

STANFORD BIO-X ANNUAL REPORT 2018



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*

Stanford Bio-X is a university-wide program that today includes over 970 faculty members from more than 70 departments across the university. We are pleased to present this Annual Report, which describes the many activities of Bio-X that address its mission.

Stanford Bio-X is an engine that drives interdisciplinary invention and creativity at the forefront of biomedical and life science research. Bio-X offers support for new ways of attacking complex research problems and training students. The interdisciplinary themes and the efforts to bring together the Life Sciences and Clinical Research on the one hand with the Physical Sciences (Chemistry, Physics, Computer Science, Statistics) and Engineering are incredibly exciting and have now truly paid off in wonderful collaborations, grants, and discoveries from faculty across the University.

In an assessment of effectiveness of interdisciplinary programs at Stanford, Professor Daniel McFarland and colleagues have described Bio-X as an “Interdisciplinary super structure that ratchets up activity and leads scholars to form bridging communities”. They have suggested that Bio-X is a new way for major research universities to operate. We see Bio-X as a way to increase connectivity and break down silos by creating opportunities for discovery and training across disciplines.

At the core of Bio-X are three key programs: 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 of 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.

On behalf of all of us at Stanford Bio-X, I send a heartfelt thank you to everyone who has supported and interacted with us. Bio-X is now emulated by many other peer institutions across the USA and the world. It was cited in 2014 by the National Research Council of the National Academy of Sciences as a model for success in fostering interdisciplinary collaborations in the sciences. The hub of Bio-X, the James H. Clark Center, continues to be a hotbed of innovation since opening in 2003. This iconic building with its open-lab design now houses 48 faculty members. Similar to the pivotal role that the Clark Center and Bio-X played when the Department of Bioengineering was established, currently some Clark Center space serves as a temporary home for faculty recruits to the new Wu Tsai Neuroscience Institute. We welcome these new Wu Tsai Neuro faculty members, and are excited by the opportunity to build strong ties that are sure to last well beyond the faculty move into the new Neuroscience and ChEM-H building in 2019. Bio-X and the Clark Center have also welcomed new faculty working in the fields of structural biology and cryoEM, who are building bridges between Stanford and the SLAC National Accelerator Laboratory,. We are pleased to continue this Bio-X tradition of helping launch new initiatives, departments, and institutes by providing wonderful space and great colleagues who share our interdisciplinary passion for understanding the complexity of biological systems in benefit of human health.

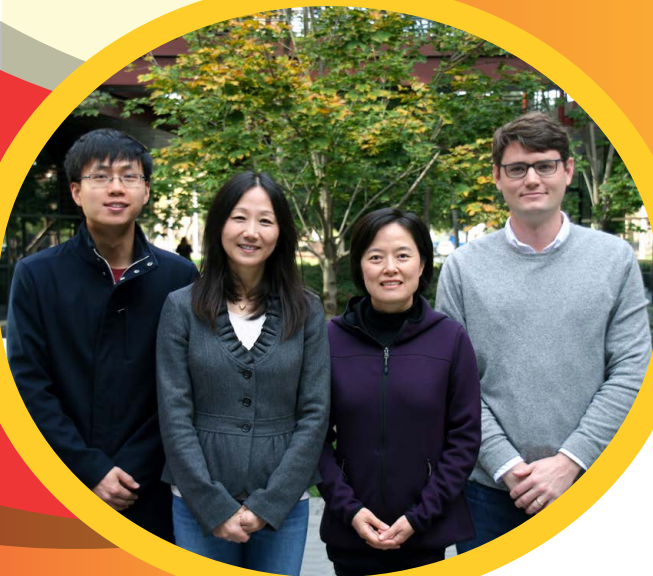
Carla

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

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 funding they need to allow innovative ideas to germinate and grow.



To read more news articles about research supported by the Stanford Bio-X Seed Grants, please visit:
biox.stanford.edu/2018-seed-grants-news

With support from a Stanford Bio-X Seed Grant, Dr. Dennis Wall has developed a new form of behavioral therapy for children with autism: a Stanford-designed smartphone application made to be paired with Google Glass smart glasses. The app uses games and prompts to help children with autism learn to distinguish between facial expressions. A shortage of trained autism therapists means that many children aren't being treated early enough. That's where Dr. Wall hopes this new digital health-based therapy can step in: by breaking through the problem to create reliable, home-based treatment systems. Results from early clinical trials have been overwhelmingly positive. For more details, please see:
<https://med.stanford.edu/news/all-news/2018/08/google-glass-helps-kids-with-autism-read-facial-expressions.html>



Supported by a Stanford Bio-X Seed Grant, Dr. Ellen Kuhl has made a computer simulation of how defective proteins spread through the brain in neurodegenerative diseases.
<https://news.stanford.edu/2018/10/12/new-simulation-shows-alzheimers-spreads/>



Investment and Returns

In August 2018, Stanford Bio-X funded twenty-four new interdisciplinary grants, 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. 367 faculty have been involved in awarded projects. 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 \$270M in externally-awarded research funding, hundreds of publications, and more than 89 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, neurologist Dr. Josef Parvizi and musician Dr. Chris Chafe have brought their "brain stethoscope" - a device that translates the brain's electrical activity into sounds, which can detect silent seizures and can also be used as a portable electroencephalogram (EEG) - into hospitals to help patients. The device recently won the Global Awards Program for Design Excellence and Design Innovation's Good Design award.
<https://news.stanford.edu/2018/03/20/brain-stethoscope-listens-silent-seizures/>



Dr. Daniel Palanker received a Stanford Bio-X Seed Grant to develop an unprecedented system for treating age-related macular degeneration, the leading cause of vision loss and blindness among people 65 and older. Dr. Palanker published the first concept paper for their approach, a device that combines image-processing goggles and tiny silicon chips implanted in the retina, 12 years ago. In 2018, Dr. Palanker has developed the device and brought it to a cohort of patients, addressing one of the largest unmet needs in incurable blinding conditions. To learn more:
<https://news.stanford.edu/2018/04/18/light-sensitive-chips-one-day-restore-sight-blind/>



PhD Fellowships



Stanford Bio-X Fellow Teresa Purzner is the co-PI on an NIH-funded clinical trial run by the Pediatric Brain Tumor Consortium, which is investigating the role of CK2 inhibitors in the treatment of SHH medulloblastoma. This work was a direct result of her Stanford Bio-X funded thesis studies.

Stanford Bio-X Fellows Andres Aranda-Diaz (pictured) and Matthew Bull published work in the *Journal Proceedings of the National Academy of Sciences* that informs the study of evolution and aid in the creation of an advanced material that could modulate its own physical properties.

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.

Visionary commitment from William (Bill) K. Bowes initiated the Stanford Bio-X Graduate Fellowship Program in 2004. The Bowes Foundation has supported the program with expendable funds for the past 15 years. In December of 2016, Bill Bowes made a bequest of \$25 million to benefit Stanford Bio-X. His generosity will continue his legacy of championing basic research and interdisciplinary scientific innovation.

In addition to Stanford Bio-X Bowes 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 15 years. The Stanford Bio-X SIGFs, in addition to the Bowes Fellowships, make it possible for Stanford Bio-X to fund about 18 new fellows each year.

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

In 2018, Stanford Bio-X awarded 22 new graduate fellows. The program has provided 270 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 2018 Fellowship Brochure is available online here: biox.stanford.edu/2018-stanford-bio-x-fellows-brochure



Stanford Bio-X PhD Fellows

Undergraduate Summer Research Program



A *Cell* publication from Michelle Monje's lab, which identifies and suggests a remedy for the cause of cognitive dysfunction side effects of chemotherapy, incorporates the work of multiple Stanford Bio-X Undergraduate Summer Research Program (USRP) participants: Lydia Tam and Praveen Pallegar (pictured, with Monje), Andrea Goldstein, and Alfonso Ocampo.

Stanford Bio-X USRP participant Cindy Nguyen was co-author on a paper about reworking CRISPR-Cas9 gene-editing technology to manipulate the genome in three-dimensional space and move genetic material to different locations in a cell's nucleus.

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.

We received 128 applications for the 2018 program and awarded 65 fellowships. Participants spent ten weeks in the laboratories, attended 28 talks given by Stanford faculty, and presented their poster at the end of the summer session. To date, 567 students have participated in the program, with involvement from 264 Stanford faculty mentors. From 157 applications for the summer of 2019, we have selected 65 students to participate in the program.

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.

The full 2018 Stanford Bio-X Undergraduate Summer Research Program brochure is available online here: biox.stanford.edu/2018-stanford-bio-x-undergraduate-brochure



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 555 travel subsidies to graduate students and postdocs. These students come from many disciplines, representing 48 different departments and research from the labs of 175 Stanford faculty. The students have traveled to 93 foreign cities in 38 different countries, and 35 different states in the US.

In 2018, 56 students and postdocs received Travel Awards. 10 of them earned additional awards at their conferences:

Michael Fanton: first place ASME PhD Best Paper Award in the Sports Biomechanics tract, 8th World Congress of Biomechanics in Dublin, Ireland

Yan Gong: ICAR 2018 travel merit award, 29th International Conference on Arabidopsis Research in Turku, Finland

Claire Gustafson: Keystone Symposium: Aging, Inflammation and Immunity in Austin, TX

Yuan Chang Leong: Merit Abstract Award, Organization of Human Brain Mapping Annual Meeting in Singapore

Steve Leung: top-scoring abstract, invited to co-moderate a conference session, 18th International Symposium for Therapeutic Ultrasound in Nashville, TN

Paola Moreno-Roman: 1 of only 2 selected as a best talk, Cell Polarity Signaling - Gordon Research Seminar and Conference in West Dover, VT

Sandra Schachat (pictured): Winifred Goldring Award for Outstanding Female Paleontology Student, Geological Society of America 130th Annual Meeting in Indianapolis, IN

Xinjian Shi: Graduate Student Silver Award, 2018 Materials Research Society Fall Meeting in Boston, MA

Matthew Titchenal: Young Investigator Award, 2018 Military Health System Research Symposium in Kissimmee, FL

Mirwais Wardak: 2nd place Cardiovascular Council Young Investigator Award, Society of Medicine & Molecular Imaging 2018 Annual Meeting in Philadelphia, PA

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 75 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 1,000 students have formally enrolled in the class.

2018/2019 Seminars:

Oct. 2, 2018 - Bianxiao Cui, Chemistry, Stanford

Oct. 4, 2018 - Bozhi Tian, Chemistry, Univ. of Chicago

Oct. 23, 2018 - Daria Mochly-Rosen, Chem. & Sys. Biology and SPARK, Stanford

Oct. 25, 2018 - Sylvaine Cases, Johnson & Johnson

Nov. 13, 2018 - Ron Dror, Computer Science, Stanford

Nov. 15, 2018 - Bryan Roth, Pharmacology, Univ. of N. Carolina

Jan. 15, 2019 - Darlene Solomon, Agilent

Jan. 17, 2019 - Stanley Qi, BioE and Chem. & Sys. Biology, Stanford

Feb. 12, 2019 - Lynette Cegelski, Chemistry, Stanford

Feb. 14, 2019 - Jochen Zimmer, Molec. Physiology & Biological Physics, Univ. of Virginia

Mar. 5, 2019 - Fan Yang, BioE and Orthopaedic Surgery, Stanford

Mar. 7, 2019 - Brendan Harley, Chem. & Biomolec. Engineering, Univ. of Illinois

Apr. 9, 2019 - Ami Bhatt, Med. and Genetics, Stanford

Apr. 11, 2019 - Angela Brooks, Biomolec. Eng., UC Santa Cruz

Apr. 30, 2019 - Julia Kaltschmidt, Neurosurgery, Stanford

May 2, 2019 - Chris Doe, Biology and Neuroscience, Univ. of Oregon

May 21, 2019 - Annelise Barron, BioE, Stanford

May 23, 2019 - Christine Stabell Benn, Global Health, Statens Serum Institut

Symposia & Workshops

In celebration of Dr. Ann Arvin, former Stanford Dean of Research and Vice Provost, Stanford Bio-X held a fireside chat between Dr. Carla Shatz and Stanford President Marc Tessier Lavigne on August 22nd, 2018. The program concentrated on the president's views about Stanford's role in innovation at the borders of disciplines, in biomedical research, and how Stanford can create new ways to facilitate crossing "the valley of death". The president touched upon priorities relevant to the greater Bio-X community. The fireside chat was followed by a poster session with over 170 posters presented by Stanford graduate students, undergraduate students, and post-doctoral fellows as well as Bio-X affiliated faculty and staff scientists. Over 600 participated at the poster session.

The Seed Grants Program Symposium on February 21, 2018 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 400 in attendance. Faculty speakers at the symposium included:

- Karl Deisseroth, Bioengineering and Psychiatry & Behavioral Sciences, Stanford University
- Fan Yang, Orthopaedic Surgery and Bioengineering, Stanford University
- Richard Scheller, Chief Science Officer & Head of Therapeutics, 23andMe
- Judith Frydman, Biology and Genetics, Stanford University
- Brian Kobilka, Molecular & Cellular Physiology, Stanford University

The Clark Faculty Onsite was held on Wednesday, May 16, 2018 at the Clark Center. This event is a great opportunity for Clark Center Faculty and Bio-X Committees to meet and to hear updates about the building and the program. The 2018 event started with a lunch and introductions, followed by an overview by Dr. Carla Shatz. Scientific talks were presented by Dr. Alice Ting (Genetics and Biology) and by Dr. Georgios (Yiorgo) Skiniotis (Molec. & Cell. Phys. and Structural Biology).

In collaboration with Dr. Jin Hyung Lee (Neurology, Neurosurgery, and Bioengineering), Stanford Bio-X held a 3-day Brain Connectivity Symposium/Workshop (BCW) from June 25-27, 2018. The BCW is an annual international meeting for in-depth discussions of all aspects of brain connectivity research, which uniquely features short presentations by approximately 20 invited speakers. Over 120 attendees from all over the world as well as Stanford participated. Invited speakers included Eliza Adams (Stanford), Adriano Aguzzi (University Hospital Zurich), Michael Breakspear (QIMR Berghofer), Edward Bullmore (Cambridge), Marvin Chun (Yale), Karl Deisseroth (Stanford), Barry Horwitz (NIH), Viren Jain (Google), Viktor Jirsa (INS Inserm), Jin Hyung Lee (Stanford), Liquan Luo (Stanford), Rosalyn Moran (King's College London), Randy McIntosh (University of Toronto), Russell Poldrack (Stanford), Petra Ritter (Charité Universitätsmedizin Berlin), Pedro Valdés-Sosa (China/Cuba Laboratory for Translational Neurotechnology), and Daniel Topgaard (Lund University). Workshop Website: biox.stanford.edu/bcw-2018

Stanford Bio-X hosted its annual Fellows Symposium on October 16, 2018. The event began with a seated lunch for 150 participants, including Stanford Bio-X Fellows, their faculty mentors, and a number of the donors who have helped to make the program possible. The symposium began with an introduction by Dr. Carla Shatz, followed by a research talk presented by Carolina Tropini. After Carolina's talk, the new 2018 Stanford Bio-X Fellows briefly introduced themselves to the Stanford community and all of the donors in attendance. The symposium concluded with a reception and a poster session during which 25 Fellows shared scientific posters with the over 200 donors, faculty members, and other students in attendance.





Corporate Forum Program

The Stanford Bio-X Corporate Forum Program has cultivated unique academic-industrial collaborations that have, since inception, brought in about \$25 million of funding support to the Stanford research community. The Program has collaborated with over 20 corporations through memberships, sponsored research, fellowships, gift, and in-kind collaborations. Most recently, Bio-X developed the Visiting Scholar/Postdoc Fellowship Program, fully paid by the Novo Nordisk Foundation (NNF). Two new fellows were added to this program in 2018, bringing the current total to 8 fellows from 6 different Danish institutions who have been integrated into 9 different hosting Stanford departments. Four more years are planned for this fellowship program. The fellows conduct postdoc-level interdisciplinary research for 3 years at Stanford that strengthens the exchange of scientific expertise between Stanford and Denmark while enhancing the fellows' training and career experience. The NNF relationship has been a culmination of a nearly 10 years of stewardship between Bio-X and various Danish entities, including Aarhus University in building Inno-X Healthcare, and the company Novo Nordisk with sponsored research.



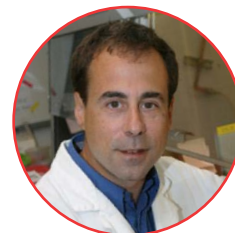
Stanford Bio-X created the Translational Innovation Partnership Awards Program with Johnson & Johnson, in which 5 projects were supported with a total of \$540,000. Dr. Dimitre Hristov received funding for his work related to robotics-guided tissue imaging, resulting in the creation of the start-up SoniTrack Systems to develop robotics, ultrasound and guidance systems for surgery and radiation oncology. SoniTrack Systems has been acquired by Zimmer Biomet for its flagship product, the Walter Surgical Assist Arm.

Stanford Bio-X created a mentoring program with the Novartis Institutes of Biomedical Research (NIBR), in which 17 Stanford postdoctoral trainees and graduate students were matched with 11 NIBR scientists for 10 months of career mentorship. Students appreciated the opportunity to interact directly with people in industry while pursuing their academic careers. Two of the participants have gone into industry: Brendan Kelly is a Life Science Specialist at L.E.K. Consulting, as well as founder and board member of A2A Pharmaceuticals; and Abraham El Gamal is a scientist at Lodo Therapeutics Corporation.



Stanford Bio-X's BioSTAR program brought over \$2 million of sponsored research funding from French-based company Sanofi to 13 different projects. One of the awarded projects was a study by Dr. Daria Mochly-Rosen related to Huntington's disease, which resulted in a recent publication in the *Journal of Clinical Investigation*.

Bio-X collaborated with Sanofi Genzyme on matching Stanford faculty with the company's interests. This resulted in Dr. Mark Kay's invention, Robust and Sustained Transgene Expression with Mini-Intronic Plasmid Vectors, being licensed by Sanofi Genzyme.



Stanford Bio-X facilitated the university's master sponsored research agreement with Amgen, which has now been active for 12 years, supporting 24 projects and 18 amendments with over \$3 million in funding to Stanford.

Stanford Bio-X cultivated a sponsored research agreement between Gilead and Dr. Bill Robinson that resulted in a 6-year relationship totaling \$875,000 of support.

Stanford Bio-X facilitated the master sponsored research agreement between L'Oreal and Stanford, resulting in 3 sponsored research projects and \$942,000 of funding to date. One of these projects supported Drs. Mary Beth Mudgett's and Elizabeth Sattely's work on plant infection, resulting in an invention and a manuscript that is currently under review in *Cell* journal.



Industry Collaborators:

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

James H. Clark Center

The hub for Stanford Bio-X houses 48 Stanford Faculty from 23 departments and more than 10 Stanford Centers and Programs. 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 serves over 8,000 meetings per year. Some highlights are included below:

Stanford Bio-X Director Carla Shatz

This year, Dr. Carla Shatz, David Starr Jordan Director of Bio-X and Sapp Family Provostial Professor of Biology and Neurobiology, won the Harvey Prize in Science and Technology as well as the Dean's Medal, the highest honor bestowed by the Stanford School of Medicine.



Sergiu Pasca

Dr. Sergiu Pasca's Clark Center lab space is under construction for his upcoming move. In 2018, Dr. Pasca received the A.E. Bennett Award, the Daniel H. Efron Award, the Life Sciences Research Award, and the Vilcek Award for Creative Biomedical Promise, and was listed as one of the *New York Times's* Visionaries in Science and Medicine.

Byers Center for Biodesign

The Byers Center for Biodesign in the Clark Center is dedicated to developing world-class innovators who have the talent and ambition to create the next generation of advanced health technologies. Biodesign trainees have founded 48 start-up companies based on technologies invented during the program. These new technologies have been used in the care of more than 1.5 million patients. An additional 26 faculty projects have received seed funding and mentoring from Biodesign that resulted in new company formation. In 2018, founder and director Dr. Paul Yock received the prestigious Bernard M. Gordon Prize for Innovation in Engineering and Technology Education.



Optogenetics Innovation Lab

The Optogenetics Innovation Lab (OIL) was developed as a partnership between Stanford Bio-X and Dr. Karl Deisseroth. OIL's mission is to train scientists in optogenetic techniques. Over 550 participants from around the world have been trained to use optogenetics and fiber photometry and CLARITY technology. Recently, OIL obtained long-term external funding from the National Science Foundation and the National Institute on Drug Abuse. In addition to numerous awards in previous years, in 2018, Dr. Deisseroth won the Kyoto Prize, the Canada Gairdner International Award, and the Berthold Leibinger Zukunftspreis.

A Hub of Innovation

The Clark Center is also home to Nobel Laureates Michael Levitt and Steven Chu, as well as Director of the Canary Center at Stanford for Cancer Early Detection Sam Gambhir and Wu Tsai Neurosciences Institute Director Bill Newsome. In addition to supporting Wu Tsai Neuro's faculty members and administration until their building is 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).

Success Stories

Stanford Bio-X Fellows who have become Stanford faculty members:

David Camarillo: Assistant Professor, Bioengineering
Adam de la Zerda: Assistant Professor, Structural Biology
Andreas Loening: Assistant Professor, Radiology
David Myung: Assistant Professor Ophthalmology
Guillem Pratx: Assistant Professor, Radiation Oncology

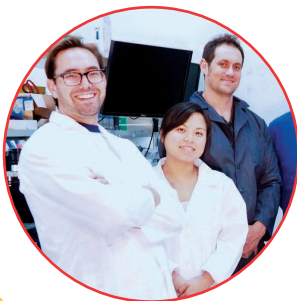
Stanford Bio-X Fellow Viviana Gradinaru is a professor of neuroscience and biological engineering at the California Institute of Technology.



Stanford Bio-X Fellow Georgios Asimenos is the Chief Technology Officer at DNAnexus, a Stanford-spawned startup company which sits at the intersection of cloud computing and genomics.



Stanford Bio-X Fellow Chris Emig, awarded with funding from Sanofi through the Bio-X BioSTAR program, developed a method for high-throughput antibody characterization. The method aids in the discovery of new therapeutics against infectious or other immune-modulated diseases. The technology has been licensed to Chris's start-up, Augmenta Bioworks.



Stanford Bio-X Fellow Bethany Percha is an assistant professor of Genetics and Genomic Sciences at the Icahn School of Medicine at Mount Sinai, and the CTO of the Precision Health Enterprise at the Mt. Sinai Health System.



Stanford Bio-X Fellow Joel Sadler cofounded and is CTO of Piper Inc., which aims to inspire kids to make electronic devices that "spark every child's inner inventor" in education.



Stanford Bio-X Fellow Bo Zhang is the VP of chemistry and cofounder of Apostle, Inc., a biotechnology company. It's in the business of the research, development, licensing, and sales of novel technologies, products, and services for diagnosis and treatment of human diseases.

