

1 April 2023 — 31 March 2024

International

Human Frontier Science Program

Organization

INTERNATIONAL HUMAN FRONTIER SCIENCE PROGRAM ORGANIZATION

The Human Frontier Science Program (HFSP) is unique, supporting international collaboration to undertake innovative, risky, basic research at the frontier of the life sciences. Special emphasis is given to the support and training of independent young investigators, beginning at the postdoctoral level. The Program is implemented by the International Human Frontier Science Program Organization (HFSPO), supported financially by Australia, Canada, France, Germany, India, Israel, Italy, Japan, the Republic of Korea, New Zealand, Norway, Singapore, South Africa, Switzerland, the United Kingdom of Great Britain and Northern Ireland, the United States of America, and the European Commission. Since 1990, more than 7,500 researchers from more than 70 countries have been supported. Of these, 29 HFSP awardees in 35 years have gone on to receive the Nobel Prize.

The following documents are available on the HFSP website www.hfsp.org:

- Joint Communiqués (Tokyo 1992, Washington 1997, Berlin 2002, Bern 2004, Ottawa 2007, Canberra 2010, Brussels 2013, London 2016, Tokyo 2019, Paris 2023): https://www.hfsp.org/about/governance/membership
- Statutes of the International Human Frontier Science Program Organization: https://www.hfsp.org/about/governance/hfspo-statutes
- Guidelines for the participation of new Members in HFSPO: https://www.hfsp.org/about/governance/membership
- General reviews of HFSP (1996, 2001, 2006-2007, 2010, 2018): https://www.hfsp.org/about/strategy/reviews
- Lists of 2024 awards: https://www.hfsp.org/awardees/newly-awarded
- Previous lists of awards, including titles and abstracts: http://www.hfsp.org/awardees/awards

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In addition to the annual report, each year, HFSP produces a *Science Digest* presenting research highlights from HFSP research grant and fellowship awardees, together with summaries of basic science leading to innovation.

Foreword

PRESIDENT'S MESSAGE

Shigekazu Nagata
HFSPO President and Chair
of the Board of Trustees

When people talk about achievement and success they often use metaphors that refer to "ascending heights," "scaling mountains," or "reaching new horizons."

Compare that to the wisdom inherent in conducting basic research. We "uncover fundamental knowledge" and "dig deep to reveal the core mechanisms" of living organisms. Indeed our metaphors are quite different, and I would go so far as to say they reflect different values. As life scientists, we focus on how organisms are born, defend against disease, thrive, and finally die — and on how species and communities evolve, as well as the mechanisms that support all these aspects of life. Curiously, our discoveries often reveal a world that spirals back on itself in fascinating ways.

In my own career, now 50 plus years in the making, I have focused on understanding programmed cell death, the way in which cells intentionally die to facilitate other processes the organism, as a whole, needs. For example, programmed cell death, apoptosis, plays an important role in promoting immunity. It might seem counter-intuitive that cell death promotes health, but it makes sense from the perspective that without apoptosis uncontrolled cell growth could lead to cancer. For me, discovering fundamental knowledge — learning to see things in ways that aren't obvious — is the hallmark of excellence in basic research.

For this reason, I feel that those of us who conduct basic research are the lucky ones: we have meaning built into the work we do. In this regard, we are fortunate the International Human Frontier Science Program Organization (HFSPO) exists, as very few science funding organizations are dedicated to fostering frontier life science research from a basic, curiosity-driven perspective. Since 2018, it has been my pleasure to serve as HFSPO's President, a role that has allowed me to give back to the very community that has made my research possible in so many different ways.

When I began my career in the 1970s — long before HFSPO was established — the scientific community was cultivating core values and mindsets that HFSPO

would later come to embody, specifically: the importance of international collaboration in advancing frontier science. What I experienced in those early years was the notion that for me to succeed and develop exceptional abilities I had to make a very basic change and pursue a somewhat counter-intuitive route. I left my home country of Japan and for several years worked in the laboratory of Dr. Charles Weissman in Zürich, Switzerland, and thereby greatly expanded my capabilities.

I found that to open new horizons, it was absolutely vital to deepen my knowledge by engaging in scientific explorations through international collaboration. I can't say this often enough: to gain insight you have to be willing to leave familiar ground and go beyond your comfort zone. For the next generation of pioneering thinkers, travel expands their minds and deepens their faculties providing them a much richer basis from which to pose questions and develop new ideas. Fortunately, HFSPO offers postdoctoral researchers the opportunity to travel abroad and work in other laboratories; for established scientists, HFSPO offers research grants so scientists can join international and intercontinental teams conducting interdisciplinary research. HFSPO's Fellowships and Research Grants offer the means for scientists to uncover the deep knowledge that humanity so urgently needs today. There remains so much still to understand about our world!

As your outgoing President, it has been my honor and my pleasure to serve HFSPO these past six years. To scientists, Members, and postdoctoral researchers, I would like to offer the following thoughts. As you set your sights on achievement, make sure you grow deep, interconnected roots. Look for meaning in the gaps of knowledge and how things come together in curious ways. Pursue interdisciplinary studies and know that your insight will become keener when you see and understand the world by connecting with others. In all these ways, HFSPO offers a rich and fertile ground; it is indeed a treasure worth cultivating.

SECRETARY-GENERAL'S MESSAGE

Pavel Kabat
Secretary-General of HFSPO

In 1973, American evolutionary biologist, Leigh Van Valen, borrowed from author Lewis Carroll's famous tale *Through the Looking Glass* when he articulated the Red Queen's hypothesis: "that species must constantly adapt, evolve, and proliferate in order to survive while pitted against ever-evolving opposing species."

Indeed, in real life species face opposing species, predators, and those who would occupy the same niche. Furthermore, what is true of living organisms, not surprisingly, is also true of human organizations. We need change from time to time to remain fresh, relevant, and adapt to the times in which we live.

For the International Human Frontier Science Program Organization (HFSPO) the greatest threat to our future is more elusive, harder to see: it is the danger of becoming complacent, comfortable in what we have already done. A pioneering organization can't afford to do that. We need to strategically move ahead. We need to be wise about our commitment of time and resources, but we can't afford to lose heart!

In 2023, HFSPO made major strides in three key areas that, taken together, all spell critical and important areas of growth.

MEMBERSHIP AND INTERNATIONAL SCIENCE CAPABILITY:

When HFSPO was first formally proposed in 1987 during the G7 Summit in Venice, the seven nations plus the European Community had the scientific capability and leadership necessary to pioneer the frontiers of life science exploration. In today's world, the G7 remains a seven-member organization, but HFSPO has grown. Science has grown. Frontier life science research has greatly expanded and deepened in this time period, and many more nations have developed the scientific expertise, facilities, universities, and research culture that is required to truly conduct frontier life science. Today, HFSPO is proud to say our organization has 17 Members. This growth is valuable for promoting excellence in science. Further, by attracting new Members, our organization remains vital and robust. This is also an indicator that we are doing our job well — we have built an organization that values exploratory, life science research, and more scientists and countries want to become part of our vigorous culture! Which brings me to my next point, our shared values.

SHARED VALUES STATEMENT:

In 2023, our governance bodies and staff came together to craft a statement that expresses the HFSPO culture in a way that reflects our identifying sensibilities and helps others resonate with us if they share the same values. In this respect, it's important to be clear what is important to HFSPO and to its Members. We want to function in a harmonious way and to be aligned with each other, so taking the time now to attune to each other is a vital part of how we operate now and for the future ahead.

If you have not yet read it, please consult:
🔗 www.hfsp.org/our-shared-values

Why do I say that crafting this statement was tantamount to an opportunity for evolution? Because there is truth in the idea that what you put your mind to is what will grow, and we have been reflecting strongly on the qualities that we value in our science, among our scientists, and among our Members. Which brings me now to my third point about 2023 and the steps we took together.

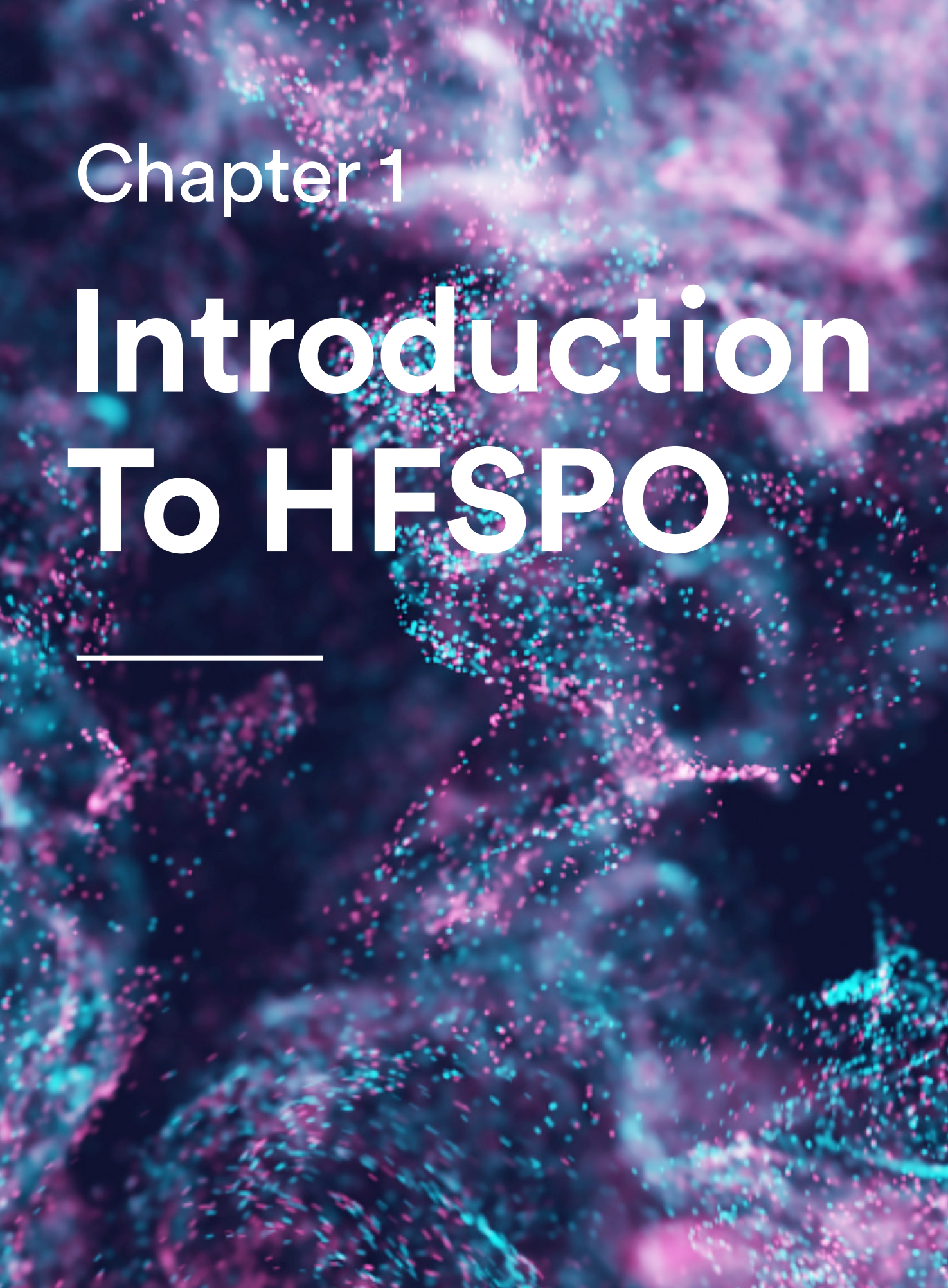
STRATEGIC PLAN FOR OUR FUTURE:

For the first time in our history, we came together to articulate a strategic vision and plan for our future and published it in 2023. The HFSPO Strategic Plan 2024-2032 "Frontier Life Science in a Time of Change" is available online (🔗 www.hfsp.org/node/74918#book) and as a hard copy.

In this document we committed to three goals: one overarching goal to Expand Frontier Science and two supporting goals: Strengthen HFSP Through Engagement and Become a Globally Inclusive Organization.

In 2024, we are celebrating our 35th anniversary, and we intend to continue to pioneer the frontiers of life science research, which means we need new energy and ideas to evolve! We need to consciously rededicate our energy and our resources to reinforcing our organization as well as expanding the science we support. We do this by welcoming more able hands and minds to the table.

HFSPO's relevance and future as a healthy, frontier life science organization depends on fostering and supporting highly imaginative, innovative, risky research! Thankfully, we have the commitment of our Members to accomplish just that!



Chapter 1

Introduction To HFSPO

1.0
GETTING TO KNOW HFSPO

The International Human Frontier Science Program Organization (HFSPO) is an international cooperation in life science research supported by the world's leading scientific countries. It promotes fundamental research in the life sciences with special emphasis on novel and interdisciplinary research, international and, in particular, intercontinental collaboration and support for early career investigators.

The beginnings lay in Japan in the 1980's and evolved from two governmental plans designed to stimulate collaboration with foreign research institutions and companies. HFSPO was an experiment in more flexible program management allowing bottom-up initiatives that would be decided by an independent scientific structure and governed by an international board of trustees.

In 1986, a feasibility study for such an international endeavor was carried out by leading Japanese scientists under the auspices of the Japanese Prime Minister's Council for Science of Technology. This discussion was expanded in 1987 to include scientists from the G7 nations and European countries, resulting in the London Wise Men's Conference in April 1987, which endorsed the concept. Prime Minister Yasuhiro Nakasone of Japan proposed to implement HFSPO as the operational entity for the organization at the Venice Economic Summit of the G7 countries and the European Community in June 1987. The Economic Summit partners welcomed the initiative.

HFSPO is unique: it supports innovative, frontier research in the life sciences, encourages high-risk, high-reward research, and promotes international collaboration in the spirit of science without borders. Over the next two years, additional discussions among international leaders gave shape to the Human Frontier Science Program, and in 1989, an International Scientists Committee further defined the

The G7 Economic Summit in Venice 1987. L to r: Wilfried Martens, Belgium; Jacques Delors, European Community; Yasuhiro Nakasone, Japan; Margaret Thatcher, United Kingdom; Ronald Reagan, United States; Amintore Fanfani, Italy; François Mitterrand, France; Helmut Kohl, Germany; and Brian Mulroney. Canada.

Human Frontier Science Program's organization, activities, research areas, and project selection procedures.

Later that year, the G7 governments agreed to implement HFSPO for an experimental phase of three years. Following a general review of the initial phase, an international conference of the Members agreed on the desirability of continuing HFSPO.

The administrative offices of HFSPO, known as the Secretariat of the Program, were established in October 1989 in Strasbourg upon the invitation of the Government of France. The first President of the Program was Ambassador Hiromichi Miyazaki of Japan, the first Chairman of the Council of Scientists was Edward Rall of the USA, and the first Secretary-General was Sir James Gowans, former Secretary of the UK Medical Research Council. The original supporting HFSPO Members were the countries of the G7 together with the European Community. Switzerland joined in 1990. Australia, the Republic of Korea, India, New Zealand, Norway, Singapore, and Israel have joined since 2004, and South Africa joined in 2023.

HFSPO was designed to foster international collaboration among nations with shared values to pioneer the most innovative research in the life sciences and promote early career scientists who propose bold, uncharted research ideas. Today, HFSPO provides opportunities for the global scientific community to support frontier research in areas for which there are no prior studies, no data, and no guarantee for the concept. In fact, HFSPO provides a critical opportunity for international life science research and has recently received important acclaim.

In May of 2023, in advance of the G7 Summit held in Hiroshima, Japan, the G7 Science and Technology Ministers met in Sendai to discuss the role of science and research in solving global challenges. Among their recommendations, the G7 Science and Technology Ministers identified HFSPO as providing crucial leadership in the arena of frontier life science and committed further support. In their official Joint Communiqué, the ministers stated: "… HFSP has promoted cutting-edge international joint research and human resource development, achieving significant results in the process."

Science Ministers representing the G7 nations met 12 – 14 May 2023 in Sendai, Japan, to discuss the role of science in addressing global challenges.

L to r: Maria Cristina Russo, Director for Global Approach and International Cooperation in R & I in the Directorate-General Research and Innovation, European Commission; Arati Prabhakar, White House Office of Science and Technology Policy Director, USA; George Freeman, Minister of State for Science, Research and Innovation, UK; Bettina Stark-Watzinger, Federal Minister of Education and Research, Germany; Sanae Takaichi, Minister of State for Science and Technology Policy, Japan; Anna Maria Bernini, Minister of Universities and Research, Italy; Mona Nemer, Chief Science Advisor, Canada; and Sylvie Retailleau, Minister of Higher Education and Research, France.

Photo credit: Kyodo News via Getty Images.

1.1

HFSP PROGRAMS

HFSP supports research into the complex mechanisms of living organisms, ranging from the biomolecular level to the whole organism and its physiology and behavior. The life sciences have emerged as a leading scientific area in which approaches from physics, mathematics, chemistry, computer science and engineering converge to solve biological questions.

HFSP is at the forefront of such interdisciplinary, collaborative research. Through its different funding schemes, it supports frontier, potentially transformative 'out-of-the-box' proposals and encourages applications for high-risk, high-reward projects. Successful projects challenge existing paradigms by using novel approaches and techniques; they address important problems and barriers to progress in the field. HFSP funding complements national programs to enable collaborations in a scientific landscape that changes fast. Novel approaches from different disciplines hold great promise to address the most important problems in understanding complex life. The challenge for all scientists is to look beyond their original expertise and to broaden their horizons by working with collaborators they have never interacted with before and by moving into new fields of research.

HFSP aims to support frontier research by involving scientists from outside the life sciences as part of research collaborations and as postdoctoral fellows. To this end, the Program Grants and Early Career Grants are specifically geared to fostering interactions between scientists from different disciplines and this is a major factor in the review of applications for these programs. In this context, HFSP supports Cross-Disciplinary Fellowships to equip young scientists from outside biology with the skills needed to tackle problems in the life sciences.

Since its establishment in 1989, HFSP has demonstrated the value of creating a framework for competitive, collaborative, international research of the highest caliber and for providing early career scientists with the opportunity to emerge as talented researchers capable of shaping the science of the future. Since 1990, more than 1,200 research grants involving over 4,300 scientists, and more than 3,400 fellowships have been awarded. Researchers from more than 70 countries have received HFSP funding.

HFSPO implements its Program through the following mechanisms of research support, details of which can be found in the subsequent chapters:

RESEARCH GRANTS

- **Early Career Grants** – grants for interdisciplinary teams of early career researchers, who are within the first five years of their first independent position and located in different countries.
- **Program Grants** – for teams of interdisciplinary researchers at any stage of their careers and located in different countries.

HFSP supports the next generation of researchers, who are in the strongest position to open new avenues of research through the fellowship program and Early Career Grant program. Program Grant teams are also encouraged to include early career scientists with the result that a significant number of scientists under the age of 40 are included in awarded teams.

POSTDOCTORAL FELLOWSHIPS

- **Long-Term Fellowships** – for early career life scientists within three years of obtaining their PhD who wish to broaden their scientific experience in a foreign laboratory.
- **Cross-Disciplinary Fellowships** – specifically for scientists with a PhD in non-biological disciplines to bring new perspectives to research in the life sciences.

HFSP is governed by the Board of Trustees, which is composed of appointees from the HFSPO Members, which currently include: Australia, Canada, France, Germany, India, Israel, Italy, Japan, New Zealand, Norway, the Republic of Korea, Singapore, South Africa, Switzerland, the United Kingdom of Great Britain and Northern Ireland, the United States of America, and the European Commission.

Members of the HFSPO Council of Scientists are nominated by the HFSPO Members. They provide scientific advice to the Board of Trustees and select the winners of the HFSP Nakasone Award. The Board is supported by the HFSPO Secretariat, which is located in Strasbourg, France, and directed by the Secretary-General. The legal basis for HFSPO is as a not-for-profit organization located in Strasbourg, Grand Est, France. The Members support HFSP through voluntary contributions that are agreed upon at the Triennial Conference of HFSPO Members.

1.2

TRIENNIAL CONFERENCE

OF THE INTERNATIONAL HUMAN FRONTIER SCIENCE PROGRAM ORGANIZATION MEMBERS

In addition to the guidance by Board of Trustees, HFSPO is governed by a Triennial Conference of the HFSPO Members (TCHM), which monitors the Organization's progress and fulfillment of its mission. The TCHM was held on 27 June 2023 at the Académie des sciences in Paris to evaluate operations and policy positions.

© Christophe PEUS

Leading the TCHM meeting, l to r, Pavel Kabat, HFSPO Secretary-General; Jacques Demotes-Mainard, Vice President of the HFSPO Board of Trustees and Chair of the TCHM in 2023; Shigekazu Nagata, HFSPO President and Chair of the HFSPO Board of Trustees.

As is the custom of the TCHM, a Joint Communiqué was issued by the Members that summarized their major decisions and agreements. Highlights included:

- Representatives endorse the HFSPO vision, in which HFSPO commits to a world where frontier, breakthrough science pioneers new knowledge and solutions for humanity's future.

- Representatives uphold the HFSPO Mission to promote innovative, cutting-edge research at the frontiers of the life sciences through international collaboration in the spirit of science without borders and for the benefit of humankind.

- Representatives commend HFSPO for its impressive track record in stimulating and supporting world-class excellence in high-risk, high-impact frontier life sciences.

- Representatives affirm HFSPO's unique global niche and value proposition, where successful curiosity-driven research projects are selected on the basis of novelty and scientific excellence alone, and in a transdisciplinary and international collaborative context, support from a common budget to which all HFSPO Members make voluntary contributions. HFSPO's approach adds significant value, complementing other international and national research funding schemes.

- Representatives recognize that the global research ecosystem has undergone profound changes since the early days of HFSPO and call on HFSPO to respond and adapt to maintain its unique niche, value proposition, and contribution to the rapidly moving frontiers of the 21st century life sciences.

- Representatives recognize that for HFSPO to remain a vital and unique contributor to the fast-evolving life sciences enterprise globally, it needs to:
  - — continue and further fortify its core mission, namely to identify and support the best international frontier research grant and fellowship projects,
  - — become more diverse and inclusive across its Members, and expand its global partnerships by strategic evolutionary growth,
  - — exercise both flexibility and agility to be able to respond adequately to the changing nature of the frontiers of the life sciences in the 21st century.

- Representatives support the HFSPO Strategic Plan 2024-2032, as adopted by the Board of Trustees and welcome the needed strategic development of HFSPO over a period of nine years, from 2024 – 2032, spanning three Triennia and budget cycles, and providing flexibility to each Member to shape their engagement with HFSPO and voluntary support to individual circumstances and financial possibilities.

- Representatives commit to an evolving budget with the ambition of arriving at an annual budget sufficient to implement the first Triennium of the HFSPO Strategic Plan 2024 – 2032.

- Representatives encourage the Board to promote Membership of HFSPO and reconfirm their view that HFSPO is open to new Members, in line with their strategy to become a more diverse and globally inclusive international organization.

- Representatives underline that prospective new HFSPO Members should align with HFSPO's Shared Values and principles that lie at the heart of HFSPO and call on the Board of Trustees to pay due attention to this aspect in the development of the long-term HFSPO Membership Strategy.

The TCHM operates through a consensus decision-making process as HFSPO operates by the voluntary commitment and contributions of its Members. All Member representatives signed the 2023 Joint Communiqué.

1.3
OUR SHARED VALUES

Supporting scientific excellence at the frontier of life science has been the overarching mission of HFSPO since its very first days. HFSPO takes pride in its distinct culture which contributes to scientific excellence through high-risk, high-gain research that is paradigm shifting, interdisciplinary, and collaborative at an international level for the benefit of all humankind.

This culture is firmly grounded on shared values of diversity, equity, inclusion, open science, and sustainability.

HFSPO is committed to the highest ethical standards of integrity, accountability, independence and impartiality, transparency, respect and professional conduct, and promotes these standards in the conduct of research.

Our culture and ethical standards are closely intertwined with fundamental human rights and mutual openness, which are at the core of innovation, and responsible, inclusive research support.

On this basis, the Program supports and nurtures individual scientists at all stages of their career and the scientific community at large. It is the collective creativity of this community that drives the Program in the service of society.

1.4

HFSPO STRATEGIC PLAN 2024 – 2032

FRONTIER LIFE SCIENCE IN A TIME OF CHANGE

Frontier life science research is at a critical crossroads. Not since the 1950s has the public become so aware of, and so in support of, scientific research as a vital enterprise for humanity. The pandemic cemented in our minds that basic life science is essential for humanity's survival, public health, and resilience in the face of global challenges. The exceptional vaccines and research on COVID-19 that scientists rapidly deployed were only possible given the groundbreaking discoveries uncovered by basic, frontier life science decades earlier.

Scientists delivered the needed response to this global wake-up call, and citizens and government leaders realized that frontier life science research is one of humanity's most vital, most creative assets. Protecting and growing this capacity is paramount. To this end, HFSPO envisions expanding its core research support programs to ensure that frontier life science can continue to evolve, inviting a diverse portfolio of cutting-edge research and globally diverse scientists, and forging new ways to foster creativity in exploring new horizons.

"Frontier Life Science in a Time of Change," was approved by the HFSPO Board of Trustees in June of 2023 and published as a formal document for the Organization.

The plan focuses on three goals: #1 Expand Frontier Science, #2 Strengthen HFSPO Through Engagement, and #3 Become a Globally Inclusive Organization. These goals are based on four operating principles: Vitality, Connectivity, Diversity, and Foresight. The goals, vision, and planned strategy will guide HFSPO for the next nine years from 2024 until 2032.

To read the strategic plan online, please visit our website:
🔗 www.hfsp.org/node/74918#book/

1.5
HFSPO BOARD OF TRUSTEES

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- Torsten GEISSLER, Federal Ministry of Education and Research, Berlin (until December 2023)
- Christian BOEHM, Federal Ministry of Education and Research, Berlin (from December 2023)

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- Pushkar SHARMA, National Institute of Immunology, New Delhi

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- Gugu MOCHE, National Research Foundation, Pretoria (from March 2024)
- Liesl ZŰHLKE, South African Medical Research Council – Tygerberg, Cape Town

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- Simona BERARDI VILEI, Swiss National Science Foundation, Bern (until December 2023)

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- Kendra SHARP, National Science Foundation, Alexandria*
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**Sharing one Trustee seat as Co-Trustees*

1.6
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- Jörg OVERMANN, Leibniz Institute DSMZ, Braunschweig (from January 2024)

VICE-CHAIRS
- Masahide KIKKAWA, The University of Tokyo, Tokyo
- Vidita VAIDYA, Tata Institute of Fundamental Research, Mumbai (until December 2023)
- Juliet DANIEL, McMaster University, Hamilton (from January 2024)

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1.7

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- Irene KUGE, (USA) Senior Executive Officer (from June 2023)

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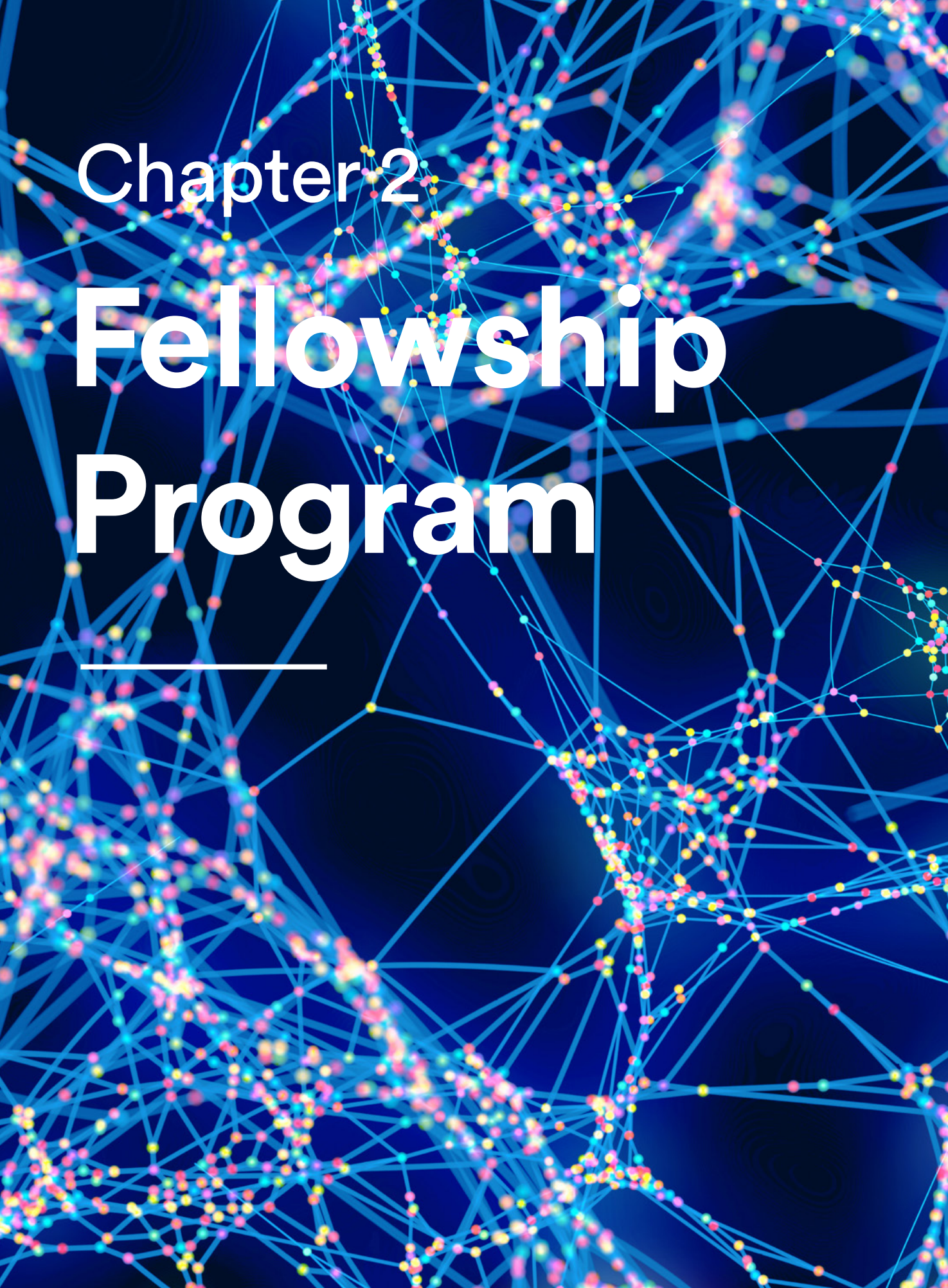
- Severine ETCHANCHU (France), Operations Officer
- Jennifer SAYOL (France), Director of Finance
- Xavier SCHNEIDER (France), IT Systems Manager



Chapter 2

Fellowship Program

2.0

KEY FIGURES AND PROJECT HIGHLIGHTS

- 59 postdoctoral fellowships, including 48 Long-Term Fellowships and 11 Cross-Disciplinary Fellowships, were awarded in March 2024 from 677 letters of intent submitted in May 2023. The final success rate based on the 535 reviewed letters of intent was 11%.
- 42.4% of fellowship awardees are females.
- In the competition that ended in March 2024, 15% of the reviewed Full Proposals were for the Cross-Disciplinary Fellowship program.
- 19% of the awards were offered to Cross-Disciplinary Fellowship applicants.
- Awardees were of 24 different nationalities and chose 11 different host countries.

- Bats are reservoirs for many viruses, including coronaviruses, and there is scarce evidence that intrinsic and extrinsic stressors (e.g., reproduction and habitat quality, respectively) cause bats to shed more viruses. An awardee from India will use his HFSP Long-Term Fellowship at the University of Oklahoma, USA, to gain a better understanding of the underlying basis of this interesting and important phenomenon.
- Splicing of newly made pre-mRNAs is essential for gene expression and is carried out by the highly dynamic spliceosome machinery. However, splicing errors can occur, resulting in aberrant spliceosomes and faulty mRNAs. An awardee from Lithuania will use her fellowship at the Research Institute of Molecular Pathology (IMP Vienna, Austria) to determine the structural basis for how aberrant spliceosomes are identified, rescued, or disassembled.
- Ultrasound neuromodulation (USNM) has recently gained significant attention in neuroscience research and clinical applications. A Cross-Disciplinary fellow from Slovenia will move to the California Institute of Technology, USA, to investigate which acoustic forcing mechanisms are responsible for USNM and to what extent, and then determine the magnitude and nature of the involved forces.
- During embryonic development, the cytoplasm separates into distinct compartments prior to cell division, which can lead to large-scale cytoplasmic flows. A Cross-Disciplinary fellow from Austria will move to the Technical University Dresden, Germany, to investigate the competition between the mechanisms of self-organization and the antagonizing transition to chaos in cytoplasmic flows. This research has the potential to explain why some embryos develop as syncytial masses while others divide into individual cells.

2.1

AIMS OF THE HFSP FELLOWSHIPS

HFSP offers two types of postdoctoral fellowships:

- **Long-Term Fellowships (LTF)** are for applicants with a PhD in a biological topic who want to embark on a novel frontier project focusing on the life sciences.
- **Cross-Disciplinary Fellowships (CDF)** are for applicants who hold a doctoral degree in a non-biological discipline (e.g., physics, chemistry, mathematics, engineering or computer sciences) and who have not worked in the life sciences before but want to work on a novel frontier project in biology.

All HFSP fellowships are for three years of research and provide an annual living allowance as well as a research and travel allowance. In addition, child, parental leave and relocation allowances are provided where appropriate.

All HFSP fellowships must be taken up in a laboratory in a different country to the one where the PhD degree was conferred. Applicants from a country that is not a Member of HFSPO must hold their fellowship in an HFSPO Member country.

HFSP fellowships are flexible. After one year at the host institution, awardees can defer their fellowship for up to one year and can also use the third year in a different country or in their home country. At the end of the fellowship, the awardees can request a six-month no-cost extension to spend any remaining funds in their host lab. At HFSP we believe that such flexibility is crucial to allow fellows to make the most of their postdoctoral training.

2.2

SELECTION OF HFSP FELLOWSHIPS

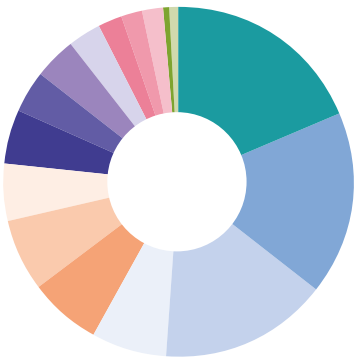
AWARDED IN MARCH 2024

The competition for 2024 fellowships was launched in March 2023, and for the third time, employed a two-step application process consisting of a letter of intent followed by the submission of a full proposal. The largest group of applicants (19%) in the letter of intent stage were from non-Member countries, illustrating the worldwide reach of HFSP (Figure 2.1 and Table 2.1), followed by candidates from India, Europe, Japan, France, Germany, and Italy. In total, 677 letters of intent were submitted, out of which 535 were eligible and took part in the complete review process. The reviewed applications were from applicants of 64 nationalities proposing to move to 28 host countries.

In March 2024, HFSPO announced fellowship awards to scientists of 24 different nationalities (see Table 2.1). Among them, 48 early career researchers were awarded Long-Term Fellowships and 11 were awarded Cross-Disciplinary Fellowships.

HFSP fellows chose host labs in 11 countries: 41% of fellows chose to go to labs in the United States of America (Figure 2.2). Since 1990, HFSP fellows have been hosted in 24 countries.

Figure 2.1
Number of Fellowship Applicants by Nationality



100	Non-Members*		21	USA
91	India		20	Korea
83	Europe**		16	Israel
37	Dual nationalities		12	UK
36	Japan		11	Australia
35	France		11	Canada
29	Germany		3	Singapore
27	Italy		3	Switzerland

* 100 applicants were from countries that are not Members of the Organization.
** 83 applicants were from countries of the European Union that are not individual Members of HFSPO, but are represented by the membership of the European Commission.

Table 2.1

Nationalities of Long-Term and Cross-Disciplinary Fellowship Applicants and Awardees in March 2024

Nationality	LTF applicants	LTF awardees	CDF applicants	CDF awardees	Total awardees
Australia	11	0	0	0	0
Canada	11	1	0	0	1
Europe	74	8	9	2	10 [(1)]*
France	35	3	0	0	3
Germany	23	3	6	3	6*
India	76	6	15	1	7
Israel	12	2	4	0	2*
Italy	24	1	3	2	3
Japan	34	7	2	1	8
Republic of Korea	17	0	3	0	0
New Zealand	0	0	0	0	0
Norway	0	0	0	0	0
Singapore	3	1	0	0	1
South Africa	0	0	0	0	0
Switzerland	2	0	1	0	0
United Kingdom	12	1	0	0	1*
United States of America	20	3	1	0	3*
Non-Members[(4)]	79	7	21	1	8 [(2)]
Dual nationalities	33	5	4	1	6 [(3)]
TOTAL	466	48	69	11	59

* Additional awardees holding dual nationalities are accounted for in the "Dual nationalities" row. For details, see point (3).

(1) The 10 European Fellowship awardees are from: Austria 2, Finland 1, Greece 1, Lithuania 1, The Netherlands 2, Portugal 1, Slovenia 1, Spain 1.

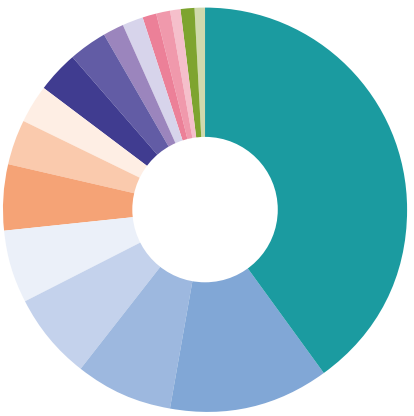
(2) The eight awardees from non-Member countries are from: Argentina 2, China 1, Indonesia 1, Sudan 1, Taiwan 2, Uruguay 1.

(3) Among the six successful applicants who hold dual nationalities, three are from HFSPO Member countries: Israel/USA 1, UK/Finland 1, UK/Ireland 1. The other three are from Argentina/Spain 1, Colombia/Bolivia 1, Germany/Iran 1.

(4) The applicants from non-Member countries are from Algeria, Argentina, Bangladesh, Brazil, Cameroon, Chile, China, Colombia, Cuba, Egypt, Indonesia, Iran, Jordan, Lebanon, Malaysia, Mexico, Morocco, Myanmar, Nigeria, Pakistan, Peru, Philippines, Russia, Serbia, Sudan, Taiwan, Turkey, Ukraine, Uruguay, and Vietnam.

Figure 2.2

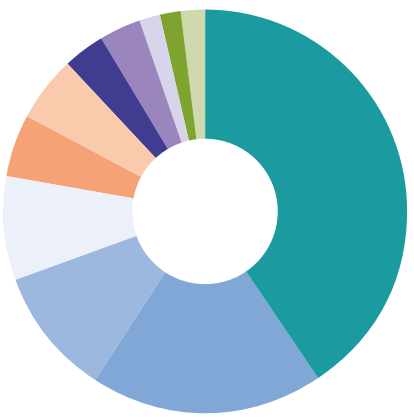
Host Countries of Long-Term and Cross-Disciplinary Fellowship Applicants and Awardees in March 2024



Host Country of 2024 Applicants

212	USA		6	Austria
68	UK		6	Belgium
42	Germany		6	Singapore
36	Switzerland		5	Denmark
32	France		5	Israel
27	Canada		5	Portugal
19	Others*		5	Italy
17	Spain		4	Portugal
9	Australia			

* There were 19 applications for the following host countries: Finland 3, New Zealand 3, United Arab Emirates 3, Japan 2, Norway 2, Brazil 1, China 1, Croatia 1, Estonia 1, Ireland 1, South Africa 1.



Host Country of 2024 Awardees

24	USA		2	Austria
11	Germany		2	Belgium
6	UK		1	Australia
5	France		1	Italy
3	Canada		1	Portugal
3	Switzerland			

Table 2.2

Gender of Long-Term (LTF) and Cross-Disciplinary (CDF) Fellowship Applicants and Awardees Awarded in March 2024

	Applications		Awards	
	LTF	CDF	LTF	CDF
Number of female scientists	223	26	23	2
	47.9%	37.7%	37.7%	18.2%
Number of male scientists	238	43	25	9
	51.1%	62.3%	62.3%	81.8%
Total number of scientists*	**461**	**69**	**59**	**11**

*Gender not provided by five Long-Term Fellowship applicants

Table 2.3

Breakdown of the Two-step Review Process for HFSP Fellowships

	LTF	CDF	TOTAL
Number of Letters of Intent	466	69	535
Number of Full Proposals	91	16	107
Number of awarded Fellowships	48	11	59
% of awarded Fellowships, based on Letters of Intent	10.3%	15.9%	11%
% of awarded Fellowships, based on Full Proposals	52.7%	68.7%	55.1%

Figure 2.3

Development of Applications and Awards as Well as Success Rate over the Last 10 Years

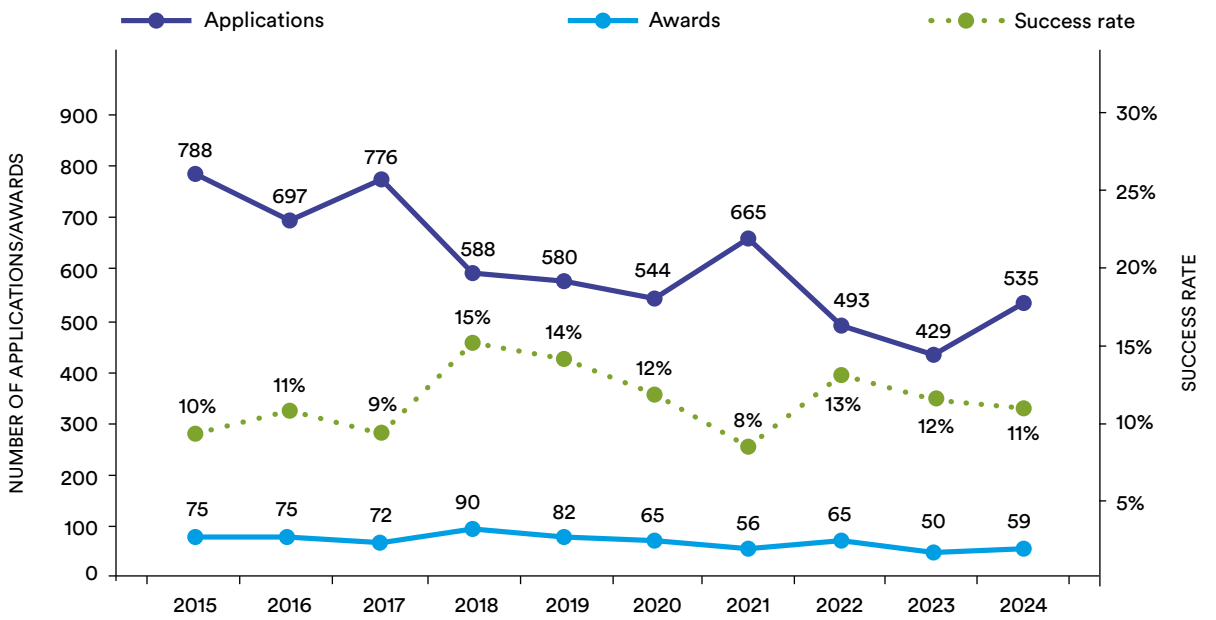
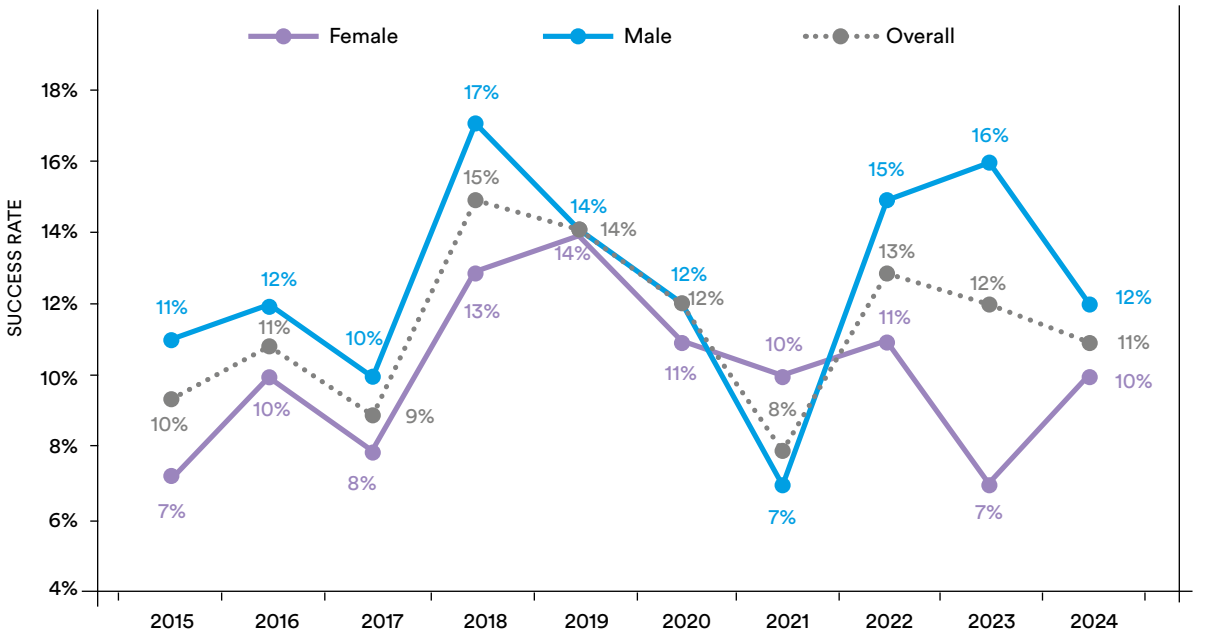


Figure 2.4

Success Rates of Female and Male Fellowship Applicants as of March 2024 (2015 – 2024)*



* As of April 2024, seven awardees declined the fellowship offer. Subsequently, seven offers were made to applicants on the reserve list.

2.3

HFSP FELLOWSHIP REVIEW COMMITTEE

JONATHAN WHITLOCK
Chair, Fellowship Review Committee

NON-REVIEWING CHAIR
- Jonathan WHITLOCK, Norwegian University of Science and Technology, Trondheim, Norway

AUSTRALIA
- Kristin BROWN, Peter MacCallum Cancer Center, Melbourne
- Jacqueline MATTHEWS, University of Sydney, Sydney

CANADA
- Mitsu IKURA, University of Toronto, Toronto

EUROPEAN UNION
- Megan CAREY, Champalimaud Center for the Unknown, Lisbon, Portugal

FRANCE
- Ana CUMANO, Pasteur Institute, Paris
- Stephanie DESCROIX, Institut Curie, Paris
- François FAGOTTO, University of Montpellier, Montpellier

GERMANY
- Victor SOURJIK, Max Planck Institute for Terrestrial Microbiology, Marburg

INDIA
- Vatsala THIRUMALAI, National Centre for Biological Sciences, Bangalore

ISRAEL
- Ilana KOLODKIN-GAL, The Hebrew University of Jerusalem, Rehovot
- Michael KOZLOV, Tel Aviv University, Tel Aviv

ITALY
- Raffaele DE FRANCESCO, Istituto Nazionale Genetica Molecolare, Milano

JAPAN
- Gohta GOSHIMA, Nagoya University, Nagoya

NEW ZEALAND
- Sarah FLANAGAN, University of Canterbury, Christchurch

NORWAY
- Jonathan WHITLOCK, Norwegian University of Science and Technology, Trondheim

REPUBLIC OF KOREA
- Daehee HWANG, Seoul National University, Seoul

SINGAPORE
- Hao YU, National University of Singapore, Singapore

SOUTH AFRICA
- Pieter DE MAAYER, University of the Witwatersrand, Johannesburg

SWITZERLAND
- Nicola ZAMBONI, ETH Zürich, Zürich

UNITED KINGDOM
- Robert INSALL, University of Glasgow, Glasgow
- Evangelia PETSALAKI, Wellcome Genome Campus, Hinxton
- Scott WADDELL, University of Oxford, Oxford

UNITED STATES OF AMERICA
- Mary Kay LOBO, University of Maryland School of Medicine, Baltimore
- Christine RICHARDSON, University of North Carolina, Charlotte

DELEGATE FROM THE COUNCIL OF SCIENTISTS

The HFSPO Council of Scientists is responsible for overseeing the peer review process of HFSP funding programs. Each year a Council member participates in the Review Committee meetings as an observer with the role to monitor due diligence of the proceedings.

- Philip HODGKIN, The Walter and Eliza Hall Institute of Medical Research, Parkville, Australia

2.4
FELLOWSHIP PROFILE

Jamil Kitoko

HFSP 2022 LONG-TERM FELLOWSHIP

Jamil Kitoko

Host Supervisor: Miguel Soares, Instituto Gulbenkian de Ciéncia, Portugal

Neuronal Heme Sensing in Metabolic Adaptation to Infection

In mammals, iron is predominantly found inside heme, the vast majority of which constitutes the hemoglobin in red blood cells. Multiple pathogens have evolved to damage red blood cells in order to access iron. In such circumstances, the body generates extracellular labile heme, which elicits a systemic adaptive response against hemolytic infections, such as malaria caused by *Plasmodium sp*. *Plasmodium* infection is associated with the development of illness-induced anorexia and metabolic reprogramming in murine models, leading to the hypothesis that neurons sense labile heme, either directly or indirectly, in order to adapt the host behavior and metabolism to fight the infection.

A 2022 HFSP Postdoctoral Fellow at the Miguel Soares laboratory, Instituto Gulbenkian de Ciência, Jamil Kitoko has found that heme activates brain hypothalamic regions that control behavior and adipose tissue metabolism. Disrupting adipose tissue metabolism leads to a severe *Plasmodium* infection. Remarkably, the hypothalamic neurons activated by heme overlap with those activated in response to *Plasmodium* infection. This is an important insight as may explain some of the adaptive changes in hemolytic diseases after labile heme accumulation in the body's circulatory system.

Chapter 3

Research Grant Program

3.0

KEY FIGURES AND PROJECT HIGHLIGHTS

- 25 Research Grants – Program and 9 Research Grants – Early Career were awarded in March 2024, to 34 principal investigators and 74 co-investigators in 23 countries.
- The success rate for letters of intent submitted in March 2023 was 4.3% for Research Grants – Program and 7.1% for Research Grants – Early Career.
- Female scientists constitute 42% of all team members in Research Grants – Early Career and 28% of all team members in Research Grants – Program.

- Projects investigate important building blocks of life such as the nucleotides, the evolution of cell organelles and organisms in their environments, the intricate relationships between microbes and their hosts, or the behavioral control and cognitive abilities of humans and other animals.
- A team with members from Norway and Ethiopia will combine hyperspectral imaging with deep learning approaches to develop dendrochronology methods for tropical trees; the final goal is to derive new types of wood-based proxy records for climate reconstruction in environments and to assess the interplay between environmental and climate variables and tree responses.
- A grant team with members on three continents aims to reveal the molecular basis of the magnetic sense. They will test their novel hypothesis that the molecules used by animals to sense ultraviolet light, UV opsin, is also used to sense the magnetic field of the earth. If successful, this high-risk project will reveal the transduction mechanism of this last enigmatic animal sense.
- Two projects will study novel aspects of mammal embryo development. A Research Grant – Program team proposes to quantify the mechanical interaction between the embryo and the uterus to understand how physical forces affect embryo development during implantation. An Early Career team aims to understand how different cell types arise by recording the mechanical cues they are sensing while they migrate through ever-changing environments.

3.1

AIMS OF THE HFSP RESEARCH GRANTS

HFSP supports frontier research in the life sciences through two types of research grants:

- **Research Grants – Program** are awarded to teams of two to four scientists at any stage of their careers who embark upon a new collaborative project.
- **Research Grants – Early Career** (previously known as Young Investigator Grants) require team members be within five years of obtaining an independent position and not more than 10 years after completing their PhD.

Both types of HFSP research grants are awarded to newly built interdisciplinary teams of two to four scientists working in different countries — preferably different continents. The emphasis is on teams, in which each member brings a distinct and unique approach to the proposed project. Major progress in answering basic questions in the life sciences requires interdisciplinary approaches with new combinations of novel tools and technologies and innovative theoretical concepts. Awards for HFSP Research Grants reflect participation by scientists from disciplines outside the traditional life sciences, including: physics, chemistry, geology, material science, mathematics, nanoscience, or psychology.

HFSP projects are based on the outstanding competence of the scientists, their innovative ways of thinking, and their willingness to take the risk to venture outside their traditional research areas to build new teams. These interdisciplinary collaborations open up new approaches for understanding the complex structures and regulatory networks that characterize living systems, from the molecular up to the ecological level, from the nanometer to the global range, and from geological timescales to microseconds.

3.2
SELECTION OF HFSP RESEARCH GRANTS

For the competition launched in March 2023, 711 eligible letters of intent were submitted. Following the two-step peer review process, the HFSPO Board of Trustees approved 34 awards, 25 to Program Grant teams, and nine to Early Career teams in March 2024.

Table 3.1
Breakdown of the Two-step Review Process for the HFSP Research Grants

	Program Grants	Early Career Grants	Total
Number of eligible Letters of Intent*	585	126	**711**
Number of full applications	82	18	**100**
Number of awarded projects	25	9	**34**
% of awarded projects, based on Letters of Intent	4.3	7.1	**4.8**
% of awarded projects, based on full applications	30.5	50.0	**34**
Number of members per awarded team, mean (range)	3.3 (2-4)	2.9 (2-4)	**3.2**
Cumulative total per year, mUSD	**10.45**	**3.45**	**13.9**

*19 submitted LOIs were ineligible and are not counted here.

Figure 3.1
Number of Eligible Letters of Intent and Awarded Grants and Success Rate over the Last 10 Years

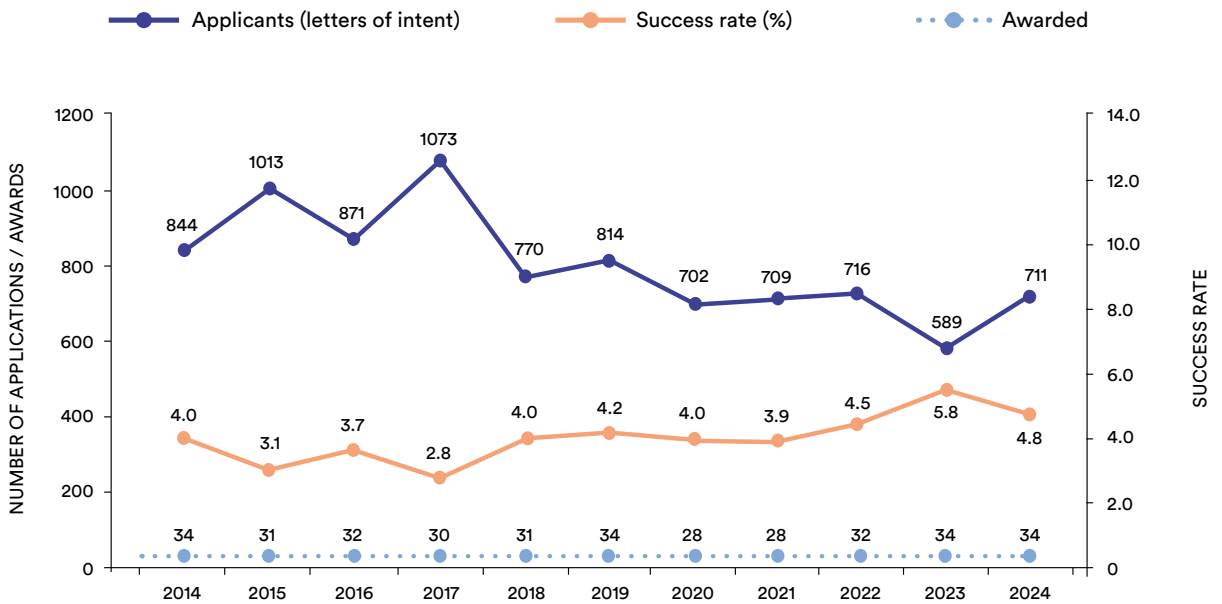


Figure 3.2
Success Rates of Female and Male Research Grant Applicants (Includes All Members of a Grant Team)

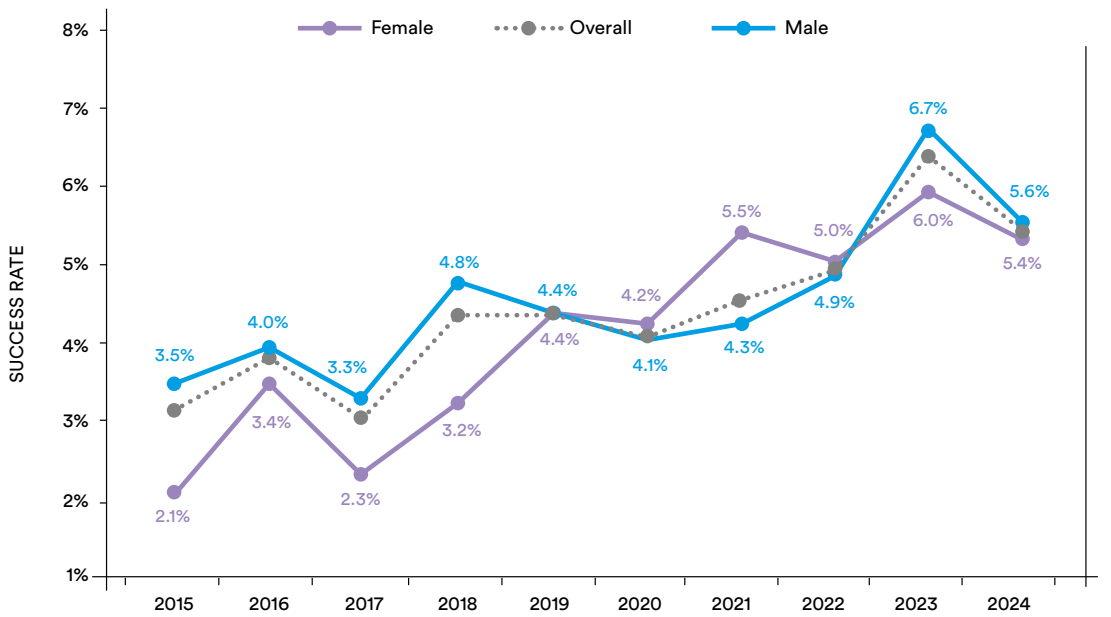


Table 3.2

Gender Distribution Across the Research Program

	Letter of Intent		Awarded grants	
	Program	**Early Career**	**Program**	**Early Career**
Number of female scientists	519	114	23	11
	31.4%	35.1%	28.1%	42.3%
Number of male scientists	1107	206	58	15
	67.0%	63.4%	70.7%	57.7%
Total number of scientists	**1653***	**325***	**82****	**26**

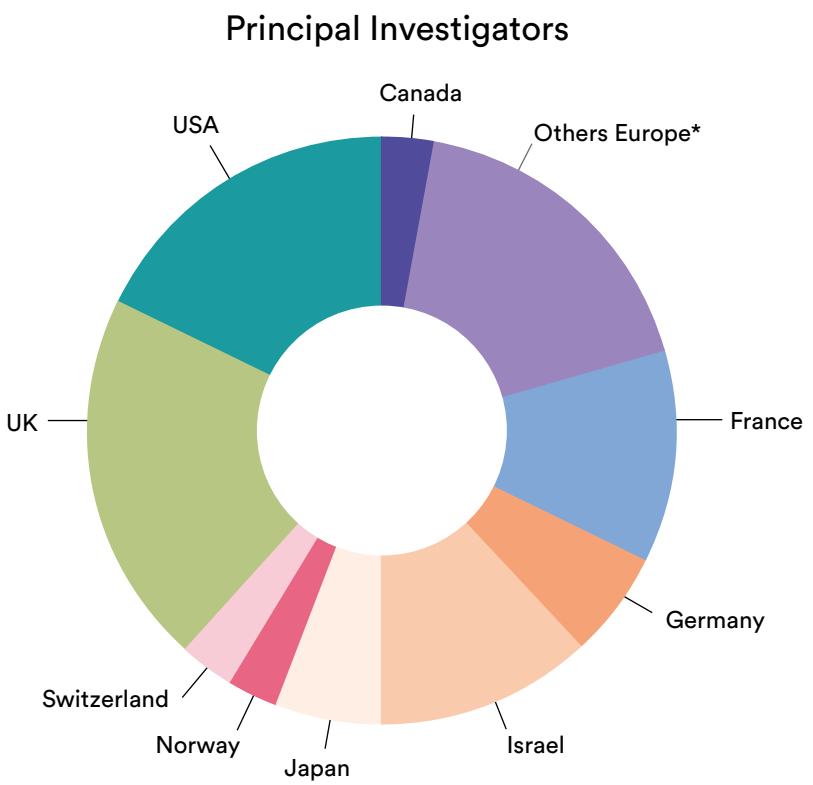
*** Gender information was not provided by 32 applicants (27 Program & five Early Career) included in these numbers.**

**** Gender information was not provided by one awardee (one Program) included in this number.**

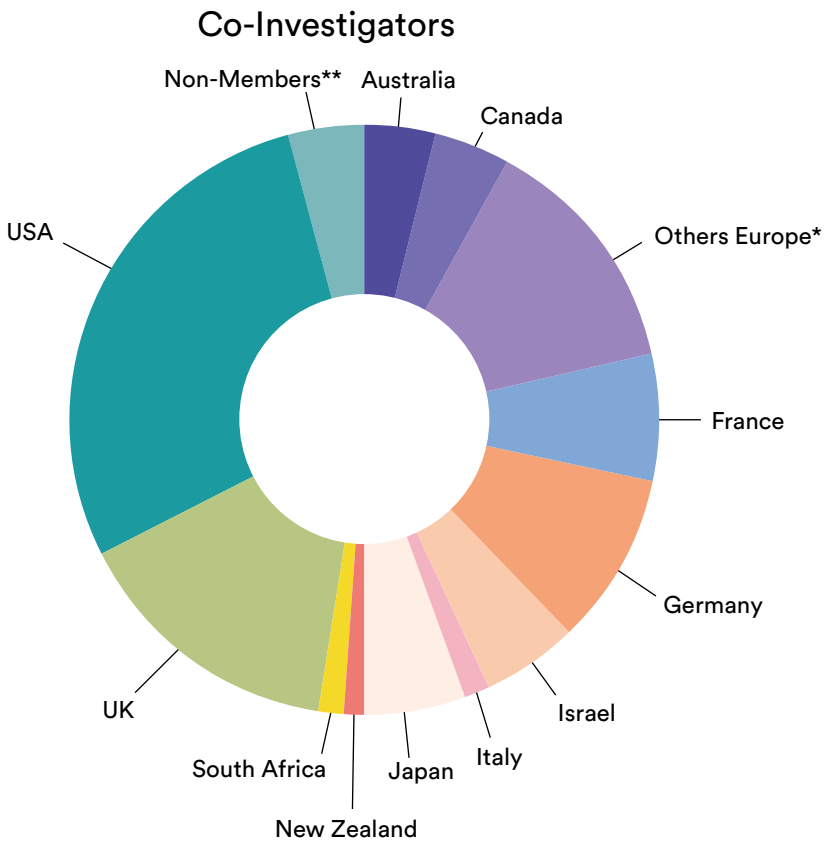
The gender distribution among all applying and awarded team members differs significantly between the Program and Early Career Grant categories. (Numbers shown refer to all team members, including principal and co-applicants).

Figure 3.3

Countries Where Awardees Are Working (as of Board Approval 26 March 2024)



*** The principal investigators mentioned under "Others Europe" have their laboratories in the following countries: Austria 1, Denmark 1, Portugal 1, and Spain 3.**



*** The co-investigators mentioned under "Others Europe" have their laboratories in the following countries: Belgium 1, The Netherlands 3, Spain 4, and Sweden 2.**

**** Those investigators with their laboratories in countries that are not Members of the Organization, include: Argentina 1, China 1, and Ethiopia 1.**

3.3

HFSP RESEARCH GRANT REVIEW COMMITTEE

NON-REVIEWING CHAIR
- Michael RYAN, Monash Biomedicine Discovery Institute, Melbourne, Australia

AUSTRALIA
- Ryan LISTER, University of Western Australia, Perth
- Robert PARTON, University of Queensland, Brisbane

CANADA
- Stephen W. MICHNICK, University of Montreal, Montreal

EUROPEAN UNION
- Alessandra CAMBI, Radboud University Medical Centre, Nijmegen, The Netherlands
- Tim VOGELS, Institute of Science and Technology Austria, Austria

FRANCE
- Aude PANATIER, Neurocentre Magendie, Bordeaux

GERMANY
- Michael LENHARD, University of Potsdam, Potsdam
- Rebecca WADE, Heidelberg Institute for Theoretical Studies, Heidelberg

INDIA
- Rashna BHANDARI (Deputy Chair), Centre for DNA Fingerprinting and Diagnostics, Hyderabad
- Uma RAMAKRISHNAN, NCBS – Tata Institute of Fundamental Research, Bangalore

ISRAEL
- Roy BAR-ZIV, Weizmann Institute of Science, Rehovot
- Ofer YIZHAR, Weizmann Institute of Science, Rehovot

ITALY
- Ina ARNONE, Stazione Zoologica Anton Dohrn, Naples

Michael Ryan
Chair, Research Grant Review Committee

JAPAN
- Jun KITANO, National Institute of Genetics, Mishima

REPUBLIC OF KOREA
- Jiwon JANG, Pohang University of Science and Technology, Pohang

NEW ZEALAND
- John REYNOLDS, University of Otago, Dunedin

NORWAY
- Tone TØNJUM, University of Oslo, Oslo

SINGAPORE
- Hongyan WANG, Duke-NUS Medical School, Singapore

SOUTH AFRICA
- Hugh PATTERTON, Stellenbosch University, Stellenbosch

SWITZERLAND
- Sebastian MAERKL, EPFL, Lausanne

UNITED KINGDOM
- Tom BADEN, University of Sussex, Brighton

UNITED STATES OF AMERICA
- Karl MUNGER, Tufts University School of Medicine, Boston
- Anne PRINGLE, University of Wisconsin, Madison
- Jennifer ROSS, Syracuse University, Syracuse

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- Jörg OVERMANN, Leibniz Institute DSMZ, Braunschweig, Germany

3.4

RESEARCH GRANT PROFILE

HFSP 2023 RESEARCH GRANT - PROGRAM

Lucy Ochola

Dissecting the Migration of *Schistosomiasis* mansoni Eggs Using an Organ-on-a-chip Model

Kennedy Okeyo, Purdue University, USA, is the principal investigator of the project with co-investigator Lucy Ochola, Strathmore University, Kenya.

Lucy Ochola examining and feeding snails reared in her lab.

Lucy Ochola, of Strathmore University in Kenya, is co-investigator on a 2023 HFSP Research Grant team of two who are studying Schistosomiasis, a neglected tropical disease caused by parasitic worms of the genus *Schistosoma spp* with a complex life cycle spanning aquatic snails and mammalian hosts. *Schistosoma*-infected snails shed thousands of cercariae, tiny, fork-tailed, tadpole-like swimmers, in freshwater bodies where they wait to infect and begin their lifecycle in the mammalian host.

Upon coming in contact with a human host, the cercariae penetrate the skin and transverse the vasculature, into the bloodstream where they get a free ride into the liver. Here male and female juvenile worms form pairs in a 'permanent embrace' and mature into adult worms. The mature paired adult worms then move to the intestines where they lay hundreds of eggs every day. Infected humans pass the eggs through stool into the environment where the eggs hatch and infect snails to complete the lifecycle. Although eggs have no motility appendages, they migrate through mesenteric vessels, intestinal walls, and the gut lumen. How this happens remains a mystery!

Recent studies have alluded to the role of various innate and adaptive immune cells, fibroblasts, endothelium activation, and blood clotting factors, and proteins and enzymes released by the parasites in aiding the migration. However, the exact mechanism the eggs employ for their migration and eventual dissemination and how host cells, such as fibroblasts, mediate this process remains to be clarified.

Further, the research team involves engineers, immunologists and parasitologists, to conduct international collaborative research utilizing organ-on-a-chip systems and animal models of schistosomiasis to address a major gap in our understanding of schistosome egg migration from intestinal tissues to the gut lumen. The team aims to quantify the forces involved in the migration and clarify their origin.

Chapter 4

HFSP Science, Impact & Innovation

4.0

BREAKTHROUGH RESEARCH AND IMPACT

Often, HFSP-supported research leads to lasting impact by providing technological innovation and advanced insights into complex mechanisms. Highlights from HFSP awardees can be found in the science articles posted on the HFSP website about breakthrough discoveries and novel approaches. Here are a few select examples.

Unlocking the Mysteries of Tumor Vasculature in Brain Metastasis

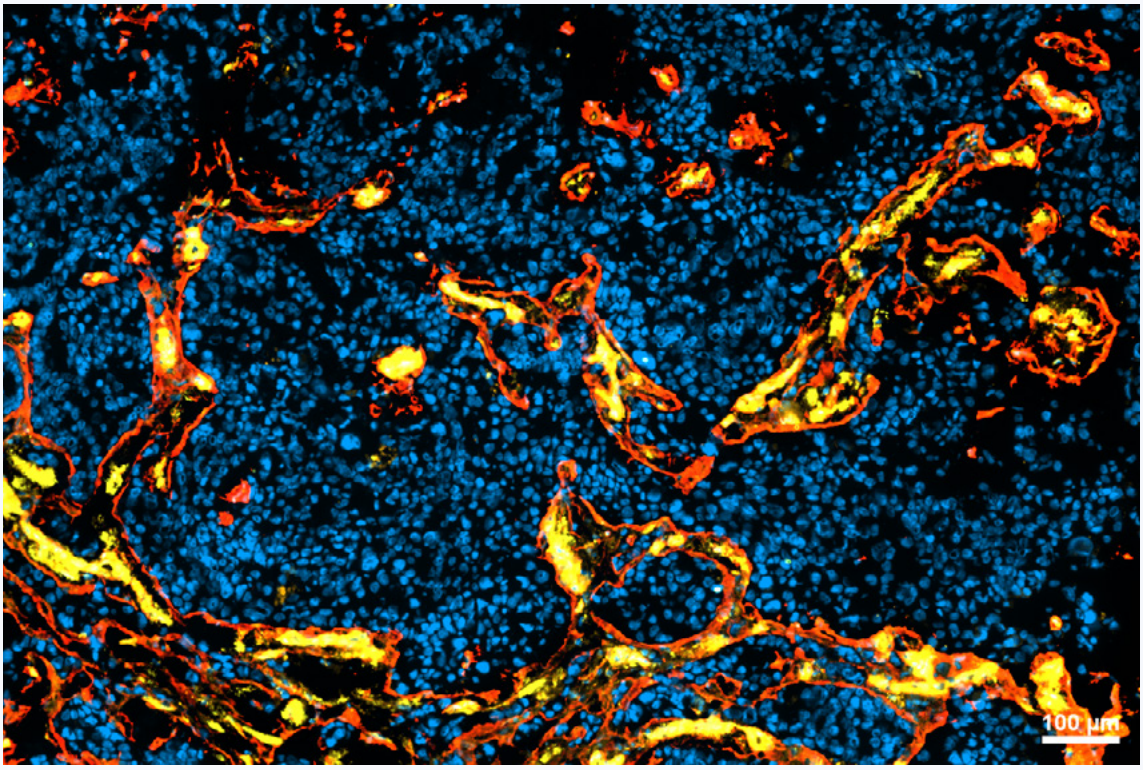
Leire Bejarano was awarded an HFSP Fellowship in 2019 to conduct research on brain tumors at the Department of Oncology, University of Lausanne, Switzerland. There, she worked to unravel the vascular heterogeneity in human brain metastases and construct a preclinical platform to design novel vascular-targeted therapeutic strategies for the treatment of these aggressive tumors.

Brain metastasis is a common malignancy, predominantly originating from the dissemination of lung, melanoma, and breast cancers. Researchers have previously shown that the tumor microenvironment, including diverse immune cells, is critical for regulating cancer progression in primary and metastatic brain tumors.

The blood-brain barrier is another key tumor microenvironment component formed by endothelial cells, mural cells, astrocytic end-feet, and microglia. Metastasizing cancer cells use different strategies to traverse the blood-brain barrier and subsequently exploit the vasculature to create the blood-tumor barrier. The heterogeneity of the major brain metastasis vascular components, specifically endothelial and mural cells, was the focus of the study.

By employing single-cell and bulk RNA-sequencing of the sorted vascular cell types, the scientists' team identified multiple brain metastasis-enriched vascular subtypes compared to non-tumor brain, including previously unrecognized immune regulatory subtypes. Bejarano and research colleagues integrated the human data with datasets from multiple brain metastasis mouse models, thereby creating a platform to identify vascular targets for the treatment of brain metastasis. The research team found that the CD276 immune checkpoint molecule was significantly upregulated in the brain metastasis vasculature, with anti-CD276 blocking antibodies demonstrating survival benefits in preclinical trials. This study provides important new insights into the complex interactions between the vasculature, immune cells, and cancer cells, with translational relevance for designing innovative therapeutic interventions.

Reference:
Interrogation of endothelial and mural cells in brain metastasis reveals key immune-regulatory mechanisms. Bejarano L, Kauzlaric A, Lamprou E, Lourenco J, Fournier N, Ballabio M, Colotti R, Maas R, Galland S, Massara M, Soukup K, Lilja J, Brouland JP, Hottinger AF, Daniel RT, Hegi ME, Joyce JA. *Cancer Cell*. 2024 Jan 8:S1535-6108(23)00446-4. doi: 10.1016/j.ccell.2023.12.018.



The promising results of the research led by HFSP Fellowship Awardee Leire Bejarano are relevant for designing innovative therapeutic interventions in brain tumors.

Microbes Support Adaptation to Climate Change

HFSP Early Career grant holders Sebastian Fraune, Adam Reitzel, and colleagues, from the Heinrich-Heine Universität (HHU) Düsseldorf, Germany, the University of North Carolina at Charlotte, USA, and Kiel University, Germany, used the sea anemone *Nematostella vectensis* to investigate the contribution of the microbiome to thermal adaptation of living organisms.

All multicellular organisms are colonized by an unimaginably large number of microorganisms and have co-evolved with them from the very beginning of life's evolutionary history. The natural microbiome, i.e., the totality of these bacteria, viruses, and fungi living in and on a body, is of fundamental importance for the organism as a whole: it performs vital tasks for the host, for example, it assists in nutrient uptake and it helps defend against pathogens.

In a study within the Collaborative Research Center (CRC) "Origin and Function of Metaorganisms," the research team investigated the involvement of the microbiome in thermal adaptation of anemones in an acclimation experiment.

Fraune of the HHU Institute of Zoology and Organismic Interactions, who is also project leader in the Kiel CRC, led the researchers, who were able to show that the bacterial colonization of the animals changes as a result of acclimation. Furthermore, they demonstrated that the sea anemone becomes more resistant to heat stress. In addition, the team proved a causal relationship: If they transferred the microbiome of heat-adapted to non-acclimated anemones, the latter also became less sensitive to higher temperatures. Their results were particularly significant with regard to changing environmental conditions due to climate change.

The offspring of the sea anemone *Nematostella vectensis*, shown here laying eggs, can directly inherit the temperature tolerance of the parent generation by passing on certain bacteria.

Long-term acclimation experiment

The research was based on an HFSP study, in which researchers studied the adaptation of anemones to changing environmental conditions for more than four years. To do this, they worked with clones of a single original animal and compared 50 genetically identical anemones in each of 15 different colonies. The researchers divided these colonies into three groups that were kept at 15, 20, and 25 degrees Celsius in order to analyze their acclimation to different temperatures. In the course of the long observation period, characteristic changes in the so-called phenotype of the anemones, i.e., in their external shape, including physiological features, became apparent. The animals grew significantly larger at lower temperatures, and they changed their reproductive mode. Changes in temperature tolerance were also particularly interesting.

“The anemones differed very significantly in their stress resistance to high temperatures. If we exposed them to a very high temperature stress of 40 degrees Celsius for six hours, the animals acclimated at 25 degrees Celsius almost exclusively survived,” said Laura Baldassarre, former member of Fraune’s group and lead author of the study.

Previous research suggested that adaptation to temperature stress may be related to changes in the microbiome composition of the animals. Analysis of the bacterial colonization of the different colonies in the acclimation experiment again supported this hypothesis, as the microbiome of the acclimated animals also changed compared to their non-acclimated conspecifics.

“That acclimation, the so-called phenotypic plasticity, can be partly controlled by bacteria seems very plausible,” said Fraune. “Their much shorter generation times allow a much faster adaptation than would be possible via genetic recombination of the host organism.”

The fact that there is indeed a causal relationship between the change in the microbiome and temperature adaptation has now been proven.

“In a transplantation experiment, we transferred the microbiomes from anemones acclimated to 15, 20, and 25 degrees Celsius to non-adapted, but genetically identical animals,” said Baldassarre. “It turned out that these animals, which received the microbiome of the anemones acclimated at 25 degrees Celsius, subsequently adopted tolerance to high temperatures as well.”

The team was able to establish a causal relationship between microbiome composition and environmental adaptations.

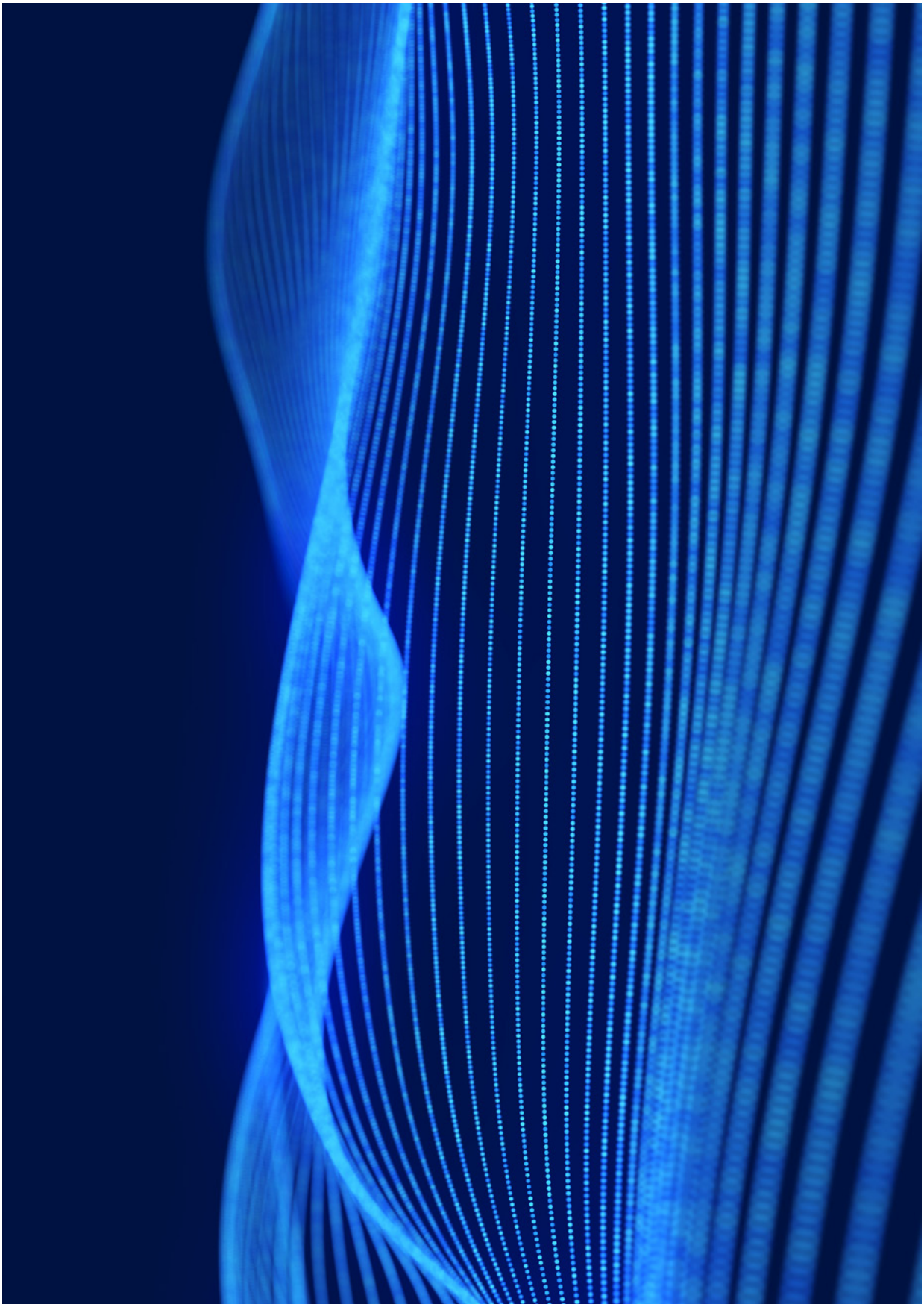
“Thus, we experimentally confirmed the so-called hologenome concept, which defines evolution as the development of host organisms with their colonizing microorganisms toward shared fitness benefits for the entire metaorganism,” said Fraune.

In further research, the scientists in Düsseldorf and Kiel now want to explore the mechanisms of acclimation in detail with a particular focus on the role of individual bacterial species involved. To this end, detailed bacterial genomic analyses are in preparation for a planned third funding phase of the CRC 1182 by the German Research Foundation (DFG). They will shed light on possible individual relationships between bacteria and certain metabolic processes of the host cells and their influence on the temperature tolerance of the organism as a whole.

“Overall, it is important to understand the bacterial component of thermal acclimation in more detail,” said Fraune. “It likely plays a fundamental role in many other living organisms from various animals and plants to overall ecosystems such as coral reefs. Deeper knowledge of the underlying processes is therefore crucial to better assess or possibly mitigate the effects of global change on species and habitats.”

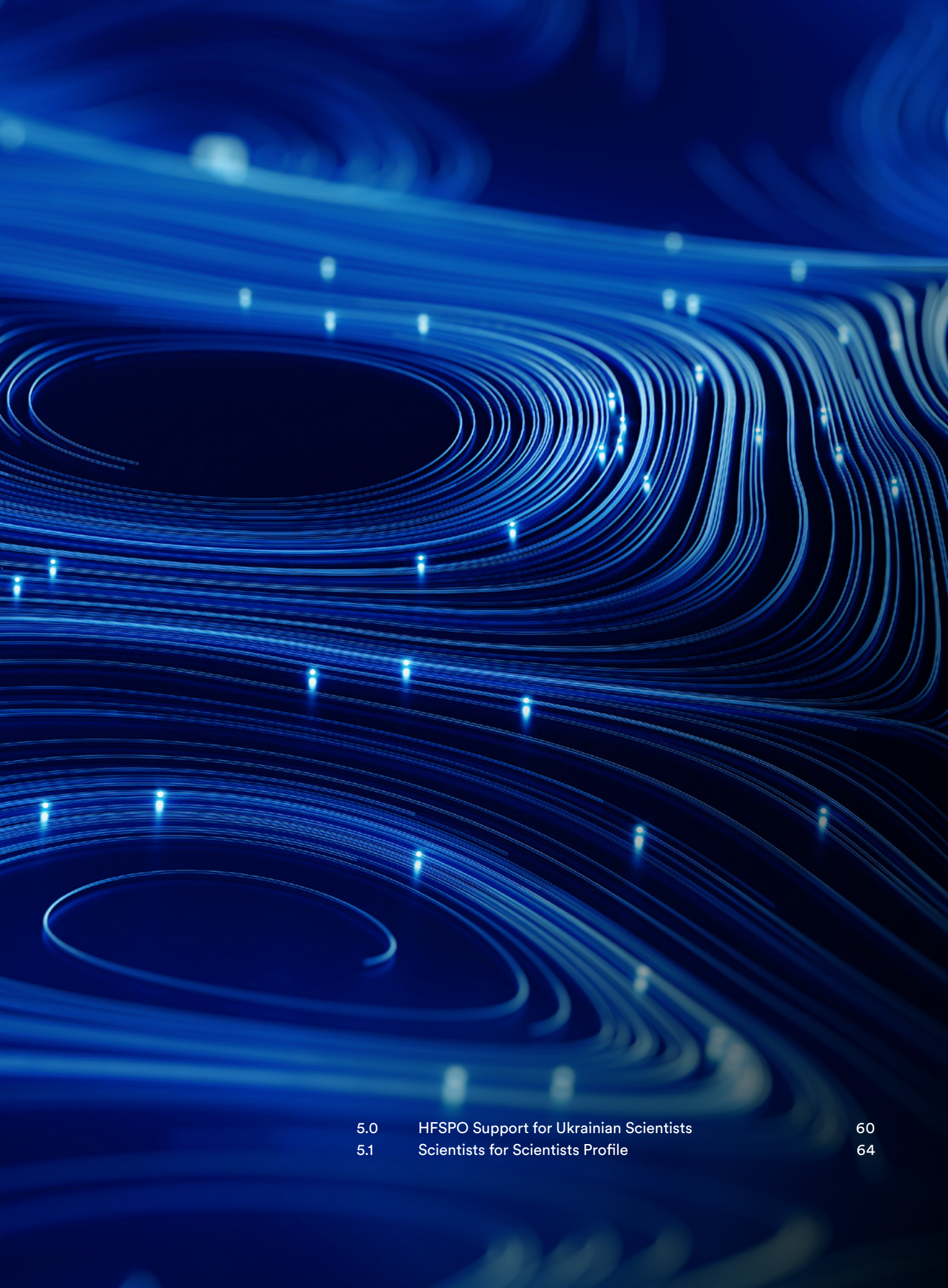
Reference:
Adapted from a press release issued in 2022 by Christian Urban, Science Communications Officer at Kiel University, announcing the published results in *Nature Communications*, July 2022.

www.uni-kiel.de/en/details/news/mikroben-helfen-bei-der-anpassung-an-den-klimawandel



Chapter 5

HFSPO's Scientists For Scientists Initiative



5.0

HFSPO SUPPORT FOR UKRAINIAN SCIENTISTS

Since 2022, the Ukraine has experienced dire impacts due to the invasion by the Russian Federation, including detrimental effects to Ukrainian scientists and their research. HFSPO launched the Scientists for Scientists Initiative (S4S) to help Ukrainian researchers affected by the war continue their research in host institutions worldwide. The S4S Initiative is firmly rooted in HFSPO's fundamental principle to foster peaceful, international collaboration by engaging its global awardees community and by showing its solidarity with affected researchers by providing continued support for their academic work.

Extraordinary financial support provided by the European Commission enables HFSPO to work with its global community of awardees to establish placements for Ukrainian scientists in laboratories and institutions, thereby demonstrating solidarity by helping them maintain continuity in their academic research. During 2022 HFSP supported 14 Ukrainian researchers and by November 2023, when the last report was issued to the Board of Trustees, a total of 1,853,208 USD had been awarded allowing 25 HFSP Research Grant teams and HFSP postdoctoral fellows to support Ukrainian scientists. Another five were added by the end of 2023, bringing the total to 30 supported awards. Most Ukrainian scientists were integrated into Research Grant teams, but several were hosted by HFSP Fellows.

Update since the last report to the Board of Trustees (dated 8 November 2023)
Since then, support was granted to team members of Research Grants, allowing them to support three new scientists in 2024 and extend the support to one scientist from the Ukraine. Funding for the S4S scheme can be used until the end of the originally funded Research Grant or Fellowship project, and awardees are required to send specific sections in their financial and scientific reports.

With the recent support for three more projects HFSPO supported 30 Ukrainian PhD students, postdoctoral researchers, as well as senior scientists, to contribute their competence and skills to HFSP projects. Three of these have been granted extended support after the first year, such that we show a total of 33 project placements.

This funding is allowing the displaced scientists to be integrated into scientific and social networks that will last much longer than the support. At the same time, new approaches, experience and skills that the Ukrainian scientists bring will become an integral part of the ongoing research projects funded by HFSPO.

Host institutions that responded to the call, include: four institutions in the USA, four in the UK, two in Canada, two in Germany, and one each in Denmark, Switzerland, Austria, Finland, Italy, The Netherlands, Czech Republic, France, Portugal, Spain and Panama — thus, the response is highly international.

In addition, support was granted to a Biology Data Science Summer

School, to be held 2 – 14 July 2024, in Uzhhorod, Ukraine. Several of the scientists supported by the S4S initiative, and additional Ukrainian scientists who are presently working in research institutions worldwide, will be teaching this summer school. Data science and computational biology are core areas that are crucial in a majority of the frontier and interdisciplinary research projects supported by HFSPO. Thus, the summer school will make an important contribution to the field and allow Ukrainian scientists to participate in the development of the field. A total of 2,269,958 USD has been awarded to support Ukrainian scientists.

Table 5.1

All HFSP S4S Projects Funded to Date (blue shading marks new awards granted since the last report prepared 8 November 2023 for the December Board of Trustees meeting in Cape Town, South Africa)*

N°	Project Title	Supported Scientist	HFSP Scientist	Host Institution
1	Unravelling an unusual biomineralization from nano to macro scale using advanced technologies	Anastasiia Maliuk	Mehran Moazen	University College London, UK
2	Controlling cellular biochemistry with electronic signals – a step towards bioelectronic hybrids	Oleh Smutok	Evgeny Katz	Clarkson University, USA
3	Mechanosensitive dynamics at the fertilisation synapse	Tetiana Mylenko	Andrea Pauli	Research Institute of Molecular Pathology, Vienna, Austria
4	A new role for aging: origin of cellular differentiation and the evolution of complex life	Uliana Semaniuk	Juha Saarikangas	Helsinki Institute of Life Science HiLIFE, Molecular and Integrative Biosciences Research Program, Finland
5	Regulation of membrane receptor function in the brain by lipid composition and dietary inputs	Daryna Sputay	Ilya Levental	University of Texas Health Science Center at Houston, USA
6	Investigating mechanotransduction at a single molecule level	Viktoriia Kashchuk	Anatolii Kashchuk	University of Florence, Italy
7	Investigating collinear bursts of HoxD genes transcription through live imaging of gastruloid body	Yuliia Romaniuk	Alexandre Mayran	EPFL-Lausanne, Switzerland
8	Pex ex machina: the cell biological mechanics of locally controlled peroxisome biogenesis	Anya Borisyuk	Triana Amen	EPFL-Lausanne, Switzerland
9	How transcriptional and epigenetic networks shape lung-resident memory T cells and tissue immunity	Nataliia Liakhovska	Alexander Lercher	Rockefeller University, USA
10	Tracking trade across symbiotic networks	Oleh Prylutskyi	Toby Kiers	VU University Amsterdam, The Netherlands
11	Bacterial biofilms as a multicellular organism: from molecules to populations	Iryna Peretiazhko	Julien Bergeron	King's College London, UK

12	A spatiotemporal map of signalling processes controlling human stem cell renewal and differentiation	Karyna Kulakova	Rafael E. Carazo Salas	University of Bristol, UK
13	Evolution of neural circuit dynamics and brain computations in Astyanax blind cave fish	Solomiya Lebid	German Sumbre	Institut de Biologie de l'Ecole Normale Supérieure, France
14	Can evolution minimize spurious signaling crosstalk to reach optimal performance?	Mariia Utrobina	Christian Landry	Université Laval, Canada
15	Evolution of neural circuit dynamics and brain computations in Astyanax blind cave fish	Solomiya Lebid	German Sumbre	Institut de Biologie de l'Ecole Normale Supérieure, France
16	Exploration of the structure-function space of prebiotic to biological proteins – RENEWAL APP	Ivan Cherepashuk	Klara Hlouchova	Charles University Prague, Czech Republic
17	Neuronal heme sensing in metabolic adaptation to infection	Valentyna Polishchuk	Jamil Kitoko	Instituto Gulbenkian de Ciência, Portugal
18	When the going gets tough: trans-kingdom spore dormancy and revival mechanisms across scales	Vitaliia Bohdanivna Polutranko	Mohan Balasubramanian	University of Warwick, UK
19	Modeling electric fields at the heart of enzyme catalysis and function	Orysia Zaremba	Stefan Wuttke	Basque Center for Materials, Applications and Nanostructures Bilbao, Spain
20	SELFCURE: Evolutionary and cognitive processes underlying self-medication of immune-challenged bats	Kseniia Kravchenko	Rachel Page	STRI, Panama
21	The mechanics of cephalopod remarkable feeding system: how to bite without a joint	Anastasiia Maliuk	Louise Souquet	University College London, UK
22	Utilizing spatial transcriptomics for uncovering the hypoxic transcriptional landscape of tumors	Khrystofor Khohklov	Johan Gustafsson	MIT, USA
23	SELFCURE: evolutionary and cognitive processes underlying self-medication of immune-challenged bats	Valeriia Bohodist	Rachel Page	STRI, Panama
24	SELFCURE: evolutionary and cognitive processes underlying self-medication of immune-challenged bats	Alona Shulenko	Rachel Page	STRI, Panama
25	SELFCURE: evolutionary and cognitive processes underlying self-medication of immune-challenged bats	Maryna Yerofeieva	Rachel Page	STRI, Panama
26	Exploring the evolution and physiology of the olfactory-immune system connection	Oleksandr Hulai	Ben Matthews	UBC Vancouver, Canada
27	Bacterial targeting of the host epitranscriptome	Zarina Nidoieva	Mark Helm	University of Mainz, Germany

28	Intracellular voltage control of directional cell migration	Svitlana Palii	Pablo Sáez	University Medical Center Hamburg-Eppendorf, Germany
29	An integrative approach to decipher flowering time dynamics under draught stress	Viktoriia Kyrychenko	Lucio Conti	Universita degli studi di Milano, Italy
30	Good vibes: How do plants recognize and respond to pollinator vibroacoustic signals?	Ivan Sili	Sebastian Oberst	University of Technology Sydney, Australia
31	Biology Data Science Summer School, 2 – 14 July 2024	Fyodor Kondrashov	Summer School	Uzhhorod, Ukraine
32	Bacterial biofilms as a multicellular organism: from molecules to populations	Iryna Peretiazhko	Julien Bergeron	King's College London, UK
33	Dark oxygen production: assessing an overlooked microbial process in Earth's hidden ecosystems	Tetyana Gilevska	Beate Kraft	University of Southern Denmark, Denmark

* In total, 30 Ukrainian scientists have been supported over two years. Some projects have been renewed, and one HFSP awardee Rachel Page in Panama has four Ukrainian scientists in her lab, thus, the table shows 33 placements over two years.

5.1
SCIENTISTS FOR SCIENTISTS PROFILE

Vitaliia Polutranko and Mohan Balasubramanian

HFSP Awardee:
- Mohan Balasubramanian, University of Warwick, United Kingdom

Grant Team:
- Sigal Ben-Yehuda, Hebrew University, Israel
- Andreas Janshoff, Georg-August University, Germany
- Ben O'Shaughnessy, Columbia University, USA

Visiting Ukrainian Scientist:
- Vitaliia Polutranko, Taras Shevchenko National University of Kyiv, Ukraine

Vitaliia Polutranko graduated with a Master's degree in Biophysics from Taras Shevchenko National University of Kyiv. She held multiple research posts in clinical and molecular diagnostics in the University Medical Center and in the World Health Organization, Ukraine. The war in the Ukraine seriously affected her career progression and her interest in pursuing a research career.

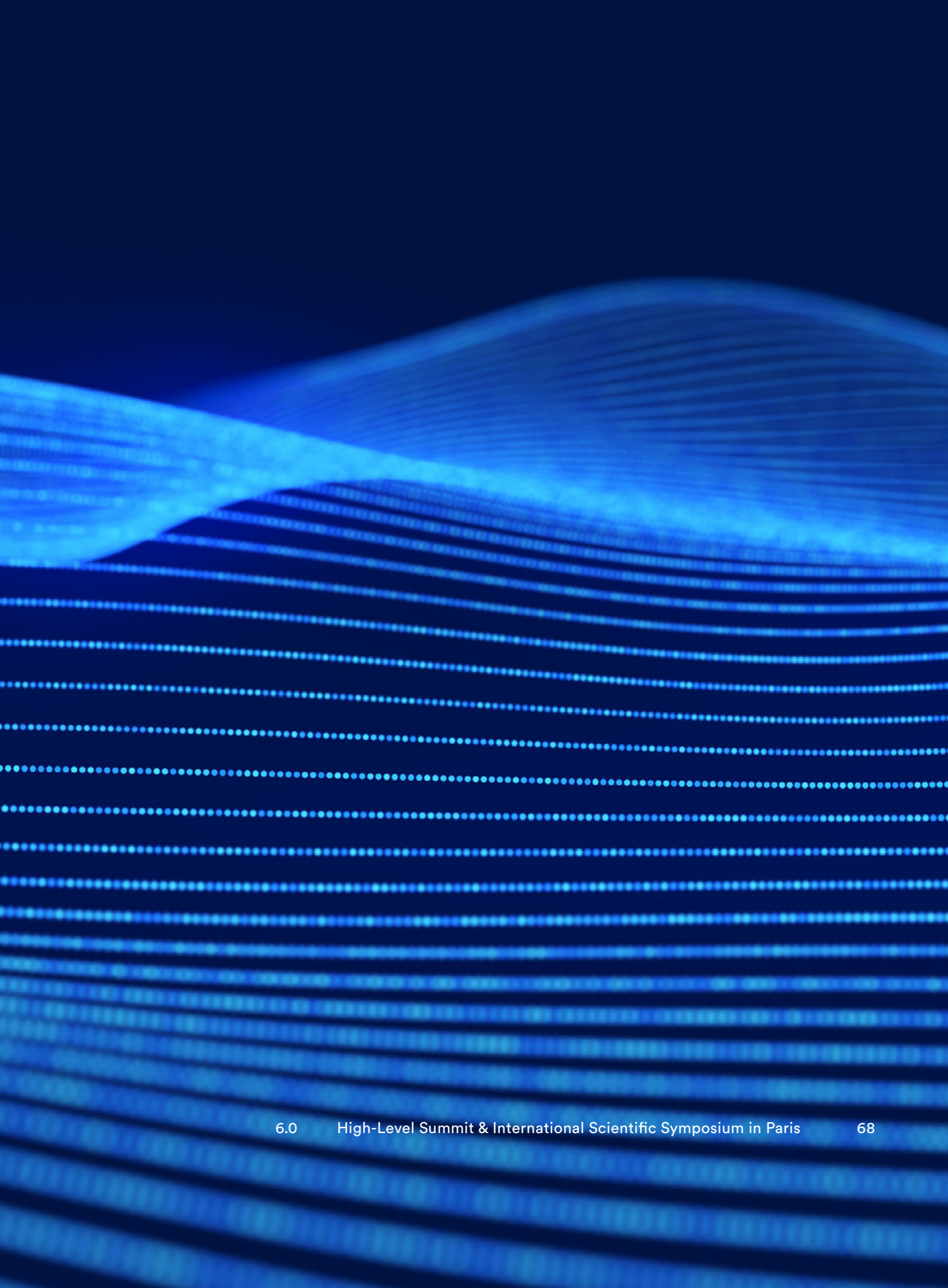
Mohan Balasubramanian's laboratory studies how cellular macromolecular machines self-organize and how this is regulated in space and time to actuate important physiological processes. In this HFSP-funded project, together with his team members in Israel, Germany, and the USA, they are investigating how bacterial and fungal spores remain dormant for extended periods (often multiple decades and more) and how they revive with such promptness when fed (often in minutes to hours). They are investigating what biochemical and biophysical state the spore cytoplasm rests in and whether this holds clues into how and why spores are so resilient when the going gets tough.

Polutranko contacted Balasubramanian in 2023 as she was unable to pursue her passions: experimental sciences and molecular biology. Her background in molecular biology and biophysics aligned well with his project's goals. Polutranko is working on a number of molecular biology and biochemistry projects aimed at investigating the fission yeast actin cytoskeleton.

"It was very lucky for me to come to the UK and work in such a prestigious university, particularly in the laboratory of Professor Mohan Balasubramanian and under his direction," said Polutranko. "I am also happy to work with people who help me and understand me. I can't thank my colleagues and Mohan enough for all their help. I really like what I do, the atmosphere at the university and in our laboratory, and I will continue to work and study. I am excited to perform molecular and biochemical investigations of the actin cytoskeleton and hope to soon look at them inside the spores to see how they are organized."

Chapter 6

High-Level Summit & International Scientific Symposium In Paris



6.0

HIGH-LEVEL SUMMIT & INTERNATIONAL SCIENTIFIC SYMPOSIUM IN PARIS

UNDER THE HIGH PATRONAGE OF MR EMMANUEL MACRON PRESIDENT OF THE FRENCH REPUBLIC

© Christophe Peus

Sylvie Retailleau, Minister of Higher Education and Research for the French government, speaks during the High-Level Summit held on 27 June 2023 at the Académie des sciences in Paris, France.

FUNDAMENTAL LIFE SCIENCE MEETS CLIMATE, ENVIRONMENT, AND SUSTAINABILITY

"Fundamental Life Science Meets Climate, Environment, and Sustainability" was organized by the International Human Frontier Science Program Organization together with its partners, and drew more than 2,000 participants from over 40 countries for in-person and online events offered at the Académie des sciences in Paris from 27 – 29 June 2023. The events sparked a wholly new approach by bringing together global expertise in basic science from biology, climate change, marine science, ecology, agriculture, psychology, and the social sciences to meet with government officials.

The three-day event was structured with a High-Level Summit on the first day that focused on science policy and ministerial responses to the challenges of our times and the opportunity for basic research to provide a wealth of insight that can lead to creative solutions going forward. On days two and three, the focus turned to world-class science and scientists for an International Scientific Symposium featuring groundbreaking approaches and discoveries by scientists.

Through the High-Level Summit & Symposium, participants validated important priorities that will greatly assist governments, communities, and science agencies committed to forging a robust sustainability transition:

1. **International collaboration is critical.** Ministers and scientists need more opportunities like this to communicate. This Summit & Symposium allowed decision-makers, funders, and scientists to communicate openly and directly regarding the needs of societies and the insight that discovery science can offer. Likewise, next steps must be based on broad inclusion that welcomes professionals from a diverse array of countries, perspectives, and backgrounds in order to have the full complement of expertise available.

2. **Basic frontier life science must be a full partner.** To fully understand the global challenges humanity faces, we need the 'life cycle' approach that biological sciences can bring to partnerships with climate science, environmental research, physics, and data science. The global challenges are ultimately a threat to life on Earth — the life sciences must be involved in these investigations to inform policymaking.

3. **Systems science is next-generation science.** Important policies and societal safeguards can benefit from the knowledge of systems behavior — biological systems, Earth systems, and the common universal truths underlying key systems. Further, the life sciences and physical sciences must partner with the social and behavioral sciences to reflect more accurately how living organisms play key roles in impacting our Earth systems.

4. **Transdisciplinary, frontier science can help people adapt to global challenges.** Engineering opportunities for food security, renewable energy, and human resilience can emerge from basic life science research coupled with climate science, marine research, data science, and other transdisciplinary approaches. There is a time and a place for discipline-focused basic science, but there is also a need for frontier life science to be involved in solving our rapidly expanding global challenges. In that setting, telescoping translation can benefit humanity and all life on Earth. Truly, the 21st century will be known as the "Age of Biology."

5. **Responding to global leaders' call for advanced science.** Reiterating what was said in May 2023 during the G7 Summit in Hiroshima and the Science and Technology Ministers' Meeting in Sendai, it is clear that science must now play a vital role for the security and future of humanity and all life on Earth. It is imperative that governments support transdisciplinary basic research that will inform solutions for global challenges.

Chapter 7

HFSPO Member Missions & Engagement

7.0

SECRETARY-GENERAL'S MISSIONS IN FY 2023

HFSPO Secretary-General Pavel Kabat traveled widely to meet with HFSPO Trustees, government leaders in key science agencies, and research funding organizations. He visited laboratories, spoke with scientists and program officials, and learned how each Member governement has specific strengths and needs, and what each brings to HFSPO. For each Member an in-depth profile detailing their history in HFSPO and successes was prepared.

Kabat also connected with government officials in countries that are potentially interested in joining HFSPO. Throughout, the goal was to deepen ties with those who have a keen stake in the vitality of HFSPO, renew their commitment, and ensure a two-way flow of creative ideas and common vision for a strong future in frontier life science research. Below are some highlights from a few key visits.

Pavel Kabat, HFSPO Secretary-General, greets Yasutoshi Nishimura, Minister of Economy, Trade, and Industry of Japan.

MISSION TO JAPAN – SEPTEMBER & OCTOBER 2023

Kabat and Hirokazu Kumekawa, HFSPO Deputy Secretary-General, held numerous high-level meetings in Japan in October, beginning with participation at the STS Forum. Kabat met the Japanese Prime Minister, Fumio Kishida, and discussed the important role that Japan plays globally in advancing frontier life science research through its leadership with HFSPO.

Kabat held extensive discussions with top Japanese science ministers: Yasutoshi Nishimura, Minister of Economy, Trade and Industry, and Masahito Moriyama, Minister of Education, Culture, Sports, Science and Technology on the importance of fostering frontier science and innovation in Japan and worldwide reaffirming the leadership role that Japan plays in these key scientific enterprises and the opportunities for innovation, as well.

Pavel Kabat, HFSPO Secretary-General, greets Masahito Moriyama, Minister of Education, Culture, Sports, Science and Technology.

Kabat and Kumekawa visited Osaka and Kyoto Universities and Okinawa Institute of Science and Technology to encourage promising scientists to engage with HFSP to pursue international collaboration on interdisciplinary research projects. From there, they continued their travels by participating in BioJapan, a key engine for life science innovation.

They also visited Hirofumi Nakasone and his son, Yatsutaka Nakasone, son and grandson of former Prime Minister Yasuhiro Nakasone, who first proposed HFSPO and provided the drive to see the vision become reality. Hirofumi Nakasone is the former Minister for Foreign Affairs and former Minister for Education; Yatsutaka Nakasone is the former Parliamentary Vice-Minister of Defense.

MISSION TO REPUBLIC OF KOREA – OCTOBER 2023

To celebrate the Republic of Korea's 20th Anniversary as a Member of HFSPO, Kabat and Kumekawa traveled to Daejeon, to meet with science ministers, leaders of research institutes, promising postdoctoral researchers, and others in Korea's scientific community and innovation ecosystem.

They participated in a robust, two-day symposium filled with excellent research presentations, held a workshop to help prospective applicants understand the HFSPO proposal process, and celebrated Korea's successes over 20 years of active participation in HFSPO. These successful efforts were possible thanks to HFSPO Trustee Hyong-Ha Kim. Kabat and Kumekawa discussed plans with officials for new strategic initiatives to further the success of Korean scientists in HFSPO programs.

L to r: Hirokazu Kumekawa, HFSPO Deputy Secretary-General; Pavel Kabat, HFSPO Secretary-General; Do Young Noh, President, Institute for Basic Science (IBS); Hyong-Ha Kim, Korea Research Institute of Standards and Science and HFSPO Trustee; and Shibo Shim, Chief Communications Officer, IBS.

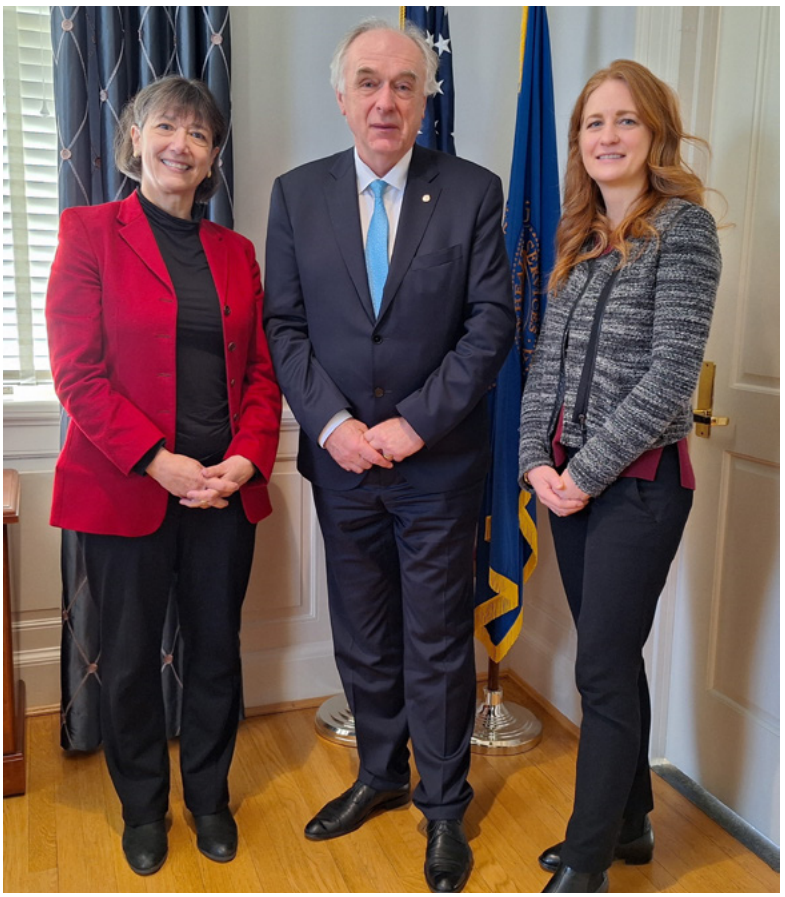
MISSION TO THE UNITED STATES – FEBRUARY 2024

Kabat visited key U.S. agencies, including the National Institutes of Health (NIH), where he met Monica Bertagnolli, NIH Director, and Tara Schwetz, NIH Deputy Director for Program Coordination, Planning, and Strategic Initiatives. Schwetz is an HFSPO Trustee.

They also met officials at the National Science Foundation (NSF), including HFSPO Trustees Kendra Sharp, Head of the Office of International Science and Engineering, and Susan Marqusee, Head of the Directorate for Biological Sciences.

Maintaining solid connections with these agencies is important, especially as the 23rd HFSPO Annual Awardees Meeting was held in June 2024 in Washington, D.C., and officials from the NSF and NIH were prominently featured in a high-level event.

Kabat also visited key officials at the U.S. Department of State, the U.S. Department of Energy, and the National Aeronautics and Space Administration; in the past, the latter two agencies worked closely with HFSPO, and presently, both show great interest in becoming partners again.



L to r: Monica Bertagnolli, NIH Director, Pavel Kabat, HFSPO Secretary-General, Tara Schwetz, NIH Deputy Director for Program Coordination, Planning, and Strategic Initiatives & HFSPO Trustee.

7.1

GLOBAL OUTREACH PROMOTING HFSPO PROGRAMS AND FRONTIER LIFE SCIENCE

HFSP contributed to the joint meeting of the 31st Conference on Intelligent Systems for Molecular Biology and the 22nd European Conference on Computational Biology, held in Lyon, France, from 23 – 27 July 2023, which included the world's largest gathering of computational biologists. HFSP staffed an outreach exhibit booth and organized a full-day scientific workshop entitled, "Data science will determine the success of breakthrough research of the future."

From 2 – 7 October 2023, HFSP engaged with the Argentinian Society for Neuroscience supporting their annual meeting with a grant writing session attended by nearly 600 scientists. HFSP hosted keynote speaker Nobel Laureate Edvard Moser of Norway and organized a special symposium on "Acetylcholine signaling: from receptors to human disease" with the following speakers:

- Francisco Barrantes, CONICET, Argentina – "Structure and function meet at the nicotinic receptor-lipid interface"
- Cecelia Bouzat, CONICET, Argentina – "Insights from the molecular functional level to understand why implementing the alpha7 nicotinic receptor as a therapeutic drug target is so challenging"
- Patricio Iturriaga-Vásquez, Universidad de la Frontera, Chile – "From zebrafish to rates: the role of nicotinic receptors in behaviors"
- Marina Picciotto, Yale University, USA – "Acetylcholine signaling relevant to anxiety and depression"

Pavel Kabat, HFSPO Secretary-General and Koichi Inoue, Director, International Affairs Office, Industrial Science and Technology Policy and Environment Bureau, Ministry of Economy, Trade and Industry (METI) are at the HFSPO booth at BioJapan in October 2023.

In addition, HFSP Research Grant and Fellowship Directors supported national gatherings and conferences of professional societies in offering talks about HFSP opportunities and support.

In 2023:

- 24 April, HFSP information webinars with India Bioscience (remotely, B Pauly)
- 7 – 10 May, HFSP Mission to Israel, A Kelber, B Pauly and P Kabat
- 16 May, Presentation on HFSP grants at Tokyo University, Japan (hybrid, remotely: A Kelber and B Pauly)
- 22 June, Presentation for the Torrey Pines Training Consortium (remotely, B Pauly)
- 21 September, Presentation for the Wheat Initiative (https://www.wheatinitiative.org; remotely)
- 2 October, Presentation on HFSP support, Institute of Biomedical Research, Pontifical Catholic University of Argentina
- 3 October, HFSP grant writing session, National Centre of Genomics and Bioinformatics (ANLIS), Administración Nacional de Laboratorio e Institutos de Salud (ANLIS) «Dr. Carlos G. Malbrán», Buenos Aires
- 4 October, Presentation on HFSP grants and fellowships at Osaka University, Japan (hybrid, remotely: A Kelber and B Pauly)

- 5 October, Presentations on HFSP grants and fellowships at Kyoto University, Japan (hybrid, remotely: A Kelber and B Pauly)
- 6 October, HFSP grant writing session at the Annual Meeting of the Argentinian Society for Neuroscience, San Luis, Argentina
- 6 October, Presentation on HFSP grants at Okinawa Institute of Science and Technology, Japan (hybrid, remotely: A Kelber and B Pauly)
- 6 December 2023 Information session on HFSP Grants and Fellowships, Cape Town, South Africa (A Kelber)
- 20 October, HFSP postdoctoral support, University of Florida, 2nd Annual Event of the Morsani College of Medicine Postdoctorate and Faculty (remotely, B Pauly)
- 19 December, HFSP presentation on HFSP grants and fellowships, Torrey Pines Training Consortium (remotely, B Pauly)

In 2024:

- 10 January, Presentation on HFSP grants and fellowships, IISER Trivandrum, India (remotely B Pauly)
- 26 January, Presentation on HFSP grants at National Institute for Advanced Industrial Science and Technology, Japan (hybrid, remotely: A Kelber and B Pauly)
- 7 February, Presentation on HFSP grants at a meeting at Boston University, USA (remotely, A Kelber)
- 12 February, Presentation on HFSP grants for scientists in Norway (remotely, A Kelber)
- 14 March, Cambridge Funding Fest, Presentation on HFSP grants and fellowships (remotely, B Pauly)
- 15 March, Presentation on HFSP fellowships for scientists in Norway (remotely, B Pauly)

7.2

HFSP'S 22ND AWARDEES MEETING – SOUTH AFRICA

The 22nd HFSP Awardees Meeting was held from 6 – 8 December 2023 at the Cape Town International Convention Centre in Cape Town, South Africa.

Nearly 200 HFSP awardees, alumni, committee members, local dignitaries, and students participated in the 22nd HFSP Awardees Meeting in South Africa. The gathering featured 35 talks and three poster sessions, including about 20 posters from South African researchers. The three-day program conveyed the best in basic life science research topics and trends. The meeting was also an opportunity to honor South Africa as HFSPO's newest Member country, and the first African country to join HFSPO. The meeting was arranged with plenty of opportunities for attendees to mingle and connect, allowing the HFSP community to engage in conversations with scientists from South Africa and other African countries.

One of the highlights of the meeting was the keynote lecture, "Unlocking the Leadership Greatness of Scientific Research," by Thokozile Lewanika. This South African life sciences researcher and learning consultant focused her talk on the global impact of basic life sciences in society.

Another highlight was the HFSP Nakasone Award Keynote Lecture, "Beyond CRISPR: The immune system of bacteria," by Rotem Sorek, the 2023 Nakasone Laureate. Due to constraints related to the Israel-Palestinian war, Sorek was unable to join the HFSP community in person, but delivered an outstanding virtual lecture about the relationship between bacteria and viruses in fighting infection.

HFSP delivered an engagement session, where participants, particularly the African research community, could get to know the HFSP Fellowship and Research Grant Programs, and two HFSPO scientific directors held a well-attended workshop on how to write a successful HFSP proposal.

In addition, the Awardees Meeting at Cape Town featured a robust social program for HFSP awardees and African research community to exchange and inspire new ideas.

Mary Chibwe, Rhodes University, speaks at the 22nd Awardees Meeting in South Africa.

Chapter 8

Strategic Communications & Increased Visibility

8.0
STRATEGIC COMMUNICATIONS TO ENHANCE HFSPO VISIBILITY

Strategic communications plays a vital role in expanding visibility on a global scale of the important work that HFSPO leads. Communication drives engagement with our frontier life science research programs and attracts new, prospective awardees to HFSPO. To achieve these aims, HFSPO creates a wide array of products. In 2023, HFSPO produced its second *Science Digest*, which met with very positive acclaim by the scientific community and science policy leaders.

HFSPO produced individual profiles for 14 Members and prospective Members. These candidates countries have had scientists participate as co-principal investigators on HFSP Research Grants and expressed interest in becoming more engaged.

To promote the High-Level Summit & International Scientific Symposium "Fundamental Life Science Meets Climate, Environment, and Sustainability," HFSPO conceived and produced a video featuring an in-depth interview with HFSPO Secretary-General Pavel Kabat and highlights of several HFSP-supported scientists, see HFSPO's YouTube channel. (https://youtu.be/rv_VzD62ypc)

8.1

PRESS OUTREACH AND SOCIAL MEDIA SUCCESSES

27. bis 29. Juni, Paris - Führende Politiker und Wissenschaftler aus aller Welt diskutieren: Grundlagenforschung als Wegbereiter für neue Ansätze zur Bewältigung globaler Herausforderungen USA - Deutsch

NEWS PROVIDED BY
Human Frontier Science Program →
Jun 26, 2023, 03:00 ET

Human Frontier Science Program

Press Release: For Immediate Release

For more information or to schedule interviews, contact Guntram Bauer, Director of Science Policy and Communications: phone: +33 (0)7 64 40 62 78 or email: gbauer@hfsp.org

Key Role of Frontier Life Science Research Reaffirmed by International Commitment

Members of the International Human Frontier Science Program Organization (HFSPO) representing countries from around the world plus the European Commission — which taken together comprises a total of 40 countries — met on Tuesday, 27 June 2023 in Paris, France, to reaffirm their commitment of HFSPO, the only truly global program that supports and funds frontier research in the life sciences.

Last week's Triennial Conference marks the 11th such recommitment, since the Organization's formation in 1989. Current Members include: Australia, Canada, France, Germany, India, Israel, Italy, Japan, the Republic of Korea, New Zealand, Norway, Singapore, the Republic of South Africa, Switzerland, the United Kingdom of Great Britain and Northern Ireland, the United States of America, plus the European Commission. Since the last Triennial Conference held in Tokyo, Japan, in 2019, three new Members have joined HFSPO: Israel, South Africa, and Norway. HFSPO operations and programmatic decisions are funded in three-year increments, or triennia, which are approved through cooperative, voluntary Member agreement during the Triennial Conference.

The meeting was emblematic of the future of HFSPO in that Member representatives committed to evolve the organization in terms of its programmatic, visionary and financial bases. This strategic move was unanimously approved by all Member representatives and will permit HFSPO to award even more research grants and fellowships for frontier life science — frontier research being those investigations into wholly new ideas, for which there are no prior studies. Member representatives commended HFSPO for its impressive track record in stimulating and supporting world-class excellence in high-risk, high-impact frontier life science, which represents a unique global niche and value proposition.

Member representatives agreed to support the HFSPO Vision and HFSPO Strategic Plan 2024-2032. They agreed to commit to a world where frontier, breakthrough science pioneers new knowledge and solutions for humanity's

In 2023, HFSPO media relations took a major step forward by investing in essential software that allows the team to identify the individual journalists in print, broadcast, and online media who are working on the issues we support. By targeting science journalists and cultivating relationships with them, HFSPO is now on track to greatly increase its visibility internationally.

The new system also allows HFSPO to issue press releases through the Cision PR wire system to top performing media outlets in as many as 120 countries worldwide and provides translation services in seven languages. The service provides frequent visibility reports, and our press releases get substantially increased pick-up.

- Press Release: **International Human Frontier Science Program Organization Releases 2024 – 2032 Strategic Plan: "Frontier Life Science in a Time of Change",** issued on 5 February 2024, saw 3,279 Release Views and Hits, and Total Pick-up of 495 times.

- Press Release: **27 to 29 June, Paris – World Leaders & Scientists to Discuss: Basic Research Can Pioneer New Approaches to Global Challenges**, issued on 26 June 2023, saw 27,901 Release Views and Hits, and Total Pick-up of 1,076 times.

This press strategy further supports our strategic goal of becoming a globally diverse organization, as scientists in more countries will become aware of HFSPO opportunities. The team is also continuing to use the science news aggregators, EurekAlert! and AlphaGalileo, to achieve a robust strategic approach.

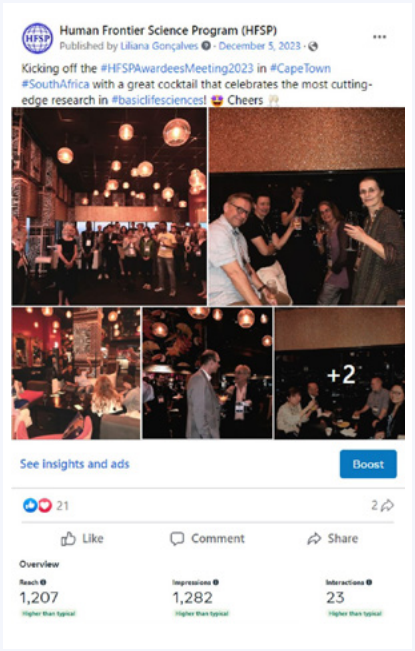
In 2023, HFSP continued to make significant strides in social media communication, building upon the previous year's successes. HFSP maintained a strong presence across various digital platforms, effectively engaging with our audiences and disseminating information about our scientific initiatives, such as: the High-Level Science Summit & Scientific International Symposium in Paris, the Annual HFSP Awardees Meeting, calls for award proposals, and the announcement of new HFSP awardees.

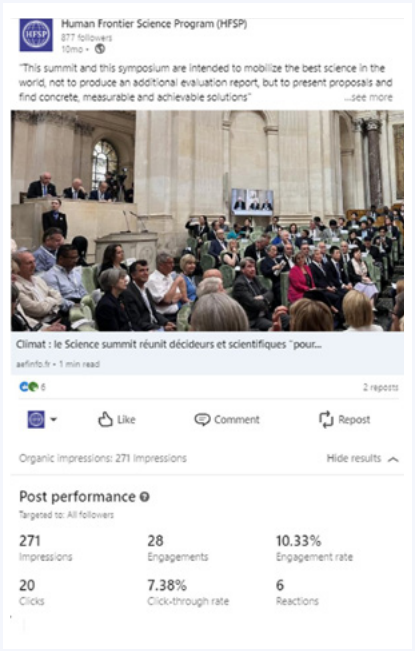
One of our most significant achievements in 2023 was establishing a rapidly growing HFSP's LinkedIn page. We now have an impressive 877 followers, all gained through organic campaigns. Notably, 456 of these followers were earned in the last year alone, demonstrating a sustained interest and engagement within the professional community.

HFSP continued implementing a comprehensive communication strategy across all social media channels to expand our digital reach. This strategy included regular posting and interaction with our audience, resulting in a 16.6% increase in Twitter followers — to about 7,000 Twitter followers — and a 2.5% increase in followers on Facebook to about 4,145 followers who engage with our Facebook page. These three platforms are frequented by distinct and different audiences; thus, the sum total of followers on LinkedIn, Twitter, and Facebook represent a wide array of scientists, ministerial officials, policymakers, postdoctoral researchers, and science communicators interested in frontier life science in different countries.

HFSP continued to foster a dynamic and interactive online presence by employing an informal tone in our posts, thus, creating a friendly, approachable atmosphere. By using visually appealing graphics and videos, both platform-integrated and embedded in our YouTube channel, HFSP significantly enhanced content comprehension and captured the audience's attention. This strategy led to a substantial increase in our YouTube followers, more than doubling the number (174 new followers, 267 in total).

#LS4S – "Life Science for Sustainability" generated interest in the High-Level Summit & International Scientific Symposium in Paris. This is just one of HFSP's successful hashtags on social media.


Human Frontier Science Program (HFSP)
Published by Liliana Gonçalves · December 5, 2023 ·
Kicking off the #HFSPAwardeesMeeting2023 in #CapeTown #SouthAfrica with a great cocktail that celebrates the most cutting-edge research in #basiclifesciences! Cheers
+2
See insights and ads
Boost
21
2
Like
Comment
Share
Overview
Reach
1,207
Higher than typical
Impressions
1,282
Higher than typical
Interactions
23
Higher than typical


Human Frontier Science Program (HFSP)
877 followers
10mo ·
"This summit and this symposium are intended to mobilize the best science in the world, not to produce an additional evaluation report, but to present proposals and find concrete, measurable and achievable solutions" ...see more
Climat : le Science summit réunit décideurs et scientifiques "pour...
aefinfo.fr · 1 min read
6
2 reposts
Like
Comment
Repost
Organic impressions: 271 Impressions
Hide results
Post performance
Targeted to: All followers
271
Impressions
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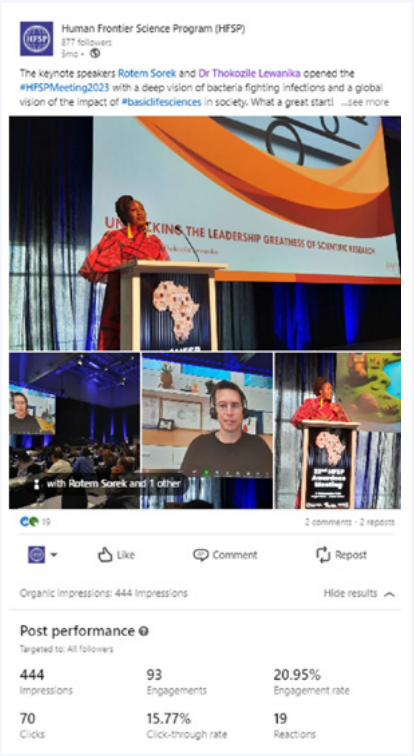
Engagements
10.33%
Engagement rate
20
Clicks
7.38%
Click-through rate
6
Reactions


Human Frontier Science Program (HFSP)
877 followers
3mo ·
The keynote speakers Rotem Sorek and Dr Thokozile Lewanika opened the #HFSPMeeting2023 with a deep vision of bacteria fighting infections and a global vision of the impact of #basiclifesciences in society. What a great start! ...see more
with Rotem Sorek and 1 other
19
2 comments · 2 reposts
Like
Comment
Repost
Organic impressions: 444 Impressions
Hide results
Post performance
Targeted to: All followers
444
Impressions
93
Engagements
20.95%
Engagement rate
70
Clicks
15.77%
Click-through rate
19
Reactions


HFSP
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Promote
From Lisbon (2017) to Strasbourg (2024), the Nobel Laureate Eric Wieschaus and the renowned physicist @wbialek will share the stage again in a tandem talk about #frontierscience at the interface of #physics and #biology. The first #HFSPFrontierWorkshop is coming soon! Stay tuned!
HFSP FRONTIER WORKSHOP
Eric Wieschaus & William Bialek
(Princeton University, USA)
Frontier Science at the Interface of Physics and Biology
13 – 15 May 2024
University of Strasbourg, France
The Nobel Prize and Princeton University
3:22 PM · Jan 31, 2024 · 12K Views


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Exciting News! Maiken Nedergaard wins the 2024 #HFSPNakasoneAward for her groundbreaking research on the glymphatic system, shedding light on the vital role of sleep in brain health. Learn more: bit.ly/3ITheuR Congrats @NedergaardLab!
#HFSP
2024 HFSP NAKASONE AWARDEE
35 years
MAIKEN NEDERGAARD
University of Rochester (USA) & University of Copenhagen (Denmark), for research on the glymphatic system
NedergaardLab and 2 others
1:36 PM · Mar 26, 2024 · 11.2K Views


HFSP
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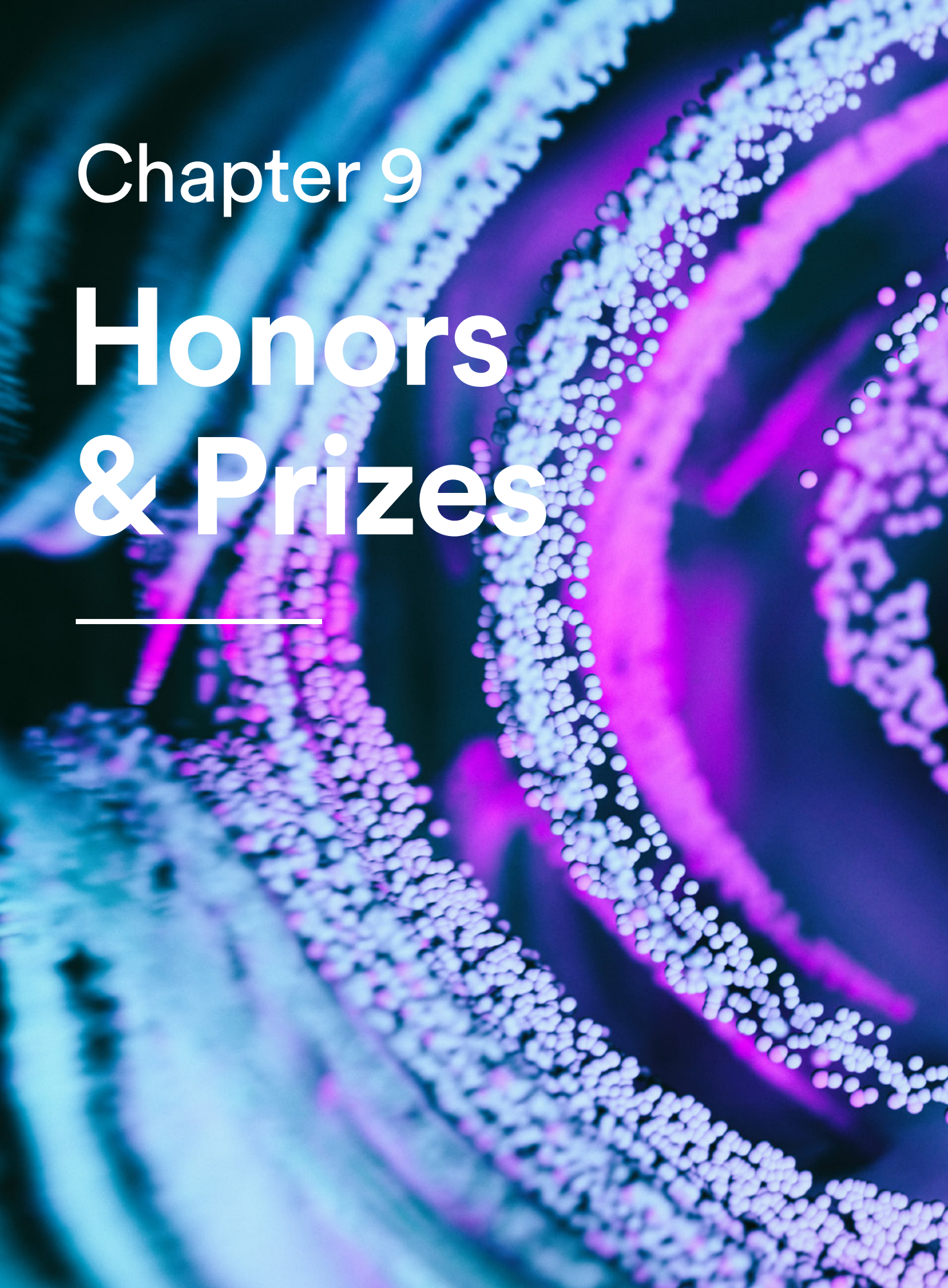
We are already here preparing everything to welcome you and let the science rock! Who's coming to the High Level Summit Fundamental #LifeScience Meets #Climate #Environment and #Sustainability? #LifeSciences4Sustainability
HFSP
Académie des sciences and 9 others
9:26 AM · Jun 27, 2023 from Paris, France · 10.8K Views


HFSP
@HFSP
It's official! The 2023 #HFSP New Awardees are here! Congratulations to the 34 winning teams of #HFSPResearchGrants and the 52 researchers awarded #HFSPFellowships! Are you a #2023HFSPAwardee? Tell us! +info: bit.ly/2QMdUae
NEW AWARDEES 2023
HFSP FRONTIER FELLOWSHIPS
NEW AWARDEES
HFSP RESEARCH GRANTS 2023
4:52 PM · Apr 4, 2023 · 205.8K Views


HFSP
@HFSP
Promote
Attention scientific community @IndiaBioscience is hosting a free webinar about #HFSPFellowships. Join us to know all about HFSP programs and how to get a fellowship! Maybe next year you can join our #HFSPawardees family! Registration is open! Info: bit.ly/3UG57WW
Human Frontier Science Program (HFSP)
IndiaBioscience's International Grants Awareness Program
HFSP Postdoctoral Fellowships: What they are and how to get one?
Date: 24 April 2023
Time: 16:00 - 17:00 IST
iCAP
Scan to Register
2:54 PM · Apr 17, 2023 · 8,636 Views



Chapter 9

Honors & Prizes

9.0

HFSP ALUMNI WIN PRESTIGIOUS LIFE SCIENCE AWARDS

HFSP-supported scientists are regularly honored with the most prestigious prizes in the life sciences for their groundbreaking research. In 2023, top researchers won the following prizes:

- Moungi G. Bawendi, 2007 research grant alumnus, was a co-recipient of the 2023 Nobel Prize in Chemistry
- Hiroaki Suga, 2001 and 2017 research grant alumnus, was a co-recipient of the 2023 Wolf Prize in Chemistry
- Clifford Brangwynne and Anthony Hyman, winners of the 2021 HFSP Nakasone Award, were among the recipients of the 2023 Breakthrough Prize in the Life Sciences
- Caroline Holt, 2009 research grant alumna, was a co-recipient of the 2023 Brain Prize in Neuronal Transcription and Translation
- Eske Willerslev, 2011 research grant alumnus, won the 2023 Balzan Prize for Evolution of Humankind: Ancient DNA and Human Evolution

The recognition of HFSP-funded scientists is an indication of the outstanding quality of the science that HFSP supports and of the Program's contribution to breakthrough advances and technological developments that have significant benefits for society. Several Research Grant and Fellowship Alumni were recipients of prestigious awards from around the world for novel, pioneering research. Over the years, the scientists funded by HFSP have been recognized for their seminal work that in many cases has led to important tangible outcomes. HFSP alumni belong to an elite group of researchers who are regularly honored by the most prestigious scientific distinctions, not the least of which is the Nobel Prize. Indeed, in 35 years, 29 HFSP-supported scientists have been awarded Nobel Prizes. Also, four of the winners of the Nakasone Award were recipients of the Nobel Prize.

9.1

MAIKEN NEDERGAARD HONORED WITH 2024 HFSP NAKASONE AWARD

Maiken Nedergaard

The 2024 HFSP Nakasone Award was awarded to Maiken Nedergaard "for her groundbreaking discovery and exploration of the glymphatic system that has transformed our understanding of the importance of sleep."

Maiken Nedergaard has emerged as a researcher of outstanding merit due to her groundbreaking elucidation of the glymphatic system, a discovery that has pivoted the scientific community towards a new understanding of brain health, particularly in the realm of sleep and its protective roles against neurodegenerative disorders. By highlighting the glymphatic system's role in eliminating potential neurotoxic metabolites — including amyloid — during sleep, Nedergaard forged new pathways in sleep research, providing crucial insights between sleep and neurodegenerative diseases.

Her scholarship has pierced the conventional paradigms of neurobiology, uncovering the pivotal role that sleep plays in cognitive preservation and exploring the multifaceted relationships between sleep, the glymphatic system, and neurodegenerative diseases. Nedergaard's research has provided the critical lens through which we perceive sleep's influence on cognitive health, providing a robust framework that guides current and future explorations into these interconnected domains.

Nedergaard's pioneering work, which has catalyzed the ongoing development of promising new strategies for diagnosing and treating a variety of brain disorders, will have lasting implications for the field of neuroscience and may lead to new diagnostic tools and treatments for neurodegenerative diseases. In a world where the fastest growing segment of our population is people over the age of 65, Nedergaard has provided transformative insights and ushered in a new era of therapeutic exploration through sleep.

9.2
NAKASONE AWARD WINNERS

Table 9.1
HFSPO Nakasone Award Recipients, Including Nobel Laureates

Year	First name	Surname	Nationality	Nobel Prize
2010	Karl	DEISSEROTH	USA	
2011	Michael	ELOWITZ	USA	
2012	Gina G.	TURRIGIANO	USA	
2013	Stephen R.	QUAKE	USA	
2014	Uri	ALON	Israel	
2015	James J.	COLLINS	USA	
2016	Emmanuelle	CHARPENTIER	France	2020
2016	Jennifer	DOUDNA	USA	2020
2017	David	JULIUS	USA	2021
2018	Svante	PÄÄBO	Sweden	2022
2019	Michal	HALL	Switzerland	
2020	Angelika	AMON	USA	
2021	Anthony	HYMAN	Germany	
2021	Clifford	BRANGWYNNE	USA	
2022	Aviv	REGEV	Israel	
2022	Ulrich	HARTL	Germany	
2022	Arthur L.	HORVICH	USA	
2023	Rotem	SOREK	Israel	
2024	Maiken	NEDERGAARD	USA	

9.3

HFSP GRANTEES AWARDED THE NOBEL PRIZE AND OTHER TOP HONORS

Since 1990, HFSP has supported more than 7,500 researchers from more than 70 countries. Of these, 29 HFSP awardees in 35 years have gone on to receive the Nobel Prize.

Table 9.2
HFSP Grantees Who Have Won the Nobel Prize

Nobel Laureate	HFSP Research Grant	Nobel Prize
Christiane NÜSSLEIN-VOLHARD	1993	1995 (Physiology or Medicine)
Rolf ZINKERNAGEL	1994	1996 (Physiology or Medicine)
Stanley PRUSINER	1994	1997 (Physiology or Medicine)
John WALKER	1996	1997 (Chemistry)
Steven CHU	1993	1997 (Physics)
Paul NURSE	1994	2001 (Physiology or Medicine)
Tim HUNT	1992, 1997	2001 (Physiology or Medicine)
John SULSTON	1991	2002 (Physiology or Medicine)
Peter AGRE	2000	2003 (Chemistry)
Linda BUCK	1995	2004 (Physiology or Medicine)
Avram HERSHKO	1998	2004 (Chemistry)
Roger KORNBERG	1990, 1993, 1997, 2000	2006 (Chemistry)

Nobel Laureate	HFSP Research Grant	Nobel Prize
Roger TSIEN	1995	2008 (Chemistry)
Jack SZOSTAK	2001	2009 (Physiology or Medicine)
Venkatraman RAMAKRISHNAN	2000, 2009	2009 (Chemistry)
Ada YONATH	2003	2009 (Chemistry)
Jules HOFFMANN	1995	2011 (Physiology or Medicine)
Ralph STEINMAN	1996, 2006	2011 (Physiology or Medicine)
Randy SCHEKMAN	1991, 1995	2013 (Physiology or Medicine)
Thomas SÜDHOF	1995	2013 (Physiology or Medicine)
James ROTHMAN	1990, 1994, 2005	2013 (Physiology or Medicine)
Martin KARPLUS	2005	2013 (Chemistry)
Michael LEVITT	2008	2013 (Chemistry)
John O'KEEFE	1994	2014 (Physiology or Medicine)
Stefan HELL	2010	2014 (Chemistry)
Aziz SANCAR	1992	2015 (Chemistry)
Jeffrey C. HALL	1991, 2000	2017 (Physiology or Medicine)
Tasuku HONJO	1990	2018 (Physiology or Medicine)
Moungi BAWENDI	2007	2023 (Chemistry)

Table 9.3

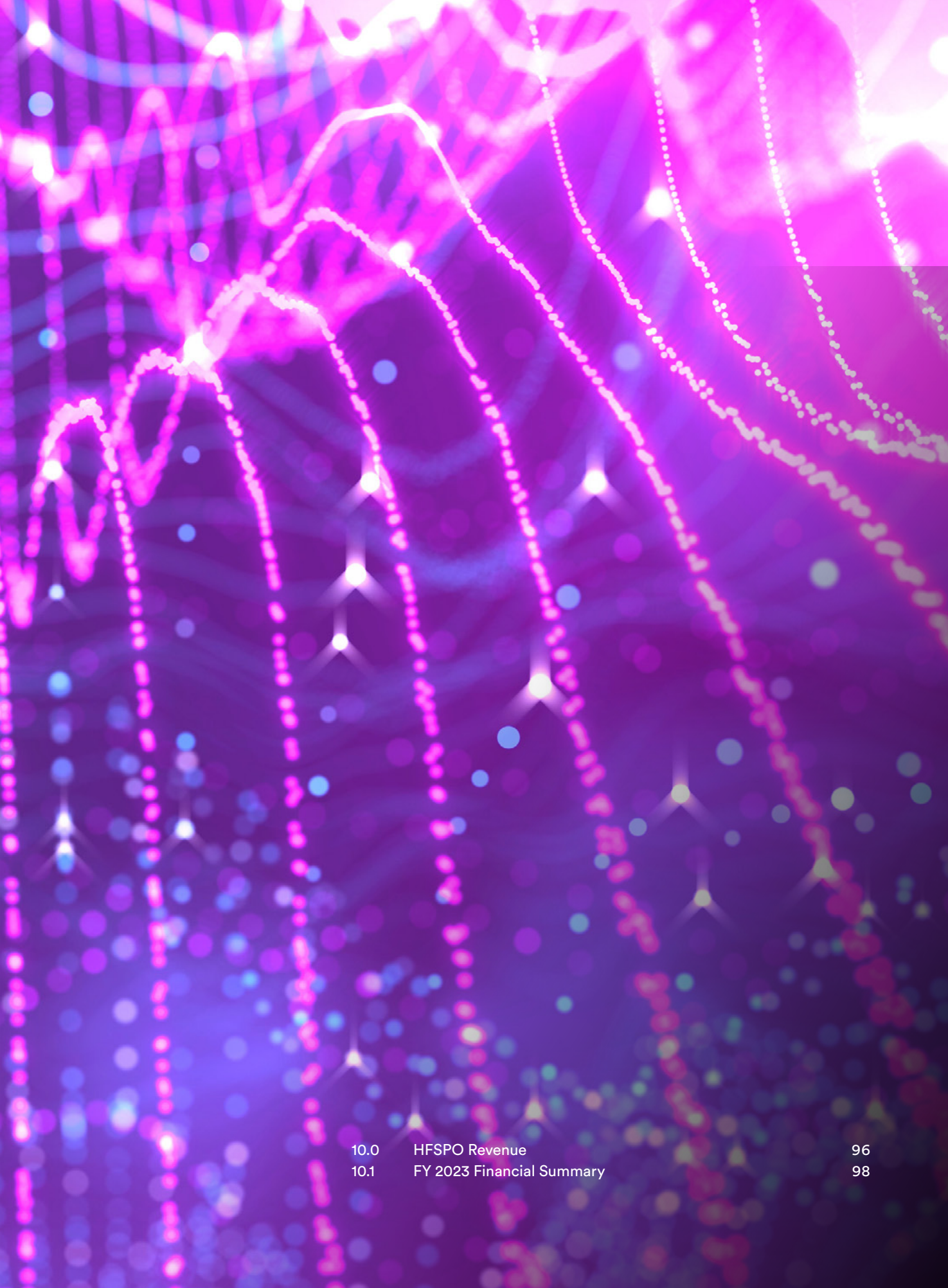
Additional Awards and Prizes Given to HFSP Awardees and Alumni from 2022 that Have Come to Our Attention in FY 2023*

Name	Nationality	Current Affiliation	HFSP Award
Académie des sciences - Grand Prix Charles-Léopold Mayer			
Benjamin SIMONS	UK	University of Cambridge, UK	PG2014
Breakthrough Prize Foundation - Breakthrough Prize - Life Sciences			
Anthony HYMAN	UK	Max Planck Institute of Molecular Cell Biology and Genetics, Germany	RG1993, RG1998, PG2019
Clifford BRANGWYNNE	USA/Ireland	Princeton University, USA	RG2012
CNRS - Silver Medal			
Tâm MIGNOT	France	CNRS, France	PG2008
Matthieu PIEL	France	Institut Curie, France	LT2002, PG2007
NIH - NIH Director's New Innovator Award			
Krishna JAYANT	India	Purdue University, USA	PG2020
Akankshi MUNJAL	India	Duke University, USA	LT2016
NIH - NIH Director's Pioneer Award			
James GREENLEAF	USA	Stanford University, USA	PG2015
NIH - NIH Director's Transformative Research Award			
Anne-Ruxandra CARVUNIS	France	University of Pittsburgh, USA	PG2023

*Notes: RG = Research Grant (pre-2001); PG = Program Grant; YI = Young Investigator Grant; RG-P = Research Grant – Program; RG-EC = Research Grant – Early Career; LTF = Long-Term Fellowship; CDF = Cross-Disciplinary Fellowship; STF = Short-Term Fellowship. It should be noted that until 2001 HFSP awarded Research Grants, after which subcategories of Program Grants and Young Investigator Grants were introduced. In 2020, the Program Grants and Young Investigator Grants were renamed Research Grants – Program, and Research Grants – Early Career, respectively. The Short-Term Fellowship program was terminated in 2010, and the Career Development Award (CDA) was terminated in 2019.

Chapter 10

Finance



10.0
HFSPO REVENUE

In FY 2023, HFSPO was funded by the generous support of 17 HFSPO Members: Australia, Canada, France, Germany, India, Israel, Italy, Japan, the Republic of Korea, New Zealand, Singapore, Switzerland, the United Kingdom of Great Britain and Northern Ireland, the United States of America and the European Commission. HFSPO officially welcomed two new Members in FY 2022: Norway and South Africa who started to contribute in FY 2023.

Together, they agreed on the individual and overall financial commitment to implement the Human Frontier Science Program.

In FY 2023, HFSPO pursued the Scientists for Scientists Initiative to help Ukrainian researchers affected by the war to continue their research in host institutions around the world. Since then, HFSPO has supported proposals from 29 Ukrainian scientists, 14 in FY 2022 and 15 in FY 2023; a 16th proposal was approved before the end of FY 2023, but the payment was made in April 2024 in FY 2024. The S4S program created placements abroad in the laboratories and institutes of active HFSPO awardees. This initiative is supported by the European Commission which provided a specific additional contribution of EUR 1 million.

These revenues are complemented by other income from asset management (interest and capital gains), which in FY 2023 constituted USD 2.3 million and some recovered funds on the order of USD 0.8 million. In sum, HFSPO's revenue for the financial year 2023 totaled USD 55.8 million.

Table 10.1

HFSPO's Revenue for FY 2023

Payments in US Dollar Equivalent at the Time of Payment

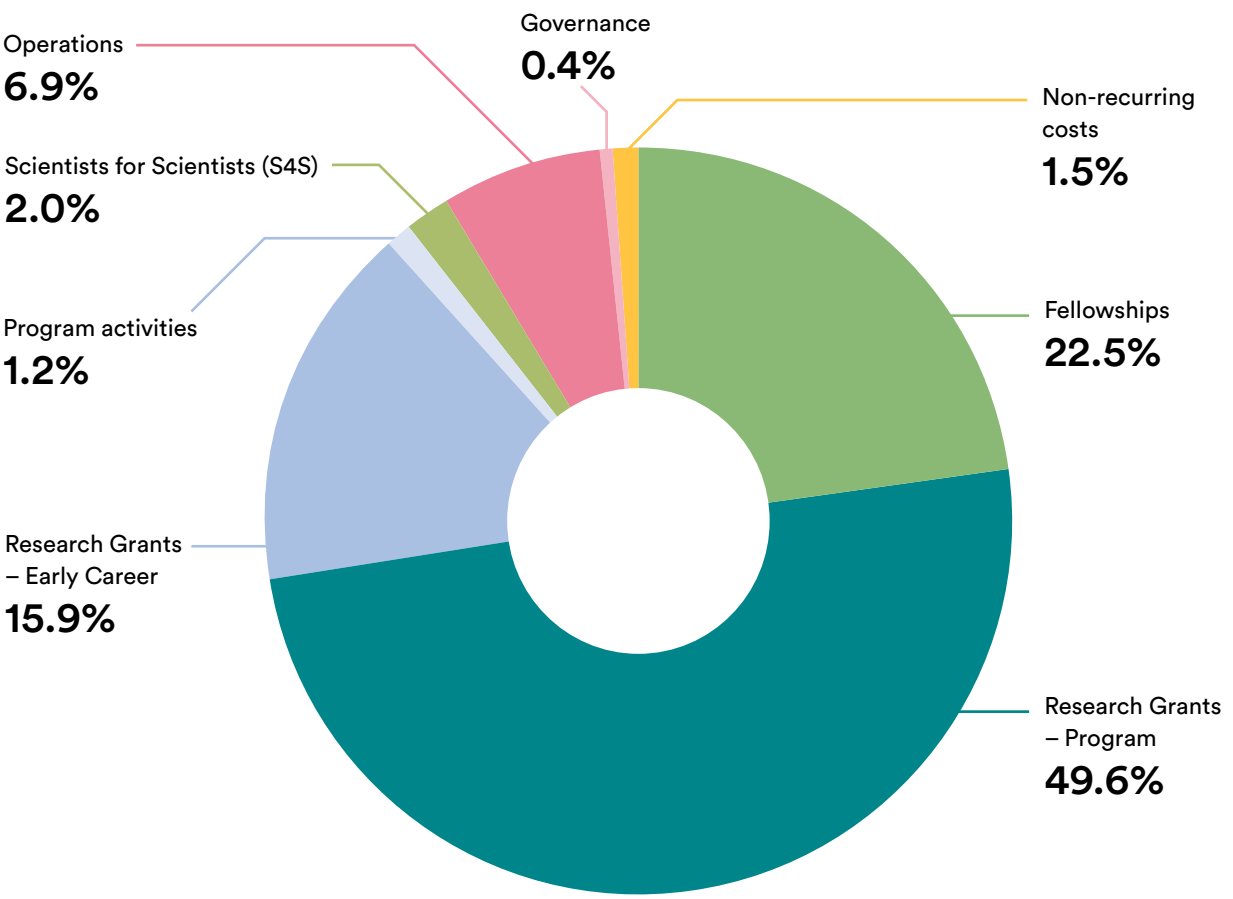
HFSPO Revenue	received in USD equivalent
Australia	847 634
Canada	1 545 341
European Commission	5 766 930
European Commission*	1 088 100
France	2 595 898
Germany	2 983 188
India	1 786 512
Israel	264 794
Italy	528 450
Japan	16 856 951
Republic of Korea	755 745
New Zealand	158 143
Norway	1 000 000
Singapore	572 380
South Africa	500 000
Switzerland	1 077 447
United Kingdom	2 098 665
United States of America	12 269 000
Total voluntary contributions	52 695 179
Interests & capital gains	2 323 786
Other sources	755 400
Other income	3 079 186
Total income	55 774 365

* Specific contribution for the S4S initiative

10.1
FY 2023 FINANCIAL SUMMARY

HFSPO was established to support and implement the scientific activities of the Program, and thus, its cost structure is geared toward a maximal support of science. In FY 2023, the scientific program accounted for 91.2% of overall expenditures. Governance and operational costs to run the scientific program stand at 0.4% and 6.9% respectively, and non-recurring costs for 1.5%.

Figure 10.1
HFSPO Expenditures by Type of Activity



HFSPO'S ACTIVITIES

Expenditures amount to USD 56.8 million and include:

- Program awards and program activities totaling USD 51.8 million:
  - USD 28.1 million for Research Grants – Program
  - USD 9.0 million for Research Grants – Early Career
  - USD 12.8 million for Long-Term and Cross-Disciplinary Fellowships
  - USD 1.1 million for Scientists for Scientists Initiative
  - USD 0.8 million for related science activities

- Governance and operational costs amounting to USD 4.2 million and non-recurring costs to USD 0.8 million.

In the spirit of science without borders, HFSP brings together international teams of researchers from around the globe and supports postdoctoral fellows to move to a laboratory in a new country. Since its inception, the Program has supported researchers from 70 different countries. Last year was no exception. As shown in Figure 3.3 on pages 44 – 45, awardees pursued their research in many different locations in the world.

Table 10.2

Geographical Distribution of HFSP Award Payments by Members in FY 2023 (in Thousand USD)

Awards/geographical area	Research Grants	Fellowships	Total
Australia	1 312	417	1 728
Canada	1 768	148	1 916
European Commission	6 522	1 113	7 636
France	1 870	673	2 542
Germany	4 706	939	5 645
India	356	0	356
Israel	967	14	981
Italy	1 133	39	1 172
Japan	2 306	56	2 362
Republic of Korea	0	0	0
New Zealand	215	0	215
Norway	258	0	258
Singapore	122	0	122
South Africa	105	0	105
Switzerland	1 057	1 436	2 493
United Kingdom	4 508	2 311	6 819
United States of America	9 105	5 645	14 750
Non-Member	849	0	849
Total	**37 159**	**12 791**	**49 949**

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e-mail: info@hfsp.org
website: www.hfsp.org
Japanese website:
amed.go.jp/program/list/20/01/008.html

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HFSP Science Writer & Editor

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Nanyang Technological University (NTU)*

South Africa
National Research Foundation
South African Medical Research Council

Switzerland
Swiss National Science Foundation (SNSF)

United Kingdom of Great Britain and Northern Ireland
UKRI-Biotechnology and Biological Sciences Research Council (BBSRC)
UKRI-Medical Research Council (MRC)

United States of America
National Institutes of Health (NIH)
National Science Foundation (NSF)

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