

# A CURRICULUM OF CONVERGENCE

INTERDISCIPLINARY WORK  
HELPS CAL POLY PRODUCE  
WHOLE-SYSTEM THINKERS

BY MATT LAZIER

IN HIS BIOGRAPHY, late Apple wunderkind Steve Jobs recalls being inspired by inventor Edwin Land, the co-founder of Polaroid, and his praise for creative minds who can stand at the intersection of the humanities and the sciences.

Jobs proved throughout his career that the most exciting work often happens not in individual disciplines but rather at the places where they converge.

He would have found a lot to like at Cal Poly.

As the university continues to define and refine the cornerstones of its comprehensive polytechnic education, the work happening at the intersections of Cal Poly's various programs becomes ever more vital in its mission to develop and inspire whole-system thinkers. (For more on the Strategic Plan, please see [www.academicaffairs.calpoly.edu/StrategicPlan/](http://www.academicaffairs.calpoly.edu/StrategicPlan/))

"It is imperative that our graduates be well prepared to work across disciplinary boundaries if they are to succeed in today's complex global economy," notes President Jeffrey D. Armstrong. "Cal Poly's comprehensive polytechnic curriculum provides students exactly the kind of educational foundation that will help transform them into creative and agile-minded professionals.

"Cal Poly has long had a firm bedrock of projects and programs that encourage students to work across multiple disciplines. Now, as we progress under our updated Strategic Plan, it's crucial that we continue to develop more opportunities for students to gain this important experience before they enter the workforce."

In true Learn by Doing fashion, as Cal Poly students gain experience in multidisciplinary work, they are also making an impact on the community through the arts, service projects for the needy and research aimed at solving real-world problems.

Here are just a few of Cal Poly's ongoing interdisciplinary programs and projects:

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LAES students have produced multimedia elements for local arts productions (left), developed interactive virtual reality programs (center) and handled technological aspects of international interactive displays. (Photos courtesy LAES.)

After planning, obtaining permits and recruiting volunteers, PolyHouse students undertake major home renovation projects every spring. (Photos courtesy PolyHouse)

## > LIBERAL ARTS AND ENGINEERING STUDIES

FIVE YEARS AGO, Cal Poly faced a growing problem of engineering students interested in expanding their educations beyond the technical boundaries of their chosen disciplines but faced with the daunting prospect of losing ground in their progress to graduation if they changed majors.

Fortunately, a group of faculty members and administrators hit on the solution: a jointly administered, dual-college program that marries technology and the humanities. Today, the Liberal Arts and Engineering Studies (LAES) program is preparing students for a variety of technically based careers in fields such as entertainment, government policy, sustainability, communications and community development.

“We offer a flexible program for those students who have equal appetite for technical disciplines – such as math, physics and science – and the liberal arts and who have a curiosity and a passion for education,” said LAES co-director and English professor David Gillette.

LAES mixes core courses and electives from the colleges of Engineering and Liberal Arts. It gives students flexibility in choosing their concentration courses from each side of the curriculum. And it requires several units of Study Abroad or Global Perspectives courses to broaden the cultural and economic outlook of its graduates.

“Cal Poly graduates used to compete with other California students for jobs in California,” Gillette said. “Now they compete with everyone, everywhere, all over the world.”

The curriculum also includes four project-based learning

classes in liberal arts and engineering, in which students take on real-world, quarter-length projects that Gillette said encourage them to learn through risk-taking and failure but also teach them that they need to deliver in the end. As part of these class projects, students have taken part in local service projects, developed high-tech cinema devices and produced technical aspects of theater and arts productions – including one that involved partnering with an Australian firm to help produce an interactive multimedia display at the Beijing Olympics in 2008.

The students themselves have had a significant impact on the makeup of the program’s curriculum, Gillette said. After it was established, several students began tailoring concentrations for audio engineering. Gillette said nearly half of the students in the program pursue that track now, and he hopes to make it an official concentration in the near future.

Allowing students this creative freedom with their own educations only serves to facilitate the interdisciplinary aspect of the program, said fifth-year LAES student Molly Schiff.

“Instead of preparing students for a specific job title,” she said, “LAES allows students to pursue a broader spectrum of interests in both the arts and engineering to assure they will be successful in whatever path they decide to take after college.”

Schiff has already done work as a filmmaker with sustainable design-build firm ConsciousBuild and plans to continue in that arena after graduating.

“My concerns with finding a job once I graduate are minimal,” Schiff said. “Because LAES has forced me to take such an active role in my own education, I feel better prepared for life post-graduation, and am confident I will succeed in whichever path I choose to take.”

For more information on Liberal Arts and Engineering Studies, visit <http://laes.calpoly.edu>.

## > POLYHOUSE

THE ANNUAL POLYHOUSE PROJECT began in 2004 not as an interdisciplinary effort but as a class project involving only professor Industrial Engineering Roya Javadpour’s project management students.

But because of its broad community-service appeal and the inherently cross-disciplinary nature of the work it entails, the project soon came to attract students and faculty from nearly every engineering discipline and from programs across the university, including architecture, agriculture and graphic communication.

In the annual project, Javadpour identifies a local disabled resident or family with a disabled child requiring complicated home upgrades to accommodate the disability but lacking the financial resources. Students in her class then plan the renovation project over six weeks and execute the work over two weekends. The project is restricted by a budget (obtained through fundraising), tools and equipment (only what can be borrowed or secured through donation), and human resources (the students and any volunteers they can recruit).

In addition to the physical labor involved, students and volunteers engage in scheduling, supply management, team recruiting, resource allocation, time/cost tradeoffs, risk assessment, task coordination, team-building, progress monitoring, and post-project assessment.

In recent years, Javadpour said, participants have begun to arrive from every college on campus. Agriculture students are taking part in the work. Graphic Communications students have pitched in by designing logos for the project managers to use in publicity. David Gillette’s students in the LAES program have volunteered for several years, providing multimedia coverage and producing several videos of past projects (in addition to taking part in the construction work).

“The variety of volunteers we attract from across campus

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gives all of the participating students a broad exposure to many different skill sets and perspectives,” Javadpour said. “That enhances the learning for everyone involved and helps the students approach problem-solving in a more comprehensive way that reflects what they will find later in the workforce.”

Weston Burke, who was a project coordinator on the 2011 PolyHouse, agreed.

“As engineers, we tend to associate and work with other engineers,” said Burke, who is preparing to work for Lockheed Martin after he graduates in June with bachelor’s and master’s degrees in engineering.

“In the world outside Cal Poly, you have to be able to work with people from all different disciplines and departments,” he said. “You have to empathize with their needs, concerns and motivations. Working on an interdisciplinary project such as PolyHouse was very good practice for getting on in the corporate arena but also life in general.”

The 2012 PolyHouse project will culminate this spring. For more information, visit [www.polyhouse.org](http://www.polyhouse.org).

## > STRIDE HUNGER-FREE COMMUNITIES

ONE HUNDRED STUDENTS from 11 degree programs across campus collaborated through Cal Poly's STRIDE (Science through Transitional Research in Diet and Exercise) center in 2011 and earlier this year on a pair of surveys to determine how many of San Luis Obispo County's low-income residents are struggling with food insecurity and where staple foods are and aren't available.

The work was funded with a U.S. Department of Agriculture Hunger Free Communities grant and is part of a broader effort by the Food Bank Coalition of San Luis Obispo County and local government and service agencies to develop a plan to fight hunger in the county.

In one survey, dozens of Kinesiology students with expertise in nutrition and health issues worked with volunteers from the community and from programs across campus to survey low-income residents to find out if they are going hungry and, if so, why.

Christian Cardenas (B.S. Kinesiology, 2011) helped recruit and train survey volunteers and coordinate the survey effort. That meant training students with a variety of backgrounds, seeking out Spanish-speakers for translation, and working with local nonprofits to ensure the questionnaire was appropriate for diverse at-risk populations and systematically find survey respondents across the county.

Once the survey data was in hand, Cardenas and other Kinesiology students then worked with peers from the Biomedical Engineering and Computer Science programs to create a database that allowed for more detailed analysis of the results. These results were given back to the Food Bank Coalition for use in developing a plan and applying for grants to battle hunger in SLO County. The team also presented the data to Congresswoman Lois Capps in January.

Also on the USDA grant, Cal Poly Food Science and Nutrition Professor Aydin Nazmi and 17 students from his senior-level Community Nutrition class led a related survey on local food availability. After surveying 45 local grocery stores, Nazmi and his students are using the data to create a "hunger map" of food availability in the county's various regions.

The interdisciplinary aspect of this and projects like it helps students to bring their learning to a new level, said Ann McDermott, Kinesiology professor and director of the STRIDE center.



(L to R) STRIDE Director and Kinesiology Professor Ann McDermott, Nutrition grad student Ally Lund, STRIDE Community Liaison Stephanie Teaford, Food Science and Nutrition Professor Aydin Nazmi, Kinesiology graduate and hunger survey volunteer trainer and coordinator Christian Cardenas. (Photos courtesy Dennis Steers)

"Interdisciplinary work pushes our students beyond simple memorization, beyond understanding and even beyond application," she said. "It helps them get to the point where they can analyze that application, evaluate the results and then be creative in developing better and more efficient processes."

Cardenas, now an account manager with healthcare communication company Standard Register, said STRIDE and the hunger study were a vital part of his Cal Poly education.

"To be successful in the workforce, you have to collaborate with a variety of people from many different backgrounds and put the pieces together," he said. "STRIDE runs like a real-world business. It teaches you things like communications skills, business etiquette and professionalism. Cal Poly would not have been the same experience for me without STRIDE, and I know I wouldn't have the job I do now."

And the interdisciplinary norm at Cal Poly meant STRIDE had an easier time organizing and executing the survey project, McDermott said.

"We are light years ahead of many other universities in that regard. When STRIDE was approached to take part in this work, even though it was complex and required expertise from many different disciplines, we were able to act very quickly. We didn't have to break down any walls, because there were no walls."

For more on STRIDE, please visit <http://stride.calpoly.edu>

CAL POLY  
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# POLY DAYS

## YOU'RE INVITED TO POLY DAYS 2012

*Come enjoy Cal Poly and San Luis Obispo during Poly Days Alumni Weekend, July 19–22.*

Please join us for Poly Days. Bring the whole family. Reconnect with old friends, make new ones. Remember once more how great it is to be a **CAL POLY MUSTANG**.

Your hosts for the weekend: President Jeffrey D. Armstrong and Sharon Armstrong

For more details, 805-756-2586 or visit [WWW.ALUMNI.CALPOLY.EDU](http://WWW.ALUMNI.CALPOLY.EDU)



# CONVERGENCE