The New York Academy of Sciences

ANNUAL REPORT FISCAL YEAR 2022

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The Academy and New Demands of Science

I marked the 2nd anniversary of my arrival at the Academy by noting that we are a 200-year-old institution that looks forward, not back.

Science in our first century as a learned society was largely the work of individuals, one of the reasons they decided to form a scientific academy.

As we traversed our second century, the practice of science often became “big science” – using particle accelerators, rockets to the Moon, and powerful computers for discoveries in biology and genetics. This was expensive science, often marshaled in the service of “national interest.”

Today, we increasingly need science with a different set of attributes – science that is interdisciplinary and collaborative, and that connects individuals across institutional and national boundaries. We need approaches to science that can best advance the public good, driven by concerns about the quality of our lives on earth and the future of the earth itself.

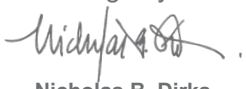
This year the Academy rapidly moved to develop a new model for the practice of science with the launch of the International Science Reserve (ISR). We are creating a network of scientists – and assembling scientific resources – to help address global crises. We’ve recruited an impressive set of industry partners, including IBM, Google, Pfizer, and UL Solutions. More than a thousand scientists have joined.

Science today needs young people who can call upon diverse perspectives for problem-solving. So we brought our STEM programs to a broad range of 16,000 students, in New York City and across the world.

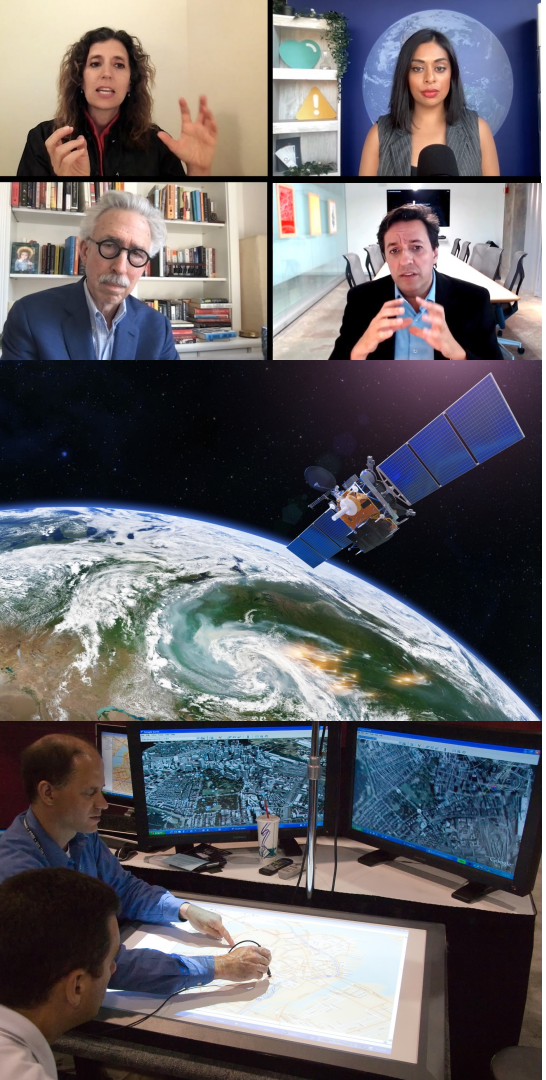
Our programs also reached thousands of college and university students, as well as recent graduates. And we are now hosting the Leon Levy Scholarships in Neuroscience.

Our mission remains the sharing of information, as demonstrated in our conferences on mRNA technology, the future of coronavirus variants, and innovative research in cancer and neuroscience. We explored the science of racial justice and examined the therapeutic value of psychedelics.

I am proud the Academy is fulfilling its mission to serve the public good by forcefully embracing the future and moving beyond “science-as-usual.”



Nicholas B. Dirks
President and CEO, The New York Academy of Sciences



IMPACT FOR SCIENCE AND SOCIETY

International Science Reserve – Building a Global Network

Science in a time of crisis is not “science as usual,” and no individual country can handle the impact of a transnational crisis alone. The New York Academy of Sciences believes science and technology can play important roles in developing solutions, and in protecting communities from many of the impacts of disaster.

Launched in 2022, the **International Science Reserve** (ISR) is an initiative to mobilize the global scientific community to respond to complex, fast-moving crises. These might include pandemics, major cyberattacks, or climate-related disasters.

Supported by founding partners **IBM, Pfizer, Google, and UL Solutions**, the ISR helps scientists secure access to specialists and technical resources, including remote sensing, genomic sequencing, geospatial-temporal mapping, and various databases.

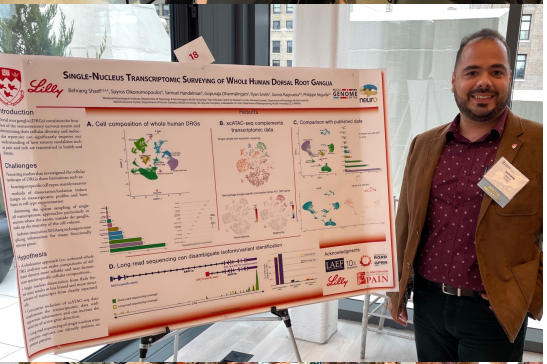
IMPACT FOR SCIENCE AND SOCIETY

The International Science Reserve – The First Year

The ISR includes members from a wide range of disciplines. In early 2022, nearly 1,000 scientists joined from across the physical, life, earth, computer, and behavioral sciences. Crises rarely recognize national borders, so the ISR is designed to work around the world. Early recruitment efforts drew scientists from more than 90 countries, creating a highly-focused network for intensive, international collaboration.

The ISR uses **scenario planning** to help scientists prepare for crises and evaluate what scientific and technical resources they would use during these emergencies. Scientists from all corners of the globe – from Chile to Australia, from the United States to the Philippines – submitted research concept proposals to address wildfire crises as part of the first readiness exercise. The exercise presented three examples: a crown fire in the conifer forests of the Northwestern United States, a rapidly moving brush fire in Greece, and a slow-burning peatland fire in Indonesia.

New collaborations and conversations are core achievements for the ISR as it broadens its reach through a network of organizations, government agencies, universities, and research associations. The ISR is catalyzing engagement, planning, and action in crisis preparation across sectors. The ISR produced an initial report, *Preparing for Crisis: Lessons from the International Science Reserve*, and is convening a bimonthly international public webinar series, Science Unusual: R&D for Global Crisis Response.



IMPACT FOR SCIENCE AND SOCIETY

The Life Sciences – Neuroscience

The Academy's neuroscience programming advanced fundamental knowledge about the brain and nervous system, sharing research developments that may provide a foundation for novel ways to reduce the burden of neurological disease.

Emerging Research & Trial Strategies for Progressive Multiple Sclerosis brought together physician-scientists, academics, industry leaders, and clinicians to discuss advancements in study designs for the assessment of treatments for progressive MS patients.

Neurodegeneration and Proteostasis considered how to apply the emerging science of proteostasis to deliver transformational therapies for neurodegenerative diseases such as Alzheimer's and Parkinson's.

Advances in Pain explored novel mechanisms underlying pain conditions, recent diagnostic progress, and emerging therapies, particularly those that go beyond traditional opioid drugs and have non-addictive properties.

Alzheimer's Disease Therapeutics: Alternatives to Amyloid highlighted the importance of identifying alternative drug targets to amyloid in Alzheimer's disease treatment and developing new tools for early detection and prediction of disease onset. In addition, the program featured the latest research on neurogenesis, neuroprotection, lifestyle factors, and brain-peripheral organ interaction in Alzheimer's disease.

IMPACT FOR SCIENCE AND SOCIETY

The Life Sciences – Cancer

Cancer continues to be an important focus for Academy programing since the disease is a leading cause of death worldwide and new cases are expected to increase significantly, to over 27 million in the next two decades. Academy programs shared the latest research on triggers for cancer formation, factors that control tumor growth and spread, and how individual cancer cells differ from each other and from healthy cells. This research will likely lead to breakthroughs in cancer prevention, diagnosis, care, and cure.

Frontiers in Cancer Immunotherapy 2022 addressed challenges in understanding why some tumor types are responsive to immunotherapy and how to better predict patient responses to this paradigm-shifting treatment. Immuno-oncology experts across academia and industry discussed intratumoral therapies, targeting tumor resistance, therapeutic potential of cytokines, combination therapy, and the application of computational bioinformatics.

Cancer Metabolism and Signaling 2022 explored how metabolic pathways are altered in cancer and how these alterations can be exploited to design new therapeutics.

Redirected Immune Cell Therapies highlighted new insights about immune cell trafficking, immunological signaling, antibody design features that lead to optimal distribution and activity in tumors, and experimental models for more confident clinical translation.

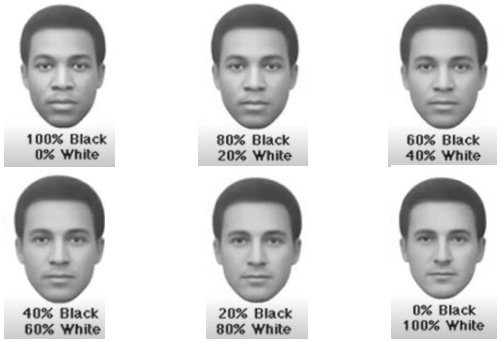
IMPACT FOR SCIENCE AND SOCIETY

Life Sciences – Maintaining a Focus on COVID-19

Throughout the year, the Academy continued to disseminate important research and public health developments about COVID-19. The Academy's programs provided critical information for both the scientific community and the general public, with topics ranging from pandemic preparedness to vaccine/therapeutic equity.

mRNA Technology: The 2021 Dr. Paul Janssen Award Symposium honored Katalin Karikó, Ph.D., Senior Vice President at BioNTech SE and Adjunct Professor at Perelman School of Medicine, University of Pennsylvania, and Drew Weissman, M.D., Ph.D., Professor of Vaccine Research, also at the Perelman School of Medicine, for their pioneering research on messenger RNA (mRNA) technology. Their work helped set the stage for the rapid use of mRNA platforms in the development of several COVID-19 vaccines. Dr. Karikó and Dr. Weissman were also recognized at the **2022 Ross Prize Symposium**.

What You Need to Know About Omicron and Future Coronavirus Variants shed light on the most recent learnings on the virology and epidemiology of Omicron and explored implications for public health as SARS-CoV-2 continues to evolve. The program featured: Rick Bright, Ph.D., of the Pandemic Prevention Institute; Dave A. Chokshi, M.D., then-commissioner of the New York City Department of Health and Mental Hygiene; Penny Moore, Ph.D., of the University of the Witwatersrand, South Africa; and Dr. Weissman.



IMPACT FOR SCIENCE AND SOCIETY

Equity, Inclusion, and Justice

Highly publicized violence and shocking incidents of bias have heightened awareness of structural racism, leading to self-reflection and restorative practices by individuals and institutions. The Academy supports these actions and advocates for diversity, equity, and inclusion, and uses its resources to probe the science of bias.

Our conference, **The Science of Racial Justice**, explored the causes and consequences of systemic bias. Speakers included social, behavioral, and cognitive scientists, as well as activists and legal scholars.

In her presentation, **The Mental Representation of Race in America**, Mahzarin Banaji, Ph.D, of Harvard University, reported on classic and recent research on disparities between conscious and unconscious bias.

In **Why Critical Race Theory Needs Science**, Jerry Kang, J.D., of the University of California, Los Angeles, described the academic origins of critical race theory and cited the work of experimental psychologists in promoting anti-bias structural change.

In **The Roots of Racial Bias**, Keith Payne, Ph.D., of the University of North Carolina, described research showing that historical oppression may be transmitted into contemporary biases through structural inequalities.

Other topics included: modern bias against indigenous peoples, lessons from developmental science for early intervention against prejudice, psychological processes that explain inequalities in higher education, and racial literacy interventions for improved emotional, cognitive, and physiological health.

IMPACT FOR SCIENCE AND SOCIETY

Reaching New Audiences at the 2022 South By Southwest Conference

Expanding our public outreach and reaching new audiences, the Academy presented two panel discussions at the influential South By Southwest Conference (SXSW) in Austin, Texas. The programs were selected from among 5,500 entries.

Psychedelics for Therapeutics and Well-Being explored whether clinician-guided treatment with mind-altering chemicals can be effective against depression, PTSD, and addiction. Author and podcast host Tim Ferriss shared his personal experience with depression, and how his use of psychedelics in college – even though unsupervised – provided relief. Psychologist Rosalind Watts, Ph.D., a researcher of mood-altering drugs, Roland Griffiths, Ph.D., of Johns Hopkins University School of Medicine, and psychiatrist John Krystal, M.D., of Yale University, discussed the neurobiology of psychedelics and their use in therapy. The panel was presented on the SXSW mainstage, and drew an in-person audience of more than 1,500.

Alienating Mars: Challenges of Space Colonization explored how a journey to Mars will test the limits of the human body. Eliah Overbey, Ph.D., a post-doctoral associate at Weill Cornell Medicine, described ethical quandaries as scientists investigate whether technologies like CRISPR gene editing might confer resistance to radiation hazards in space. Erika Nesvold, Ph.D., of the JustSpace Alliance, explained why space travel should accommodate people with disabilities. Astrobiologist Charity Phillips-Lander, Ph.D., of the Southwest Research Institute, presented evidence for and against life on Mars, and sustainable approaches to getting there. The program was moderated by Brooke Grindlinger, Ph.D., the Academy's Chief Scientific Officer.

IMPACT FOR SCIENCE AND SOCIETY

The Interstellar Initiative

The Interstellar Initiative, developed by the Japan Agency for Medical Research and Development (AMED) and the New York Academy of Sciences, fosters international and interdisciplinary collaboration between scientists early in their careers. The program brings together researchers from around the world, selected via a competitive application process, and teams them with peers in complementary disciplines. With the guidance of leading senior researchers, each team develops a grant proposal centered on a novel scientific research question.

The **2021-2022 Interstellar Initiative focused on healthy longevity**, with projects targeting cancer, neurodegenerative and cognitive disorders, cardiovascular disease, metabolic and hormonal disorders, and other chronic, age-related conditions. The teams and mentors from 16 countries met virtually for two workshops.

The **Interstellar Initiative Alumni Program** brought together past participants to continue their collaborations and to form new teams. Thirty-seven returning early career investigators and 14 mentors from 12 countries met virtually for two workshops. A scientific symposium highlighted the achievements of past Interstellar Initiative projects.

Interstellar Initiative Beyond is a program the Academy and AMED are developing to provide further funding and support for the most promising team research projects developed through the Interstellar Initiative.

IMPACT FOR SCIENCE AND SOCIETY

Nutrition Program

The New York Academy of Sciences' Nutrition Science Program continues to make significant contributions to the global nutrition agenda.

The **Multiple Micronutrient Supplementation (MMS) in Pregnancy Technical Advisory Group**, hosted by the Nutrition team, prepared a successful application to include MMS in the World Health Organization's Essential List of Medicines. It also conducted two comprehensive analyses that support the introduction of MMS in low- and middle-income countries. These analyses were published in scientific journals and presented at a WHO Technical Consultation on MMS. The Nutrition team is also conducting a research project involving 16 trials, to determine the dose of MMS required to improve pregnancy and birth outcomes.

A webinar, **Calcium in Global Health and Nutrition**, was hosted to disseminate the conclusions of the Calcium Task Force, which were also presented in four scientific papers published in a special issue of *Annals of the New York Academy of Sciences*. The Nutrition team secured a grant to develop a biomarker of calcium status and provide technical assistance for calcium programs in Ethiopia and Pakistan.

In the **Adolescent Girls and Adult Women Nutrition Initiative**, participants from Colombia and Vietnam competed in a social challenge to promote healthy eating habits, submitting 23 solutions consisting of nutritious recipes using inexpensive, locally available foods. The recipes were distributed through social media, helping the authors become agents of change among their peers. The New York Academy of Sciences provided support and training to the winners to help implement their solutions and promote healthy eating habits.

CELEBRATING ACHIEVEMENT

The Blavatnik Awards for Young Scientists

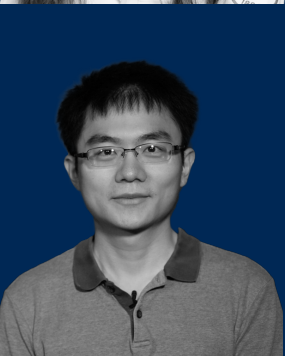
Blavatnik Awards for Young Scientists

The Blavatnik Awards for Young Scientists were established in 2007 by the Blavatnik Family Foundation to identify and honor exceptional young scientists and engineers in the categories of Life Sciences, Chemistry, and Physical Sciences & Engineering. The Awards celebrate extraordinary achievement, recognize outstanding promise, and accelerate innovation through unrestricted funding.

Honoring **groundbreaking young scientists around the world**, the original Blavatnik Regional Awards for Young Scientists recognized researchers in New York, New Jersey, and Connecticut. The program expanded with the Blavatnik National Awards in 2014, and then, beginning in 2017, grew to include scientists and engineers in Israel and the United Kingdom.

Over **$13.6 million was awarded to 392 young scientists and engineers** by the close of 2022. The Blavatnik Awards for Young Scientists has honored scientists from 51 countries, representing 36 disciplines.

Fifty-two researchers were recognized in the 2022 fiscal year. The program continues to champion a more diverse workforce and the Blavatnik Awards strongly encourages the nomination of women and other underrepresented groups in science and engineering.



CELEBRATING ACHIEVEMENT

Blavatnik Regional Awards

The 2021 Blavatnik Regional Awards received 152 nominations of talented postdoctoral scientists from 24 institutions across New York, New Jersey, and Connecticut. The three Winners and six Finalists, each awarded US$30,000 and US$10,000 respectively, were announced on September 21, 2021, during National Postdoc Appreciation Week and were recognized at the 2022 New York Academy of Sciences gala.

2021 LAUREATE IN CHEMISTRY

Daniel Straus, Ph.D., is challenging assumptions about how materials form and behave. By identifying a key structural instability in a promising new solar cell material – cesium lead iodide – Straus has enabled chemists to synthesize new, more stable materials using this new combination of atoms.

2021 LAUREATE IN LIFE SCIENCES

Direna Alonso-Curbelo, Ph.D., is a cancer biologist investigating the similarities and differences between wound healing and tumor development in an effort to discover why cancer commonly arises in damaged tissue. Her discoveries have unlocked key information that could be used for the earlier detection and treatment of cancer.

2021 LAUREATE IN PHYSICAL SCIENCES & ENGINEERING

Chenhao Jin, Ph.D., is an experimental physicist working in a new area of physics known as two-dimensional materials. His experimental results have uncovered new types of quantum phases and led to the development of an innovative, energy-efficient memory storage device. Jin has also developed optical techniques to better visualize these interesting new materials.

CELEBRATING ACHIEVEMENT

Blavatnik National Awards

The Blavatnik National Awards recognize the most groundbreaking young scientists and engineers from across the United States. They are nominated by over 300 academic and government research institutions. Lawrence Bacow, President of Harvard University, served as Presenter of Ceremonies. The 2022 Blavatnik National Awards Laureates and 28 Finalists were announced in early summer 2022, recognizing exceptional work ranging from measuring gravitational waves to tracking the behavior of drugs in the brain.

2022 LAUREATE IN CHEMISTRY

Hosea M. Nelson, Ph.D., has pioneered microcrystal electron diffraction (MicroED) as a tool to determine with unprecedented detail the positions of atoms within small molecules. He is now using this technique to accelerate development of new drugs and commercial chemicals.

2022 LAUREATE IN LIFE SCIENCES

Elaine Y. Hsiao, Ph.D., is expanding our understanding of how the gut microbiome – the community of microorganisms that live in intestines – interacts with the nervous system. Her work could help improve maternal-fetal health and predict risk for neurodevelopmental disorders.

2022 LAUREATE IN PHYSICAL SCIENCES & ENGINEERING

Conor Walsh, Ph.D., is reshaping how humans can interact with machines through the development of a new class of lightweight, flexible, and soft wearable robot technologies. His innovations could dramatically improve mobility for disabled people, including people with ALS and those who have experienced a stroke.

The three 2021 Blavatnik National Awards Laureates – **Andrea Alù, Ph.D., Mircea Dincă, Ph.D.,** and **Kay Tye, Ph.D**. – were each awarded US$250,000 and celebrated in a fall 2021 ceremony at the American Museum of Natural History (pictured on page 13).

CELEBRATING ACHIEVEMENT

Blavatnik Awards in the United Kingdom

The Blavatnik Awards in the United Kingdom announced nine 2022 honorees – three Laureates, each awarded £100,000, and six Finalists, each awarded £30,000 – in January 2022. They were honored at an award ceremony in London in February 2022 and their work was featured at a public symposium.

2022 LAUREATE IN CHEMISTRY

Kim Jelfs, Ph.D., has developed remarkable computer software that enables the accelerated discovery of new materials. The software is capable of predicting not only the structure of materials before they are created but also their unique properties and functions.

2022 LAUREATE IN LIFE SCIENCES

Madeline Lancaster, Ph.D., has created the first method for generating brain organoids, which are artificially grown *in vitro* from human induced pluripotent stem (iPS) cells. These tiny, self-organized tissue cultures share many features with the brain, and can be exploited to investigate the blood-brain barrier, primate brain evolution, fetal brain development, and disease.

2022 LAUREATE IN PHYSICAL SCIENCES & ENGINEERING

Matthew Brookes, Ph.D., has created a new magnetoencephalography (MEG) technology that led to new capabilities in functional brain imaging. His invention allows the mapping of brain connections in moving subjects and opens up a wide range of new approaches and subject groups for study, such as non-invasive imaging of children's brains.

Due to pandemic delays, the 2021 honorees of the Blavatnik Awards in the United Kingdom were celebrated at an award ceremony and symposium in London in October 2021.

CELEBRATING ACHIEVEMENT

Blavatnik Awards in Israel

The 2022 Blavatnik Awards in Israel, jointly administered by the New York Academy of Sciences and the Israel Academy of the Sciences and Humanities, honored the most promising and impactful young scientists in Israel. Three Laureates were each awarded US$100,000. They were honored at an outdoor celebration in Tel Aviv in June 2022, and their work was featured at a symposium at the Israel Academy of Sciences and Humanities in Jerusalem.

2022 LAUREATE IN CHEMISTRY

Menny Shalom, Ph.D., develops new types of advanced materials that only contain the elements carbon, nitrogen, phosphorus, sulfur, and boron. The low-cost materials produced in Shalom's laboratory are stable under harsh conditions and can be utilized for applications in photocatalytic and photo-electrochemical reactions.

2022 LAUREATE IN LIFE SCIENCES

Noam Stern-Ginossar, Ph.D., is developing groundbreaking analytical tools to study viral genome regulation. The tools include the use of ribosome profiling to generate high-resolution maps of the genome and have been applied to characterize the genome of SARS-CoV-2, the virus that causes COVID-19.

2022 LAUREATE IN PHYSICAL SCIENCES & ENGINEERING

Ronen Eldan, Ph.D., is a mathematician making groundbreaking contributions to the field of high-dimensional probability, which deals with data sets containing a very large number of variables. Eldan has developed techniques that have found applications in statistics and computer science, most notably in the field of machine learning.

CELEBRATING ACHIEVEMENT

Innovators in Science Award

The New York Academy of Sciences, in partnership with Takeda, continued the fourth cycle of the Innovators in Science Award, a global recognition program to honor both a promising early-career scientist and an outstanding senior scientist for their exceptional research and contributions to a specific field of study. In this cycle, the focus of the award was gastroenterology.

The 2022 Innovators in Science Award winners were announced in April 2022.

The **Early-Career Scientist Winner was Elaine Y. Hsiao, Ph.D.**, De Logi Associate Professor of Biological Sciences at UCLA. Dr. Hsiao has made groundbreaking discoveries into how the gut microbiome influences the brain and behavior.

The **Senior Scientist Winner was Jeffrey Gordon, M.D.**, Director of the Edison Family Center for Genome Sciences and Systems Biology and Dr. Robert J. Glaser Distinguished University Professor at Washington University in St. Louis. Dr. Gordon is widely recognized as the “father of microbiome science” and his pioneering interdisciplinary research has revealed the profound effects of the human gut microbial community on physiology and metabolism.

Each winner received a US$200,000 prize to support their commitment to innovative research.

BROADENING THE STEM PIPELINE

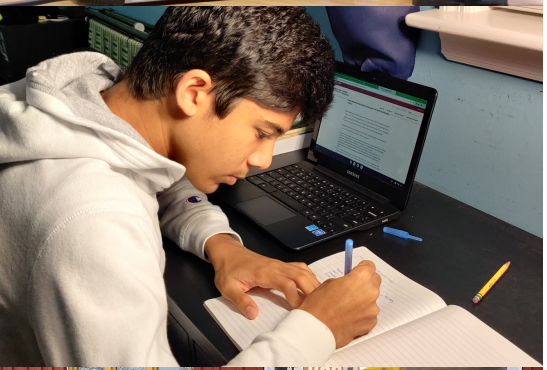
Educational Programs with a Global Reach

The Academy is helping close opportunity gaps in STEM with programs that encourage students to develop solutions to our most pressing global problems. Each year, more than 16,000 young people participate in life-changing Academy programs.

New York City
The Academy's STEM City Program places scientists in classrooms, afterschool programs, and libraries using a "scientist-in-residence" model in low-resourced settings. In 25 classrooms, scientist-teacher pairs brought year-long STEM learning experiences to life, and our scientists worked with 167 community-based organizations to deliver engaging, hands-on afterschool STEM programs.

Around the World
The Academy coaches students across the globe in challenge-based programs that teach science as well as communication, presentation, and collaboration skills. Team members learned to work with peers in other countries as the Academy expanded its reach in South America, Europe, the Middle East, and Africa. In 2022, the Academy's Junior Academy merged with its 1000 Girls,1000 Futures program, forming a new high school research program. In 2022, these Academy programs served students in 84 countries.

Mentorship
The Academy taps its most important resource – its members – for its STEM programs. The Afterschool STEM Mentoring Program now has 1,200 alumni, many of whom have leadership roles in science, policy, and education. Ten percent of the Academy's mentors go into science teaching, many through a pilot program with EnCorps.



BROADENING THE STEM PIPELINE

Educational Programs that Make a Difference

The Academy uses evidence-based approaches to design its STEM programs, and external evaluation methods to demonstrate the quality, reach, and impact of its work. Data shows students in these programs are more likely than their peers to continue studying STEM after high school.

Career Aspirations
Students in our Afterschool STEM Mentoring Program develop higher STEM career aspirations compared to a control group. When combined with the authentic and active learning opportunities in the program, data also show mentorship amplifies these career aspirations for young women compared to their peers.

Student Engagement
Seventy-five to 85 percent of participating students completed our Junior Academy program, a much higher percentage than comparable enrichment programs. Ninety-five percent of students reported they want to do another challenge and say they most enjoyed working in groups, building a global network of peers, engaging with new and meaningful STEM subjects, and working with a mentor.

External Evaluation
An external evaluation program confirmed the results of student surveys for our high school research programs and found that 88 percent of students learned to collaborate and communicate across diverse teams. Students also learned to set and manage goals with 86 percent of students using goal setting to explore their interests and passions. Finally, 75 percent of students exceeded their own performance expectations, challenging themselves to take risks.

BROADENING THE STEM PIPELINE

The Science Alliance – Focus on Scientists-in-Training

The Science Alliance is a consortium of more than 30 leading universities, teaching hospitals, and research institutions committed to better preparing future scientists and engineers from diverse backgrounds to meet the needs of a global workforce. The program is available to 7,000 undergraduate and graduate students, and postdoctoral fellows, across all STEM fields. Members have access to a full curriculum of professional development training, communications and leadership workshops, and opportunities for networking and career exploration.

The Science Alliance Leadership Training (SALT) program supports career transition decisions of participants by developing communication and leadership skills. The program serves over 150 graduate students. Sixty percent are women and 40% are individuals from other groups underrepresented in science.

Equity and Inclusion in STEM are foundational themes in programs that focus on effective mentorship, advocating for bystander intervention, and unconscious bias. These workshops have been offered to over 15 university partners.

The Career Path Series and **Building Trust in Science Workshops** help scientists and engineers understand diverse career opportunities in science policy, recruitment, and regulatory affairs, as well as the importance of engaging with broad audiences to facilitate behavior change.

The Data Science Innovation Challenge is a talent development pipeline program run in partnership with PepsiCo. Four hundred registrants competed for a summer internship at the company.

RANKED 14TH

OUT OF 73

IN THE MULTIDISCIPLINARY SCIENCES CATEGORY

6.499

IMPACT FACTOR

2021 Journal Citation Reports (Clarivate Analytics)

SCIENTIFIC PUBLICATION WITH GLOBAL IMPACT

Annals of the New York Academy of Sciences

The Academy's multidisciplinary scientific journal *Annals of the New York Academy of Sciences* achieved significant goals and reached important milestones in 2022.

The number of issues published annually was reduced to twelve without a reduction in the number of papers published. In addition, themed issues were eliminated in favor of non-themed issues that present a diverse collection of papers. These changes reduce production costs and the time to publication for all papers and authors.

With the aim of becoming a fully Open Access journal, the number of published papers as well as the number of papers with Open Access licenses increased significantly compared to 2021. These changes increase revenue and better position *Annals* to transition to a non-subscription business model.

Top 5 highly cited papers in 2022:

- The present and future use of functional near-infrared spectroscopy (fNIRS) for cognitive neuroscience
- The prevalence of depression, anxiety, and sleep disturbances in COVID-19 patients: a meta-analysis
- A review of the major threats and challenges to global bat conservation
- Gut microbiome and its role in obesity and insulin resistance
- Advances in understanding large-scale responses of the water cycle to climate change.

Financial Statement

OPERATING SUPPORT AND REVENUE

- Contributions..... $19,316,520
- Publication Sales..... $2,164,912
- Membership Fees..... $525,809
- Registration Fees..... $374,640
- Other Income..... $91,772

Total Public Support and Revenue..... $22,473,653

OPERATING EXPENSES

- Program Expenses..... $16,515,920
- Fundraising..... $1,659,216
- General and Administrative..... $2,664,459

Total Operating Expenses..... $20,839,595

Change In Net Assets Before Depreciation..... $1,634,058

Less: Depreciation Expense..... $145,875

Change In Net Assets After Depreciation and Before Lease Exit Activities and Unrealized Gains On Investments..... $1,488,183

Gain on Lease Exit Activities..... $340,109

Unrealized Gains on Investments..... $7,026

Change in Net Assets..... $1,835,318

The above data has been condensed from the consolidated financial statements as of June 30, 2022, audited by EisnerAmper, LLP. Copies of the audited statements including the accountant's unmodified opinion are available from the Academy upon request.

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The New York Academy of Sciences is pleased to recognize the generous contributions of all our donors. Their support helps us build a better future using science and technology to solve our world's most pressing challenges.

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In recognition of those who have named the Academy in their estate plans through a will, trust, life insurance policy or retirement plan, leaving their legacy in support of science for the public good.

A. Christine Berger Trust

Carolyn J. Foster

Jennifer Henry

Herbert J. Kayden* and Gabrielle Reem*

Joel Kirman* and Liora Kirman

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Conferences, Discussion Groups, and Scientific Events

5/12/21 - 11/29/21	Online Course: Cybersecurity and Healthcare Sector
6/1/21 - 8/9/21	Online Course: Scientists Teaching Science 2021
8/2/21	2021 Blavatnik Awards for Young Scientists in Israel Symposium: Science for Tomorrow
8/11/21	Cultimvating STEM Identity
9/13/21	Career Paths: PepsiCo
9/14/21	Redirected Immune Cell Therapies
10/4/21 -11/17/21	Online Course: Introduction to Molecular Modeling for Drug Discovery
10/4/21	Emerging Research & Trial Strategies for Progressive Multiple Sclerosis
10/12/21	Pulmonary Hypertension: Beyond Vasodilators
10/13/21	Career Paths: Academic Workforce Development
10/14/21	Lyceum Society
10/18/21	Genome Integrity Discussion Group
10/26/21	Innovating for a Better Future: 9 Young Scientists Transforming Our World – 2021 Blavatnik Awards in the UK Symposium
11/9/21	Covalent Modification: Chemical Biology and Therapeutic Applications
11/10/21	Transition to Reseach Independence: Funding and Grantsmanship
11/11/21	Chat with a Scientist: Renewable Energy
11/16&17/21	The Science of Racial Justice
11/18/21	Chat with a Scientist: Sustainable Food Production
11/19/21	mRNA Technology: The 2021 Dr. Paul Janssen Award Symposium

Conferences, Discussion Groups, and Scientific Events

11/30/21	2021 Annual Meeting: Renewed Investment in STEM
12/2/21 - 4/21/22	Chat with a Scientist Series
12/3/21	Alzheimer's Disease Therapeutics: Alternatives to Amyloid
12/6/21	Lyceum Society
12/6/21	Genome Integrity Discussion Group
12/7&8/21	Targeted Protein Degradation: From Drug Discovery to the Clinic
12/9/21	Career Paths: Medical Science Liaison
12/14/21	What You Need to Know About Omicron and Future Coronavirus Variants
1/3/22	Lyceum Society
1/18-25/22	Calcium in Global Health and Nutrition
1/26/22 - 5/18/22	Career Paths 2022 Series
2/7/22	Lyceum Society
2/11/22 - 7/27/22	Eureka Moments that Changed Science
2/14/22 - 4/4/22	Genome Integrity Discussion Group 2022
2/24/22 - 3/17/22	Online Course: How to Effectively Communicate Your Science to Any Audience
3/1/22	Discover, Design, and Diagnose: 9 Young Scientists Transforming Our World – 2022 Blavatnik Awards in the UK Symposium
3/7/22	Neurodegeneration and Proteostasis
3/7/22	Lyceum Society
3/11/22	mRNA Technology: The 2021 Dr. Paul Janssen Award Symposium

Conferences, Discussion Groups, and Scientific Events

3/12/22	Alienating Mars: Challenges of Space Colonization at South By Southwest
3/15/22	Psychedelics for Theraeputics and Well-Being at South By Southwest
3/22/22 - 4/13/22	Trust in Science: How Should Scientists Build Credibility and Engage with Society?
3/30&31/22	The Future of Vaccinology
4/1/22	Expert Talk with Dr. Xiaowei Zhuang
4/4&5/22	Frontiers in Immunology
4/11/22	Lyceum Society
5/21/22	Cancer Metabolism and Signaling
5/2/22	Lyceum Society
5/3&4/22	Advances in Pain
5/9-11/22	Frontiers in Cancer Immunotherapy 2022
5/18-22/22	Science Alliance Leadership Training
5/26/22	Chemical Biology Discussion Group Year-End Symposium
6/1/22 - 8/9/22	Scientists Teaching Science
6/6/22	Lyceum Society
6/7/22	Science and Society: 2022 Blavatnik Awards in Israel Symposium
6/7/22	The 2022 Ross Prize in Molecular Medicine

The New York Academy of Sciences

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The New York of Academy of Sciences is an independent, not-for-profit organization that since 1817 has been committed to advancing science for the benefit of society. With more than 20,000 Members in 100 countries, the Academy advances scientific and technical knowledge, addresses global challenges with science-based solutions, and sponsors a wide variety of educational initiatives at all levels for STEM and STEM-related fields. The Academy hosts programs and publishes content in the life and physical sciences, the social sciences, nutrition, artificial intelligence, computer science, and sustainability. The Academy also provides professional and educational resources for researchers across all phases of their careers. Please visit us online at www.nyas.org.

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