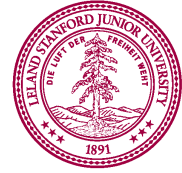


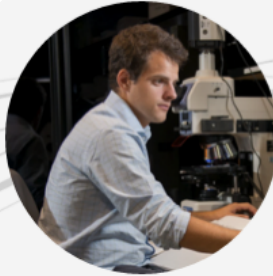


Stanford Bio-X



What is Stanford Bio-X?

Bio-X is Stanford's pioneering interdisciplinary institute, bringing together biomedical and life science researchers, clinicians, engineers, physicists, and computational scientists to unlock the secrets of the human body.



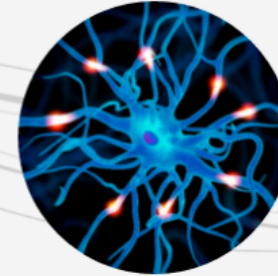
Education

Participating in interdisciplinary research prepares students for careers that make an impact in the scientific community.



Innovation

Our pioneering approach to science generates novel technologies for exploring how the body works.



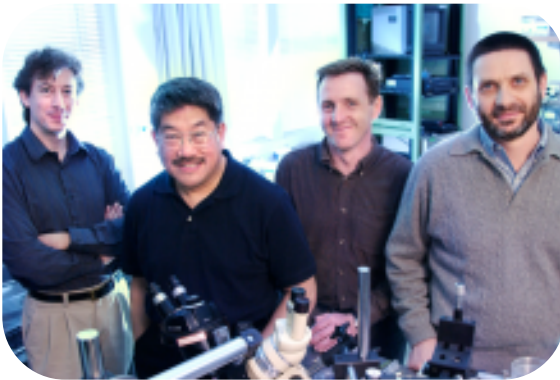
Discovery

Research breakthroughs and technological advances by our collaborative teams advance scientific knowledge.



Collaboration

Our programs bridge disciplines and catalyze discoveries that will ultimately improve human health.



**Interdisciplinary Initiatives
Seed Grant Program (IIP);
Ventures**

PhD/Postdoc Fellowships



**Undergraduate
Summer Research
Program (USRP)**

<https://biox.stanford.edu/research>

The Mission of 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.**

Bio-X Impact: The Culture in 2016

- High performance model for how research universities can operate across disciplines
- Web of interconnected and collaborative scientists across entire campus

*“A cauldron of innovation” –
John Hennessy,
Previous Stanford
President*

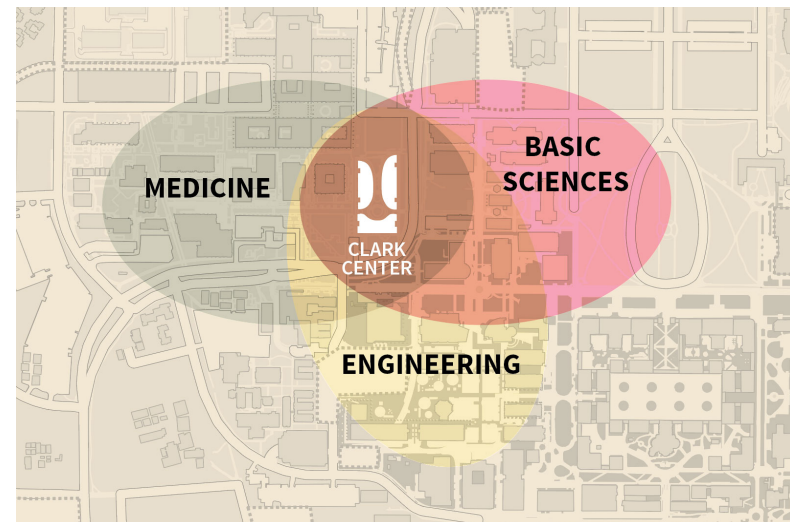
- 800+ faculty from 60+ departments from all 7 Stanford schools
- 1500+ interdisciplinary research teams formed
- 20 new Seed Grant IIP projects to be awarded this year for a total of 185 projects awarded in 8 rounds (16 years)
- 23 new PhDs to be announced this Fall for a total of 221 PhD Fellows & 8 Postdocs supported in the past 12 years
- 436 undergraduates supported during the last 11 years

- A “new breed” of scientist
- Nobel laureates, highly sought after faculty, and rising young scientists and engineers ALL benefit

An interdisciplinary success story, and a leading model for conducting bioscience research – National Science Council report

James H. Clark Center

Bio-X Hub in the heart of Silicon Valley



45 Faculty from 25 Depts

Shared Facilities

Social Aspects: Nexus Restaurant, Peet's Coffee and Tea

***Meeting Spaces – Clark Auditorium, 8
Conference Rooms, 4 Seminar Rooms***

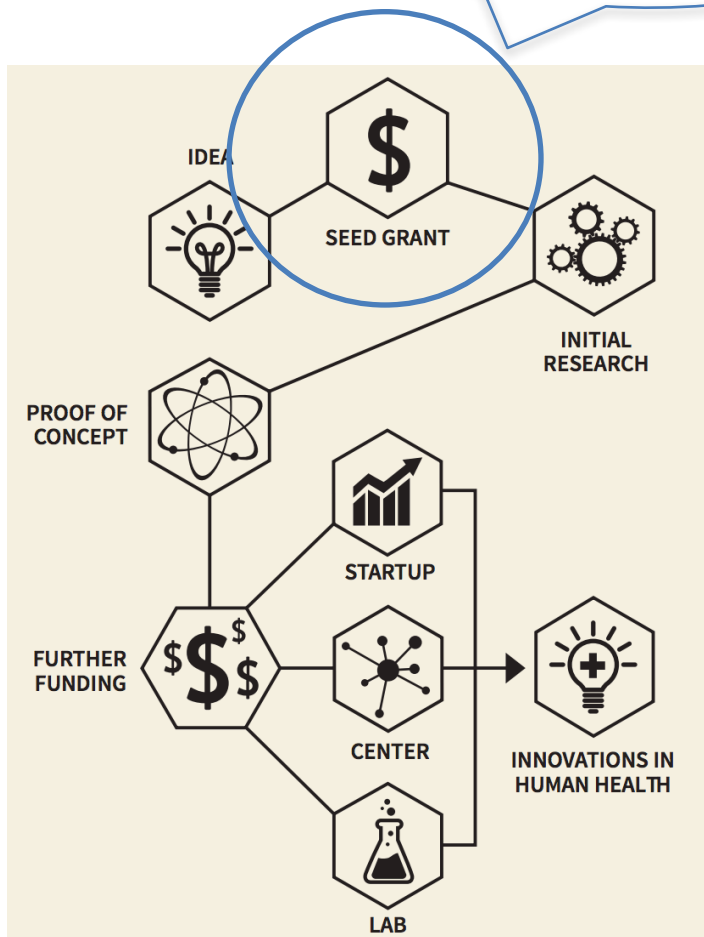
Open Lab Space

Seed Grants for Success

Interdisciplinary Initiatives Program (IIP)

2-YEAR SEED FUND
**Collaborative,
 Interdisciplinary, High Risk &
 High Reward**

- Beginning 8th round this year, total of 185 IIPs awarded
- 800+ interdisciplinary teams created



10-fold+
Return on investment
(more than \$220M)

nature

Cell

Science

PNAS



**57+ Patents filed
 so far from the
 164 awarded IIP
 projects**



Scott Delp PhD
Bioengineering



Vijay Pande MD PhD
Chemistry,
Structural Biology



Russ Altman PhD
Bioengineering



Michael Levitt PhD
Computer Science,
Structural Biology

2002 Bio-X IIP

*How Myosin Walks: 3D Simulation Brings Life
to Atomic Structures of Motor Proteins*



**NIH Center for Biomedical
Computation at Stanford**



Josef Parvizi, MD, PhD
Neurology

Chris Chafe PhD
Music



2012 Bio-X IIP

*The Brain in Performance:
Converting Brain Waves to Sound
and Image*

CERIBELL



*Device that creates audio sounds
directly from arrays of brain
signals in patients with epilepsy*

DISCOVER
THE MAGAZINE OF SCIENCE, TECHNOLOGY, AND THE FUTURE

Forbes

**science
FRIDAY**

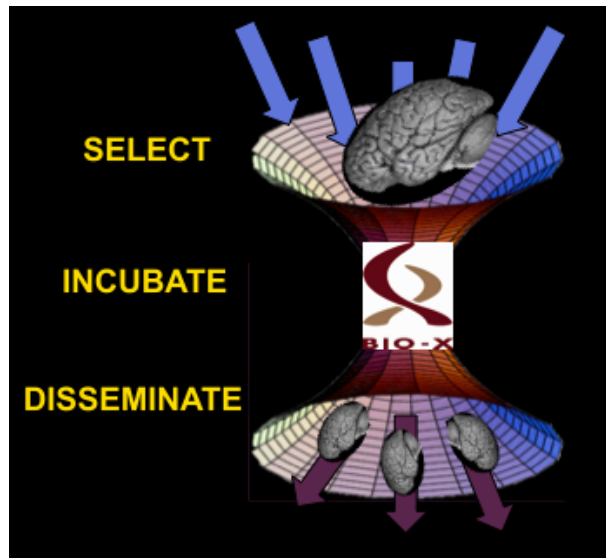
NewScientist

NBC
BAY AREA



Ventures

Capital for Scientific Enterprise



What seed funding does for individual projects, Bio-X Ventures provides for larger-scale endeavors, those with the potential to revolutionize the way science is done. Bio-X Ventures focuses resources in key areas, facilitating rapid development until a new enterprise can stand alone

Bio-X NeuroVentures

**Led to the formation of a new interdisciplinary institute:
*Stanford Neurosciences Institute***



Nicholas Melosh, PhD
Mat Sci & Eng

Craig Garner, PhD
Psychiatry



2012 Bio-X NeuroVenture
Solid State Whole Cell Patch-Clamping with Biomimetic Probes

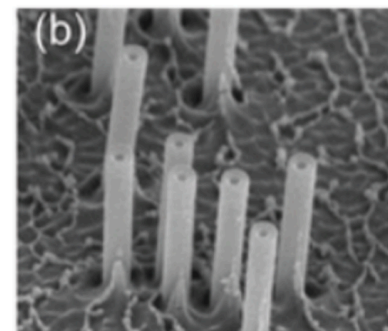
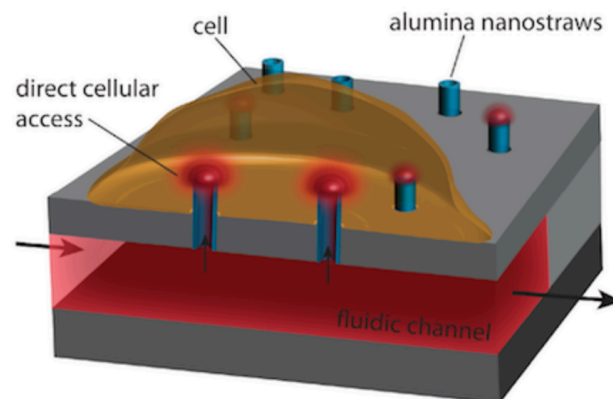
STEALTH BIOSCIENCES

NANOSTRAWS

Nanostraws provide direct fluidic access to cells

Proprietary Nanostraws allow unparalleled two-way access to individual cells. Our technology can deliver or extract genes, proteins, or other molecules of interest.

No chemicals or viruses are used, making Nanostraws a safe and efficient platform for personalized medicine and stem cell therapies.





Karl Deisseroth, MD, PhD
BioE, Psychiatry



Optogenetics Innovation Lab *Bio-X supported Research Partner*

sequence info virus preparation hardware request materials references d-lab

Brain tissue light transmission calculator
Anged Stereotax coordinate calculator (MatLab)
Opsin and fluorophore spectra tool

Clarity Resource Site
Optogenetic courses
Fiber photometry resources

2016 Perspective
Cell
Targeting circuits

2015 Commentary
nature neuroscience
Optogenetics 10 year history

2016 Primer
Cell
Communication in the brain

2014
nature
Circuit dynamics of behavior

2015
Neuron
Closed-loop optogenetics

2012 Analysis
nature methods
Quantitative opsin properties

2012
nature REVIEWS
Optogenetics & neural circuits in brain disease

2011 Primer
Neuron
Optogenetics in neural systems

2010 Method of the year
nature methods

2014 Annual Review of Biomedical Engineering
Optical neural interfaces

2011 Annual Review of Neuroscience
Development & application of optogenetics

2010
SCIENTIFIC AMERICAN
Controlling the brain with light

OPTOGENETICS

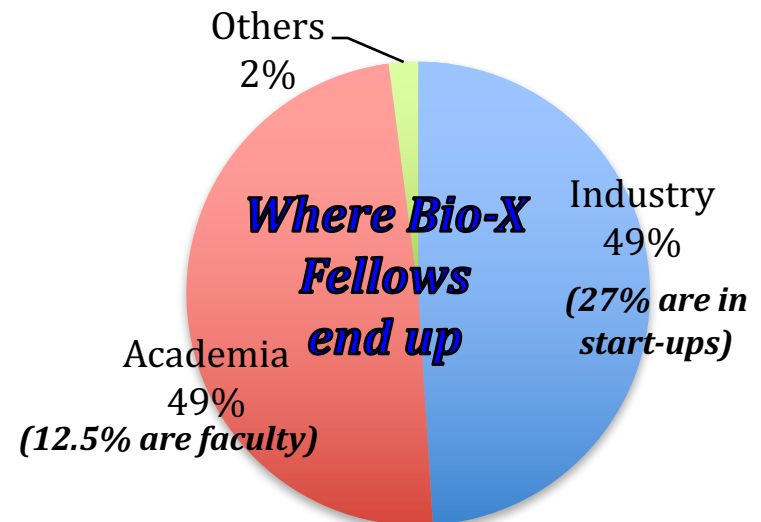
Fellowships

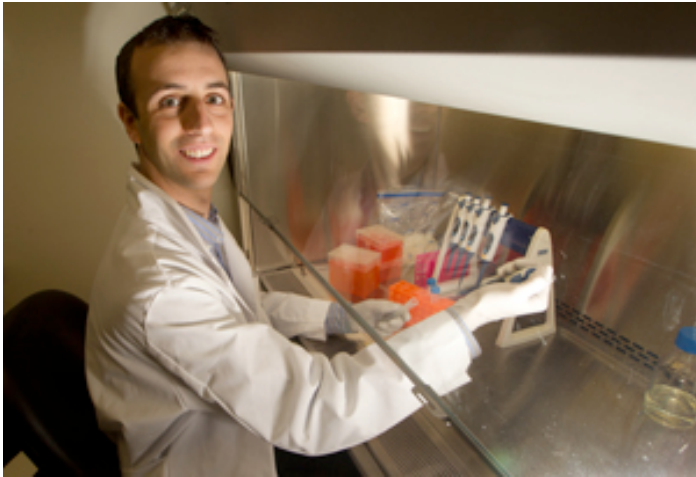


- Self-nominated
- Multiple co-mentors
- 13 rounds of Fellowships since 2004
- 221 PhDs and 8 Postdocs awarded for 3-year interdisciplinary fellowships

Training graduate students pursuing interdisciplinary projects

Investing in the future of human health





Adam de la Zerda, PhD
Structural Biology, EE

Bio-X Skippy Frank Fellow from (2008-2011)

Co Advisors:

Sam Gambhir, MD, PhD (Radiology, BioE)

Shan X. Wang, PhD (EE, Mat Sci & Eng.)

James S. Harris, PhD (EE)

Forbes Magazine 30 under 30 twice

**Stanford Professor in Structural
Biology**, courtesy appointment in Electrical
Engineering **(2012)**

2012 Bio-X IIP

*Visualizing the Molecular Processes of the
Retina in Living Subjects*

2014 Bio-X Bowes Fellow - Orly Liba

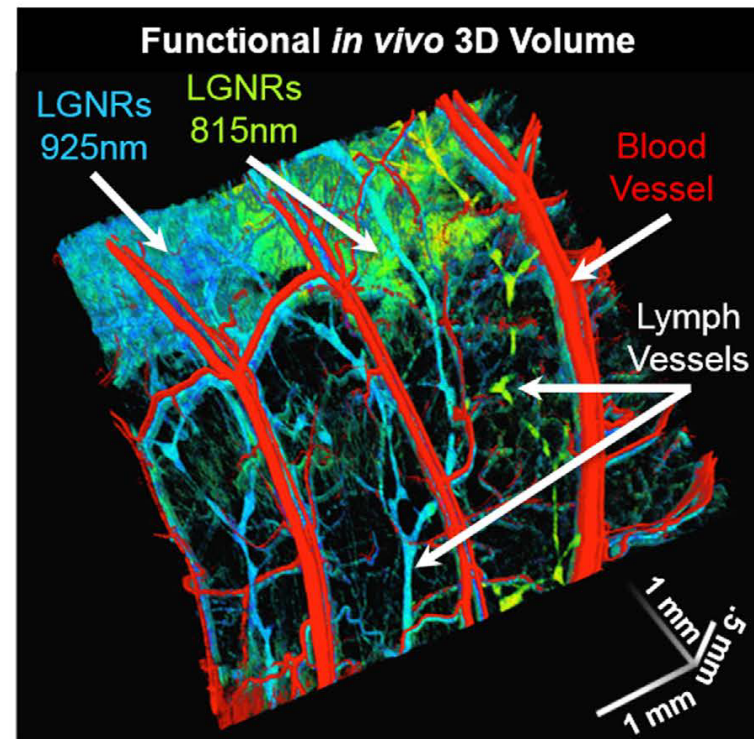
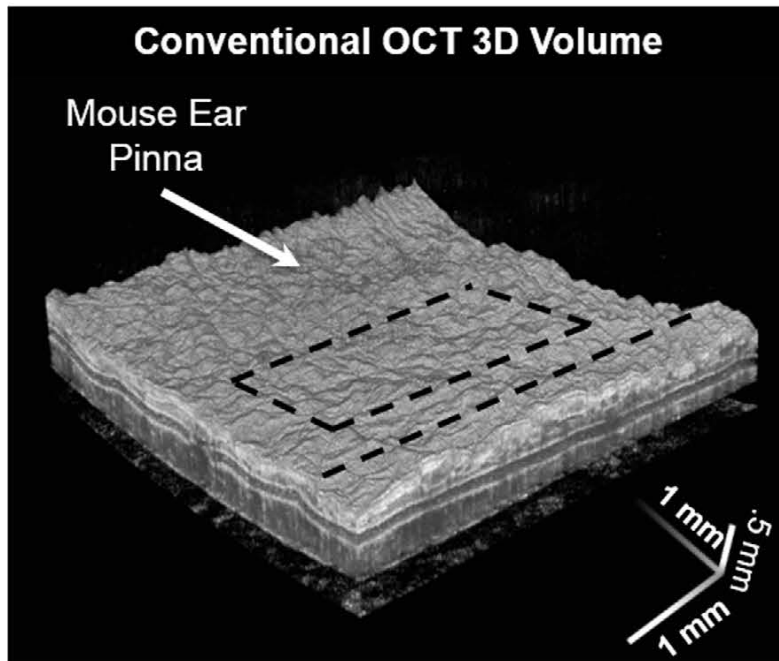
Home Department: Electrical Engineering

Faculty Advisors: Adam de la Zerda (Structural Biology)
and Sanjiv Sam Gambhir (Radiology)



MOZART

MOlecular imaging and characteriZation of tissue noninvasively At cellular ResoluTion





Viviana Gradinaru
Professor at Caltech

Andrew Lee
*Co-Founded Stem Cell
Theranostics*



Sanaz Saatchi
*Medtronic R&D
Engineering Manager*



Mark Sellmyer
Radiology Resident



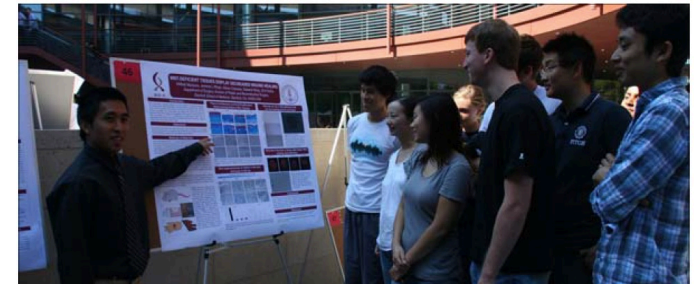
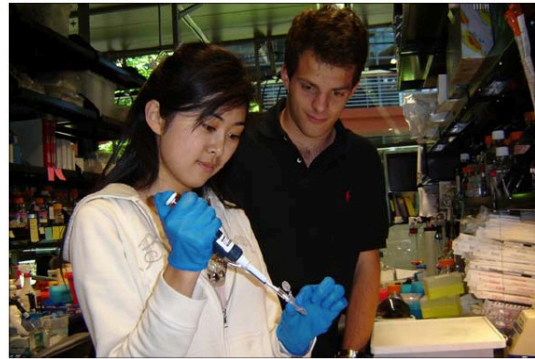
David Myung
*Co-Founded Biomimica
Invented smartphone-
based eye imaging system
licensed to DigiSight
Technologies*

Summer Undergraduate Fellowship Program

Supporting undergraduates conducting research for 10 weeks in a Bio-X affiliated lab

**436 undergraduates in 11
summers**

**Highlight - Weekly Lunch
Seminar**



- *NSF Graduate Research Fellowships*
- *Publications in Nature, Cell, etc.*
- *Fulbright Scholarship*
- *Best Poster Awards in conferences*

Translating Bio-X: *Corporate Forum Program*



Bio-X started its Corporate Forum Program in 2004



Ways to bring academia & industry together

- *Symposiums, seminars*
- *Customized technical summits*
- *Newsletter*
- *Liaison to OTL/ICO*

Translating Bio-X: *Corporate Forum Program*



Fostering stronger academic-industry relations through the Bio-X portal



Danish Visiting Scholars

novonordiskfonden

- *3 Rounds, 2 Scholars per round*
- *4-year fellowships with 3 at Stanford, 1 in Denmark*
- *4,000,000 DKK per scholar*
- *Two-round review process with NNF and Bio-X*
- *Must select 2nd Bio-X mentor 6 months into fellowship*



Round 1 Awardees (2015)



Rasmus Fonseca, PhD
Brian Kobilka (Molecular & Cellular Physiology) & SLAC



Ninna Rossen, PhD
Amato Giaccia (Radiation Oncology) & Sarah Heilshorn (Materials Science & Engineering)



Bio-X Impact: Research Outcomes

Rapid acceleration of discovery and innovation

Extraordinary amount of new knowledge and technological advances

Collaborative culture: curiosity and creativity flourish

Leveraging over 10x on investment in seed grants

Bio-X identified as “highly effective super structure

Hundreds of publications; dozens of patents filed

Bio-X PhDs driving new research directions



Contact Information

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