



Sandia National Laboratories

A Department of Energy National Laboratory



Strategic UNIVERSITY PARTNERSHIPS Council

A C T I V I T Y R E P O R T



FY
2002-2004



Introduction

Partnerships and collaborations with the academic community are a highly valued tradition at Sandia National Laboratories. The focus of these interactions is primarily with colleges and universities committed to preparing the scientists and engineers of the future. The result is a win-win situation for all:

Sandia has the opportunity to cultivate and nurture potential future employees, while academic institutions gain unique and valuable learning opportunities for students and faculty. Vigorous, two-way exchanges of emerging new science and technology aids both Sandia and the universities.

The University of California, Berkeley, has both the largest number and the highest percentage of top-ranked doctoral programs of any university in the country.

Because of its Bay Area location, Sandia's California site has a unique opportunity to build alliances with some of the top research institutions in the country. Located nearby are Stanford University, the University of California, Berkeley (UC Berkeley), and the University of California, Davis (UC Davis)—three prestigious universities with highly respected graduate programs and world-class research facilities. In fact, UC Berkeley has both the largest number and the highest percentage of top-ranked doctoral programs of any university in the country.

Sandia California's Strategic University Partnerships Council (SUPC), an ongoing group interested in enhancing the California site's university relations, launched a coordinated effort to establish or strengthen partnerships with these three universities. The group's mission is to create a strategic focus to Sandia's university partnerships by integrating its research, recruiting, student programs, and minority outreach. In Spring 2003, three teams were formed to develop and implement outreach plans with the universities, focusing on research areas of mutual interest. The report that follows describes the Council's goals, objectives, tactics, and accomplishments over the 2002-2004 fiscal years.

Strategic University Partnerships Council:

Action Plans for Bay Area Universities

At Sandia/CA, the Staffing, Recruiting and University Partnerships Department, under manager Karen Scott, oversees the site's interactions with the academic community. In 2002, the department guided the SUPC in focusing its efforts on strengthening interactions with the Stanford, UC Berkeley, and UC Davis. This effort was spearheaded by Scott and Bill McLean, Director of the Combustion and Physical Sciences Center.

Three separate teams comprising current and former technical managers, technical staff, and a representative from the Recruiting and University Partnerships Department were formed to develop stronger ties with the universities (see Table 1). The teams have identified key contacts at the various institutions, which recognize the value of increasing their interactions with Sandia. Working with these individuals, each team developed a roadmap for increasing the impact of current interactions, as well as establishing new interactions. A detailed list of tactics for these interactions can be found in the teams' action plans for FY2004-2005 in the [Appendix](#). Efforts are focused on a small number of

targeted technical areas, which were selected to have the most impact on Sandia's university partnership goals.

	Stanford	UC Berkeley (College of Eng.)	UC Davis (College of Eng.)
Team Leader(s)	Sarah Allendorf	Alec Willis [†] Ray Eng	Mike Hardwick
Team Members	Bill McLean Chuck Hartwig Bob Gallagher [†] Amy Herr Chuck Hartwig Andrew Dryden Yuki Ohashi Chris White Brian Kirby Rene Bierbaum Cheryl Lam Paul Yoon Heidi Ammerlahn Richard Reguerio Dawn Manley Monica Martinez-Canalas Dennis Siebers Mark Allendorf Dahv Kliner Norma Hibbs Carol Crown	Bill McLean Carole LeGall Neal Fornaciari Lisa Brown Keith Vanderveen Michael Johnson Chris Moen Bob Crocker Raphael Davalos Andy McIlroy Jack Skinner Nina Berry Norma Hibbs Carol Crown	Robert Hillaire Alec Willis Mike DeVay Greg Valdez Debra Post Ken Wallace Kiet Tieu Jerry Friesen Ed Talbot Tracy Walker Andy Lutz Norma Hibbs Carol Crown
Areas of Interest	Mechanical engineering (Global Climate and Energy Project) Computer science & information technology (cyber security) Biology/Bioengineering/Biophysics <i>Long term interest:</i> <i>International security</i> <i>Chemical physics</i>	MEMS/Berkeley Sensor and Actuator Center (BSAC) Computer science Electrical engineering Biotechnology Mechanical engineering Chemical engineering	Applied science Biomedical engineering Chemical engineering & materials science Computer science & information technology (cyber security) Electrical & computer engineering Mechanical engineering

[†] Retired

Table 1. SUPC teams and team members.

Sandia and each institution have developed strategic goals for their partnership. Sandia's objectives for each of the three partnerships are virtually identical and include the following:

- ***Improved visibility and name recognition*** – Enabling Sandia to become known in university communities as a premier Northern California science and technology institution. Establish recognition and rapport with department chairs, faculty, student groups, and administrative personnel.
- ***Improved recruiting effectiveness*** – Provide effective pipelines for attracting high-quality staff with key skills to Sandia career and postdoc opportunities.
- ***Joint research and development*** – Provide opportunities to collaborate on R&D activities key to Sandia's programmatic needs.
- ***Broader visibility*** – Mutually enhance the visibility and positive image of Sandia and the local universities by making our partnership more visible to our respective constituencies.

With some variations, the universities' strategic objectives generally include the following:

- ***Strengthen academic programs*** – Increase enrollments and support of engineering graduate students to strengthen overall academic programs. Strengthen recruiting through the deployment of “Sandia assistantships.”
- ***Provide opportunities for students*** – Provide high-tech career opportunities for engineering graduates.
- ***Joint research and development*** – Participate with Sandia/CA in high-profile engineering activities to mutually enhance visibility and positive image of both organizations.
- ***Acquire extramural funding*** – Participate in collaborative research activities that provide extramural funding for faculty and students.
- ***Use Sandia staff to teach courses and present seminars*** – Use Sandia staff where beneficial to both organizations to teach courses and present seminars.

Representatives from Sandia and the respective universities have developed specific actions for achieving these objectives at joint planning meetings. A detailed list can be found in the action plans for each university in the [Appendix](#). Some of the more important activities include the following:

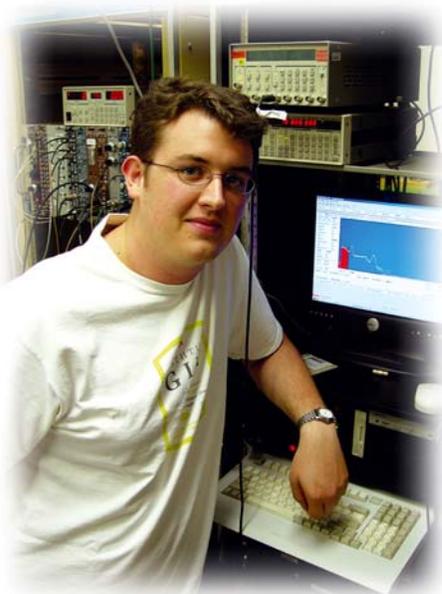
- Establishing Sandia-sponsored research at the universities
- Developing externally funded joint research as appropriate

- Establishing fellowships to support graduate students in areas of technical interest to Sandia
- Holding technical seminars at both Sandia and the universities
- Jointly presenting research results
- Providing co-ops and summer internships to students
- Exchanging faculty and staff, sponsoring senior capstone projects
- Placing Sandia employees in graduate school at the universities.

Accomplishments

SUPC spent much of FY03 on developing its structure, organizing the teams, and making initial contacts with the three universities. Subsequently, the teams implemented a number of the actions they developed in conjunction with university representatives, including the following, which have occurred at all three universities:

- Established fellowships through the Sandia Campus Executive LDRD program.
- Established collaborations in targeted research areas.
- Conducted recruiting activities for technical staff



Ross Dunkel, a Stanford Ph.D. student in physics, has worked as a summer intern at Sandia for three summers.

Fellowships



Sandia Executive Vice President Joan Woodard and James Plummer, Dean of the School of Engineering, signed an agreement establishing a Sandia Excellence in Engineering Fellowship to support Craig Foster, Ph.D. student in civil engineering.

Shannon Timpe, a Ph.D. student conducting MEMS research under mechanical engineering professor Kyriokos Komvopolous, is being sponsored by a Sandia Excellence in Engineering Fellowship. He is planning to receive his Ph.D. in 2007.

UC Davis

Two Sandia Excellence in Engineering Fellowships were established on March 11, 2004, during a signing ceremony at Sandia with Vice President Mim John and Enrique Lavernia, Dean of the College of Engineering. Each fellowship is supported by \$25,000 of Campus Executive funding from Sandia and will be supplemented by matching contributions from UC Davis. Selected for the fellowships are graduate students Merry L. Proebstel (computer security) and Kurtis Kredon III (embedded reasoning). They will identify faculty advisors and begin formal study in Fall 2004.



Enrique Lavernia, Dean of the College of Engineering at UC Davis, signs an agreement with Sandia Vice President Mim John establishing two Excellence in Engineering fellowships for Ph.D. students.

Collaborations

Stanford

Center for International Security and Cooperation (CISC). Sandia manager Larry Brandt is continuing his department's affiliation with CISC, a multidisciplinary community dedicated to research and training in issues of international security—work that aligns well with Sandia's analysis work in national security. Part of the Stanford Institute for International Studies, CISC brings together scholars, policymakers, area specialists, business people, and other experts to focus on a wide range of security questions of current importance.

Advanced Simulation & Computing (ASC) University Alliance. Sandia manager Tony Chen participates in this three-lab, five-university collaboration at Stanford. This is the seventh year of a ten-year program.

Industrial Affiliates Program in Mechanical Engineering/Thermosciences. Sandia manager Jay Keller replaces Bob Gallagher in this program directed by Professor John Eaton.

Celebration Dinner. Lockheed Martin sponsored a dinner on June 1 honoring Stanford IEEE/CS-CE students. The company also provided funding for publication of IEEE/CS-CE's first technical research journal, which will showcase the latest technical research being done by Stanford undergraduate and graduate students. Sandians Chuck Hartwig and Nancy Durgin attended.

UC Berkeley

Campus Presentation. On March 8, 2004, Sandia director Ken Washington gave a presentation about Sandia to about 50 faculty and staff members of the Electrical Engineering and Computer Sciences Department.

Berkeley Sensor and Actuator Center (BSAC). Professor Al Pisano visited Sandia in December 2003 and met with Sandians Pam Caton, Yolanda Fintschenko, and Blanca Lapizco-Encinas to discuss research at the center. Glenn Kubiak, John Goldsmith, Bill Repogle, and Jack Skinner participated in the biannual BSAC meeting March 8–9, 2004.

Berkeley Edge. Alec Willis, Norma Hibbs, and Rafael Davalos have worked with UC Berkeley on this Ph.D. program that helps to identify, recruit, and retain talented minority students in science, mathematics, and engineering.

Sandia Visit. Computer science lecturer Dan Garcia came to Sandia/CA on June 17. His host, Rafael Davalos, arranged a Sandia tour, a presentation to student interns, and a meeting with other Sandians involved in computer science/information technologies. Alec Willis, Carol Crown, and Norma Hibbs met with Dr. Garcia and discussed research collaborations and

interactions, recruiting, and exchange/seminar opportunities.

Sandia Higher Education Award. Each year, Sandia presents UC Berkeley with two checks of \$1,500 each for two underrepresented students in math, science, and engineering.

Sandia Visit. Professor Zhi Ding and Bevan Baas from the Electrical Engineering Department visited Sandia on August 28, 2003, and discussed wireless and telemetry issues with staff members in 8200.

Colloquium at Sandia. Tony Wexler, Professor of Mechanical and Aeronautical Engineering, held a colloquium at Sandia on December 4, 2003. Several potential collaborations were identified and have been subsequently pursued.

Seminar at Sandia. On March 11, 2004, Professor John Rundle, Director of the Center for Computational Science and Engineering, presented a seminar on computational science and engineering at Sandia. He was accompanied by Enrique Lavernia, Dean of the College of Engineering, and Billy Sanders, Associate Dean of Undergraduate Affairs. Jackie Chen, Paul Spence, John Howard, and Nina Berry presented Sandia computational work.



Sandia senior scientist Bill Ballard lectures at UC Davis.

Distinguished Lecture Series. Bill Ballard made the first Sandia presentation at UC Davis as part of the Dean's Distinguished Lecture Series, giving a talk on lessons learned for Sandia from the Columbia accident investigation review. The presentation was attended by about 30 faculty, staff, and students.

Enterprise Zone Research Park. The UC Davis Enterprise Campus is a proposed 25-acre development to encourage research relationships at UC Davis in a research park environment. Sandia facilitated introductions between representatives from UC Davis and Lockheed Martin's Technology Venture Corp. (TVC), which could lead to future collaborations on this project.

Sandia Vice President Mim John became a member of the UC Davis Office of Research External Research Advisory Board (ERAB), a formal advisory council to aid in achieving regional economic development through collaborative research.

On January 30, Laurence Mayer represented Sandia at the Industrial Affiliates dinner.

Sandians Robert Monson and Nancy Yang are collaborating with Enrique Lavernia, Dean of the School of Engineering, on specialized materials development.

Sandians Ken Wallace, Debra Post, and Cameron Blatter are helping the UC Davis Society of Women Engineers (SWE) with their national design competition.

Steve Robinson is working with Enrique Lavernia to develop and evaluate high strength nanocrystalline aluminum for Sandia applications.

Professor Mike Hill is working with Steve Robinson to evaluate the effect of laser peening to reduce residual stresses in weld regions of high-pressure gas reservoirs.

Sandia Higher Education Award. Each year, Sandia presents UC Davis with two checks of \$1,500 each for two underrepresented students.

Recruiting

Stanford

Sandia's Stanford Recruiting Team was on campus October 7, 2003, with Lockheed Martin for a career fair. On October 28, the team hosted a joint information session with Lockheed Martin, followed by on-campus interviews with graduate students on October 29.

On January 24, 2004, the Stanford Recruiting Team participated in a career fair as part of the Lockheed Martin team. On February 17, Alec Willis held a series of on-campus interviews. These recruiting efforts resulted in four student interns coming to Sandia in summer 2004. In addition, one Stanford postdoc was hired this year.

UC Berkeley

On September 9, 2003, the UC Berkeley Recruiting Team attended the Cal Career Fair with Lockheed Martin. On October 1-3, the team held an information session and interviews. The team attended the M.S./Ph.D. Career Fair on October 8, and followed up with on-campus interviews.

Sandia's UC Berkeley Recruiting Team participated in the EECS Intern Career Fair on January 23, 2004, with Lockheed Martin, the Diversity Career Fair on January 28, and the HKN (Eta Kappa Nu) Career Fair on February 12. On March 3, the team participated in an information session with Lockheed Martin. On March 3-4, the team conducted EECS intern interviews. On March 4, the also conducted M.S./Ph.D. student interviews. On March 11, the team participated in Lockheed Martin Day at UC Berkeley.

As a result of Sandia's increased recruiting efforts, ten UC Berkeley students have summer internship positions, and we have three acceptances for full-time positions and an acceptance for a One Year On Campus (OYOC) position.



Retired Sandian Alec Willis talks with UC Berkeley students at a recent career fair.

UC Davis

Sandians who recruit at UC Davis participated with Lockheed Martin representatives in a career fair on October 9, 2003.

On January 29, 2004, Sandia participated with Lockheed Martin in the Spring Engineering Career Fair. On February 2, 2004, Sandia conducted on-campus M.S./Ph.D. student interviews. To date, Sandia has eleven summer interns from UC Davis.

These recruiting efforts resulted in eleven student interns coming to Sandia in summer 2004, and one FTE hire.

Appendix

Action plans for FY2004-2005

■ Appendix A ■

Action Plan

To create a *dynamic partnership* between
Sandia National Laboratories
and
Stanford University

October 13, 2004

- 1.0 Vision: Sandia National Laboratories/California (Sandia/CA) and Stanford University will have a dynamic, strong partnership.

We will achieve this vision by increasing the level of technical and programmatic interactions between Sandia and Stanford, and this Action Plan documents the roadmap to increase the impact of current interactions, while establishing new interactions. We will strategically focus our dynamic partnership efforts on a small number of technical areas that are selected to have the most impact on our corporate missions. We anticipate that the many ongoing technical interactions will continue to be productive.

This plan will be reviewed on an annual or as-needed basis in order to assess progress toward stated goals and to amend it by adding, deleting, or modifying defined activities.

- 2.0 Ownership

This document is owned by the Recruiting, Staffing, and University Partnerships Department at Sandia National Laboratories/California. It is desired that co-sponsorship of this Action Plan be approved by individuals at Stanford University, but for now the principle points of contact include:

Bill McLean	Director, Combustion & Physical Sciences Center Sandia National Laboratories
Holly Stryker-Katz	Manager, Recruiting, Staffing, and University Partnerships Department Sandia National Laboratories
Sarah Allendorf	Stanford Action Plan Team Lead Manager, Combustion Chemistry

- 3.0 Action Plan Developers

The following individuals developed this action plan at Sandia:

Bill McLean	Director, Combustion & Physical Sciences Center
Sarah Allendorf	Manager, Combustion Chemistry
Chuck Hartwig	Deputy Director, Information Technologies
Robert Gallagher	Manager (retired), Combustion Research Facility
Norma Hibbs	University Relations & Student Programs
Carol Crown	Recruiting and Staffing

- 4.0 Strategic Objectives
 - 4.1 Sandia has identified the following high-level strategic goals for the partnerships:
 - 4.1.1 Improved Regional Recognition: Enable Sandia/CA to become well known in university communities as the Bay Area science and technology institution second to none.
 - 4.1.2 Improved Recruiting Effectiveness: Provide effective pipelines for attracting high-quality staff with key skills to Sandia/CA for career and postdoc opportunities.
 - 4.1.3 Joint Research and Development: Provide opportunities to collaborate on R&D activities key to Sandia/CA programmatic needs.
 - 4.1.4 Broader Visibility: Mutually enhance the visibility and positive image of Sandia/CA and Stanford by making our partnership visible to our various constituencies.
 - 4.2 We anticipate the following goals will encourage Stanford to partner with Sandia:
 - 4.2.1 Strengthen Academic Programs: Increase enrollments and support of engineering and science graduate students to strengthen overall academic programs. Strengthen recruiting through the deployment of “Sandia Assistantships.”
 - 4.2.2 Provide Opportunities for Students: Provide high-tech career opportunities for engineering and science graduates of SU.
 - 4.2.3 Joint Research and Development
Participate with Sandia/CA in high-profile engineering and science activities to mutually enhance visibility and positive image of both organizations and contribute to the nation’s engineering and science goals.
 - 4.2.4 Acquire Extramural Funding
Participate in collaborative research activities that provide extramural funding for faculty and students.
 - 4.2.5 Use Sandia Staff
Utilize Sandia staff, where beneficial to both organizations, to teach SU courses and present seminars.

5.0 Technical areas of mutual interest around which this partnership activity will focus (subheadings are additional focus areas within the super heading and are not intended to exclude subtopics):

- 5.1 Engineering
 - 5.1.1 Mechanical Engineering
 - 5.1.2 Electrical Engineering
 - 5.1.3 Global Climate and Energy Project (GCEP)
- 5.2 Computer Science and Information Technology
- 5.3 Biology/Bioengineering/Biophysics
- 5.4 Applied Physics

We note a strong Sandia interest in these technical areas as well, but will likely not focus on them in the near term.

- 5.5 International Security
- 5.6 Chemical Physics

6.0 Interaction Tactics

We view the following interaction tactics to be promising, and will focus our efforts in the following areas:

Sponsoring students to study at Stanford (fellowships through the LDRD University Executive program that sponsor graduate students at Stanford; sponsoring Sandia employees to get advanced degrees at Stanford); student internships (hiring Stanford students to work at Sandia during the summer or as interns); technical exchanges; recruiting.

- 6.1 Sponsoring Students at Stanford
 - 6.1.1 Establish one or more fellowships (assistantships) to support graduate students working in technical areas of importance to both Sandia and Stanford. Funded by Sandia LDRD program.
 - 6.1.2 Sandia Employees in Advanced Degree Programs at Stanford
 - 6.1.2.1 Place Sandia employees, especially those hired at the Bachelors level, into advanced degree programs at Stanford. (This also provides an opportunity for other students to be made aware of the opportunities at Sandia/CA.)
 - 6.1.2.2 Take advantage of the multiple ways (OYOC; Special Masters Program; University Part-Time) that Sandia will assist with education.
 - 6.1.2.3 Place Sandia employees in Stanford continuing education programs, for example, MBA program; management classes; long-distance learning.
- 6.2 Student Internships at Sandia/CA
 - 6.2.1 Actively recruit the best and brightest undergraduate and graduate level students for summer or school-year internships at Sandia/CA. A goal is to attract these students to becoming permanent hires at Sandia.
 - 6.2.2 Track OYOC and student programs interns; keep in touch; encourage them to return for multiple years.
- 6.3 Technical Exchanges
 - 6.3.1 Technical Seminars at Stanford and Sandia

Establish a program to alternately host technical seminars on topics of mutual interest. The intent is to broaden awareness of the partnership in the Sandia/CA and Stanford communities. This will likely be more effective once the partnerships have matured.
 - 6.3.2 Senior Design Project Sponsorship

Sponsor projects and provide guidance and support for a team of students in the senior mechanical design course.
 - 6.3.3 Faculty / Staff Exchanges
 - 6.3.3.1 Arrange tours/technical presentations for staff to visit a series of labs at Stanford; reciprocate by inviting faculty/grad students to visit Sandia.
 - 6.3.3.2 Arrange for Stanford faculty to perform work at Sandia on a temporary basis.
 - 6.3.3.3 Arrange for Sandia/CA staff to teach courses and seminars at Stanford.
 - 6.3.4 Sandia-Sponsored Research
 - 6.3.4.1 Use Sandia funds to sponsor research projects at Stanford in areas of technical importance to Sandia and of interest to Stanford.
 - 6.3.4.2 Encourage Sandians to be co-advisors for Stanford graduate students.
 - 6.3.5 Externally Sponsored Joint Research
 - 6.3.5.1 Develop joint research projects funded by external entities, most likely state or federal agencies. Synergistically use customer contacts developed by both parties.
 - 6.3.5.2 Prepare joint presentations at major conferences, emphasizing the benefits of collaboration between universities and national laboratories.
 - 6.3.6 Advisory Panel Memberships
 - 6.3.6.1 Work with Stanford to appoint Sandia staff to appropriate University Advisory Panels.
 - 6.3.6.2 Appoint Stanford faculty to appropriate Sandia Advisory Panels.
 - 6.3.7 Participate in Industrial Affiliates Programs.

(Jay Keller will take Gallagher's place at Mech. Eng's IA program.)
 - 6.3.8 Participate in Large Technical Forums such as Planet-X.
- 6.4 Recruiting Activities: Revitalize the Stanford Recruiting Team
 - 6.4.1 Take advantage of on-roll recent Stanford graduates.
 - 6.4.2 Make contacts with Career Office personnel.
 - 6.4.3 Participate in Lockheed Martin career fairs.
 - 6.4.4 Arrange to be invited to do "tech talks" with student groups.
 - 6.4.5 Sponsor Stanford student tours of Sandia.

- 6.4.5.1 Develop a Sandia on-site tour program to introduce students to career opportunities at Sandia/CA.
 - 6.4.5.2 Host one or two such sessions per year.
 - 6.4.6 Host informal events at Stanford to introduce students to career opportunities at Sandia/CA
 - 6.4.7 Recruit a robust group of summer interns from Stanford.
 - 6.4.8 Participate in Sandia-sponsored Ph.D.-recruiting activities.
 - 6.4.9 Identify key faculty and students for long-term recruiting relationships.
- 7.0 Actions
- 7.1 Establish Sandia/Stanford Assistantship through Campus Executive LDRD program.
 - 7.2 Establish contact with Career Office and schedule series of recruiting trips to Stanford for FY05.
 - 7.3 Establish points of contact in three or four major technical areas
 - 7.3.1 Identify staff/faculty pairings that are likely to be fruitful.
 - 7.3.2 Develop seminar series.
 - 7.3.3 Arrange for staff/faculty visits to Stanford/Sandia
- 8.0 Schedule – Due Date
- 8.1 Milestone 1: Assistantship funded – 1 October 2004.
 - 8.1.1 Status: Fellowship terms finalized; recipient identified; LDRD proposal complete and submitted to LDRD office. Awaiting release of funds.
 - 8.2 Milestone 2: Schedule series of recruiting trips to Stanford for FY05 – 1 September 2004.
 - 8.2.1 Status: 7/15/2004 appointment with Career Office personnel.
 - 8.3 Milestone 3: Establish points of contact in three or four major technical areas – 1 October 2004.
 - 8.3.1 Status: Fritz Prinz, Chair of Mechanical Engineering.
- 9.0 Program Evaluation
- 9.1 Evaluate progress at end of each fiscal year (9/30/2004).
 - 9.2 Metrics to include
 - 9.2.1 # publications joint with Sandia
 - 9.2.2 # students sponsored for Ph.D.
 - 9.2.3 # seminars presented by Sandians at Stanford
 - 9.2.4 # seminars presented by Stanford faculty/students at Sandia
 - 9.2.5 # grant proposals funded that are joint between Stanford and Sandia
 - 9.2.6 # new-hires that are Stanford graduates:
 - 9.2.6.1 Summer interns
 - 9.2.6.2 Bachelors
 - 9.2.6.3 Bachelors OYOC
 - 9.2.6.4 Masters
 - 9.2.6.5 Ph.D.
 - 9.2.6.6 Postdocs (Sandia hires folks who are postdocs at Stanford into staff positions at Sandia).
 - 9.2.7 # summer interns
 - 9.2.8 # names of students and faculty we want to track

■ Appendix B ■

Action Plan

For a partnership between

Sandia National Laboratories/California and the University of California, Berkeley, College of Engineering

May 13, 2004

1.0 Introduction

Sandia National Laboratories/California (Sandia/CA) has developed this action plan to enhance relationships with the University of California, Berkeley (UC Berkeley) College of Engineering (COE). The areas of focus in this plan are intended to increase the level of mutually beneficial technical and programmatic interaction and to enhance the recruitment of top candidates. This Action Plan documents the basis for the interaction and identifies specific activities that collectively comprise the interaction.

This plan will be reviewed on an annual or as-needed basis in order to assess progress toward stated goals and to amend it by adding, deleting, or modifying defined activities.

2.0 Ownership

This document is currently owned by the Recruiting and University Partnerships Department at Sandia National Laboratories/California. Principal points of contact include:

Bill McLean	Director, Combustion & Physical Sciences Center Sandia National Laboratories
Karen Scott	Manager, Recruiting and University Partnerships Department Sandia National Laboratories
Norma Hibbs	University Relations Liaison Sandia National Laboratories

3.0 Action Plan Developers

The following individuals developed this action plan:

Sandia National Laboratories:

Bill McLean	Director, Combustion & Physical Sciences Center
Norma Hibbs	University Relations & Student Programs
Carol Crown	Recruiting & Staffing
Alec Willis	Consultant

- 4.0 Technical Areas of Mutual Interest
 - 4.1 The scope of planning and activities described in this plan are currently focused on the following technical areas of interest:
 - 4.1.1 MEMS - BSAC
 - 4.1.2 Computer Science
 - 4.1.3 Electrical Engineering
 - 4.1.4 Biotechnology
 - 4.1.5 Mechanical Engineering
 - 4.1.6 Chemical Engineering

- 5.0 Strategic Objectives

The Berkeley action planning team has developed the following high-level strategic goals:

 - 5.1 Strategic Goals:
 - 5.1.1 Name Recognition

Establish recognition and rapport with department chairs, faculty, students groups and administrative personnel.
 - 5.1.2 Attraction of Top Candidates

Attract top M.S., Ph.D., student intern, and OYOC candidates with the educational background and skills for careers at Sandia.
 - 5.1.3 Collaborations

Identify and facilitate opportunities for collaborations on research and development activities key to Sandia's programmatic needs.
 - 5.1.4 Broader Visibility

Mutually enhance the visibility and positive image of Sandia/CA and UC Berkeley by making our partnership visible to our various constituencies.
 - 5.2 UC Berkeley Strategic Objectives (proposed)
 - 5.2.1 Strengthen Academic Programs

Increase enrollments and support of engineering graduate students to strengthen overall academic programs.
 - 5.2.2 Provide Opportunities for Students

Provide high-tech career opportunities for engineering graduates of UC Berkeley.
 - 5.2.3 Joint Research and Development

Participate with Sandia/CA in high-profile engineering activities to mutually enhance visibility and positive image of both organizations.
 - 5.2.4 Acquire Extramural Funding

Participate in collaborative research activities that provide extramural funding for faculty and students.
 - 5.2.5 Use Sandia Staff

Utilize Sandia staff where beneficial to both organizations to enhance engineering education thru seminars and classroom presentations.

- 6.0 Interaction Tactics

The interaction tactics included below represent a multifaceted approach to achieving the goals of our action plan.

 - 6.1 Sandia Dean's Day

Participate in Sandia Dean's Day activities. Dean's Day is an event in which deans from selected universities visit Sandia, learn about its programs, and identify opportunities for collaboration. This event is intended to identify areas for joint research and can lead to extramural funding for the university.
 - 6.2 Fellowships

Establish one or more fellowships to support graduate students working in technical areas of importance to both Sandia and UC Berkeley. Fellowships impact most strategic goals.
 - 6.3 Co-op / Summer Internships

Actively recruit the best and brightest undergraduate and graduate level students for internships at Sandia. The intent is to develop a pipeline of such students that results in permanent hires.

- 6.4 **Technical Seminars at UC Berkeley and Sandia**
Establish a program to alternately host technical seminars on topics of mutual interest. The intent is to broaden awareness and develop opportunities for partnerships between Sandia and UC Berkeley. Technical seminars would enable the sharing of information on important work at both Sandia and at UC Berkeley. The seminars would also provide meaningful recognition of Sandia and help identify top students with skills that match Sandia's needs.
- 6.5 **Information Sessions**
Information sessions target a large portion of the student population, including student organizations like IEEE; ASME; and women and minority groups. Organizing the sessions through minority student organizations would allow Sandia to target minority student populations where it currently has difficulty recruiting.
- 6.6 **Senior Design Project Sponsorship**
Sponsor projects and provide guidance and support for students working on their senior capstone design projects. This sponsorship affords opportunities for more significant and relevant student interactions. Also, it would provide a high level of recognition for Sandia and help identify students with skills needed by Sandia.
- 6.7 **Sandia Employees in Graduate School at UC Berkeley**
Place Sandia employees, especially those hired at the Bachelors level, into advanced degree programs at UC Berkeley. Sandia employees in advanced degree programs at UC Berkeley act as ambassadors and recommend other students for employment. They may also identify opportunities for joint R&D. They help UC Berkeley increase graduate enrollment and they bring in extramural funding.
- 6.8 **Faculty / Staff Exchanges**
Arrange for UC Berkeley faculty to perform work at Sandia on a temporary basis (consultants and faculty sabbaticals). Arrange for Sandia/CA staff to teach classes and seminars at UC Berkeley. This staff/faculty relationship would reasonably lead to identifying opportunities for joint R&D.
- 6.9 **Sandia-Sponsored Research**
Use Sandia funds to sponsor research projects at UC Berkeley in areas of technical importance to Sandia. The primary benefit of Sandia sponsoring research at UCB is directly increasing the level of joint R&D. It also provides recognition and recruiting opportunities.
- 6.10 **Externally Sponsored Joint Research**
Develop joint research projects funded by external entities, most likely state or federal agencies. Synergistically use customer contacts developed by both parties.
- 6.11 **Advisory Panel Memberships**
Encourage Sandia staff to participate in appropriate university engineering and science advisory panels.
- 6.12 **Joint Presentations at Major Conferences**
Jointly present important research results at major conferences, emphasizing the benefits of collaboration between universities and national laboratories. Such opportunities can provide broad visibility, profoundly impact future joint R&D, and lead to significant extramural funding.
- 6.13 **Equipment Loans**
Arrange for the loan of equipment to UC Berkeley where appropriate for programs of mutual interest.
- 6.14 **Explicit Advertising of Research/PR Collaboration**
Identify venues for advertising impact of joint research, local television channels for example.

■ Appendix C ■

Action Plan

For a partnership between

Sandia National Laboratories/California and the University of California, Davis, College of Engineering

December 15, 2003

1.0 Introduction

Sandia National Laboratories/California (Sandia/CA) and the University of California, Davis (UC Davis) College of Engineering (COE) have agreed that increasing their level of technical and programmatic interaction is mutually beneficial. This Action Plan documents the basis for the interaction and identifies specific activities that collectively comprise the interaction.

The partnership principals intend to review this plan on an annual or as-needed basis in order to assess progress toward stated goals and to amend it by adding, deleting, or modifying defined activities.

2.0 Ownership

This document is owned jointly by the Recruiting and University Partnerships Department at Sandia National Laboratories/California and UC Davis/COE. Principal points of contact include:

Bill McLean	Director, Combustion & Physical Sciences Center Sandia National Laboratories
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Billy Sanders	Assistant Dean/Academic Affairs College of Engineering University of California, Davis

3.0 Action Plan Developers

The following individuals developed this action plan:

Sandia National Laboratories:

Bill McLean	Director, Combustion & Physical Sciences Center
Michael Hardwick	Deputy to the Vice President for Defense Programs
Norma Hibbs	University Relations & Student Programs

University of California, Davis:

Enrique Lavernia	Dean, College of Engineering
Billy Sanders	Assistant Dean/Academic Affairs
Karen McDonald	Associate Dean for Research and Graduate Studies

- 4.0 Technical Areas of Mutual Interest
- 4.1 The scope of planning and activities described in this plan are currently limited to the following technical areas of mutual interest:
- 4.1.1 Applied Science
 - 4.1.2 Biomedical Engineering
 - 4.1.3 Chemical Engineering and Materials Science
 - 4.1.4 Computer Science
 - 4.1.5 Electrical and Computer Engineering
 - 4.1.6 Mechanical Engineering
- 5.0 Strategic Objectives
- Each of the two institutions has developed the following high-level strategic goals for the partnership:
- 5.1 Sandia/CA Strategic Objectives
- 5.1.1 Improved Regional Recognition
Enable Sandia/CA to become well known in university communities as the Northern California science and technology institution second to none.
 - 5.1.2 Improved Recruiting Effectiveness
Provide effective pipelines for attracting high quality staff with key skills to Sandia/CA career and postdoc opportunities.
 - 5.1.3 Joint Research and Development
Provide opportunities to collaborate on R&D activities key to Sandia/CA programmatic needs.
 - 5.1.4 Broader Visibility
Mutually enhance the visibility and positive image of Sandia/CA and UC Davis by making our partnership visible to our various constituencies.
- 5.2 UC Davis Strategic Objectives
- 5.2.1 Strengthen Academic Programs
Increase enrollments and support of engineering graduate students to strengthen overall academic programs.
 - 5.2.2 Provide Opportunities for Students
Provide high-tech career opportunities for engineering graduates of UC Davis.
 - 5.2.3 Joint Research and Development
Participate with Sandia/CA in high-profile engineering activities to mutually enhance visibility and positive image of both organizations.
 - 5.2.4 Acquire Extramural Funding
Participate in collaborative research activities that provide extramural funding for faculty and students.
 - 5.2.5 Use Sandia Staff
Utilize Sandia staff, where beneficial to both organizations, to teach UC Davis courses and seminars.
- 6.0 Interaction Tactics
- The partnership principals developed a list of potential interaction tactics, which were subsequently categorized as either student-centric or faculty-centric. This section defines those tactics.
- 6.1 Sandia Dean's Day
Participate in Sandia/CA Dean's day activities. Dean's day is an event where Dean's from selected universities visit Sandia, learn about its programs, and identify opportunities for collaboration.
 - 6.2 Fellowships
Establish one or more fellowships to support graduate students working in technical areas of importance to both Sandia and UC Davis.
 - 6.3 Co-op / Summer Internships
Actively recruit the best and brightest undergraduate and graduate level students for internships at Sandia/CA. The intent is to develop a pipeline of such students that results in permanent hires.

- 6.4 Sandia Student Tours
Develop an Sandia on-site tour program to introduce selected students to career opportunities at Sandia/CA. Host one or two such sessions per year.
- 6.5 Technical Seminars at UC Davis and Sandia
Establish a program to alternately host technical seminars on topics of mutual interest. The intent is to broaden awareness of the partnership in the Sandia/CA and UC Davis communities. This tactics will likely be more effective once the partnership has matured.
- 6.6 Senior Design Project Sponsorship
Sponsor projects and provide guidance and support for a team of students in the senior mechanical design course.
- 6.7 Sandia Employees in Graduate School at UC Davis
Place Sandia employees, especially those hired at the Bachelors level, into advanced degree programs at UC Davis. Utilize them to educate other students about Sandia/CA.
- 6.8 Faculty / Staff Exchanges
Arrange for UC Davis faculty to perform work at Sandia on a temporary basis. Arrange for Sandia/CA staff to teach courses and seminars at UC Davis.
- 6.9 Sandia-Sponsored Research
Use Sandia funds to sponsor research projects at UC Davis in areas of technical importance to Sandia.
- 6.10 Externally Sponsored Joint Research
Develop joint research projects funded by external entities, most likely state or federal agencies. Synergistically use customer contacts developed by both parties.
- 6.11 Advisory Panel Memberships
Appoint Sandia staff to appropriate University Advisory Panels.
- 6.12 Joint Presentations at Major Conferences
Jointly present important research results at major conferences, emphasizing the benefits of collaboration between universities and national laboratories.
- 6.13 Equipment Loans
Arrange for the loan of equipment to UC Davis/COE where appropriate for programs of mutual interest.
- 6.14 Explicit Advertising of Research/PR Collaboration
Identify venues for advertising impact of joint research, local television channels for example. Encourage Sandia and UC Davis public relations organizations to collaborate.

7.0 Analysis

The Tactics Matrix, shown below, establishes a relationship between the strategic goals and the proposed interaction tactics. Each strategic goal is weighted with a factor representing its relative importance to its institution. The matrix cells at the intersections of strategic goals and tactics contain a value (0, 1, or 2) representing the potential for that tactic to help achieve the corresponding goal. An implicit assumption is that the tactic is implemented ideally. These values were developed by the partnership principals and are relative in nature. Each tactic includes a weighted sum total that is normalized to the maximum possible value for that tactic and can therefore vary from zero to one. These totals indicate the relative impact of the tactics on an institution’s collective goals. Discussion notes for each of the tactics are included below.

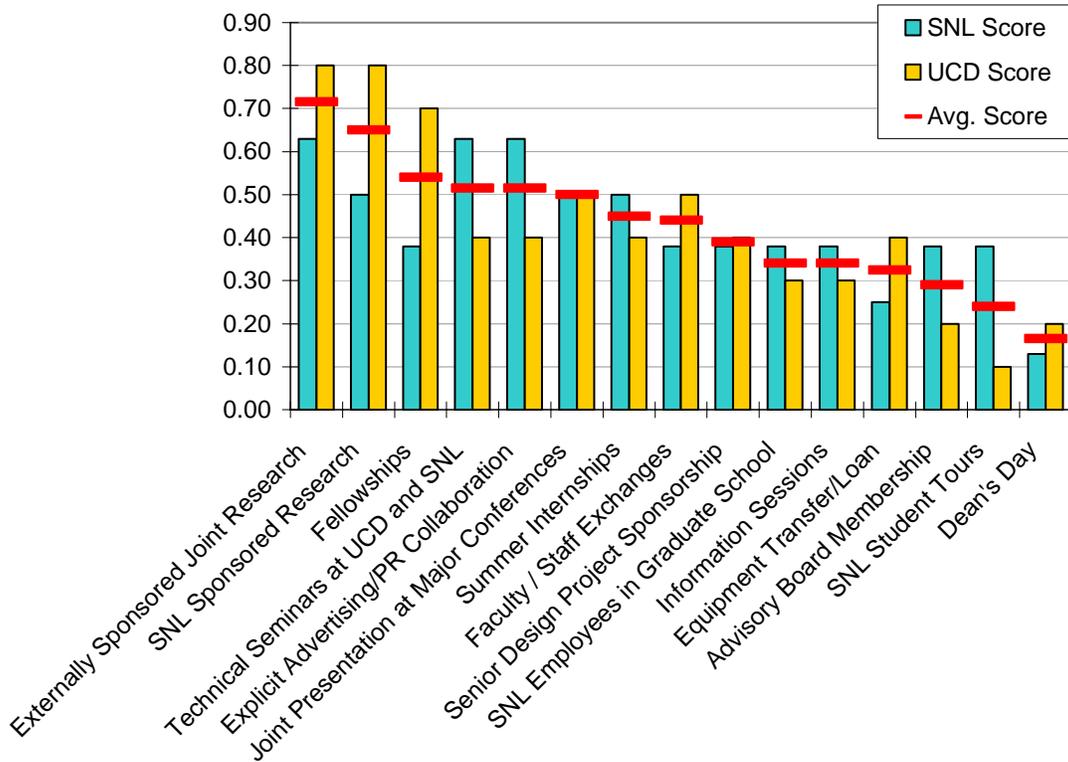
SNL / UCD Interaction Tactics			Student-Centric								Faculty-Centric							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
			Weight	Dean's Day	Fellowships	Summer Internships	SNL Student Tours	Info Sessions	Technical Seminars at UCD and SNL	Senior Design Project Sponsorship	SNL Employees in Graduate School at UCD	Faculty / Staff Exchanges	SNL Sponsored Research	Externally Sponsored Joint Research (DOE, DOD, CA)	Advisory Board Membership	Joint Presentations at Major Conferences	Equipment Transfer / Loan	Explicit Advertising of Research / PR Office Collaboration
SNL Strategic Objectives	S1	Local Recognition	1	0	1	1	1	1	2	1	1	1	1	1	1	0	0	1
	S2	Recruiting	1	0	1	2	2	2	2	2	1	0	1	1	0	0	0	1
	S3	Joint R&D	1	1	1	1	0	0	1	0	1	2	2	2	1	2	2	1
	S4	Broad Visibility	1	0	0	0	0	0	0	0	0	0	0	1	1	2	0	2
SNL Weighted Sum (norm to max)			0.08	0.25	0.33	0.25	0.25	0.42	0.25	0.25	0.25	0.33	0.42	0.25	0.33	0.17	0.42	
UCD Strategic Objectives	U1	Academic Strength	1	0	2	1	0	0	1	0	1	0	2	2	0	0	0	1
	U2	Student Opportunities	1	0	2	2	1	2	1	2	0	0	2	2	0	0	1	0
	U3	Joint R&D	1	1	1	1	0	0	1	0	1	2	2	2	1	2	2	1
	U4	Extramural Funding	1	1	2	0	0	0	0	0	1	1	2	2	0	2	1	1
	U5	Use SNL Staff	1	0	0	0	0	1	1	2	0	2	0	0	1	1	0	1
UCD Weighted Sum (norm to max)			0.13	0.47	0.27	0.07	0.20	0.27	0.27	0.20	0.33	0.53	0.53	0.13	0.33	0.27	0.27	
Average Weighted Sum			0.11	0.36	0.30	0.16	0.23	0.34	0.26	0.23	0.29	0.43	0.48	0.19	0.33	0.22	0.34	
Rank			15	3	7	14	10	4	9	10	8	2	1	13	6	12	4	

- 7.1 Dean’s Day: This event is intended to identify areas for joint research and can lead to extramural funding for the university. However, limited success with previous such events leads the principals to agree on a score of one for those goals.
- 7.2 Fellowships: Fellowships impact most strategic goals. The Sandia goal scores are limited by the fact that the fellowships impact a small number of students. For UC Davis, fellowships help increase enrollment, provide opportunities for students, and bring in funding.
- 7.3 Summer Internships: For Sandia these internships are primary recruiting tools while for UCD they provide student opportunities.
- 7.4 Sandia Student Tours: For Sandia these tours would target students that meet Sandia’s hiring guidelines and would be used for recruiting. They would also provide a limited level of Sandia recognition within the university and could provide employment opportunities for students. Students could be selected for the tours during Sandia information sessions held at UC Davis.

- 7.5 Info Sessions: Information sessions accomplish goals similar to student tours but target a larger portion of the student population. UC Davis felt that additional student opportunities might be identified and that such sessions are a good, but limited, way to use Sandia staff. Organizing the sessions through minority student organizations would allow Sandia to target minority student populations where it currently has difficulty recruiting. UC Davis proposes using the EJC to coordinate sessions. The Center for Engineering Professionals (Karen Mack) is a good conduit to the EJC.
- 7.6 Technical Seminars: Technical seminars would share information on important work at both Sandia and at UC Davis. The seminars would provide meaningful recognition of Sandia and would help identify good students with skills that match Sandia needs. Additional areas of joint research might also be identified, however the forum is not optimum for identifying such opportunities. UC Davis felt that seminars might help increase graduate enrollment and provide opportunities for students. UC Davis is in the process of planning a new engineering lecture hall and would like to make it a state-of-the-art facility. By incorporating advanced collaboration technologies, distributed technical seminars would be possible.
- 7.7 Senior Design Project Sponsorship: Design project sponsorship affords opportunities for deeper Sandia/UC Davis student interaction. Such sponsorship, if implemented broadly, would provide a high level of recognition for Sandia and would help identify students with skills needed by Sandia. The intent would be to sponsor projects in both the mechanical and electrical engineering design classes.
- 7.8 Sandia Employees in Graduate School at UC Davis: Sandia employees in advanced degree programs at UC Davis act as ambassadors and recommend other students for employment. They may also identify opportunities for joint R&D. They help UC Davis increase graduate enrollment and they bring in extramural funding.
- 7.9 Faculty/Staff Exchanges: The intent is to use Sandia staff to teach classes at UC Davis and to use UC Davis faculty to teach (short) courses at Sandia. This staff/faculty relationship would reasonably lead to identifying opportunities for joint R&D.
- 7.10 Sandia Sponsored Research: The primary benefit of Sandia sponsoring research at UCD is directly increasing the level of joint R&D. It also provides recognition and recruiting opportunities. For UC Davis such research greatly impacts most of their strategic goals.
- 7.11 Externally Sponsored Joint Research: The impact of externally sponsored joint research is similar to Sandia sponsored joint research, with the exception that visibility is broader.
- 7.12 Advisory Board Memberships: Because advisory board interactions are limited and specific, the opportunities for impacting strategic goals are also limited.
- 7.13 Joint Presentations at Major Conferences: By jointly presenting the important results of joint research, the two institutions can show potential customers (funding sources) that the collaboration is fruitful and worthy of future investment. Such advertising can provide broad visibility, profoundly impact future joint R&D, and lead to significant extramural funding.
- 7.14 Equipment Loan: The use of Sandia equipment by UC Davis can increase the effectiveness of joint R&D. With the appropriate equipment, UC Davis may be able to secure additional extramural funding and can provide additional opportunities for its students.
- 7.15 Explicit Advertising of Research/PR Collaboration: Significant opportunity exists to advertise the impact of joint Sandia/UC Davis R&D. Venues include local access television and airport displays. By using the public relations organizations to identify and implement appropriate advertising programs, both institutions can impact most of their strategic goals.

8.0 Tactics Matrix Conclusions

8.1 Rank-ordered tactics based on average Sandia and UC Davis scores are shown in the following chart.



8.2 Sandia and UC Davis Result Consistency

The rankings generated on the Sandia and UC Davis portions of the matrix demonstrate some inconsistency. Some tactics clearly impact one of the institutions more than the other, an effect best seen in the five highest rated tactics. Even so, within that group of five, the impact is well distributed between institutions. Taken as a whole, the tactic set provides equal opportunity for each institution to make progress toward achieving its goals.

8.3 Tactic Dependencies

Some tactics seem to logically follow the successful implementation of others. To significantly impact the level of joint R&D by either identifying Sandia or external sponsors, the two institutions must develop appropriate relationships. Practically, these are one-to-one relationships between faculty and staff who share interests, identify collaboration areas and mechanisms, write proposals, and subsequently implement research plans. Until such relationships are established and nurtured, we expect only a minimal impact to our strategic goals. Therefore, the initial actions described in this plan are intended to foster these relationships. Another example of such a dependency is the fact that PR Collaboration and Advertising requires real research results.



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