

*CENTER OF EXCELLENCE IN KNOWLEDGE MANAGEMENT AND COMPUTATIONAL SCIENCE*

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**Submitted to:** Allen A. Mori, Provost and Vice President - Academic Affairs

**Subject:** Earmark Proposal for FY'06

**Agencies:** Department of Defense, Homeland Security, and Department of Commerce

**Nature of the Research:** **Science, Technology, and Engineering Education and Research**

**Introduction:**

Our nation's security and robust economy rely heavily on infrastructures for transportation, communication, energy distribution, water supply, and finance systems. Some of the infrastructures provide a range of essential services that are necessary to support the nation's economy and our quality of life. *The* Computer Science Department has established a **Center of Excellence in Knowledge Management and Computational Science (CECS)** at <http://csc.csudh.edu/cecs/> that focuses on novel approaches to security related issues of national priority. The Center will combine the scientific expertise of faculty and students for the disciplines such as Computer Science, Chemistry, Biology, Physics, Mathematics, and geology and Earth Sciences and others at California State University, Dominguez Hills (CSUDH). The Center is the focal point for state-of-the-art education and research projects among the various departments using the shared facilities. The Center supports programs such as bio-terrorism, network security, bioinformatics and other security related areas. The Center has the capacity to develop a security research infrastructure and a new Master's degree program in Computer Science with emphases in security. The Center is designed to involve a diverse group of faculty and students engaged in security focused research projects. The Faculty and students are

drawn from different disciplines within CSUDH as well as colleagues from other four year institutions and community colleges actively involved in related projects.

### **Background and Proposal**

The South Bay region of Los Angeles County is rich in highly vulnerable strategic resources. As the home of the ports of Los Angeles and Long Beach, Los Angeles International Airport, the Alameda Corridor, the highly sensitive Los Angeles Military Bases, and high concentrations of manufacturing and commerce, the region requires high priority concerns in all aspects of homeland security. Because California State University, Dominguez Hills is a major regional public undergraduate and graduate institution of higher education, the university has a responsibility to marshal its resources to meet the educational, research and public service requirements associated with the safety and physical well-being of the nearly 800,000 residents and 24,000 enterprises in South Bay Communities.

To focus this effort, the Computer Science Department at California State University, Dominguez Hills (CSUDH) has established a campus wide multi-disciplinary Center of Excellence designed to provide homeland security-related instruction, basic and applied research, and public service to the South Bay community. The Center focuses on all areas of homeland security, in particular Information Assurance and Network Security. The proposed funding request will increase undergraduate and graduate enrollment and research participation. Recently acquired grant funds has helped to establish a small security laboratory to support up to 3 student research assistants in the computer science department. We propose to expand the research capacity to include undergraduate and graduate faculty mentored research training in all disciplines.

Emerging workforce-related needs in fields of science have become a vital part of advanced studies in areas such as computer science (information assurance, cyber security, data mining, computational science, graphics, pattern recognition, and network security, and sensor networks); physics (visualization and simulation); chemistry (computational science, simulation and modeling); biology (bio-terrorism,

bioinformatics, quantitative biology and modeling); earth sciences (remote sensing and global positioning systems), economics (trade, transportation and related issues); quality assurance (risk analysis and quality control); psychology (human behavioral patterns, computational science, and data mining); sociology (data mining and computational science); and the arts (visualization, graphics, multimedia, and design). The Center provides the technological foundation for faculty development and students to pursue graduate studies across disciplines and become more competitive in a technology-based workforce. As a minority serving institution, CSUDH is an ideal environment for inclusion of women and minorities in the pursuit of academic preparation for careers related to homeland security and technology.

### **Goals and objectives**

The Center serves as a bridge between the technological skills developed from the academic communities and the economic requirements of the government, industry, transportation, and security communities. It provides students with education and hands-on research training experiences using state-of-the-art facilities in the various aspects of computational science and related fields that contribute to the further development of homeland security. The Center's programs are focused on the following objectives:

- Develop technology-based research and educational programs that will allow the University to participate effectively in public/private partnerships targeting homeland security
- Engage faculty in cyber security, data mining, sensor networks, bioinformatics, and related areas of research and education.
- Involve undergraduate students in appropriate levels of research activities.
- Provide research mentors from educational institutions, industry, and specialized laboratories,
- Increase the enrollment and retention of students in technology and quantitative areas of science and engineering,
- Increase the participation of women and minorities in technologically-based undergraduate and graduate studies.

- Collaborate with experts from federal, industry, and other research institutions.

The Center's approach is to develop strategically planned activities to recruit faculty and students to participate in highly competitive technological research programs supported by Federal, State and private agencies. Research opportunities will be available throughout the academic year and summer. Students joining the Center, will be required to participate in internships and research experiences in other institutions or agencies. These research and educational activities will evolve into new tracks in our existing academic programs, based on the nation's current technological and homeland security needs.

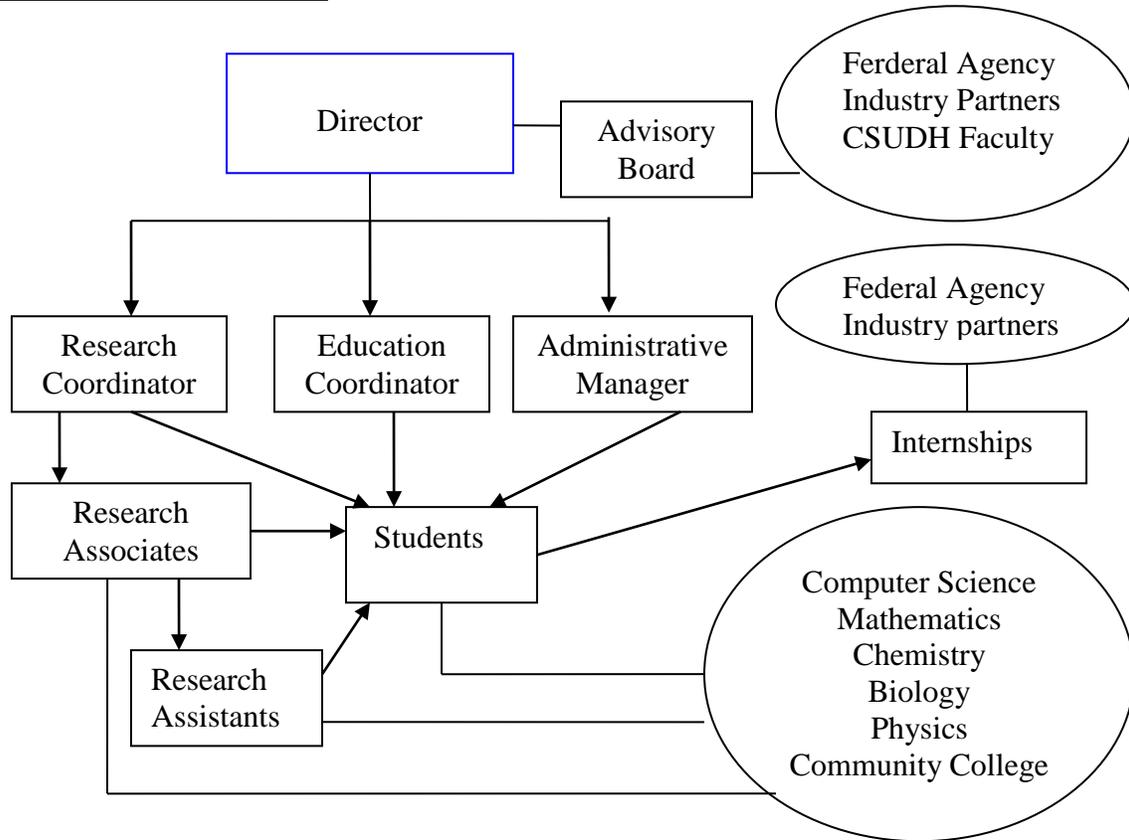
### **Administrative Structure**

Currently the Center Director, a senior faculty member in Computer Science has been successful in receiving several external awards to support the intelligence related research projects. A new security lab to be equipped with four workstations, four laptops, and wired and wireless connections has been established to conduct security related research and experiments. To increase the capacity of the Center to achieve the stated goals and objectives, we proposed the following:

The Center will be headed by a Director, a senior faculty member in Computer Science who will coordinate administrative, educational, and research activities. There will be faculty coordinators in two areas of research and education. A Research Coordinator will identify internship sites and facilitate involvement of faculty and students in research programs. An Education Coordinator will coordinate the educational aspects of the center such as outreach, training, curricula changes based on new research, workshops, symposia, seminars and conferences. Also, the Center will include an administrative manager to assist the director in center related activities. Other research associates and post doctoral individuals provide internship and mentoring opportunities for graduate and undergraduate students. A University-Community Advisory Board made up of 1) faculty 2) researchers from their respective disciplines and 3) experts external to the university in areas such as cyber security, data conversion process, bioinformatics and other related

fields will be recruited. This Advisory Board structure will ensure that the Center remain current in emerging technology and community issues.

### Structure of the Center



### Description of key personnel:

**Director:** oversees all programmatic and administrative responsibilities

**Advisory Board:** including the CSUDH faculty and representatives from the granting agency and industry partners will give recommendations to the director for continuous improvement.

**Research Coordinator:** Assists the director in research activities

**Education Coordinator:** Assists the director in educational and training activities.

**Administrative Manager:** Assists the director in administrative activities related to the center.

**Research Associates:** CSUDH faculty leading the research and educational projects and mentoring and guiding the research students in the center.

**Research Assistants:** CSUDH and Community college faculty working with research associates and students in various research and educational projects.

**Students:** students selected based on a predefined selection criteria by the faculty associates.

**Internships:** Internship opportunities provided by federal agencies and private/publics industry partners to students within the center. Research assistants and associates will take the roll of mentorship for students who are doing internship.

**Evaluation and Dissemination:**

There will be a series of questions that will be given to students and faculty to assess the effectiveness of the center and its activities. These survey questions will be conducted each semester. The data will then be compiled and discussed during the meetings in order to point out the issues and exercise feasible solutions for further improvements. Program performance assessments will be documented in an annual progress report.

**Budget:**

**Center of Excellence in Knowledge Management and Computational Science**

Budget	cost	units	Year 1	units	Year 2	units	Year 3
Director (salary)	\$100,000	1	\$100,000	1	\$103,000	1	\$106,090
Research Coordinator (salary)	\$90,000	0	\$0	0.5	\$46,350	1	\$95,481
Education Coordinator (salary)	\$80,000	0	\$0	0.5	\$41,200	1	\$84,872
Administrative Manager (salary)	\$50,000	1	\$50,000	1	\$51,500	1	\$53,045
IT Technician (salary)	\$60,000	0.25	\$15,000	0.25	\$15,450	1	\$63,654
CSUDH Associates (2 releases per yr)	\$13,000	5	\$65,000	10	\$133,900	12	\$165,500
Comm. Col. Associates (2 releases per Yr)	\$10,000	2	\$20,000	2	\$20,600	2	\$21,218
CSUDH students (Stipends)	\$15,000	10	\$150,000	15	\$231,750	20	\$318,270
Comm. College Students (stipends)	\$15,000	3	\$45,000	4	\$61,800	5	\$79,568
Equipments/Supplies/Travel			\$100,000		\$10,000		\$100,000
<b>Total (per year)</b>			<b>\$545,000</b>		<b>\$715,550</b>		<b>\$1,087,698</b>
<b>Grand Total</b>							<b>\$2,348,248</b>

**Budget Justification:**

**Director:** a Senior Ph.D. faculty in Computer Science with experience in directing center related activities. Salary of \$100,000 per year with increments of 4% the following years.

**Research coordinator:** a senior Ph.D. faculty with experience in research activities. Salary \$93,600 per year starting in year 2, with increments of 4% the following years.

**Education Coordinator:** a senior Ph.D. faculty with experience in educational activities. Salary \$86,528 per year, starting in year 3.

**Administrative Assistant:** senior personnel with experience in program and financial management, salary of \$50,000 per year with increments of 4% the following years.

**IT Technician:** experienced IT personnel to manage and maintain all the equipments and labs and support the needs of the Center, salary \$64,894 per year stating in year 3 with increments of 4% the following years.

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**Faculty associates:** starting with 7 faculty members, one from each discipline and 2 from community colleges for the first year and to increase the number to 14 by year 3. Average salary of \$5000-\$8000 per course release with increments of 4% the following years.

**Student:** start with a total of 18 students from different disciplines with CSUDH and 3 from community colleges for the first year and increase the number to 25 from CSUDH and 5 from community colleges, stipend of \$15,000 per year including tuitions for each student, with increments of 4% the following years.

**Time Table:**

<b>Time</b>	<b>Activities</b>
<b>Summer 06</b>	Project initiation Recruit associate faculty Identify Center Activities for next year
<b>Fall 06</b>	Establish student selection committee Establish advisory committee Establish student selection criteria Start recruiting students Start research activities Establish the evaluation and assessment process Establish the the lab for the Center Attend conferences
<b>Spring 07</b>	Start the research activities involving students Attend conferences Start assessment and evaluation process
<b>Summer 07</b>	Compile the first year assessment improve the collaboration within disciplines Attend conferences Recruit more faculty Recruit more students Prepare the first year progress report
<b>Fall 07</b>	continue to improve the collaboration within disciplines Continue assessment and evaluation process Continue assessment and evaluation process Compile the first year assessment collaborate with other colleges and institutions Attend conferences
<b>Spring 08</b>	continue to improve the collaboration within disciplines submite proposals to fund the center for the following years host the first symposium for research activities Continue assessment and evaluation process Continue assessment and evaluation process Prepare the second year progress report
<b>Summer 08</b>	continue to improve the collaboration within disciplines Continue assessment and evaluation process Attend conferences Recruit more students
<b>Fall 08</b>	submite proposals to fund the center for the following years continue to improve the collaboration within disciplines Continue assessment and evaluation process Modify the lab modules as necessary Attend conferences
<b>Spring 09</b>	submite proposals to fund the center for the following years Host the 4 <sup>th</sup> colloquium Continue assessment and evaluation process Prepare the third and final year progress report

The time table for this project is as follows: starting summer 06, the director will begin recruiting associate faculty and identify the center activities for Fall 06. During the fall the advisory committee and the student selection committee will be established to prepare the selection criteria. Student recruiting will start during fall 06. During Spring 06 the center will have the faculty and students identified and the research activities involving student will start. The advisory Committee will continue to give recommendations to the director to further improve the process. Assessment and evaluation will start from Spring 07 and will continue thereafter for the purpose of continuous improvement. The first progress report will be ready during the summer of 07. Student internships will also start from summer 07. The cycle will continue for the next two years. During the next two years more faculty and students will be added to the center. The laboratory equipment will be improved and collaboration among different disciplines with CSUDH and community college partners will continue. There will be travel to conferences and agency annual meeting to disseminate the knowledge to others. The final report will be due spring of 2009.