

STANFORD-CESAR CHAVEZ PARTNERSHIP: SCIENCE FOR KIDS AT STANFORD ("STANFORD SCIENCE")

**A report presented by
Rodolfo Dirzo and Sid Krishna Kumar**

Joining forces with the Citizen Schools Initiative, Katlin Kane (Academic Program Lead of the Citizen Schools at Cesar Chavez Academy), Sid Krishna Kumar (Biology graduate student), and Rodolfo Dirzo (CLAS Director and Professor in the Biology Department) developed a new educational partnership: The CLAS-Cesar Chavez Academy of Palo Alto, "Stanford Science".

This new partnership focuses on STEM (Science, Technology, Engineering and Mathematics), in which students from this Palo Alto school came, weekly for the entire fall quarter, to learn science in several Stanford science laboratories and in the Jasper Ridge Biological Preserve, and we also toured the rain forest ecosystem of the California Academy of Sciences. In these sessions students typically received an introductory presentation of the theme of study for the session, and this was followed by a demonstration of the corresponding laboratory and the students were engaged in some activity representative of the research being done therein. It was a fabulous experience to facilitate these encounters between this group of outstanding Stanford professors/instructors and the group of students from an underserved community of the Bay Area.

At the end of the program, students prepared an exhibit at the Cesar Chavez Academy, where they displayed a slide show of the program and provided handouts for visitors to ask questions regarding their activities and learning experience. The experience was a stimulating and encouraging success. It is our hope now to be able to secure funds to continue with this new Stanford Science for Kids Initiative.

The Cesar Chavez Academy Students

We were fortunate to have 18 enthusiastic students participating in the program:

Angel Aguilar

Alberto Avalos

Ramiro Benitez

Nayelli Contreras

Stephanie Gutierrez

Jennifer Enriquez

Tahjanae Foster

Avit Garcia

Esther Gomez

Karina Gonzalez

Senitila Havili

Caleb Joya

Yvonne Lopez

Odalis Mendoza

Esmeralda Pineda

Lorenzo Spears

Tahlia Tookes

Stephanie Ulloa

Academic content

The program was composed of the following seven sessions:

- *EMBRIOLOGY AND DEVELOPMENT*
- *ECOLOGY*
- *VOLCANOES AND EARTHQUAKES*
- *NANOTECHNOLOGY*
- *CHEMISTRY RESEARCH LAB*
- *MEDICAL ROBOTICS*
- *CALIFORNIA ACADEMY OF SCIENCES*

The sessions are briefly described and illustrated in the following pages.

EMBRIOLOGY AND DEVELOPMENT

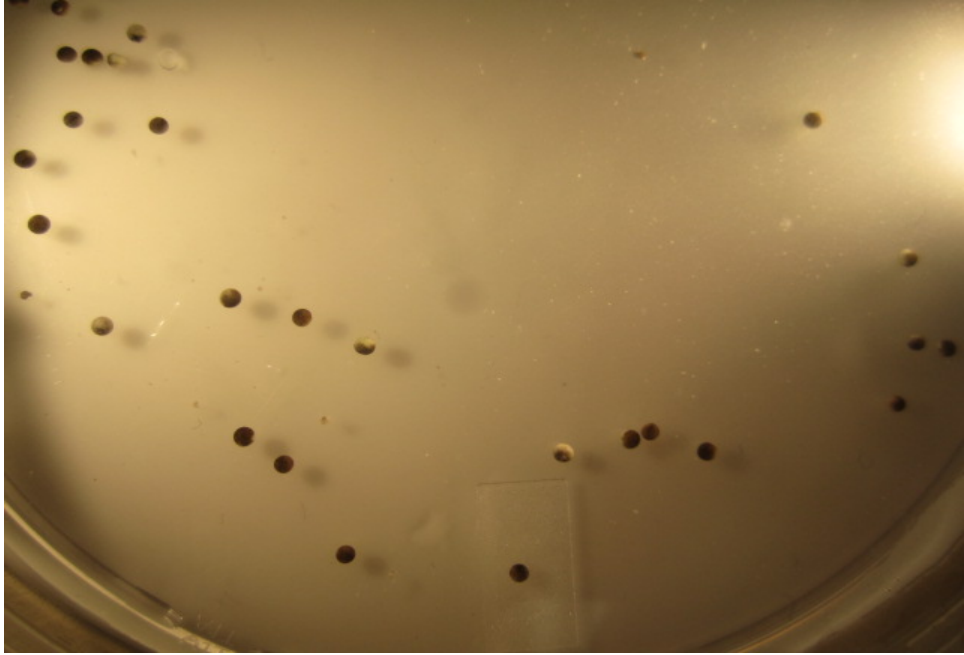
Date: September 24

Instructor: Eduardo Maldonado

This session covered an introduction of why we should study embryos, why bother with animal embryos? He then proceeded to cover some intro on developmental biology, how fingers develop, what mutations can do to the development etc. They saw frog and mouse embryos under a microscope at different stages of development. They got to observe an adult female frog, its features and the ovulation process.







ECOLOGY

Date: October 1

Instructor: Rodolfo Dirzo (Jasper Ridge Biological Preserve)

We began with a conceptual introduction of the main elements of ecology. This was followed by a demo of several animals (preserved), particularly those available in the insect collection, or a variety of animal parts – skulls, vertebrae and other bones. This was then followed by the highlight of the day: a hike in the preserve where we observed and discussed ecosystems, species adaptations, ongoing experiments, and general observations of some of the ecosystems present at the preserve, including an artificial lake.







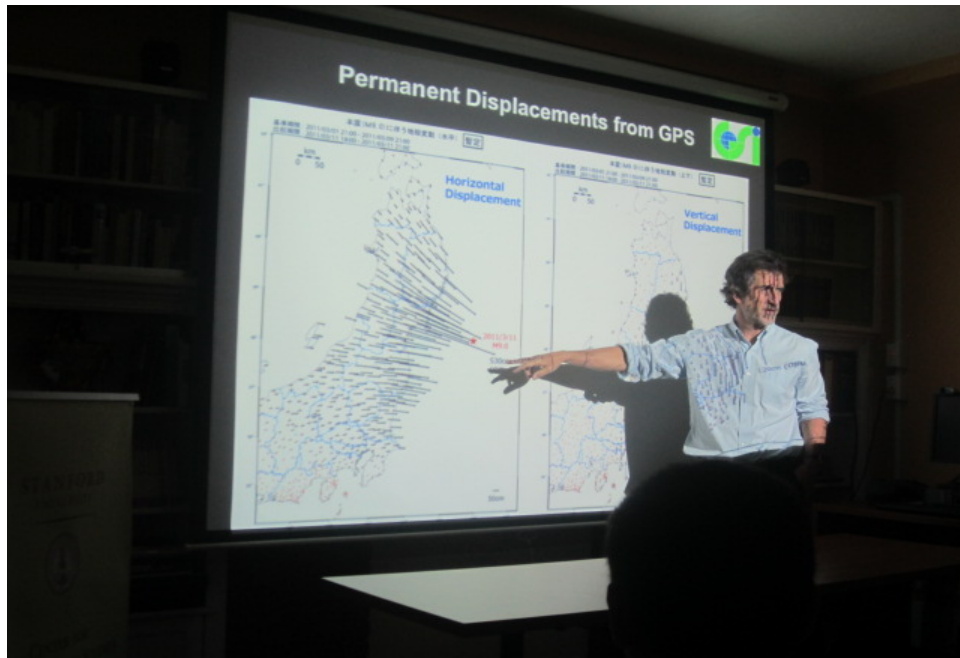
VOLCANOES AND EARTHQUAKES

Date: October 8

Instructor: Paul Segall

This session began with an introduction to earthquakes, structure of the earth's crust, how do deformations take place? What causes an earthquake? What is the destruction? How does destruction vary with the country's development? What data do scientists need and how do they collect it. Ended with a short intro to volcanoes: What is an active volcano, when do volcanoes erupt, what is lava made of?







NANOTECHNOLOGY

Date: October 15

Instructors: Mike Deal, Maurice Stevens

What are the key issues being studied? Why should people care? Why is research in the field important? How do they make your computers faster? Broad picture of how this is done. How to avoid contamination at the work site. Suiting up of students Romero and Ivonne. Tour of the labs.







CHEMISTRY RESEARCH LAB

Date: October 22

Instructor: Ana Rae Snyder

Students had an opportunity to learn about the importance of catalysts. Properties of catalysts, why do we need catalysts? Students performed chemical reactions in groups of three, took measurements, made observations and answered questionnaires prepared by the teaching staff. They noted how the volume increased several fold on adding the catalyst. A more rapid catalysis reaction was displayed by the teaching staff





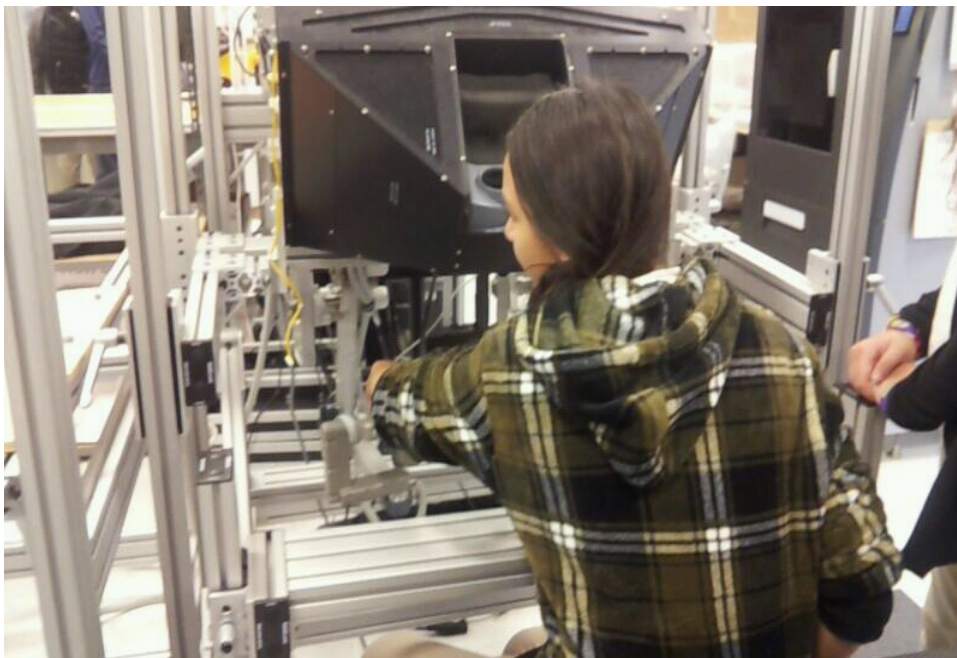


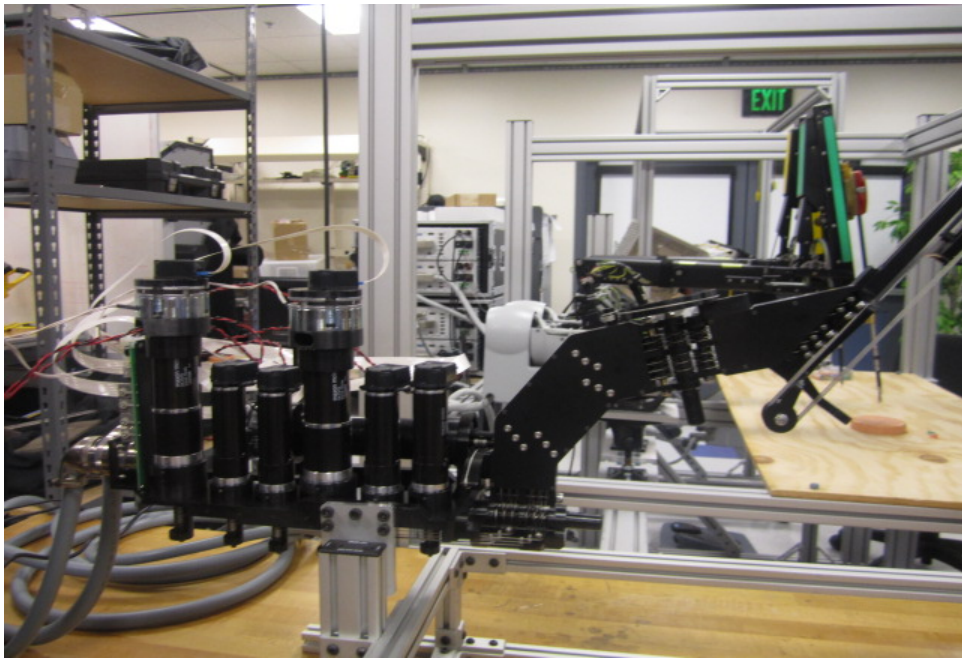
MEDICAL ROBOTICS

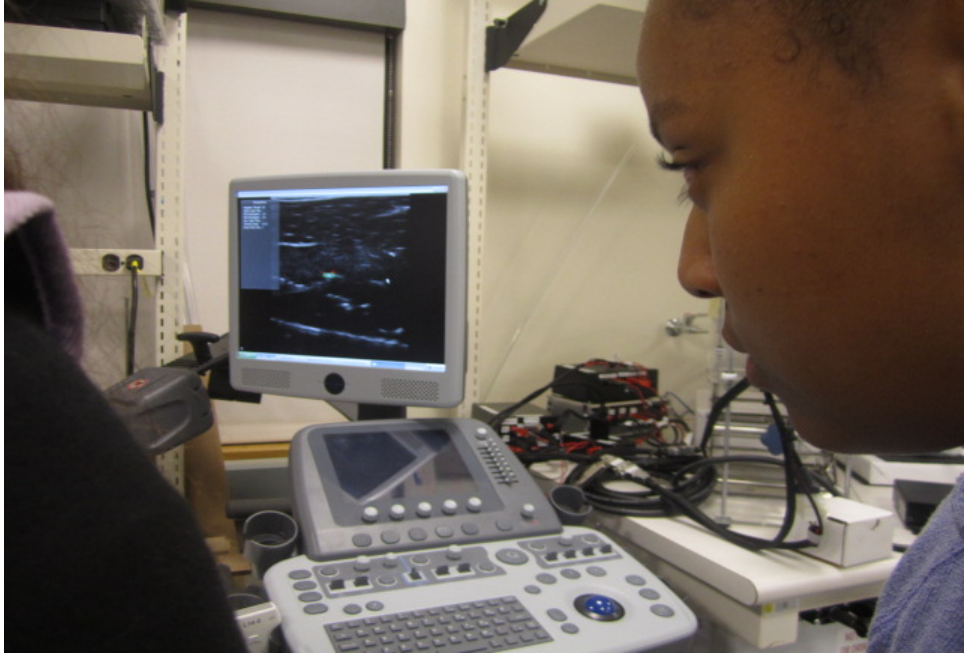
Date: November 12

Instructor: Dr. Allison Okamura

Introduction to haptics, why should we care, where can this be useful? Instructors showed four demos of haptics (robotic arm, remote control incision device, and two kinds of remote pressure sensing device).







CALIFORNIA ACADEMY OF SCIENCES

Date: November 13

Instructor: Dr. Rodolfo Dirzo

Introduction to the history of life on the planet: A demonstration using accessible models to illustrate the length of time since the appearance of the first organisms on the planet, the concept of geological eras and the main events that have taken place over the last 3.5 billion years of organic evolution, leading to the exuberant diversity we see in the world today. The epitome of such biological diversification is the tropical rain forest ecosystem. Therefore, we had a guided tour in the Academy's tropical rain forest dome where we got to see aspects of the ecology of this forest, got to know some plants and some live animals, both terrestrial and aquatic! We closed with a wrap up discussion of what we saw in the session at the Academy.







CLAS's Business Manager, Laura Quirarte, was in charge of all the logistics of transportation and finances, and Together with Katlin Kane, she also served as assistant in all sessions to make sure all sessions took place seamlessly and she also help to orient and assist the students in any aspect they needed help with. We are indebted to Laura and Katlin for this invaluable help and dedication to this effort. Guillermina Gómez also attended and helped in several sessions.