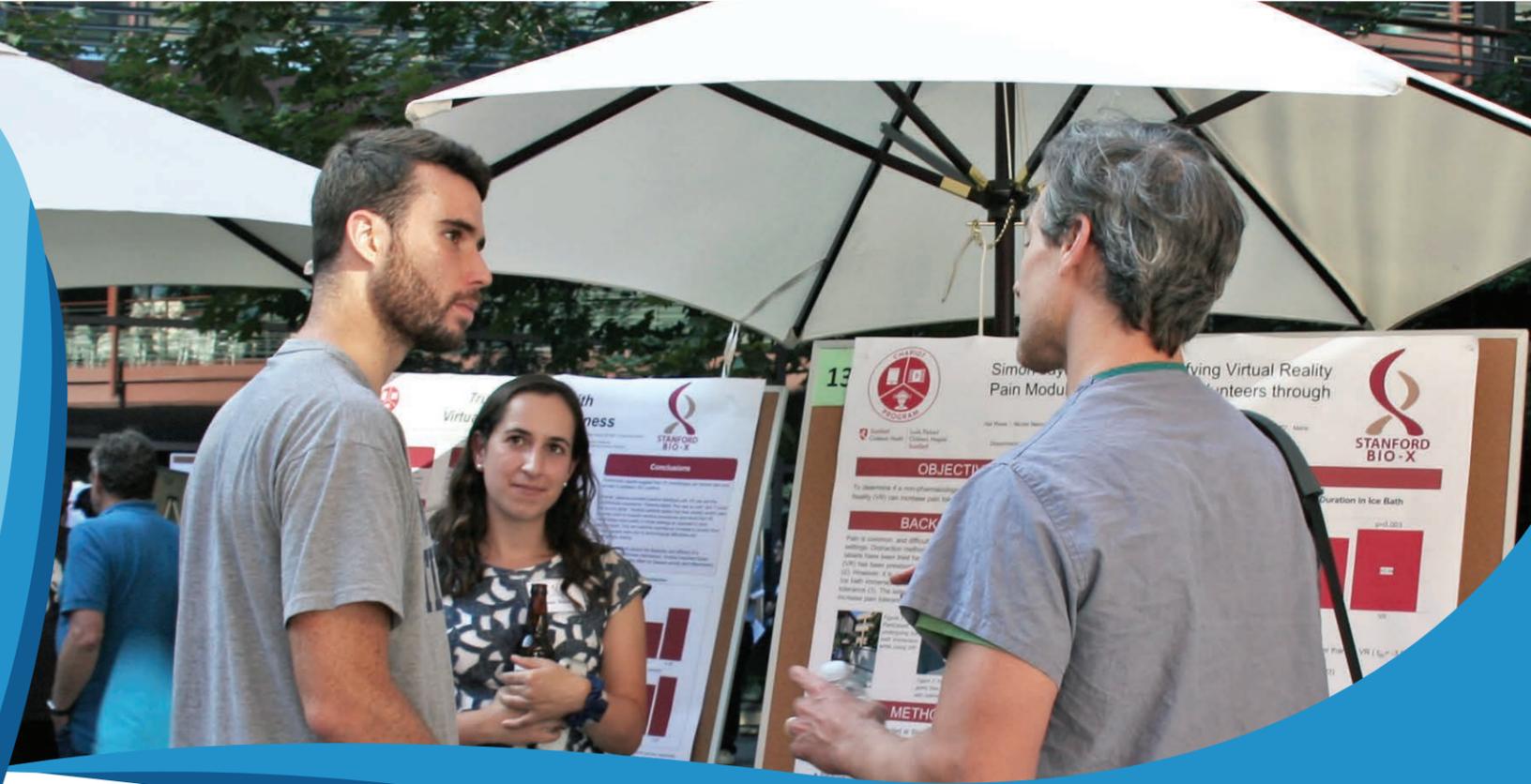


STANFORD BIO-X ANNUAL REPORT 2019



Mission

The Mission of Stanford Bio-X is to catalyze discovery by crossing the boundaries between disciplines, to bring interdisciplinary solutions, and to create new knowledge of biological systems, in benefit of human health.



*Dr. Carla Shatz,
Stanford Bio-X Director*

On behalf of all of us at Stanford Bio-X, I send heartfelt thanks to everyone who has supported and interacted with us. We are pleased to present this Annual Report, which describes the many activities of Bio-X that carry out its mission: to catalyze discovery by crossing boundaries between disciplines, to bring interdisciplinary solutions and to create new knowledge of biological systems in benefit of human health.

From its inception in 1998, Bio-X has evolved into a powerful engine driving interdisciplinary invention and creativity at the forefront of biomedical and life science research, now emulated by many other peer institutions across the USA and the world. In the early days, the idea of a program supporting collaborative research across disciplines was revolutionary and the “X” in Bio-X was mysterious and unique. Today, over 970 faculty from more than 70 departments across the university are members of Bio-X. The “X” still connotes the intersection of disciplines and has now cropped up in program names all over the world.

Stanford Bio-X offers support for new ways of attacking complex research problems and training students. The emphasis is always on high-risk, potentially high-reward approaches. These themes of bringing together the Life Sciences and Clinical Research on the one hand with the Physical Sciences (Chemistry, Physics, Computer Science, Statistics) and Engineering have now paid off in wonderful collaborations, grants and discoveries from faculty across the University.

Three key programs are at the core of Bio-X: 1) The Bio-X Seed Grants, designed to fund high-risk, high-reward faculty team-based research that has returned over ten-fold in subsequent external funding. 2) The Bio-X Graduate Fellowships, which fund individual PhD or MD/PhD students working on research spanning departments and disciplines; some of our Bio-X fellows are now on the faculty at major research universities or have founded start-up companies. 3) The Bio-X Undergraduate Summer Research Program, designed to provide hands-on laboratory research experience to Stanford undergraduate students, help them learn about other disciplines, and increase their scientific interactions during a 10-week supervised program on campus.

Bio-X is intentionally agnostic with regard to specific disciplines, uniquely defining it from other institutes and interdisciplinary programs that focus on a specific theme. We are always searching for the “next new thing” to help launch or catalyze even when it may appear initially only as a glimmer in the eye of faculty or student inventors. In an assessment of effectiveness of interdisciplinary programs at Stanford, Professor Daniel McFarland and colleagues described Bio-X as an “Interdisciplinary Super Structure that ratchets up activity and leads scholars to form bridging communities”. We see Bio-X as a powerful way for a major research university to increase connectivity and break down silos by creating opportunities for discovery and training across disciplines.

The hub of Bio-X is the James H Clark Center, designed by architect Sir Norman Foster. Ever since its opening in 2003, this iconic building with its open lab design and shared spaces has evolved organically into a thriving research environment. Our program design and building have also set the stage for the evolution of new theme-based Institutes. Bio-X funding for NeuroVentures, as well as precious Clark Center space, were used in dynamic ways to help launch and house faculty for the new Wu-Tsai Neuroscience Institute years before the opening in 2020 of the beautiful new building that will house both the Wu-Tsai Neuroscience Institute and ChEM-H. Bio-X and the Clark Center are also home to new faculty working in the areas of structural biology and Cryo Electron Microscopy who are building bridges between Stanford and the Stanford Linear Accelerator. We are pleased to continue this Bio-X tradition of helping to launch new initiatives and institutes, and to recruit and retain diverse faculty within departments, by providing wonderful space and a home for great colleagues who share Bio-X’s interdisciplinary passion for understanding the complexity of biological systems in benefit of human health.

Carla

Carla J. Shatz
David Starr Jordan Director of Bio-X
Sapp Family Provostial Professor of Biology and Neurobiology

Stanford Bio-X Interdisciplinary Initiatives Seed Grants Program

Seed Grants for Success

The Stanford Bio-X Seed Grants provide funding for high-risk, high-reward, interdisciplinary life science and biomedical team-based research collaborations across the university. The program is extremely effective in encouraging innovative interdisciplinary research and stimulating novel widespread collaborations among Stanford faculty, departments, and schools. Stanford Bio-X is a fertile environment for visionaries, and the seed grants give teams of faculty the resources they need to allow innovative ideas to germinate and grow.



Supported by a Stanford Bio-X Seed Grant, **Drs. Anthony Norcia, Martin Breidenbach, and Christopher Kenney** united researchers in physics and psychology with scientists at SLAC to prototype novel devices that can simultaneously stimulate the brain and measure its electrical responses, which could vastly improve neuroscientists' ability to study the brain. To learn more: <https://news.stanford.edu/2019/09/28/particle-physicists-lend-hand-advance-neuroscience/>

With support from a Stanford Bio-X Seed Grant, **Drs. Polly Fordyce and Martha Cyert** developed a new technology called marble pep, which attaches different proteins to colored beads with a one-to-one relationship between the identity of the protein and the color of the bead. This technology will allow researchers to measure hundreds of protein-protein interactions using the same amount of material and time typically required to measure one. They have published a manuscript on this collaborative work in *eLife*. A Stanford Bio-X/Novo Nordisk Foundation Visiting Scholar is working to expand the capabilities of the technology even further. For more details, please see: <https://biox.stanford.edu/video/stanford-bio-x-seed-grant-polly-fordyce-and-martha-cyert>



With support from a Stanford Bio-X Seed Grant, **Drs. Hunter Fraser and Sergiu Pasca** are working on a collaborative project to try to understand how changes in gene regulatory activities between humans and chimpanzees might contribute to differences in their brains. Their Seed Grant combines technology developed in their labs to try to illuminate the molecular mechanisms underlying the immense expansion of the human cerebral cortex versus other primates. By analyzing cortical spheroids, small brain-like structures derived from stem cells, they hope to identify and experimentally validate genes underlying key innovations in human brain evolution. For more details, please see: <https://biox.stanford.edu/video/stanford-bio-x-seed-grant-hunter-fraser-sergiu-pasca>



Supported by a Stanford Bio-X Seed Grant, **Drs. Sarah Heilshorn and Erinn Rankin** are investigating how cancer cells in high-grade serous ovarian cancer interact with their environment, developing engineering technologies in the hopes of creating new therapies that could prevent the spread of disease. They published findings in *Cancer Research* in May of 2019. To learn more: <https://news.stanford.edu/2018/11/29/new-techniques-study-deadly-ovarian-cancer>



To read more news articles about research supported by the Stanford Bio-X Seed Grants, please visit: biox.stanford.edu/2019-seed-grants-news

Investment and Returns

Round 9 of the Stanford Bio-X Seed Grants awarded twenty-four new interdisciplinary collaborations, out of 122 teams of faculty who worked together and submitted applications. The seed grant application process stimulated Stanford faculty members to collaborate and form these teams to develop innovative research proposals. Over the past two decades, 212 of these team-based grant proposals, out of a total of 951 team applications, have been funded. Independent analysis of the Stanford Bio-X Seed Grants program by Professor Daniel McFarland, Professor of Education, Sociology, and Organizational Behavior, has shown that Bio-X not only increases collaboration across schools, but also that faculty who apply for Stanford Bio-X Seed Grants increase their rate of other grant applications and their chance of awards, and that their rate of publication and service on dissertations also increases. These findings show that the Seed Grants inspire an adventurous interdisciplinary spirit across campus.

Follow-on success from research seeded by the Stanford Bio-X awards has now generated over \$300M in externally-awarded research funding, hundreds of publications, and more than 110 patents. Our Stanford Development colleagues have noted that many donors have found the successful track record of Stanford Bio-X and its ability to foster innovative research very compelling. Donors are greatly motivated to make a tangible, significant impact in benefit of human health through highly collaborative research. Thanks to all involved who made the Innovation Partners Funds for the Stanford Bio-X seed grants possible. These funds have secured the future of the program.

Stanford Bio-X Seed Grants awarded in 2018: biox.stanford.edu/2018-stanford-bio-x-seed-grants

Complete list of Stanford Bio-X awarded grants: biox.stanford.edu/research/seed-grants

Supported by a Stanford Bio-X Seed Grant, **Drs. Aaron Newman and Ash Alizadeh** invented a computational technique called CIBERSORTx that can analyze the RNA of individual cells taken from whole-tissue samples or data sets. Being able to identify not only the types of cells, but also their state or behaviors, could lead to dramatic new biological discoveries and improve therapies for cancer and other diseases. In addition to publishing four manuscripts so far, they have also filed for a patent. To learn more: <http://med.stanford.edu/news/all-news/2019/05/computational-tool-enables-powerful-molecular-analysis-of-tissue-samples.html>



Dengue fever affects 200-400 million people each year, with a mortality rate of at least 500,000 annually. Supported by a Stanford Bio-X Seed Grant, **Drs. Shirit Einav** (pictured) and **Purvesh Khatri** identified a set of 20 genes that predicts who is at the highest risk of progressing to a severe form of the illness. The discovery could guide future treatments and decrease dengue morbidity. Drs. Einav and Khatri and their colleagues have published 3 manuscripts, filed for 2 patents, and received a \$1.8 million grant from the Department of Defense, as well as a \$420,000 Catalyst Award from the Dr. Ralph & Marian Falk Medical Research Trust. To learn more: <http://med.stanford.edu/news/all-news/2019/01/set-of-genes-predicts-severity-of-dengue.html>

Stanford Bio-X PhD Fellowships

Stanford Bio-X Undergraduate Summer Research Program



Stanford Bio-X Boves Fellow Yonatan Winetraub, a PhD candidate in Biophysics working with Stanford Bio-X Skipper Frank, is developing a device for non-invasive cancer cell imaging. Yonatan is also a co-founder of SpaceCell, a non-profit that built and launched the first-ever private moonlanding spacecraft. Yonatan has been named one of Forbes Israel's 30 under 30 and one of Globes Israel's 40 under 40.

2019 Stanford Bio-X Fellow Lindsey Hasak, a PhD candidate in Education, is co-advised by Drs. Bruce McCandliss in Education and Anthony Norcia in Psychology. Lindsey's work involves using school-based electroencephalography (or EEG) to measure brain responses to letters and speech sounds to understand how children learn to read.

Stanford Bio-X Undergraduate Summer Research Program (USRP) participant Kristina Correa began her research career in the lab of Dr. Theo Palmer. Kristina continued to conduct research and received the J.E. Wallace Sterling Award for Scholastic Achievement as well as a 2019 Rhodes Scholarship, which covers 2-3 years of study at the University of Oxford. At Oxford, Kristina will undertake master's degrees in integrated immunology and computer science.

Working in Dr. Michelle Monje's lab, Stanford Bio-X USRP participant Jacob Greene has co-authored papers in *Cell* and *Neuron* on long-term neurological side effects of chemotherapy. Jacob also speaks publicly about living with cystic fibrosis, and is a co-founder of Project Amara, a non-profit that seeks to "translate" research papers into simpler articles and facilitate networking for people of like diseases.

The Stanford Bio-X Graduate Fellowship Program provides Stanford students with interdisciplinary research interests with three years of funding support. Stanford Bio-X Fellows work on the cutting edge at the intersection of disciplines, giving them profound potential to generate transformative discoveries for the benefit of human health.

The Stanford Bio-X Undergraduate Summer Research Program provides Stanford students a 10-week hands-on research experience in the laboratories of Stanford faculty. A unique component of the program is the weekly research talks given by the faculty mentors. The goal of the talk series is to provide the students a flavor of the rich diversity of interdisciplinary life science and biomedical research taking place across the university. These weekly talks expose students to a variety of scientific fields and enrich their summer research experience. Talks are open to the entire Stanford community. During the talks, students hear more about the broad range of research within Stanford, have the opportunity to network with faculty in a variety of scientific fields, and have the chance to meet each other as potential future collaborators and colleagues. At the end of the ten-week summer program, students present a poster of the progress of their project.

Visionary commitment from William (Bill) K. Boves initiated the Stanford Bio-X Graduate Fellowship Program in 2004. The Boves Foundation has supported the program with expendable funds for the past 16 years. In December of 2016, Bill Boves made a bequest of \$25 million to benefit the Stanford Bio-X Fellowship Program. His generosity will continue his legacy of championing basic research and interdisciplinary scientific innovation.

We received 157 applications for the 2019 program and awarded 67 fellowships. Participants spent ten weeks in the laboratories, attended 30 talks given by Stanford faculty, and presented their poster at the end of the summer session. To date, 637 students have participated in the program, with involvement from 287 Stanford faculty mentors.

In addition to Stanford Bio-X Boves fellowships, Stanford Bio-X has 32 endowed Stanford Bio-X SIGF Fellowships that were generously funded by friends of Stanford Bio-X in the past 16 years. The Stanford Bio-X SIGFs, in addition to the Boves Fellowships, make it possible for Stanford Bio-X to fund at least 20 new fellows each year.

Alumni of the program have gone on to pursue doctorates and medical degrees all over the world, published in high-impact journals, and accepted exciting positions in industry and beyond. Countless students have indicated that the program changed the course of their time at Stanford and influenced their future careers.

Stanford Bio-X students are encouraged and empowered to interact and work together to create new knowledge.

In 2019, Stanford Bio-X welcomed 26 new graduate fellows, including honorary fellows. The program has provided 298 three-year fellowships to graduate students pursuing interdisciplinary research. Students collaborate with multiple mentors, thereby enhancing their potential to generate transformative discoveries. Stanford Bio-X graduate student fellows come from 30 different departments and PhD Programs, and five different schools at Stanford.

The full 2019 Stanford Bio-X Undergraduate Summer Research Program brochure is available online here: biox.stanford.edu/2019-stanford-bio-x-undergraduate-brochure

The full 2019 Fellowship Brochure is available online here: biox.stanford.edu/2019-stanford-bio-x-fellows-brochure



Stanford Bio-X PhD Fellows



Stanford Bio-X Undergraduate Summer Research Program Cohort



Travel Awards

The Stanford Bio-X Travel Awards Program gives graduate students and postdoctoral fellows from across campus the opportunity to travel to off-site seminars and symposia, develop their public speaking skills, network with peers, disseminate their research, and learn new ideas that could positively affect their work. The awards also give our students and postdoctoral fellows chances to win recognition that could help them immensely in their future careers.

To date, the program has provided over 630 travel subsidies to graduate students and postdocs. These students come from many disciplines, representing 48 different departments and research from the labs of 200 Stanford faculty. The students have traveled to 103 foreign cities in 39 different countries, and 37 different states in the US.

In 2019, 77 students and postdocs received Travel Awards. 18 earned additional awards at their conferences, including:

Alice Stanton, a PhD student in Bioengineering mentored by Dr. Fan Yang (Orthopaedic Surgery and Bioengineering), traveled to Philadelphia, Pennsylvania to present at the 2019 Biomedical Engineering Society Annual Meeting. She was selected to receive a BMES Career Development Award.

Helen Tran, a postdoctoral fellow in Chemical Engineering under Dr. Zhenan Bao, traveled to San Diego, California to present at the American Chemical Society 2019 meeting. Helen participated as a Division of Polymeric Materials: Science and Engineering Future Faculty Scholar. These scholars are chosen by a committee as talented postdocs who have made significant contributions to their respective fields within polymer materials science and engineering.

Eneko Axpe Iza, a postdoctoral fellow in Materials Science & Engineering mentored by Dr. Eric Appel, traveled to Galveston, Texas to attend the 2019 NASA Human Research Program Investigators' Workshop. He was selected as a top five finalist in the Science Fiction to Science Fact Award Competition for his idea about developing an injectable hydrogel for the bone healing in astronauts. His project was selected as a "Promising Proposal," and he was invited to submit a full proposal for a Focused Investigator Project, which is an award of \$100,000 to further develop this promising idea. In addition, the poster he presented, was awarded Third Place for the NASA Human Research Program Postdoctoral Fellow Award.

Frontiers in Interdisciplinary Biosciences Seminar Series (Course 459)

The Stanford Bio-X Frontiers in Interdisciplinary Biosciences Seminar Series/Course 459 is directed by Professor Channing Robertson and managed by Stanford Bio-X. The course provides an introduction to cutting-edge research involving interdisciplinary approaches to bioscience and biotechnology for both specialists and non-specialists. Each year, 18 well-attended seminars address a broad set of themes related to interdisciplinary approaches to human health in bioengineering, medicine, and the chemical, physical, and biological sciences. Over 60 students from 25+ Stanford departments enrolled in the course this year, while up to 150 in total from all over campus attend each seminar.

Leading investigators present the latest breakthroughs that cut broadly across many core disciplines. For non-experts, the information provided by Stanford faculty before each seminar introduces basic concepts. Over 1,500 students have formally enrolled in the class.

2019/2020 Seminars:

Oct. 1, 2019 - Sarah Heilshorn, Mat. Sci. & Eng., Stanford
Oct. 3, 2019 - Tatiana Segura, Biomed. Eng., Duke University
Oct. 22, 2019 - R&D Career Panel: Industry Insights & Scientific Careers Path in Biotech
Nov. 12, 2019 - James Spudich, Biochemistry, Stanford
Nov. 14, 2019 - Richard Lieber, Phys. Med. & Rehabilitation and Physiology, Northwestern Univ.
Jan. 14, 2020 - Julia Salzman, Biochemistry and Biomedical Data Science, Stanford
Jan. 16, 2020 - Barbara Engelhardt, Computer Science, Princeton Univ.
Feb. 18, 2020 - Ovijit Chaudhuri, Mechanical Engineering, Stanford

Feb. 20, 2020 - Kenneth Yamada, Cell & Dev. Biology, NIH NIDCR
Mar. 3, 2020 - Xiaoke Chen, Biology, Stanford
Mar. 5, 2020 - Yi Zhang, Pediatrics and Genetics, Harvard University
Apr. 7, 2020 - Aaron Gitler, Genetics, Stanford
Apr. 9, 2020 - Nancy Bonini, Biology, University of Pennsylvania
Apr. 28, 2020 - Jian Qin, Chemical Engineering, Stanford
Apr. 30, 2020 - Arup Chakraborty, ChemE, Physics, Chemistry, and Biological Engineering, MIT
May 19, 2020 - Shamit Kachru, Physics, Stanford
May 21, 2020 - Nigel Goldenfeld, Physics and Genomic Biology, Univ. of Illinois at Urbana-Champaign

Symposia & Workshops

On February 6, 2019, Stanford Bio-X held a poster session inside of Nexus Café. Over 700 scientists from Stanford and the industry attended to view the 104 scientific posters presented by Stanford Bio-X faculty, postdocs, graduate students, undergraduates, and other members of the Bio-X community.

The Seed Grants Program Symposium on August 29, 2019 was held in the Clark Center Auditorium. Over 150 scientists from Stanford and friends from the industry attended the talks. The symposium was followed by a poster session, with over 700 in attendance. The symposium featured "team" talks where faculty who had previously received Stanford Bio-X Seed Grants co-presented the results of the collaborative, interdisciplinary research to share their findings:

- **Anson Lee**, Assistant Professor of Cardiothoracic Surgery and **Zhenan Bao**, K. K. Lee Professor in the School of Engineering
- **Ellen Kuhl**, Professor of Mechanical Engineering and **Kinya Seo**, Instructor of Cardiovascular Medicine in Euan Ashley's lab
- **Hunter Fraser**, Associate Professor of Biology; **Sergiu Pasca**, Assistant Professor of Psychiatry & Behavioral Sciences; and **Rachel Agolia**, PhD candidate in Genetics
- **Zev Bryant**, Associate Professor of Bioengineering and, by courtesy, of Structural Biology and **Lin Ning**, postdoctoral research fellow in Neurobiology in Michael Lin's lab
- **Dennis Wall**, Associate Professor of Pediatrics (Systems Medicine) and Biomedical Data Science and **Michael Snyder**, Stanford W. Ascherman, MD, FACS, Professor in Genetics
- **Lucy O'Brien**, Assistant Professor of Molecular & Cellular Physiology and **Anna Kim**, postdoctoral research fellow in Molecular & Cellular Physiology in Lucy O'Brien's lab

In collaboration with Dr. Georgios Skiniotis (Molecular & Cellular Physiology, Structural Biology, and Photon Science), Stanford Bio-X held a 2-day Cryo-Electron Microscopy (cryoEM) Workshop from September 24-25, 2019. The workshop brought experts in cryoEM to Stanford to provide a thorough introduction to cryoEM and related methodologies. 10 invited speakers' talks expanded use and understanding of cryoEM techniques and resources at Stanford, with 150 faculty, students, and researchers in attendance. The workshop included a scientific poster session where 13 cryoEM-related posters were presented by Stanford researchers, showcasing more applications. Website: biox.stanford.edu/cryoem2019

Stanford Bio-X hosted its annual Fellows Symposium on October 29, 2019. The symposium began with an introduction by Dr. Carla Shatz, followed by career talk by Dr. Christopher Emig, a Stanford Bio-X Fellow alum who is the Co-Founder and CEO of Augmenta Bioworks, and a research talk presented by Stanford Bio-X Bowes Fellow Johanna O'Day. After Johanna's talk, the 26 new 2019 Stanford Bio-X Fellows briefly introduced themselves to the Stanford community and the donors in attendance. The symposium was followed by a seated lunch for 150 participants, including Fellows, their faculty mentors, and many of the Stanford donors who have helped to make the program possible. The symposium concluded with a poster session during which 23 of the Fellows shared their work through scientific posters.





Corporate Forum Program

Since 2004, the Stanford Bio-X Corporate Forum Program has successfully cultivated fruitful collaborations for the Stanford academic community by securing nearly \$27M in direct financial support from nearly 30 different corporations. At least 50 different Stanford departments have benefited from this funding.

The most recent program under the Stanford Bio-X Corporate Forum is the Visiting Scholar/Postdoc Fellowship Program that Bio-X developed with the Novo Nordisk Foundation (NNF). Since 2014, the program has supported 9 fellows from 6 Danish institutions, who have integrated into 10 different Stanford departments. These visiting scholars have published over 20 manuscripts, and the first fellows have gone on to build careers in academia and industry. Ninna Rossen is now a professor in Denmark, and Rasmus Fonseca is now a developer at a self-driving vehicle company in the U.S. These fellowships have strengthened the exchange of scientific expertise between Stanford and Denmark while enhancing student training at the postdoctoral level. The NNF relationship is the culmination of a decade of stewardship between Bio-X and various Danish entities. Aarhus University in Denmark built their Inno-X Healthcare program with assistance from Bio-X. The company Novo Nordisk has also collaborated with Stanford faculty by supporting research and providing materials.



Stanford Bio-X facilitated the master sponsored research agreement between Stanford and Roche through the ROADS program. Three projects have been executed, bringing \$2.1M of funding support to Stanford. The current project is with Dr. Tony Wyss-Coray from the department of Neurology, and exciting new data has resulted from their research on new therapeutic targets related to auto-immune responses that could have an impact on the research towards drugs for Alzheimer's Disease.

Stanford Bio-X created a mentoring program with the Novartis Institutes of Biomedical Research (NIBR), in which 17 Stanford post-doctoral trainees and graduate students were matched with 11 NIBR scientists for 10 months of career mentorship. 6 of the participants have left Stanford and gone on to industry: Brendan Kelly, a Life Science Specialist at L.E.K. Consulting and a founder and board member of A2A Pharmaceuticals; Abraham El Gamal, a scientist at Lodo Therapeutics Corporation; Kavya Swaminathan, a life science consultant in Australia; Szu-Yuan Pu, a scientist at Takara Bio; Chad Liu, a postdoc researcher at Genentech; and Benedict Anchang, a principal investigator at NIH.

Stanford Bio-X has been actively collaborating with Amgen for the past 13 years, securing \$4.22M of sponsored research funding to nearly 20 Stanford departments through 35 agreements. Amgen also provided \$250K of support to 2 Bio-X PhD Fellows: Sanaz Saatchi is now the Co-Founder and President of CrownPoint Medical, LLC, which provides strategic services that accelerate healthcare innovation. Patricia Ortiz-Tello Suma is a health education specialist at the non-profit Health Connected.



Stanford Bio-X has been actively collaborating with Amgen for the past 13 years, securing \$4.22M of sponsored research funding to nearly 20 Stanford departments through 35 agreements. Amgen also provided \$250K of support to 2 Bio-X PhD Fellows: Sanaz Saatchi is now the Co-Founder and President of CrownPoint Medical, LLC, which provides strategic services that accelerate healthcare innovation. Patricia Ortiz-Tello Suma is a health education specialist at the non-profit Health Connected.

Stanford Bio-X cultivated both the BioSTAR program as well as the master sponsored research agreement with Sanofi, bringing in nearly \$4 million in sponsored research funding for 15 projects to support over 20 Stanford departments. A patent was produced with Dr. Steve Quake, and at least 6 manuscripts have been published, including Dr. Daria Mochly-Rosen, who published in *The Journal of Clinical Investigation*; Dr. Magali Fontaine, who published in the *Journal of Tissue Engineering and Regenerative Medicine*, and Drs. PJ Utz and Shan Wang, who published in *Nature Scientific Reports*. In addition, Sanofi Genzyme licensed Dr. Mark Kay's invention, "Robust and Sustained Transgene Expression with Mini-Intronic Plasmid Vectors".



Stanford Bio-X spearheaded a meeting for Dr. Bill Robinson and JNJ's Immunology division, and in 2014, his company, Atreca, Inc., announced a strategic collaboration with JNJ Innovation and Janssen to apply the company's Immune Repertoire Capture technology to autoimmune disease. In 2019, Atreca IPO-ed, and had a market cap of about \$389 million on its first day of trading.



Industry Collaborators:

Abbott, Agilent, Alza, Amgen, Anatomage, Aarhus University, Boston Scientific, Fuji Photo Film, Genentech and Genentech Foundation, Gilead, L'Oreal, Leo Pharma, Lockheed Martin, Medtronic, Merck, Nikon, Novartis Institutes of Biomedical Research, Novo Nordisk, Novo Nordisk Foundation, Olympus, Panasonic, Pfizer, Philips Electronics, Roche, Sanofi

James H. Clark Center

The hub for Stanford Bio-X houses 48 Stanford Faculty from 30 departments and more than 10 Stanford Centers and Programs. In addition to supporting Wu Tsai Neuro's faculty members and administration until their building was completed, Clark maintains the Stanford Microfluidics Foundry, a Tissue Foundry, the Stanford Radiology 3D and Quantitative Imaging Lab (3DQ Lab), the Stanford Center for Innovation in *In vivo* Imaging (SCI³), and the NIH Center for physics-based Simulation of Biological Structures (Simbios). Over 1,000 scientists are residents of the Clark Center, while thousands more use Clark Center resources and take classes and workshops offered by Stanford Bio-X. The building includes meeting rooms, an auditorium, a courtyard, a cafeteria, and a coffee shop and served over 8,200 meetings in 2019. Some highlights are included below:

New Clark Center Faculty

In 2019, the Clark Center welcomed three new faculty to the building:



Sergiu Pasca
Assistant Professor of Psychiatry & Behavioral Sciences



Benjamin Good
Assistant Professor of Applied Physics



Anca Pasca
Assistant Professor of Pediatrics

Judith Frydman

Dr. Judith Frydman, the Donald Kennedy Chair in the School of Humanities & Sciences and Professor of Genetics, was selected as a Biophysical Society 2019 Fellow for her fundamental contributions to deciphering the role of molecular chaperones in protein folding, quality control, and cell regulation.

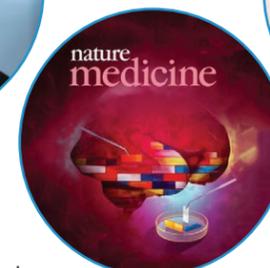


Nobel Laureate Steven Chu

This year, Dr. Steven Chu, the William R. Kenan Jr. Professor and Professor of Molecular & Cellular Physiology, became the president of the American Association for the Advancement of Science.

Sam Gambhir

Dr. Sam Gambhir, Virginia and D.K. Ludwig Professor for Clinical Investigation in Cancer Research and Director of the Canary Center at Stanford for Early Detection, received the 2019 IEEE Marie Skłodowska-Curie Award for outstanding contributions to the field of nuclear and plasma sciences and engineering.



Sergiu & Anca Pasca

In 2019, Dr. Sergiu Pasca, Assistant Professor of Psychiatry & Behavioral Sciences, received a Chan Zuckerberg Initiative Early Career Acceleration Award. This year, Dr. Anca Pasca, who also resides at Clark, received the Inaugural Bhatt-Ramanathan Scholarship Award from the California Association of Neonatologists. Dr. Sergiu Pasca published 12 manuscripts in 2019 in journals such as *Science*, *Neuron*, and *eLife*, including one with Dr. Anca Pasca and Stanford Bio-X affiliated faculty member Dr. Theo Palmer, which was featured on the cover of *Nature Methods*.



Sylvia Plevritis

This year, Dr. Sylvia Plevritis, Professor of Biomedical Data Science and of Radiology, was appointed chair of the Department of Biomedical Data Science. Dr. Plevritis is also the director of the Stanford Center for Cancer Systems Biology and of the Cancer Systems Biology Scholar Program, and a principal investigator of the Cancer Intervention and Surveillance Modeling Network.

Stanford Bio-X Fellows become Stanford faculty members:

Xiaojing Gao: 2012 Enlight Foundation Interdisciplinary Graduate Fellow/Stanford Bio-X SIGF, Assistant Professor of Chemical Engineering in 2020

David Myung: 2005 Stanford Bio-X Bowes Fellow, Assistant Professor of Ophthalmology since 2017

Andreas Loening: 2004 Stanford Bio-X Bowes Fellow, Assistant Professor of Radiology since 2015

Guillem Pratx: 2006 Stanford Bio-X Bowes Fellow, Assistant Professor of Radiation Oncology since 2013

Adam de la Zerda: 2008 Stanford Bio-X Skippy Frank Fellow, Assistant Professor of Structural Biology since 2012

David Camarillo: 2004 Stanford Bio-X Bowes Fellow, Assistant Professor of Bioengineering since 2012

Some recent smiles to share:



Stanford Bio-X Fellow Lyndia Wu is an assistant professor of mechanical engineering at the University of British Columbia. In her first year, she received a Natural Sciences and Engineering Research Council Discovery Grant, a New Frontiers in Research Fund Grant, and a Michael Smith Foundation Scholar Award.



Stanford Bio-X Fellow Mark Sellmyer is an assistant professor of radiology with a secondary appointment in biochemistry and biophysics at the University of Pennsylvania. Mark recently received the Burroughs Wellcome Fund Career Award for Medical Scientists and the National Institutes of Health Director's Early Independence Award.



Stanford Bio-X Fellow Kathryn Keenan was one of ten researchers from the U.S. Department of Commerce's National Institute of Standards and Technology to receive a Presidential Early Career Award for Scientists and Engineers in 2019. This award is the highest honor bestowed by the U.S. government to science and engineering professionals in the early stages of their independent research careers.



Stanford Bio-X Fellow Oguzhan Atay is now the co-founder and CEO of BillionToOne, a venture capital-backed molecular diagnostics company. BillionToOne has developed a molecular counter platform that increases the resolution of circulating free DNA diagnostics by over a thousandfold. This technology unlocks a wide range of diagnostics, from noninvasive prenatal testing to quantitative liquid biopsy applications for cancer.



Stanford Bio-X Fellow Samir Menon founded and became the CEO of Dexterity, Inc., a start-up focused on developing autonomous robots with human-like dexterity for applications in logistics, supply chain, and warehousing.



Stanford Bio-X Fellow Lisa Gunaydin is now an assistant professor of Psychiatry at the University of California, San Francisco, with a joint appointment at the UCSF Institute for Neurodegenerative Diseases. Lisa was also named a Chan-Zuckerberg Biohub Investigator.



<http://biox.stanford.edu>
contact-biox@stanford.edu