Stowers Report

FOUNDATIONAL SCIENCE. PROFOUND IMPLICATIONS.

2024

Stowers Institute

Stowers Report

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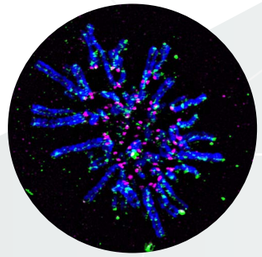
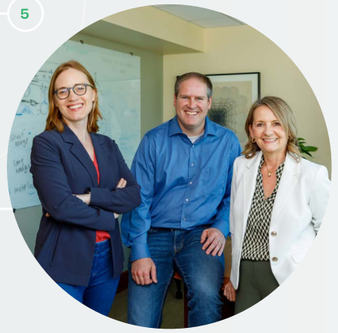
IN THIS ISSUE





FEATURED STORIES

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Visit the Stowers Institute at www.stowers.org.

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In Perspective

Biology is at a pivotal point. As technology accelerates to match the pace of innate scientific curiosity, biological mysteries that have remained inaccessible are on the brink of being revealed.

At the Stowers Institute, our approach to scientific exploration is driven by a commitment to objectivity and pure inquiry. We pursue scientific knowledge with boldness and rigor, never compromising on our standards of excellence. Our research institute thrives on the collective efforts of each member, fostering an ecosystem that not only demands but also flourishes from diverse perspectives. This rich congregation of ideas and viewpoints empowers us to conduct cutting-edge science, pushing the boundaries of discovery and innovation. Our sights are on ensuring that our research remains at the forefront of scientific advancement, continuously challenging conventional wisdom and uncovering new frontiers of knowledge.

Since our last report, our Institute expanded its roster of minds with the addition of Assistant Investigator Kamena Kostova, Ph.D., and Jim and Virginia Stowers Fellows Alex Garruss, Ph.D., and Nelson Hall, Ph.D. These exceptional researchers embody our commitment to creative and audacious scientific inquiry, tackling unsolved problems at the core of health and disease. Their expertise in harnessing cutting-edge technological advances aligns with our Institute's mission and drive. By continually pushing the frontiers of biological knowledge, we strive to unveil the underlying principles of life's mysteries. Our collective pursuit not only advances our understanding of fundamental biology but also paves the way for meaningful and enduring contributions to the improvement of human health.

Jim and Virginia Stowers' legacy to the biological sciences is an enduring gift of immeasurable value, designed to transcend their own lifetimes. As a community united in the pursuit of discovery, we share a collective mission to unravel the most fundamental mysteries of life. Your continued support enables us to be faithful stewards of the Stowers' visionary gift, enabling us to dedicate ourselves wholeheartedly to the pursuit of extraordinary science. Together, we are forging a path of discovery that promises to illuminate the intricate workings of life itself, carrying forward the torch of scientific excellence that Jim and Virginia Stowers so generously ignited. •

Alejandro Sánchez Alvarado, Ph.D.

PRESIDENT AND CHIEF SCIENTIFIC OFFICER

Discovery

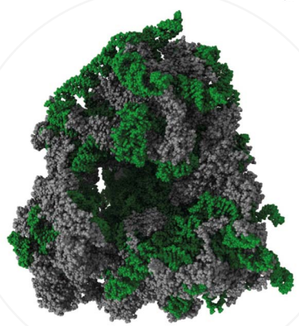
VIEWING LIFE THROUGH A DIFFERENT LENS

Stowers Institute welcomes newest Investigator Kamena Kostova, Ph.D.

From development to disease, biology can be viewed through the lens of ribosomes, the molecular machines that manufacture proteins in the cell. Given their vital function, ribosomes were once viewed as largely static entities. Now, the dynamic nature of ribosome composition and function is coming to light.

"Exploring how ribosomes vary across tissues in the body at different stages of development and in healthy versus disease states, we can get a new view of biology from the perspective of these critical cellular machines. They are much more multifaceted than previously thought," said cellular and molecular biologist Kamena Kostova, Ph.D., who joined the Institute this year as Assistant Investigator.

Previously serving as an Independent Fellow at the Carnegie Institution for Science, Kostova brings with her an established lab and track record of success. Her lab focuses on uncovering how complex conditions like cancer first start by studying damage and defects in ribosome structure and function. Using cutting-edge technologies, the lab maps the molecular mechanisms that maintain functional ribosomes and aims to unlock fundamental biological principles governing these essential machines to contribute to the understanding of human health and disease. ●



Learn more about what motivates Kostova in her study of ribosomes.

Left to right: Alex Garruss, Ph.D. and Nelson Hall, Ph.D.

Jim and Virginia Stowers Fellows Program

This year, the Stowers Institute launched a new initiative, the Jim and Virginia Stowers Fellows Program. The Stowers Fellows program seeks to advance scientific knowledge by funding early-career investigators who have distinguished themselves with novel and bold ideas to understand fundamental biological processes. Fellows are given a five-year term to pursue their own ideas independently. In the spring of 2024, the Institute welcomed its two inaugural Fellows, Alex Garruss, Ph.D., and Nelson Hall, Ph.D.

Garruss, an Institute alumnus, rejoined as a Fellow after earning a Ph.D. from Harvard University and working several years as a scientific leader and innovator in the biotechnology industry. His goals during the fellowship are to develop innovative methodologies for uncovering central concepts governing RNA. The method development and application Garruss will adapt involves uniting artificial intelligence with massive multiplexing—combining many varied molecules of interest into a single experiment—allowing millions to even billions of parallel experiments simultaneously.

Hall joined the Institute after earning a Ph.D. from Stanford University. Hall, who designs tools to genetically modify new or untraditional research organisms, was inspired by the Institute's broad range of both unusual and established organisms. Hall's goals as a Fellow are to optimize genetic tools to enable more researchers to study the unusual flatworm, *Macrostomum lignano*, and, more broadly, to develop universally applicable tools to study the biology of any new research organism. ●

Hear Garruss and Hall discuss what led them to the Institute and the impact of their research.

Welcoming our newest organisms

Plants as research organisms are a first for the Stowers Institute. The lab of Assistant Investigator Siva Sankari, Ph.D., has introduced and established two legumes, *Medicago sativa*, more commonly known as alfalfa, and *Medicago truncatula*, native to the Mediterranean. The Institute invested in new infrastructure to house them—a plant incubator also known as a growth chamber was installed to maintain critical factors plants require, including temperature, humidity, daylight cycle, and light intensity.

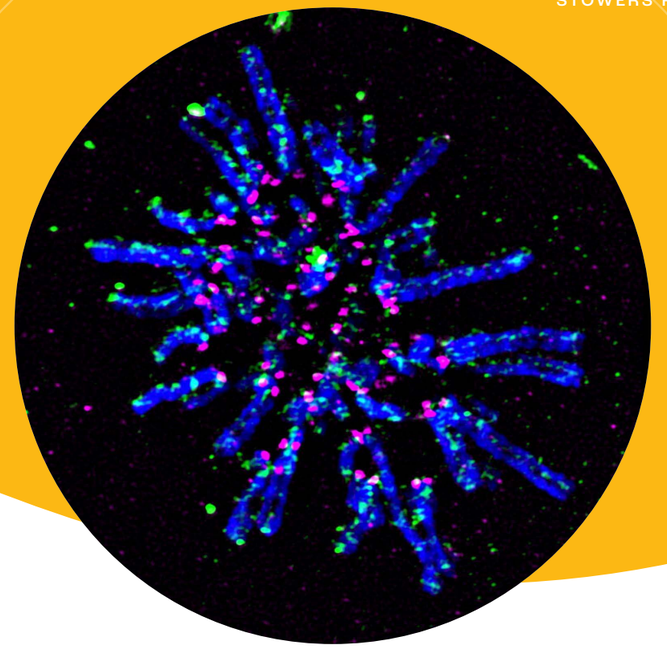
The Sankari Lab studies how plants interact with the bacteria found in their environment. Thus, several species of soil bacteria have been added to the Institute's research organism arsenal to investigate the biological process of symbiosis, the mutually beneficial arrangement between bacteria and their host plants. These bacteria live inside plants and help their hosts function and grow. Understanding the mechanisms of this simple one-to-one system can potentially be extended to host-symbiont relationships in more complex organisms including humans.

Studying untraditional research organisms that have perfected incredible biological feats can illuminate not only how they do so but also how human biology may benefit from this understanding and harness it for health.

Looking ahead, the development and preparation for housing new organisms like coral and jellyfish is in place, untethering limitations for establishing novel, unordinary research organisms at the Institute.

Plant sprouts used to study soil bacteria *Sinorhizobium meliloti* and *Bradyrhizobium japonicum*.

Learn more about Sankari's research on plants.



Research Highlights

Chromosome centers have similar configurations

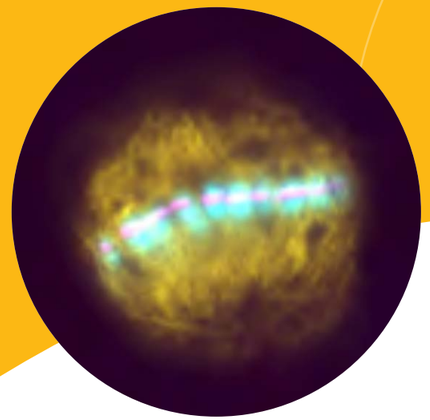
PUBLISHED DECEMBER 1, 2023, IN *NATURE COMMUNICATIONS*

Centromeres, typically corresponding to the center of a chromosome, play a crucial role in ensuring proper alignment and separation of chromosomes during cell division. However, their size is far from uniform, presenting a paradox in how these different sizes achieve a common function.

Research led by Ayantika Sen Gupta, Ph.D., in lab of Jennifer Gerton, Ph.D., developed a model that accounts for centromere functional maintenance despite the variability in centromere length and DNA sequence.

"The work reveals how human centromeres, despite differences in DNA sequence length, can achieve a common core structure by variable looping of DNA," said Gerton. "This may be one explanation for the centromere paradox."

This research also lays groundwork for studying centromere variation, which could reveal insights underlying centromere mutation, genome instability, and human disease.



Silk moths reproduce by recycling

PUBLISHED JANUARY 3, 2024, IN *CURRENT BIOLOGY*

Furry white silkworms are most famous for the commodity they synthesize—silk. However, they are also valuable for understanding the unusual biology behind butterfly and moth sexual reproduction.

Like other sexually reproducing species, female silkworms initially line up duplicated chromosomes for proper segregation into egg cells, a process aided by a protein complex that tethers similar chromosomes together. Typically, the chromosomes then "cross over," forming stabilizing linkages with each other.

In female silk moths, however, crossovers do not occur. Instead, the tethering protein complex is dismantled, and its component proteins are recycled to build a bridge-like structure that ensures the chromosomes are eventually able to segregate properly.

The study led by Youbin Xiang, Ph.D., from the lab of Scott Hawley, Ph.D., resolved the structure and dynamics of the bridge formed during egg cell production, a fundamentally different mechanism enabling proper chromosome segregation.

Sea monsters are our cousins

PUBLISHED FEBRUARY 20, 2024, IN *NATURE COMMUNICATIONS*

The sea lamprey, with a sharp-toothed suction cup in place of a mouth, is a 500-million-year-old relative. Human and sea lamprey hindbrains, the brain region responsible for governing blood pressure and heart rate, are built using the same molecular and genetic toolkit.

Research led by Alice Bedois, Ph.D., from the lab of Robb Krumlauf, Ph.D., discovered that despite sea lampreys lacking a jaw, a key feature in vertebrate evolution, they use the same molecular cue called retinoic acid, or vitamin A, to guide the genes that form the hindbrain.

"We found that this basic part of the brain is built in exactly the same way as mice and even humans," said Krumlauf.

Read more and hear the authors discuss the impact of the work.

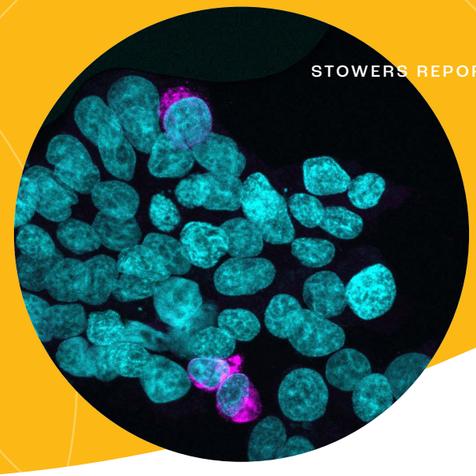
Heads or tails

PUBLISHED MAY 7, 2024, IN *THE PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES*

Humans have limited capabilities to regenerate tissues or organs lost to injury. However, if a planarian flatworm loses its head, it can simply grow one back. Astoundingly, a tiny fragment as small as 0.4% of a whole worm can regenerate an entire body. What are the fundamental biological processes that drive regeneration in planarian flatworms?

To accomplish these remarkable feats of regeneration, restoring form and function following injury, remaining cells must figure out how to start rebuilding the missing tissues in alignment with the animal's three body axes: head-to-tail, middle-to-edge, and belly-to-back.

Research led by Viraj Doddihal, Ph.D., in the lab of Alejandro Sánchez Alvarado, Ph.D., uncovered a genetic pathway that simultaneously coordinates both the head-to-tail and middle-to-edge body axes patterning during planarian regeneration.



Viral mechanisms for invasion

PUBLISHED JULY 22, 2024, IN *MOLECULAR SYSTEMS BIOLOGY*

Mosquito-borne viral infections once confined to tropical regions are spreading. Dengue virus infects around 400 million people each year according to World Health Organization estimates, and no available treatments exist for this disease.

Research led by Luciana Castellano in the lab of Ariel Bazzini, Ph.D., uncovered surprising strategies for how dengue and hundreds of other viruses including HIV and SARS-CoV-2 infect their hosts.

To replicate and spread, a virus must use its host cell's machinery to make its own proteins. The researchers discovered that many viral genomes tend to use a different subset of genetic "words" from the universal genetic code compared to their mosquito and human hosts. Revealing the fundamental rules that viruses use to invade their hosts could potentially aid in developing novel antiviral treatments and vaccines.

Read more and listen to the researchers explain the impact of the work.

Bats thriving solely on sugar

PUBLISHED AUGUST 28, 2024 IN *NATURE ECOLOGY AND EVOLUTION*

High blood sugar in humans is a hallmark of diabetes. Research co-led by Jasmin Camacho, Ph.D., and Andrea Bernal-Rivera in the lab of Nicolas Rohner, Ph.D., reported the highest naturally occurring blood sugar concentrations in mammals ever observed, a finding that suggests bats have evolved strategies to survive, and even thrive, with this extreme trait.

Fieldwork performed in the jungles of Central America, South America, and the Caribbean studied how Neotropical bats have diversified their diets from insects to other nutritional sources including only sugar.

Potential solutions for human metabolic disease may be uncovered by turning to evolution and to bats. “Looking to animals that have existed for millions of years allows us to start to catalog changes that have happened over evolution,” said Camacho. •

Read more and listen to Camacho explain how she conducted her field work and the hope she has for her continued research.

Read more and listen to the researchers explain their findings.

A critical factor for killifish regeneration

PUBLISHED ON SEPTEMBER 20, 2024 IN *ISCIENCE*

Spontaneous injuries like the loss of a limb or damage to the spinal cord are impossible for humans to repair. Yet, some animals have an extraordinary capacity to regenerate after injury. A study led by Augusto Ortega Granillo, Ph.D., formerly of the lab of Alejandro Sánchez Alvarado, Ph.D., has unveiled a critical timing factor that helps regulate regeneration.

The team investigated how African killifish properly regrow their tail fin following damage. By analyzing tissue dynamics during regrowth, they found that in addition to how many cells are participating and where they are located, the length of time cells spend actively engaged in repair is key.

Understanding how these factors are modulated may lead to the development of human therapies for activating and prolonging the regrowth of tissues normally lacking this ability. •

Training the next generation

Left to right: Scientific Advisory Board Chair Eric Olson, Ph.D., Matt Gibson, Ph.D., and Kaelan Brennan.

Behrensen - Guzman Palma Award

To honor the memory of Stowers Predoctoral Researchers Camila Behrensen and Pablo Guzmán Palma, the annual Behrensen - Guzmán Palma Graduate Student Award recognizes the most outstanding research paper by a predoctoral researcher in the Stowers Institute for Medical Research.

The Stowers Scientific Advisory Board selects the award winner based on the highest standards of scientific excellence, experimental creativity, and/or technical innovation. The inaugural recipient of the award was Kaelan Brennan from the lab of Julia Zeitlinger, Ph.D., for his 2023 *Developmental Cell* publication describing novel DNA-sequence rules for gene regulation during early embryogenesis through the integration of artificial intelligence and experimental data.

Investigator and Graduate School President Matt Gibson, Ph.D., presented the award to Brennan while recognizing his incredible work, scholarship, and commitment to the Stowers community. •

Postdocs Natasha Shylo-Hyson, Ph.D., and Ansa Cobham, Ph.D., presenting research in a preparatory workshop.

Growth of PostdocEDGE

Among the many advantages of PostdocEDGE, the postdoctoral training program at the Stowers Institute, are unparalleled access to technology and resources, individualized mentorship and career support, and multiple community building and collaboration opportunities.

One of the key components of career support is the Faculty EDGE series, consisting of a series of academic preparatory seminars covering every aspect of the faculty application package. This preparation culminates in the Faculty EDGE Workshop, a two-day immersive experience where postdocs practice their job talks in a simulated interview setting.

"The academic job market is highly competitive," said Assistant Dean for Student and Postdoctoral Affairs Rashmi Raj, Ph.D. "The workshop ensures that postdocs' application materials and interviewing skills are vetted both internally and externally, so they are prepared and confident when applying." •

Left to right: 2024 Graduates Júlia Peloggia de Castro, Ph.D., Emma Moore, Ph.D., Kai Zhang, Ph.D., and Sharien Fitriasari, Ph.D.

2024 Graduation Ceremony

The Graduate School of the Stowers Institute for Medical Research, founded on immersive research and collaboration, an innovative curriculum, and a willingness to take chances, is dedicated to preparing the next generation of scientific leaders in biology. Graduates are the confirmation that the school's mission—to prepare a superb cadre of predoctoral researchers from around the world for the pursuit of innovative and creative investigation in the biological sciences—is working.

The Stowers Graduate School celebrated four Ph.D. program graduates this year. The 2024 class of graduates join 29 alumni who have successfully earned doctoral degrees in biology.

"Our newest graduates are our hope for life, are a superb cadre of scientists, and fulfill the vision of Jim and Virginia Stowers, the Stowers Institute, and the Graduate School," said Graduate School President Emeritus Betty Drees, M.D. •

Investigator and President Matt Gibson, Ph.D., President Emeritus Betty Drees, M.D., and Investigator and Dean Jennifer Gerton, Ph.D.

New President and Dean for the Graduate School

Read more and listen as Gibson explains his excitement for training the next generation of scientists.

New leadership in the Graduate School of the Stowers Institute for Medical Research is poised to steward its growth and presence as a prominent Ph.D. program in biology while maintaining the innovative and immersive learning paradigm the school was founded on.

The Stowers Graduate School announced Matt Gibson, Ph.D., former Dean of the Graduate School and Investigator at the Stowers Institute, as its third president. Gibson was appointed by the Board of Directors following the retirement of Betty Drees, M.D., who served in the role from 2018 to 2024. As President, Gibson is dedicated to excellence in education and to the learning experience for predoctoral researchers.

Stowers Investigator Jennifer Gerton, Ph.D., succeeds Gibson as the newest Graduate School Dean. Gerton is enthusiastic about further shaping a robust curriculum that encourages early-career researchers to ask bold questions in the life sciences. •

The Stowers Graduate School Class of 2024

FOSTERING THE FUTURE OF FOUNDATIONAL SCIENCE LEADERS

This summer, the Stowers Graduate School welcomed the newest class of predoctoral researchers. Ten talented, early-career scientists entered the Stowers Graduate School Ph.D. program, designed to guide their development into the next generation of scientific leaders through immersive education and research experience. The program emphasizes critical thinking and equips predocs with the ability to apply cutting-edge technologies and techniques to their research.

FROM LEFT TO RIGHT

Dilan Sakinci
Izmir Institute of Technology

Alejandra Alonso Quintana
National Autonomous University of Mexico – School of Medicine

Shao-Fu Nien
National Taiwan University, National Central University

Zhengda An
Wuhan University

Grace McKown
University of Missouri – Kansas City

Michael Epp
Baker University

Ritvee Talele
Indian Institute of Science Education and Research, Pune

Adam Cogan
Trinity College University of Dublin

Shrutika Sansaria
Indian Institute of Science Education and Research, Thiruvananthapuram

Sergio Barroso Bordon
Pablo de Olavide University, University of Barcelona

Meet the new class.

Innovation

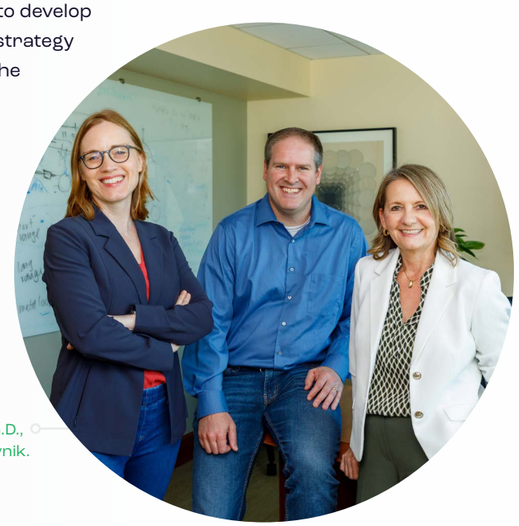
A new AI Initiative to power biological research

An experimental model of DNA wrapping around a protein core to form a nucleosome.

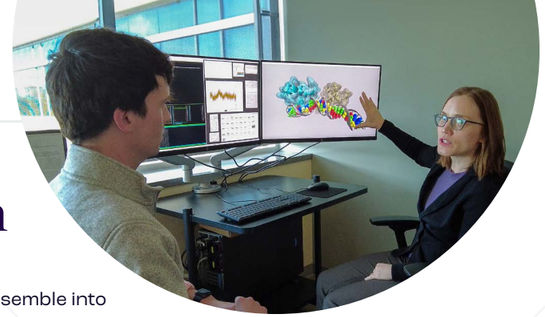
With artificial intelligence (AI) poised to greatly accelerate the pace for novel discoveries in foundational biological research, the Stowers Institute launched the Office of Scientific Leadership AI Initiative, a new program designed to advance capabilities in machine learning and AI for addressing critical biological questions. Investigator Julia Zeitlinger, Ph.D., has been appointed to lead this effort and leverage cutting-edge computational techniques to accelerate scientific discoveries and drive innovation in biological research.

Zeitlinger will work to develop and execute a long-term strategy to build world-class AI-powered computational expertise. She will head the steering committee that, together with Chief Information Officer Evelyn Travnik and Director of Scientific Data Jay Unruh, Ph.D., prioritizes and implements computational efforts across the organization. She also advises the Stowers Fellows program and the Graduate School to attract, support, and maintain computational talent at the Institute.

“Biology is incredibly complex, and AI is an excellent way to detect its underlying patterns and rules. A great example is the information encoded in our DNA,” said Zeitlinger. “I am passionate about leading the Institute’s new initiative to promote AI in our scientific research.”



From left to right: Julia Zeitlinger, Ph.D., Jay Unruh, Ph.D., and Evelyn Travnik.



Kaelan Brennan, Ph.D., and Julia Zeitlinger, Ph.D., discussing 3D structure of a protein.

AI and protein prediction

Discerning the 3D structure of a protein helps scientists understand how it works and how changing the protein's sequence may affect its function. Determining a protein's shape experimentally is difficult and costly. However, scientists are now using the power of AI to assist with protein structure predictions.

"The Institute's recent investment in a high-performance computing cluster is already paying off by hosting AI protein structure prediction platforms like AlphaFold," said Jay Unruh, Ph.D., Director of Scientific Data.

Multiple Stowers labs are utilizing AI to identify interactions between proteins that allow them to assemble into complexes with structural or regulatory functions. Other labs are searching for sequences likely to play a role in regulating gene activity and protein production. Additional groups are examining proteins in research organisms that have evolved adaptations to extreme environments and are comparing their structures to counterparts in non-adapted organisms.

Using AI aids discovery by providing a first approximation that can then be tested experimentally. In this way, biology is benefiting from technology and, in return, validating AI prediction tools. •

Exapansion of sequencing capabilities

Deciphering our genetic code, the Human Genome Project, was a monumental milestone in biology. Since then, technology has advanced to where scientists now have tools to see not only how cells are reading this code but also precisely where cells are located in a tissue sample.

Spatial transcriptomics allows Stowers scientists to study gene transcription—or which genes are turned on—and how cells are organized within a tissue of interest, while maintaining the spatial context of the cells within the intact tissue.

"Spatial context of gene activity can be extremely important when studying developmental stages to visualize how cell arrangements may change as an organism grows," said Kaitlyn Petentler, Associate Scientist II in the Sequencing group. "In studies on cancer and other diseases, this technology can illuminate how cellular organization correlates with disease states or mechanisms for treatment." •

Research Scientist II Kaitlyn Petentler operating the Xenium Analyzer.

Convening Power

Fostering scientific innovation and leadership

In 2024, the Institute hosted two scientific conferences and a leadership training workshop for scientists, providing an engaging platform for networking, collaboration, and knowledge exchange among leading thinkers, experts, and emerging talents in the scientific community.

In April, Stowers Associate Investigator Ariel Bazzini, Ph.D., and Assistant Investigator Kamena Kostova, Ph.D., co-organized a Stowers Research Conference with a molecular cell biology theme, focusing on three key areas of RNA regulation: mRNA decay, mRNA translation, and mRNA structure and modifications.

In October, another Stowers Research Conference, co-organized by Stowers Investigators Matt Gibson, Ph.D., Robb Krumlauf, Ph.D., and Tatjana Sauka-Spengler, Ph.D., featured prominent scientists in the field of developmental cell biology covering a range of innovative topics including stem cell biology, tissue regeneration, and the origin of multicellularity.

Since 2019, the Stowers Institute has been the U.S. host for the European Molecular Biology Organization Laboratory Leadership Course. The July 2024 course brought together seasoned and emerging scientists for interactive workshops designed to equip attendees with essential tools and strategies for effective mentorship and lab leadership. •

Participants of the European Molecular Biology Organization Laboratory Leadership Course participate in workshop activity.

Roy Parker, Ph.D., University of Colorado, presents the keynote address at Stowers Research Conference.

A Full Circle Moment

Nearly 30 years after taking the Marine Biological Laboratory's esteemed Embryology course as a student, Stowers Investigator Tatjana Piotrowski, Ph.D., has been named co-director of the course. Known for her research exploring sensory organ system development and regeneration in zebrafish, Piotrowski marks a new chapter in her ongoing commitment to scientific education and mentorship with this appointment.

Piotrowski has taught the zebrafish module of the six-week laboratory and lecture course for the past 13 years. The Embryology course is renowned for its transformative impact by providing technical skills and advanced training opportunities and instilling innovative thinking strategies and confidence in early-career scientists.

"This course often changes career paths," Piotrowski explained. "Students are exposed to new research organisms and techniques that shape their future research projects and often their career trajectory."

Recognizing the importance of fostering such transformative experiences, the Stowers Institute expanded its presence at the Marine Biological Laboratory. In 2023, the Institute opened a year-round satellite lab to further enable its scientists and researchers to study marine organisms and collaborate with colleagues from around the world. •

Attendees of the 2024 Embryology Course. Tatjana Piotrowski, Ph.D. standing far left.

"Students are exposed to new research organisms and techniques that shape their future research projects and often their career trajectory."

Tatjana Piotrowski, Ph.D.
COURSE CO-DIRECTOR

Read more and listen as Piotrowski describes her excitement for this new role.

On Campus

Speaker programs stimulate discussion, networking, collaboration

Rarely does a week pass at the Stowers Institute without a scientific seminar on the schedule. Many weeks feature multiple seminars, with more than 75 held in 2024.

The Wednesday Lecture Series, held during the fall and spring academic semesters, explores topics in many areas of biology by nationally and internationally renowned researchers. Stowers predoctoral and postdoctoral researchers often meet with guest speakers over lunch for more focused conversations and networking.

"I've found Wednesday Lectures to be beneficial not only for the scientific aspect but also for the opportunity to meet speakers and learn about their departments," said Michael Church, Ph.D., a Postdoctoral Research Associate in the Workman Lab.

Friday Science Club, also held in the fall and spring, consists of internal presentations where Stowers scientists share their latest research, techniques, and approaches with each other. This series provides a valuable opportunity for speakers to gain experience giving presentations and receiving constructive feedback.

In the summer, Open Mic Science offers a more casual atmosphere for discussing internal research projects. Frequently highlighting new research directions and collaborations, many seminars feature co-presentations by researchers from labs and Technology Centers.

"Presenting at internal seminars urges me to think about my research project deeply, organize the story clearly, and communication science effectively," said Minling Hu, a Predoctoral Researcher in the Zanders Lab. "At my talks, I have received questions and feedback from various perspectives that have constructively shaped my project." •

Wednesday Lecture Series guest speaker Danny Miller, M.D., Ph.D., Assistant Professor at the University of Washington.

American Century and Stowers members at KC Pride Parade - June 8, 2024

Strengthening connections with American Century Investments

In 2001, Jim and Virginia Stowers gifted the Stowers Institute over $1 billion of stock in American Century Investments, the global asset management firm founded by Jim. Since then, over 40% of American Century's profits have been directed to the Institute in the form of dividends.

This relationship ensures that the Institute is self-sustaining, allowing researchers to ask big questions in biology and human health. In return, American Century benefits from the market differentiation that comes from profits being used for charitable purposes.

To enrich connections between the two organizations, newly hired American Century employees have an opportunity to tour the Stowers Institute to meet scientists and observe laboratory research in progress. Each year, several hundred employees participate.

"After seeing the campus, labs, and researchers in person, it really hit home," said Carter Balentine, a Registered Representative at American Century. "My grandpa had Alzheimer's disease, so I appreciate seeing fundamental medical research in action. I feel even more invigorated in my role at American Century."

In addition to new member tours, the organizations team up for other activities and events throughout the year. In 2024, opportunities for intermingling included Kansas City Corporate Challenge events, AIDS Walk Kansas City, the Kansas City Pride Parade, and a celebration of Juneteenth. ●

American Century Investments' new members view a model of the Stowers campus on Institute tour.

Kansas City Corporate Challenge Kickoff Walk – April 12, 2024

Holi Festival of Colors – March 24, 2024

Asian American and Pacific Islander Heritage Month Celebration – May 2024

Kansas City Chiefs Super Bowl Victory – February 11, 2024

Celebrations and events bring Stowers members together

Stowers members enjoyed the camaraderie of coworkers during many events in 2024. Whether celebrating cultural heritage and traditions, enjoying sporting events, witnessing a solar eclipse, or simply savoring a summertime food festival, these gatherings offered opportunities for colleagues to learn more about each other, build interpersonal relationships beyond work routines, and contribute to a vibrant workplace community. ●

Stowers Food Fest – June 27, 2024

Great North American Solar Eclipse – April 8, 2024

Organizational Highlights

Leadership bolstered with new appointments

Over the past year, the Institute has enhanced its leadership team by adding three new executive leaders: Vice President and Chief Information Officer Evelyn Travnik, Vice President of Regulatory Affairs Tonyea Inglis, and Vice President of Science Operations Brian Slaughter, Ph.D.

Evelyn Travnik, an accomplished leader in biosciences, joined the Stowers Institute in late 2023. Her extensive experience includes spearheading strategy and implementing enterprise-level digital science and technology solutions across biotech, life sciences, sustainable agriculture, and healthcare. As Vice President and Chief Information Officer, she leads the teams that continuously improve the functionality of the Institute and support research through technology.

Tonyea Inglis joined the Stowers Institute in 2001, bringing extensive experience from the pharmaceutical and healthcare sectors. She began her career as a Safety Specialist and advanced through progressively more complex roles within Environmental Health and Safety (EH&S). In 2024, she was appointed Vice President of Regulatory Affairs, where she leads the EH&S, Quality, and Regulatory Systems team, overseeing regulatory compliance and legal adherence for the Institute.

Brian Slaughter has dedicated 17 years to advancing the research programs at the Stowers Institute. After completing a postdoctoral fellowship in 2010, he became a Research Advisor, focusing on microscopy methods. In 2015, he was appointed Co-Head of the Microscopy Center and later became Co-Director of Microscopy, Imaging, and Big Data in 2019. By 2022, Slaughter was Senior Director of Research Support, overseeing multiple Technology Centers. In 2024, he was promoted to Vice President of Research Operations, overseeing the scientific operations teams across the Institute. ●

Donors & Impact

Galway Holdings event benefits Stowers research

In June, Alejandro Sánchez Alvarado, Ph.D., Stowers Institute President and Chief Scientific Officer, was a featured speaker at the inaugural Galway Live! + ARENA event. At the event, Sánchez Alvarado and American Century Investments President and Chief Executive Officer Jonathan Thomas were panelists for a discussion on Profit with Purpose: Building Success with Mission-Driven Businesses. Galway Holdings is a diversified financial and insurance services company focused on empowering clients through innovative data and technology solutions.

The three-day event was a combination of business conference, golf tournament, and charity auction benefiting select organizations dedicated to improving health and social outcomes. The Stowers Institute was honored to be chosen as one of the beneficiaries.

Reflecting on the occasion, Sánchez Alvarado shared, “To be able to share the work we do at the Institute with new audiences is not only a privilege but an opportunity to inspire others through the vision of altruism by the bold pursuit of knowledge bestowed upon us by our founders Jim and Virginia Stowers.” ●

Jonathan Thomas (on stage far left) and Alejandro Sánchez Alvarado, Ph.D. (on stage far right) participate in panel discussion.

Making an impact and providing hope

From diabetes to neurodegeneration, infertility to regeneration, and aging to cancer, the profound impact of the Institute's foundational research is paving the way for future breakthroughs in how to alleviate and treat disease.

The Stowers Impact series explores the transformative potential of the Institute's research. An immersive collection of stories and videos is available on **stowers.org/impact**. By harnessing technologies that were unimaginable just a few years ago, researchers can now delve deeper into the intricate complexities of life. Gifts from the Institute's supporters help accelerate these life-changing discoveries and improve the future of human health, providing hope for better, healthier, and happier lives.

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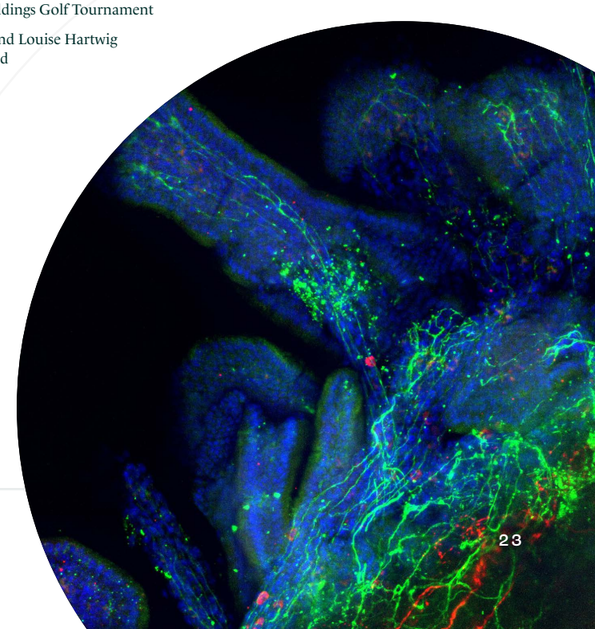
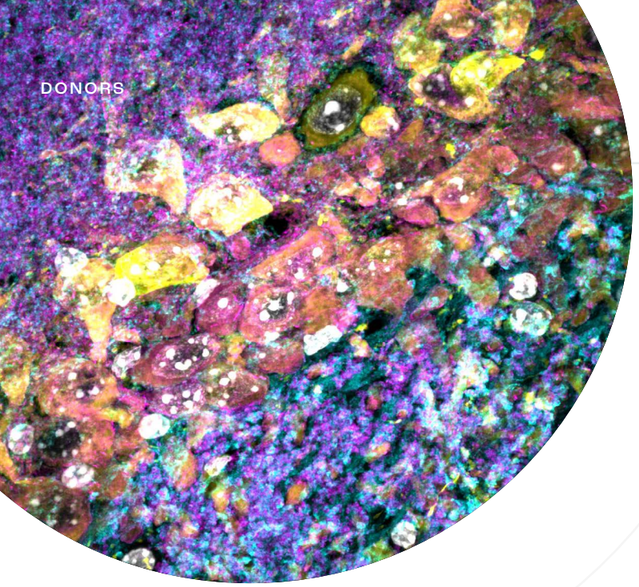


Glia (green) and enteric neurons (red) of mouse intestines.



A mouse hippocampus with cell bodies and synapses highlighted in magenta and blue.

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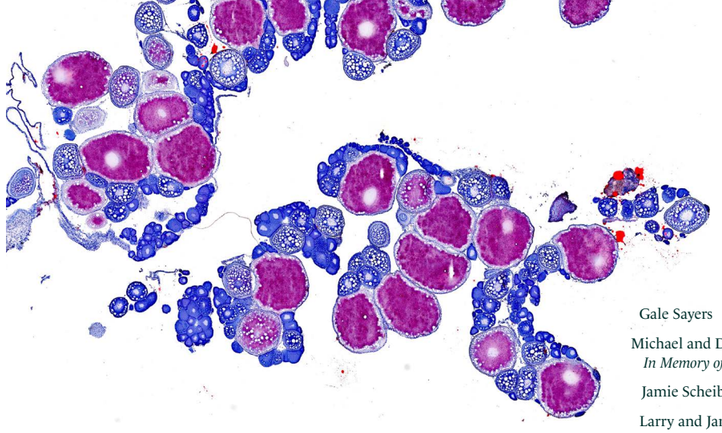

A collection of zebrafish oocytes at different stages of development displaying varying levels of lipid content (magenta).

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Roger Zakheim

Jon Zindel

Behind the Science

Research publications are the culmination of scientific inquiry and examination, and are essential to the advancement of science. They serve as vehicles for presenting and sharing experimental results, providing evidence for scientific theories, and proposing novel ideas.

Publications contribute substantially to the foundational knowledge that underpins many technological breakthroughs, medical advances, and solutions to the world's problems. Without publication, researchers cannot readily evaluate and build upon others' findings, and overall science cannot progress and evolve.

For scientists, publishing peer-reviewed research represents the pinnacle of their efforts. In 2024, the Stowers Institute celebrated a significant milestone: achieving its 2,000th scientific publication..

STOWERS SCIENTIFIC PUBLICATIONS BY THE NUMBERS

1 Library Specialist providing library and publication services to Stowers researchers

13 Years the Stowers Original Data Repository has supported data sharing

33 Words in the longest titled publication

48 Single-author publications

87 Authors on the publication with the most contributors

95 Publications with a student as a first author

103 Publications published in a single journal

191 Largest number of publications featuring the same Principal Investigator Lab

251 Largest number of publications featuring the same Technology Center

447 Different journals in which Stowers publications have appeared

1997 Year of first Stowers Institute publication

245,762 Citations of Stowers-affiliated publications

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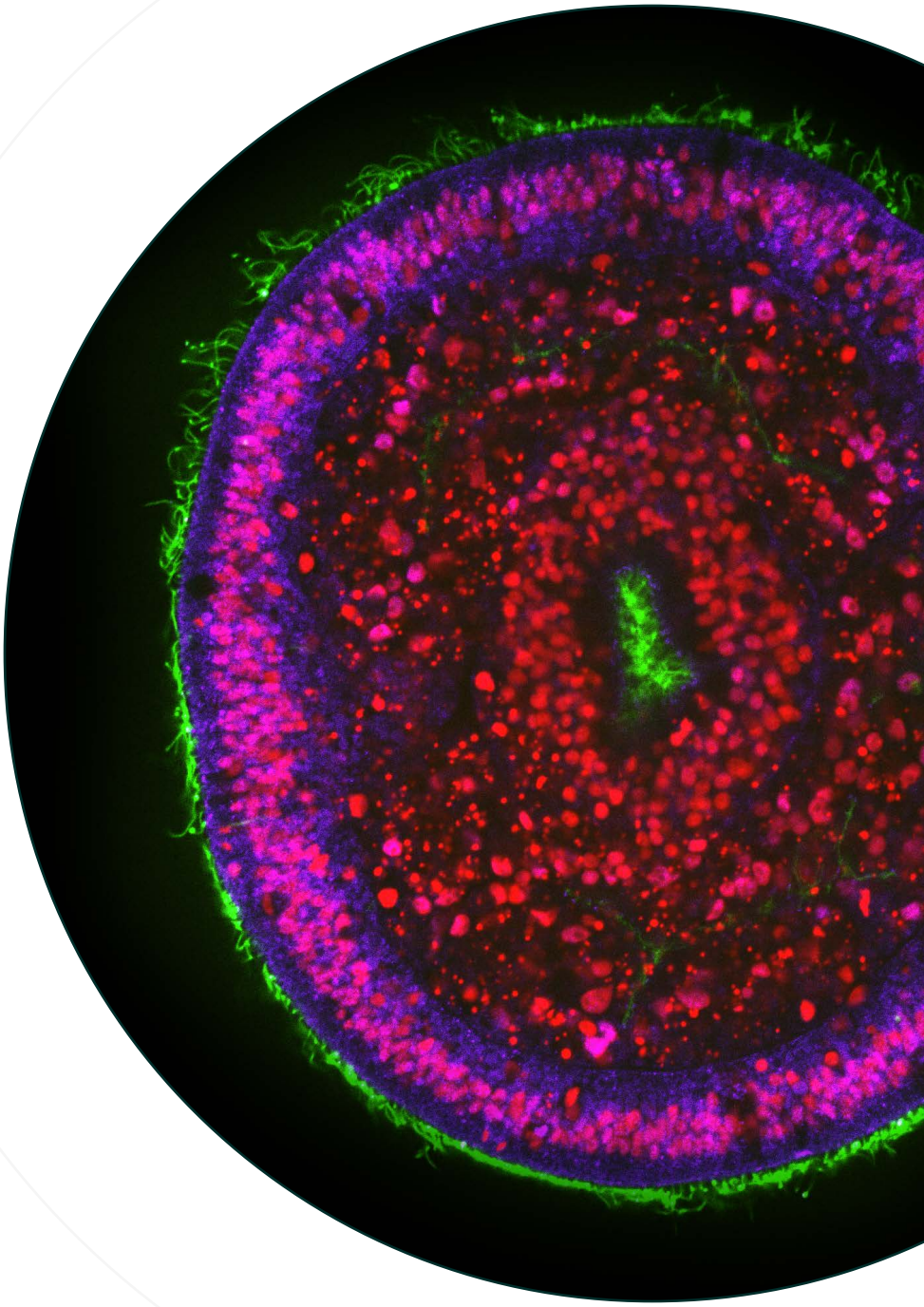

Yap1 protein (purple), a regulator of growth, accumulates in the nuclei (red) of the body wall in a three-day old sea anemone embryo, *Nematostella vectensis.*

Our Mission

To make a significant contribution to humanity through medical research by expanding our understanding of the secrets of life and by improving life's quality through innovative approaches to the causes, treatment, and prevention of diseases.

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