RESOLUTION ON
PROPOSAL FOR THE ESTABLISHMENT OF THE CAL POLY
CYBERSECURITY CENTER

RESOLVED: That the Academic Senate of Cal Poly endorse the attached proposal for the establishment of the Cybersecurity Center.

Proposed by: Russell Bik (President's Cabinet Member), Debra Larson, Ph.D. (College of Engineering, Dean), & Ignatios Vakalis, Ph.D. (College of Engineering, Chair, Computer Science Department

Date: March 26, 2013
Based upon the above subject Resolution, the positive endorsement by the Academic Deans’ Council at its August 19, 2013, meeting, the Office of Research and Economic Development ad hoc committee, as well as the recommendation of Provost Enz Finken, I am pleased to approve the Proposal for the Establishment of the Cal Poly Cybersecurity Center as amended in the final proposal which is dated August 19, 2013, and attached hereto. I am also attaching a memo dated September 19, 2013, from Dean Wendt explaining the differences between the proposal adopted by the Academic Senate on April 30, 2013, and the final version.
Memorandum

To: Jeffrey D. Armstrong, President

Date: September 19, 2013

File No.:

From: Dean E. Wendt, Interim Dean of Research

Copies: R. Fernflores

Subject: Establishment of Cybersecurity Center

The Office of Research and Economic Development ad hoc committee reviewed the proposal to establish a Cybersecurity Center at Cal Poly. In its review, it asked for two main additions to the final proposal, which was approved unanimously by the Deans.

First, the ad hoc committee requested adding some text about how the proposed center is different from others at other universities. Consequently, Center proposers added the following text on page 4 of the proposal:

"In line with Cal Poly’s focus on undergraduate education, growth in the area of cybersecurity will differ in some important ways from established cybersecurity programs, such as the programs associated with University of Maryland Cybersecurity Center. The Maryland Cybersecurity Center includes programming not just for undergraduates and Master’s level students, but also in support of the university’s Ph.D. program in Computer Science and Electrical and Computer Engineering. There are no plans to develop a Ph.D. program at Cal Poly comparable to that at the University of Maryland. In addition, faculty members at the University of Maryland engage in a much higher level of research activity than is typically done at Cal Poly. While the expectation is that Cal Poly faculty members will increase cybersecurity related research, for example in areas such as cryptography, systems security, and software security, such engagement will be for the purpose of remaining current and complementing undergraduate and Master’s level educational goals."

Second, the ad hoc committee requested adding text about how the proposed Center fits with the strategic direction the College of Engineering (CENG) and the University is taking. Consequently, the following text, from pages 3-4, quoted from a CENG white paper, was added to the final proposal:

"Cal Poly aspires to become the leading supplier of cyber-ready professionals through a comprehensive and collaborative program that spans our comprehensive polytechnic university and partners with public and private organizations. Our goal is to educate:

- Thousands of Cal Poly students in a basic level of cybersecurity awareness (readiness) as part of their educational requirements – Cal Poly graduates will then carry this readiness forward as they become the next generation of industry and agency professionals.
- Hundreds of students in engineering, science, and business [ed. and others], for study in cyber technologies and systems (experts) through programmatic concentrations and major requirements.
- Tens of students for service in the military and/or defense industry as cyber experts (warriors)."
• Tens of students (innovators) for advanced study and applied research with their associated faculty in the many emerging issues of this tightly-coupled, complex system.

Cal Poly proposes to accomplish this goal by partnering with businesses to create a framework of education, applied research and public service."

All other changes to the final proposal were minor grammatical corrections which proposers had not noticed in earlier versions. The final proposal simply has more detail about the wider context of cybersecurity centers in higher education and future directions in CENG.

Please let me know if you have any questions.

Proposal to Establish a Cybersecurity Center
California Polytechnic State University

Submitted by: Russell Bik (President's Cabinet Member), Debra Larson, & Ignatios Vakalis

August 19th, 2013
Introduction

"Cybersecurity includes preventing damage to, unauthorized use of, or exploitation of electronic information and communications systems and the information contained therein to ensure confidentiality, integrity, and availability. Cybersecurity also includes restoring electronic information and communications systems in the event of a terrorist attack or natural disaster."¹

The Cybersecurity Center at California Polytechnic State University (Cal Poly) will provide students, faculty, and industry partners with collaborative opportunities to engage in basic or applied research, cybersecurity training, workshops, internships, and curriculum development.

"Cybersecurity" is a broad term that includes systems and practices to prevent and mitigate cyber attacks and cyber crimes aimed at global, national, organizational, or personal cyber spaces. The National Infrastructure Protection Plan identifies cyber crimes and attacks as a leading threat to national security.

Scholars, industry experts, and the media identify a pressing need for cybersecurity experts within the United States. Some experts have suggested that in the western part of the world, we still have not grasped how “unbridled” the cyber threats are.² Government and industry experts estimate that we will need approximately “60,000 cybersecurity experts in the next three years” and that “There will be a shortage.”³

In partnership with public and private organizations, Cal Poly is poised to become a leading supplier of cyber professionals through the development of comprehensive and collaborative programs that span our polytechnic university. Cal Poly intends to be a major contributor of qualified cybersecurity experts (i.e., defenders, warriors, innovators). The proposed Cybersecurity Center will serve as one catalyst in reaching this goal. Cal Poly is uniquely poised to provide students with Learn by Doing experiences that will prepare them to make rewarding contributions in the field of cybersecurity.

College of Engineering (CENG) department chairs and program directors ranked establishing a cybersecurity center 3rd out of 10 possible initiatives in a 2012 campaign assessment survey. In addition, Cal Poly engineers have been working for some time on an array of cybersecurity initiatives. These include: development of curriculum (currently: an undergraduate and a graduate course in computer/cyber security which has been offered multiple times during the last two years), development of the Raytheon security laboratory (Bonderson #204), the establishment of an ever increasing in size student club, “white

hats," as well as white papers. The Cal Poly Cybersecurity Center will be among the primary platforms from which faculty, students, and industry partners can explore the intersectionality of a wide range of complex and varied cybersecurity issues.

Cal Poly recently partnered with Northrup Grumman to build a second cyber laboratory on campus, which is under construction in Engineering IV, building 192. The Northrop Grumman Cyber Laboratory will be used for both curricular activities and for Cybersecurity Center activities. The Computer Science Department recently completed a recruitment of a new faculty member, Dr. Zachary Peterson, whose expertise in cybersecurity will bolster the department's capacity to grow in this area.4

Cal Poly Corporation, Cal Poly Advancement, President Armstrong, and Dean Larson have also worked with industry partners to create a detailed job description for a Cybersecurity Center Director, along with plans to begin the recruitment process soon. The Cybersecurity Center will also benefit from a Cybersecurity Council, to which President Armstrong has already appointed some members. Further appointments to the Council will be made once the Cybersecurity Director is in place.

Cal Poly has made a strategic commitment to growing in the area of cybersecurity. A recent white paper from CENG's Office of the Dean summarizes cybersecurity related goals:

“Cal Poly aspires to become the leading supplier of cyber-ready professionals through a comprehensive and collaborative program that spans our comprehensive polytechnic university and partners with public and private organizations. Our goal is to educate:

• Thousands of Cal Poly students in a basic level of cybersecurity awareness (readiness) as part of their educational requirements – Cal Poly graduates will then carry this readiness forward as they become the next generation of industry and agency professionals.

• Hundreds of students in engineering, science, and business [ed. and others], for study in cyber technologies and systems (experts) through programmatic concentrations and major requirements.

• Tens of students for service in the military and/or defense industry as cyber experts (warriors).

4 See Appendix Two for Curriculum Vitae of all faculty in the Department with cybersecurity expertise – over time, the expectation is that some Department recruitments will further bolster the cybersecurity capacity of the Department.
• Tens of students (*innovators*) for advanced study and applied research with their associated faculty in the many emerging issues of this tightly-coupled, complex system.

Cal Poly proposes to accomplish this goal by partnering with businesses to create a framework of education, applied research and public service.\(^5\)

In line with Cal Poly's focus on undergraduate education, growth in the area of cybersecurity will differ in some important ways from established cybersecurity programs, such as the programs associated with University of Maryland Cybersecurity Center. The Maryland Cybersecurity Center includes programming not just for undergraduates and Master's level students, but also in support of the university's Ph.D. program in Computer Science and Electrical and Computer Engineering. There are no plans to develop a Ph.D. program at Cal Poly comparable to that at the University of Maryland. In addition, faculty members at the University of Maryland engage in a much higher level of research activity than is typically done at Cal Poly. While the expectation is that Cal Poly faculty members will increase cybersecurity related research, for example in areas such as cryptography, systems security, and software security, such engagement will be for the purpose of remaining current and complementing undergraduate and Master's level educational goals.

**Mission**

The Cybersecurity Center will provide Cal Poly students, faculty, and industry partners with cutting edge cybersecurity pedagogical and research opportunities. It will build on the multidisciplinary nature of the field of cyber security. The Cybersecurity Center will be a non-partisan, self-supporting center informed by the highest principles of academic freedom.

**Funding**

Key Cybersecurity Center personnel (i.e., Director in collaboration with the faculty and industry Council for the Cybersecurity Center) will work with Cal Poly Advancement to partially fund the Cybersecurity Center. Other funding will result from contracts, grants and participating industry partners.

Cal Poly has already benefited from generous support from industry in the effort to establish a Cybersecurity Center. Northrop Grumman has provided substantial funds to purchase the equipment for the new cyber laboratory. Current Cybersecurity Council members have, in addition, provided valuable advice about how Cal Poly can grow its cybersecurity curricular offerings and expertise.

**Background and Context**

One important challenge in addressing potential breaches in cybersecurity is that the threat goal post is constantly changing. Adam Vincent, CTO-public-sector at Layer 7 Technologies explains:

"The threat is advancing quicker than we can keep up with it. The threat changes faster than our idea of the risk. It's no longer possible to write a large white paper about the risk to a particular system. You would be rewriting the white paper constantly."⁶

Compounding the constantly evolving nature of cyber threats is the complexity of software (let alone the complexity of hardware and networks). Robert C. Armstrong and Jackson R. Mayo explain:

"Complexity of software is an artifact of the complex things we require computers to do. Their capacity for computation is inextricably connected to the fact that they are also unpredictable, or rather capable of unforeseen emergent behavior. Vulnerabilities are one of those behaviors."⁷

Cyber-experts, then, need to navigate between emergent vulnerabilities of software, as well as vulnerabilities in hardware and networks. Additionally, a well-trained cyber-expert takes a multi-disciplinary approach to solving problems and developing defensive and protective tools. This is because the quickly emerging field of cybersecurity aims to understand and anticipate more than technological vulnerabilities. The cyber-expert needs also to understand people, both the victims and the perpetrators of cyber crimes and cyber threats. Therefore, the cyber-expert needs to understand the habits and psychology of people who, tricked by hackers and other cyber criminals, unknowingly succumb to threats. Even more challenging, the cyber-expert needs to understand the habits and psychology of a very wide range of types of cyber criminals due to the wide range of attack targets cyber criminals have.

Our dependency on information systems permeates what seem to be innumerable aspects of our lives. On personal computers we store information that, if obtained by hackers, could potentially and dramatically negatively impact our quality of life. Additionally, we all have a vested interest in ensuring that information obtained by banks, internet retail operations, Social Security, Internal Revenue Service, the military, and the government, etc., is protected with the highest levels of confidentiality and integrity.

The emphasis we place at Cal Poly on the importance of helping students to learn from their successful problem-solving experiences, but also, to learn from failure, positions our faculty and students to be among the most "cyber-educated" citizens and professionals universities can create. The Learn by Doing approach we take at Cal Poly is ideal for training savvy cyber-experts who are holistic in solving cybersecurity problems.

A holistic hands on approach is crucial to understanding just how open-textured cybersecurity problems are. For instance, sometimes, specific kinds of cyber attacks can be in part explained by national borders. Richard Bejtlich, chief security officer of the Alexandria, Virginia based cybersecurity company Mandiant explains:

"In the West ... attacks are aimed at military facilities and intelligence communities. But Chinese hackers go after civilian targets, such as media organizations, banks, defense contractors, and law firms (if a particular company is too difficult to break into, Bejtlich says, 'they go to [their] law firm or a supplier' for information). One reason for this difference in perspective: in China, these groups are state-owned, unlike in the West." 8

Addressing cybersecurity in the global context involves more than understanding regional and national differences in attack approaches because the profile of the cyber criminal is so diverse. He or she can live in and attack from the house next door, or any home anywhere in the world, work for a major corporation, a government, an army, or a terrorist organization.

Since the nature and identification of cyber vulnerability, cyber crimes, and cyber attacks is always evolving, cybersecurity experts can successfully develop innovative preventative and response strategies to cyber threats only if their activities are governed by clear principles of academic freedom. Thus, a basic tenet of all Cybersecurity Center activities involves a commitment to academic freedom, which includes "the protection of freedom of inquiry, research, expression and teaching both inside and beyond the classroom." 9

Cybersecurity Center: Need and Activities

Cal Poly needs a Cybersecurity Center to serve as the nexus for a wide range of activities that involve faculty and students partnering and collaborating with private companies, defense industries and government agencies, research laboratories (Sandia National Laboratories, Lawrence Livermore National Laboratories), as well as with experts from other academic institutions. CENG is setting the groundwork to establish Cal Poly as a leading producer of cyber experts. In time, Cal Poly intends to boast thousands of cybersecurity experts, at the undergraduate and graduate level, who can serve the cyber needs of society.

The diverse academic and professional interests of Cal Poly faculty and students strongly suggest that a wide range of possible cybersecurity experts will graduate from our programs. Students in engineering, the sciences, business, and ROTC students are all potential problem solvers and innovators in the complex world of cybersecurity. The

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9 AS-709-10 Resolution on Private Donors
Cybersecurity Center will function as a platform and a venue for many types of activities that will allow Cal Poly faculty and students to develop and hone expertise, including:

- Grant writing for cybersecurity projects and research
- Cybersecurity workshops and conferences
- Cybersecurity competitions for students
- Curriculum development
- Applied projects that will be implemented at the Cyber laboratories at Cal Poly
- Innovative projects that can lead to commercialization of new technologies
- Student internships in private, defense industries, and in government agencies
- Fund raising
- Fostering industry partnerships
- Cybersecurity training

Possible subjects of interest in Cybersecurity Center activities include:

- Cybersecurity and policy
- Cybersecurity ethics
- Cyber-warfare
- Cyber-resiliency
- Cyber-crime
- Cyber-terrorism
- Cyber-responsibilities

The expectation is that students will be involved in all of the Cybersecurity Center activities, as well as use the Raytheon Cyber Laboratories and the Northrop Grumman Cyber Laboratories to serve curricular ends. Student partnerships and internships with industry, along with student participation in workshops and conferences, should prove to be invaluable to Cal Poly students who are interested in working in the field of cybersecurity. Students will also be involved in research activities associated with the center.

It is important to note, too, that the Cybersecurity Center presents, for faculty participants, an exciting opportunity to implement the teacher-scholar model at Cal Poly. There already exists a significant amount of excitement and energy for increasing our cybersecurity expertise and experiences among many of our engineers. The Cybersecurity Center, which will engage with colleagues across the University and colleagues in industry, government (at the local, state, or federal level), and the military (Air Force, Army, Coast Guard, Marine Corps, or Navy), promises to help our faculty “create vibrant learning experiences for students” while enjoying enriching careers that allow for a strong connection between teaching and scholarship. The Cybersecurity Center Director, University Advancement, the Office of Research, and the Cybersecurity Center Council (see next section, “Governance and Staffing”), will ensure that industry, government, and military involvement is

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10AS-725-11 Resolution on Defining and Adopting the Teacher-Scholar Model
productive for Cal Poly's faculty and students. Additionally, through the wide range of Cybersecurity Center activities, our faculty and students will also be of service to the interests of the university and society.

**Governance and Staffing**

Please see a proposed Cybersecurity Center Organizational Chart on the following pages.

A Cybersecurity Center Director will be responsible for management and oversight of all Cybercenter activities. The Director will report to CENG Dean and indirectly to the Vice President for Research and Economic Development.

The Cybersecurity Center Director will seek direction and support from a standing Cybersecurity Council. Professor Ignatios Vakalis and Mr. Russell Bik will serve as the initial co-chairs the Cybersecurity Council.

Professor Ignatios Vakalis has served as Chair of the Computer Science Department in CENG at Cal Poly since 2006. Prior to joining Cal Poly, Professor Vakalis served as the Coordinator of the State-wide Initiative in Computational Science at the Ohio Board of Regents and Ohio Supercomputer Center, Executive Director of the Center for Computational Science at Capital University, and professor in the departments of Math and Computer Science at Capital University. Dr. Vakalis has worked on a suite of projects in the areas of Computational Modeling and Parallel Computing with the Ohio Supercomputer Center (OSC). He also served as the chair for three international conferences on "Teaching of Undergraduate Mathematics." Currently he helps shape the multi-prong strategic initiatives in the Computer Science Department, serving as its chair while maintaining passion in teaching.

Mr. Russell Bik was a founding stockholder of Sun Microsystems in 1982, where he served as Sun's original Vice President of Operations, building the organization from three people to one shipping over a billion dollars a year in revenue. He served concurrently as a member of Sun's Executive Committee and later became President of Sun Federal, a wholly-owned subsidiary he founded focusing on sales to the CIA and NSA. Since leaving Sun, Mr. Bik has continued to work closely with the venture capital firm of Kleiner, Perkins, Caufield & Byers serving as a corporate officer, CEO, and board member of numerous portfolio companies. Prior to Sun, Mr. Bik was employed by Intel for 7 years where he was one of the first 100 employees of the company's Systems Division. He is a Cal Poly graduate. As a student at Cal Poly he founded several startup businesses. After graduation he enlisted in the navy and later served in the U.S. Naval Air Reserve. Mr. Bik continues to pursue entrepreneurship working with both University of California at Santa Barbara and Cal Poly, where he is an adjunct professor. He has been a member of the Cal Poly "President's Cabinet" advisory council for over a decade and is a licensed instrument pilot.

The Cybersecurity Council will be comprised of Cal Poly faculty and industry representatives. Regular interactions between several faculty members and industry
experts on cybersecurity initiatives already occur, so these relationships are healthy and established.

Faculty, students, and industry partners, will work together to accomplish goals that are cybersecurity project specific. Cybersecurity Center participants may depend on the expertise from colleagues working at other Cal Poly centers or institutes, such as the University Center for Innovation and Entrepreneurship or the Institute for Advanced Technology and Public Policy.

The Cybersecurity Director and Cybersecurity Council will ensure that best practices are maintained in all Cybersecurity Center activities. In addition, the Cybersecurity Director will ensure that Cal Poly policies and practices are adhered to in all Cybersecurity Center Activities.

Responsibilities of the Cybersecurity Center Director may include:

- Develop and coordinate initiatives and activities of the Cybersecurity Center in cooperation with industry partners, the Cybersecurity Council, Computer Science Advisory board, Dean of Engineering and the Chair of the Computer Science Department
- Spearhead the development of mutually beneficial partnerships with industry, agencies, key national forums and other institutions
- In cooperation with the Cybersecurity Council, develop specific measurable goals and objectives in general and, in particular, the use of resources committed to the Center
- Actively seek funding to support the operations of the Cybersecurity Center including equipment, grants, and faculty endowments
- Work to secure involvement of industry experts who can deliver specialty courses
- Uphold the highest principles of academic freedom
- In collaboration with faculty, develop strategic directions for curriculum development in the cybersecurity area
- Work with industry partners to secure student internship positions
- Seek sponsored research projects in collaboration with faculty and industry partners
- Be aware and supportive of the development of entrepreneurial opportunities within the cybersecurity area
- Participate in and represent Cal Poly in key professional meetings in the cybersecurity area

Faculty members involved in cybersecurity activities/projects

- Hisham Assal
- Franz Kurfess
- Debra Larson
• Philip Nico
• Zachary Peterson
• Ignatios Vakalis

Curriculum Vitae can be found in Appendix Two.

Companies and industry partners (partial list)

Group #1

• Northrop Grumman
• Raytheon
• Parsons
• McAfee

Group #2 (Partial list of companies as potential candidates for representation)

• Lockheed Martin
• Boeing
• PG&E
• Apple
• Intel
• Symantec
• Chevron
• Cisco
• VMWare
• Sandia National Laboratories
• Lawrence Livermore National Laboratories
• US Airforce

Assessment

As required by the California State University system, the Cybersecurity Center will be reviewed regularly in accordance with Cal Poly center and institute program review policies, practices, and timelines. Assessment of the Cybersecurity Center is tied to its mission. Therefore, the primary assessment question will be: what did the center accomplish? What was it supposed to accomplish? The quality and outcomes of center activities will be reported in program review. Faculty involved with the Cybersecurity Center will develop performance metrics for student engagement that measures output (e.g., how many students involved?) and outcomes (learning achievements). In addition, faculty will develop appropriate metrics for their activities within the center, such as the number of grants developed, workshops held, industry involvement, contracts, donations, and student projects.
Cybersecurity Center Organizational Chart

- CENG Dean
- VP of Research & ED
- Cybersecurity Center Director
- Cybersecurity Council
- Research Associates
  - Graduate Students
  - Industry
  - Undergraduate Students
  - Faculty
    - Other Cal Poly Centers and Institutes (e.g., ATPPI)

- Training
- Innovation
- Applied or Basic Research
- Workshops
- Internships
- Curriculum Development
Appendix One

Budget
Cybersecurity Center – Estimated Budget

Key Cybersecurity Center personnel (i.e., Director, in collaboration with the faculty and industry Council for the Cybersecurity Center) is working with University Advancement to develop and execute a fundraising plan for the sustainable financial viability of the proposed center. Vice President Read, President Armstrong, Dean Larson, and Ignatios Vakalis have worked together to develop a plan for supporting the budget model, below, to ensure that it is sustainable.

Additional funding will be pursued for projects in areas that constitute research priorities for the Cybersecurity Center. Possible funding sources include: National Science Foundation, United States Department of Defense, Department of Homeland Security, and other state and federal agencies. Under the leadership of the director and in collaboration with affiliated faculty, the Center will also actively pursue the development of sponsored research projects from a variety of industry partners. Furthermore, a model for membership fees will be developed.

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<th>Year 3</th>
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| Balance                            | **$98,275**  | **$108,275** | **$103,275** | **$123,275** | **$123,275** |

- Subject to availability from the Dean of Research
For the first three years, the Cybersecurity Center plans to provide seed funds to faculty members to conduct research in the cyber area. The sources of these funds will be generated primarily from donations. These modest funds will help faculty conduct small-scale investigations and develop plans and collaborations in pursuing major grants.

For the sustainable viability of the Cybersecurity initiative, the Cybersecurity Center will be responsible for obtaining funds to cover costs directly related to: a computer technician, student assistant, and maintenance of hardware and software associated with the Cybersecurity curriculum at Cal Poly.
Appendix Two

Curricula Vitae
EDUCATION

Ph.D., Computer-aided Design in Architecture, University of California, Los Angeles (UCLA), 1996.

M.S. of Computer-aided Design in Architecture, California Polytechnic State University (Calpoly), San Luis Obispo, 1990.

M.S. of Computer Science and Information, Cairo University, Egypt, 1988.

B.Sc. Architectural Engineering, Cairo University, Egypt, 1983.

RESEARCH & ACADEMIC EXPERIENCE

January 2011 – Present, Director of Research. CAD Research Center, California Polytechnic State University, San Luis Obispo, CA.

Responsible for generating research grants and support funds. Lead research group and set direction and objectives.

February 1996 – December 2010, Research Scientist. CAD Research Center, California Polytechnic State University, San Luis Obispo, CA.

Lead research in software complex systems, knowledge representation, agent-based systems, planning systems, and ontology-based systems. Supported research in other areas, such as supply chain management, business process management, natural language processing and cyber security.


Developed and implemented the Engineering Data Model (EDM) for engineering database systems, and system translators for common exchange of drawing information among different standard formats (DXF, IGES, etc.), using C, PROLOG and UNISQL in a UNIX environment.


Designed and implemented the Intelligent Computer-Aided Design System (ICADS), including expert system-database link, a set of expert systems and communication and coordination modules. Developed a Frame-based knowledge representation scheme for the integration of system modules, using C, CLIPS and SQL in a UNIX environment.


Implemented an expert system for energy conservation in architectural design, using PROLOG on IBM PC/AT.


Designed and implemented a database design toolbox. A system for relational database design that provides alternatives for the database decomposition and table designs, using Pascal and PROLOG on IBM 4360 and IBM PC/AT.

Designed and implemented a structural design system in graphics. A graphic editor for engineers to aid in the design of reinforced concrete systems, using IBM PC/AT.
PROFESSIONAL EXPERIENCE

February 1996 – Present, Consultant. CDM Technologies, Inc. in conjunction with the CAD Research Center, Cal Poly, San Luis Obispo, CA.

Worked with Business Process Management (BPM) systems and designed a process model for updating, distributing and validating reference data for the US Transportation Command using Savvion and JBoss’ JBPM systems to simulate and analyze the process model.

Initiated and managed process improvement efforts aiming at compliance with software engineering standards and best practices with the objective of achieving highest level certification of CMMI (level 5).

Designed and supervised implementation of multiple multi-agent decision support systems for the Marine Corps using Java, C++, CLIPS and JESS on NT and UNIX environments. These systems were installed for the Marine Corps for use in the Urban Worrier exercise, Logistics Support for Sea Basing operations and other missions.

Designed and supervised development of facility management project for the San Diego Naval Stations, using C++, CLIPS, in a UNIX environment. This system was used by the Naval Station staff for scheduling of ship arrival.

Conducted research and development of an intelligent engineering design environment as a demonstration of multi-agent decision support systems.


Designed and supervised development of Decision Support Systems for applications of facilities management and resource allocation for the U.S. Navy and Army, using Java, C++, CLIPS and JESS on NT and UNIX environments. The ship scheduling system is installed and being used by the Naval Station staff for daily operations. Other systems were also deployed and used in various branches of the Military


Advised architectural and engineering offices on the use of computers and information systems for their practice. Designed and supervised implementation of information systems for engineering practices.


Advised architects and engineers on the requirements of computer installation for the remodeling and instrumentation operation of the Egyptian air force computing facility in Cairo, Egypt


Responsible for the design and preparation of working drawings and construction documents for medium scale housing projects, supervision of site preparations and coordination with the contractors.


Preparation of design and working drawings of governmental housing projects and tourist resorts.

AREAS OF EXPERTISE

Years of Related Professional Experience: 25
Ontology and Knowledge Representation
Publications


Eastman C M, Chase S C, Assaf H H, 1994, System architecture for computer integration of design and construction knowledge in Automation Based Creative Design - Research & Perspectives Ed A Tzonis, I White (Elsevier, Amsterdam) 185-203


Assal, Hisham, Pohl, Kym J. On the Road to Intelligent Web Applications. InterSymp-2010 Conference, Baden-Baden, Germany 2-6 August, 2010: Focus Symposium (2 August)


MEMBERSHIPS

ACM. Association of Computing Machinery

AAAI. Association for the Advancement of Artificial Intelligence

IEEE. Institute of Electrical and Electronic Engineers

IEEE-Computer Society
Franz J. Kurfess - Biographical Sketch - Emphasis on Cyber Security

Professor, Department of Computer Science and Software Engineering
California Polytechnic State University, San Luis Obispo
805-756-7179  fkurfess@calpoly.edu  http://users.csc.calpoly.edu/~fkurfess/

A. PROFESSIONAL PREPARATION

<table>
<thead>
<tr>
<th>College/University</th>
<th>Major</th>
<th>Degree &amp; Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical University Munich</td>
<td>Computer Science</td>
<td>Master’s, 1985</td>
</tr>
<tr>
<td>Munich, Germany</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical University Munich</td>
<td>Computer Science</td>
<td>PhD, 1991</td>
</tr>
<tr>
<td>Munich, Germany</td>
<td></td>
<td>1990-1991</td>
</tr>
<tr>
<td>ICSI Berkeley, CA</td>
<td>Computer Science</td>
<td></td>
</tr>
</tbody>
</table>

B. ACADEMIC/PROFESSIONAL APPOINTMENTS

Professor, Computer Science, Cal Poly, San Luis Obispo, CA; 2000 – present
Associate Professor, Computer Science, Concordia University, Montreal, Canada; 1999-2000
Assistant Professor, Computer Science, New Jersey Institute of Technology, Newark, NJ; 1994-1999
Assistant Professor, Computer Science, University of Ulm, Germany; 1992-1994

C. PUBLICATIONS

Publications Most Closely Related to Cyber Security

1. Hisham Assai, Franz J. Kurfess, Kym Pohl, Emily Schwarz, and John Seng, Enhancing information extraction with context and inference - the ODIX platform; Ontology-Driven Web Mining - Concepts and Techniques (Hector Oscar Nigro and Sandra Gonzalez Cisaro, eds.), IGI Global, 2013.

Other Significant Publications

1. Franz J. Kurfess and Ngan Phan, Learning styles and tablet PCs, Educause Western Regional Conference (San Francisco, CA), April 2009.
D. SYNERGISTIC ACTIVITIES
4. Peer-to-peer Knowledge Management for Teaching and Learning. Co-Pi with Prof. Josef Schneeberger (FH Deggendorf, Germany). Bavaria California Technology Center (BaCaTeC), Euro 10,000 (app. $12,000).
5. *Neural Networks and Structured Knowledge.* NSERC Canada research grant, Jan. 2001, $82,000.

E. COLLABORATORS AND OTHER AFFILIATIONS

**Collaborators Over The Last 48 Months:**
- Dr. Hisham Assal, (CADRC, Cal Poly) – (1) NLP and Ontologies for Information Retrieval; (2) Extensible Ontologies
- Dr. Mehul Bhatt, University of Bremen, Germany – Spatial Cognition and Human-Computer Interaction
- Prof. Leilei Chu, School of Science, Xi’an Jiaotong University China – Computational Intelligence
- Prof. Vytautas Cyras, (Vilnius University, Lithuania) – Ontologies for Computer-Based Knowledge Management
- Greg Flanagan, (CSC/CADRC, Cal Poly) – Extensible Ontologies
- Dr. Diana Franklin, (CSC, UC Santa Barbara) – Mobile Service Learning: Bringing Positive Computer Science Experiences to High School Campuses
- Prof. Christian Freksa, University of Bremen, Germany – Spatial Cognition
- Prof. Michael Haungs, (CSC, Cal Poly) – Mobile Service Learning: Bringing Positive Computer Science Experiences to High School Campuses
- Prof. Günther Palm, (University of Ulm, Germany) – Neural Networks and Structured Knowledge
- Kym Pohl, (CDM Technologies) – (1) NLP and Ontologies for Information Retrieval; (2) Extensible Ontologies
- Prof. Josef Schneeberger FH Deggendorf, Germany – Knowledge Management for Teaching and Learning
- Emily Schwarz, (CSC/CADRC, Cal Poly) – NLP and Ontologies for Information Retrieval
- Prof. John Seng, (CSC/CADRC, Cal Poly) – NLP and Ontologies for Information Retrieval
- Prof. Zoe Wood, (CSC, Cal Poly) – Mobile Service Learning: Bringing Positive Computer Science Experiences to High School Campuses

**Graduate and Postdoctoral Advisors**

Ph.D. Thesis Advisor: Prof. Eike Jessen, Technical University Munich, Germany (retired)
Postdoc advisor: Prof. Jerry Feldman, International Computer Science Institute / UC Berkeley

**Thesis Advisor and Postgraduate Scholar Sponsors over the Last Five Years:**
Graduate Students: Jason Anderson, Hoang Bao, Nate Black, Brian Blonski, Brett Bojduj, Erik Buchholz, Evan Collins (Architecture), Matt Colón, Devlin Cronin, Ryan DeHaven, Matt Derry, John Dewey, Allen Dunlea, Greg Flanagan, Russell Fritch, Adam Gray, Evan Hecht, Christopher Hoover, Shraddha Kacha, Scott Kuroda, Connor Lange, Jonathan McElroy, Daniel Miller, Nghan Phan, Frank Pike, Ryan Reck, Emily Schwarz, Kacha Shraddha, Ricky Tam, Dennis Taylor, Ross Wampler, Cheng-His (Charles) Wei, Cory White; all Master’s Students, Cal Poly CSC, except where noted.
Total Number of Graduate Students advised: ~ 125

Postdoctoral Fellows: None
Visiting Professors: Leilei Chu, Xi’an Jiaotong University, China; 03-2012 – 03-2013
DEBRA S. LARSON

EDUCATIONAL BACKGROUND

Ph.D., Civil Engineering, Arizona State University, Dissertation: Passive Control Using Coulomb Damped Masses
M.S., Civil Engineering, Michigan Technological University, Thesis: The Technical and Marketing Feasibility of Producing Synthetically Reinforced Parallel Laminated Veneer Material
B.S., Civil Engineering, Michigan Technological University, With Honor

ACADEMIC POSITIONS

Dean, College of Engineering, August 2011 to Present, California Polytechnic State University, San Luis Obispo, CA

Associate Vice Provost for Academic Affairs, July 2010 to August 2011, Northern Arizona University, Flagstaff, AZ

Associate Dean, May 2008 to July 2010, College of Engineering, Forestry and Natural Sciences, Northern Arizona University, Flagstaff, AZ

Department Chair, May 2004 to May 2008, Civil and Environmental Engineering, College of Engineering and Natural Sciences, Northern Arizona University, Flagstaff, AZ

Associate Dean of Engineering and Professional Programs, July 2005 to July 2006, College of Engineering and Natural Sciences, Northern Arizona University, Flagstaff, AZ

Visiting Professor, January 2003 to June 2003, Joint Appointment in Departments of Civil Engineering and Forest Products Technology, Helsinki University of Technology, Espoo, Finland.

Professor of Civil Engineering, August 2000, College of Engineering and Technology, Northern Arizona University, Flagstaff, AZ

Initial Appointment: 1994 as Associate Professor of Civil Engineering at Northern Arizona University, Flagstaff, AZ

PREVIOUS EXPERIENCE


Instructor, Scottsdale Community College, Scottsdale, AZ, August 1992 – December 1992

General Research Engineer (part-time), Forest Products Laboratory, USDA, Madison, Wisconsin, November 1991 – May 1994

Teaching Associate, Department of Civil Engineering, Arizona State University, Tempe, Arizona, January 1989 – May 1994

Sunbelt Regional Engineer, Phoenix Service Center, Trus Joist International, Tempe, Arizona, June 1986 – March 1988

Staff Engineer, Corporate Engineering, Trus Joist Corporation, Boise, Idaho, September 1984 – June 1986

Plant Technical Director, MICRO= LAM® Division, Trus Joist Corporation, Junction City, Oregon, June 1983 – August 1984


Graduate Teaching/Research Assistant, Department of Civil Engineering, Michigan Technological University, Houghton, Michigan, August 1979 – June 1981

Analysis Engineer, Manitowoc Crane Co., Manitowoc, Wisconsin, June 1978 – June 1979

PROFESSIONAL REGISTRATION

Professional Civil Engineer: Oregon (inactive) and Arizona

RECENT HONORS AND AWARDS

Academy of Civil and Environmental Engineers, 2011, Department of Civil and Environmental Engineering, Michigan Technological University, Houghton, MI.

Golden Key, 2010, Most Influential Faculty for Recipient Constance Mapoles, Graduating Senior in Civil Engineering and Mathematics, Northern Arizona University

Arizona Society of Civil Engineers, 2008, Distinguished Service Award


Arizona Society of Civil Engineers, 2005, President’s Award

Distinguished Lecturer, 1999-2000, NSF/ASEE Visiting Scholars Program: Conducted workshops at University of Maine, University of Florida, and University of Washington

2000 ASME Curriculum Innovation Award, Honorable Mention, Design4Practice

1999 NAU Centennial Year Service Award for the Design4Practice program

Dean’s Award, 1999, College of Engineering and Technology, Northern Arizona University

Outstanding Teaching Award, 1999, Pacific Southwest Section of American Society of Engineering Educators

The 1999 $50,000 Boeing Outstanding Educator Award for Design4Practice: Engineering Design through the Curriculum at NAU

Debra S. Larson, Ph.D. P.E.
Phillip L. Nico  

Department of Computer Science  
California Polytechnic State University  
One Grand Avenue  
San Luis Obispo, CA 93407  

Education  

Ph.D. University of California, Davis Computer Science September, 2001  
M.S. University of California, Davis Computer Science March, 1994  
A.B. University of California, Berkeley Computer Science May, 1991  

Dissertation Research  

Implicit Scheduling of Time-Critical Applications. (Advisor: John Feo)  
SERT is a language and compiler approach for specifying the timing requirements of real-time applications and automatically generating parallel schedules for them.  

Academic Experience  

California Polytechnic State University, San Luis Obispo; Associate Professor, September 2006–present.  
California Polytechnic State University, San Luis Obispo; Assistant Professor, September 2000–September 2006.  
University of California, Davis; Associate Instructor, September 1998–June 1999.  
Taught Computer Organization and Machine-Dependent Programming for three quarters.  
Developed SERT, an automatic parallelization and scheduling system for real-time applications.  
University of California, Davis; Teaching Assistant, April 1994–June 1994.  
University of California, Davis; Research Assistant, September 1993–March 1994.  
Investigated the applicability of zero-knowledge proof systems for authentication with Matt Bishop.  
Investigated cache behavior of functional vs. imperative languages.  
University of California, Davis; Teaching Assistant, September 1992–June 1993.  
University of California, Davis; Teaching Assistant, September 1991–June 1992.  

Related Professional Experience  

TechUSB, San Luis Obispo, California; Technical Advisor, Summer 2011–present.  
Teradyne EDA, Santa Clara, California; Programmer, May 1990–August 1990.
Courses Taught

Fundamentals of Computer Science I
Computer Architecture I
Systems Programming I
Introduction to Operating Systems
Introduction to Computer Security (new in Spring 2006)
Computer Security (Graduate, new in Spring 2009)
Graduate Computer Architecture (co-taught)
High-Performance Clustered Computing (independent study)
Algorithmic Problem Solving (Topics in CS)
Computer Organization and Machine-Dependent Programming

Selected Masters’ Committees

Movsesyan, A. Reliable Ethernet, Spring 2011.
Yick, W. Web Service Discovery and Composition Framework, Fall 2009.
Weber, B. Tabu Search for Military Supply Distributor, Spring 2006
Watts, M. Multi-Threaded End-to-End Applications on Network Processors
J. Sosinski, Electronic Voting Systems: A Requirements Analysis, July 2004
D. Gridley, Active Network Algorithm Performance on a Network Processor: Adaptive Metric Based Routing and Multicast, June 2004
M. Bhatt, Heuristic-guided Assessment of the Biodiversity of Complex Microbial Communities Using 16S Ribosomal DNA Terminal Restriction Fragment Patterns, December 2002
J. Hatashita, Evaluation of a Network Co-processing Architecture Implemented in Programmable Hardware, March 2002
A. Melara, Performance analysis of the Linux firewall in a host, June 2002

Selected Senior Projects

Armstrong, A. Cal Poly Honeynet, Spring 2012.
Miller, A. O. and Cummings, D. White Hat Capture the Flag Competition, Winter 2012.
Graham, E. VENU: A Nick Focused Social Networking Retail Website, Spring 2011.
Tyler, J. Interactive Quiz Game Generation Tool, Fall 2010.
Robertson, S. Amid the VIPERS: Establishing Malware’s Place Within the Information Ecosystem, Winter 2011
Chavez, A. Ternary Computing Testbed: Software Implementation, Summer 2008
Kubiak, N. Automated Transforming Robot, Spring 2008
Goyal, A. New illumination system for lab microscopes, Spring 2006
Stearrett, A. AarMAP: A database-backed IMAP server, Spring 2006
Baldino, B. Mp3Jukebox, Spring 2006
Berry, J. MelaFS: A layer of filesystem abstraction, Spring 2006
Felten, L. Perfect multi-user dungeon (PMUD), Winter 2006
Moller, K. Building a handheld GPS navigational device, Winter 2006
Collins, M. G., and Goring, R. J. Autonomous mouse, March 2005
Kelsey, A. S., Implementing a hardware random number generator using radioactive decay as a random source, December 2004
Z. Jadia, L. Gschwend, and C. Le, Battle Arena MP—A multiplayer network game, June 2003
N. Kocharhook, Implementation of a Hierarchical Buddy List for a Multi-Protocol Instant Messenger Client, June 2003
M. Myers, Developing Network Device Drivers for Linux and Minix, March 2003
C. Burtt, An In-Line Ethernet Packet Counter, March 2003

Publications


Technical Reports


Invited Talks

Automatic Scheduling for Real-Time Signal Processing
California State University Hayward, Department of Mathematics and Computer Science Colloquium. November, 2001

How to Study Computer Security
California Polytechnic State University, Linux Users Group Technical Seminar. February, 2006

How “Programmers” should be “Engineering Software”
California Polytechnic State University, Upsilon Pi Epsilon Academic Interest Panel Discussion. February, 2004

An Evaluation Architecture for a Network Coprocessor
California Polytechnic State University, Electrical Engineering Graduate Seminar. November, 2002

Professional Activities

Referee
IEEE Transactions on Computers 2003, 2004
IEEE International Conference on Communications (ICC) 2002
International Association of Science and Technology for Development (IASTED), International Conference on Software Engineering and Applications (SEA) 2002
Parallel Architectures and Compilation Techniques (PACT) 1998
High Performance Functional Computing (HPFC) 1995

Professional Affiliations

Member of the Association for Computing Machinery (ACM)
Member of the ACM Special Interest Group on Computer Science Education (SIGCSE)
Member of the ACM Special Interest Group on Security, Audit and Control (SIGSAC)
Member of the Institute of Electrical and Electronics Engineers (IEEE) Computer Society
Member of the American Society for Engineering Education (ASEE)

Honors

Computer Engineering Professor of the Year

Computer Science Professor of the Year

Computer Science Professor of the Year
Cal Poly Association for Computing Machinery. June 2009.

Most Inspiring Professor

Most Supportive Professor

Computer Science Professor of the Year

Certificate of Appreciation

Most Inspirational CPE Instructor

Certificate of Appreciation

Best Computer Engineering Instructor in Office Hours

University Service

At Cal Poly

University:
- Member of the Academic Senate, Fall 2008–Spring 2012.
- Member of the Distinguished Teaching Award Committee, Fall 2008–Spring 2012.

In the College of Engineering (CENG):
- Member of the CENG ABET Coordinating Committee, Fall 2009–Summer 2011.
- Computer Science and Software Engineering Representative to CENG Curriculum Committee, Fall 2007–Summer 2009.
- Computer Engineering Program Representative to CENG Curriculum Committee, 2002–03.

In Computer Science (CSC):
- Chair, CSC/CPE Faculty Search Committee, 2007–08, 2010–11.
- Member of the CSC First Year Committee, Spring 2002.
- Member of the CSC Facilities Planning Committee, Fall 2001.
- Member of the CSC CSC101 Coordination Committee, Fall 2000–Fall 2002.
- Member of the CSC Fun! (Social) Committee, Fall 2000–Winter 2002.

In Computer Engineering (CPE):
- Member of the CPE Program Council, Fall 2001–present.
- Member of the CPE Curriculum Committee, Fall 2001–Spring 2004 and Fall 2007–present, Chair 2002–03.

Club Activities:
- Founding Advisor of White Hat, a Cal Poly Computer Security Student Interest Club, Fall 2007–present.
- Co-advisor to the Cal Poly Association for Computing Machinery (ACM), Fall 2009–Fall 2011.
- Co-advisor to the Cal Poly Linux Users’ Group (CPLUG), Fall 2003–Fall 2011.

Before Cal Poly
U. C. Davis Computer Science Department Graduate Student Association President, 1996–1997
Curriculum Vitae

Zachary N. J. Peterson
152 Mar Vista Drive
Monterey CA 93940
443.794.4958
zachary@jhu.edu
http://www.znjp.com

Current Position
Assistant Professor, Computer Science Department, Naval Postgraduate School, Monterey, CA

Interests
Secure Storage Systems, Applied Cryptography, Technology Law & Policy, Computer Science Pedagogy

Education
PhD 2006 The Johns Hopkins University, Computer Science
Dissertation: Toward Regulatory Compliant Storage Systems
Research: Federally compliant storage systems employing cryptography, file system versioning, secure deletion, and authentic provenance data.
Advisor: Professor Randal Burns

MS 2005 The Johns Hopkins University Information Security Institute, Security Informatics
Project: Secure Deletion for a Versioning File System
Research: Electronic record and content management policy, digital rights, intellectual property, and privacy issues.
Advisors: Professor Gerry Masson and Professor Aviel Rubin

MS 2002 University of California, Santa Cruz, Computer Science
Thesis: Data Placement for Copy-on-Write Using Virtual Contiguity
Research: Data placement and allocation policies, MEMS-based storage.
Advisor: Professor Darrell D. E. Long

BS 2000 University of California, Santa Cruz, Computer Engineering
Liberal arts emphasis in music.

Employment History
2010– Naval Postgraduate School, Assistant Professor, Computer Science, Monterey, CA.
2008–10 The Johns Hopkins University, Assistant Research Scientist, Computer Science, Baltimore, MD.
2008 McDaniel College, Adjunct Lecturer, Mathematics and Computer Science, Westminster, MD.
2002–06 The Johns Hopkins University, Graduate Researcher, Hopkins Storage Systems Lab, Baltimore, MD.
2000–02 University of California, Santa Cruz, Graduate Researcher, Computer Systems Lab, Santa Cruz, CA.
2000–02 International Business Machines, Research Associate, Almaden Research Center, San Jose, CA.
1999–00 eBay Inc., Software Engineering Intern, Santa Cruz, CA.
1999–00 Education Opportunity Program, Tutor, University of California Santa Cruz, Santa Cruz, CA.
1998–99 NetMind Technologies, Software Engineering Associate, Santa Cruz, CA.
1997–98 @Home Networks, Software Engineering Intern, Redwood City, CA.
Publications

Journals


Refereed Conferences


Refereed Workshops and Short Papers


Miscellanea


Research Artifacts

[d0x3d!]: A Network Security Game. [d0x3d!] is a non-digital board game designed to introduce high school and undergraduate students to network security terminology, attack mechanics and basic computer security constructs. In [d0x3d!], two to four students take on the roles of black hat hackers working in cooperation to infiltrate and compromise a computer network, winning only when they collectively extract four valuable resources: personally-identifiable information, financial information, intellectual property and authentication credentials. The intent of [d0x3d!] is to engage students in computer science while removing common barriers associated with using a computer, such as feeling of isolation, lack of computer “comfort” or financial limitations. The game attempts to improve security literacy, encourage students to think adversarially, and introduce players to possible STEM career paths.

The Provable Data Possession (PDP) software libraries. http://znjp.com/pdp. This site makes available a collection of provable data possession software libraries that each provide cryptographically strong evidence that storage service providers meet their contractual obligations. Using PDP, users that store their data at an untrusted server can have probabilistic guarantees that the server possesses the original data. The client needs only to store his cryptographic keys and never has to retrieve the file. PDP uses homomorphic verifiable tags that minimize the amount of server computation, network traffic and block accesses while achieving a strong guarantee of data possession. More details on PDP can be found in the paper: Provable Data Possession at Untrusted Stores.

The ext3cow file system. http://www.ext3cow.com. Ext3cow builds upon the popular ext3 file system, the default file system for most Linux distributions, to provide continuous file versioning and file system snapshot. Ext3cow’s novel time-shifting interface permits a real-time and continuous view of data in the past. Ext3cow was designed to meet the federal auditability and real-time disclosure requirements set forth in legislation such as Sarbanes-Oxley and HIPAA. It has gone on to be a foundation for developing technical solutions to a wide array of regulatory storage challenges such as: secure deletion, authenticated encryption and verifiable audit trials. Our release of ext3cow for the Linux 2.6 kernel was reported on both slashdot.org and digg.com. The software has been downloaded thousands times and has an active development community. Ext3cow is used as the basis for on-going research projects at the Johns Hopkins University, UC Berkeley, Columbia University, the University of Utah, and UC Santa Cruz. A startup even uses ext3cow as the file system in their object-based storage product.
Course Instruction

Su 2011  Naval Postgraduate School, Co-Instructor, CS2140: Low-Level Programming.
2007  The Johns Hopkins University, Invited Lecturer, 600.419: Storage Systems.
2006  The Johns Hopkins University, Co-Lecturer, 600.419: Storage Systems.
2005  The Johns Hopkins University, Teaching Assistant, 600.107: Introduction to Programming in Java.
2004–05 The Johns Hopkins University, Invited Lecturer, 600.105: Freshman Experience.
2002  The Johns Hopkins University, Teaching Assistant, 600.419: Storage Systems.

Grants


Amazon Web Services in Education Grant: Rethinking Provable Data Possession. Zachary N. J. Peterson (PI).


Department of Health and Human Services. Strategic Healthcare Information Technology Advanced Research Projects on Security (SHARPS), Research Focus Area: Security of Health Information Technology. $15,000,000 total; $1,600,399 Johns Hopkins University portion. Zachary Peterson, Senior Personnel with Carl Gunter (Director) et al.

Patents

Invited Talks & Panels

2010  Security and Privacy in Medical and Home-Care Systems (SPIMACS), Invited panel member.

Professional activities

Steering Committee  USENIX Workshop on Health Security and Privacy (HealthSec) ’13
Program Chair  USENIX Workshop on Health Security and Privacy (HealthSec) ’12, Co-Chair with Carl Gunter
Program Committee  International Symposium on Engineering Secure Software and Systems (ESSoS) ’13, IEEE Symposium on Security and Privacy (Oakland) ’12, StorageSS ’06

Service and Outreach

2012  Mentor, Undergraduate Research Opportunities Center (UROC), CSU Monterey Bay
2012  Mentor, Community College Catalyst (3C), Cebrowski Institute
2012  Instructor, CyberAdventurer Week, Cebrowski Institute
2012  Member, Computer Science Department Curriculum Committee, Naval Postgraduate School
2011–12  Judge, Monterey County Science and Engineering Fair, Monterey, CA
2011  Member, Computer Science Department Faculty Search Committee, Naval Postgraduate School
2011  Member, Computer Science Department Symposium Committee, Naval Postgraduate School
IGNATIOS E. VAKALIS

Office
Department of Computer Science
CalPoly (California Polytechnic and State University)
San Luis Obispo
Tel: 805-756-6285
Email: ivakalis@calpoly.edu

Education

Ph.D., Mathematics (1992)  
M.Sc., Computer Science (1988)  
B.Sc., Physics (1982)

Experience

Chair and Professor of Computer Science  
(2006 – present)

Coordinator of the Education Component for the Statewide Initiative in Computational Science;  
Senior Fellow of the Ohio Supercomputer Center  
(March 2005 – July 2006)

Professor, Mathematics and Computer Science  
(1996-2006)

Director, Center of Computational Studies  

Director, Computational Science Program  
(2001-2006)

Director, Battelle Visualization Laboratory
Director, Advanced Computational Lab  
(2002-2006)

Professional Memberships

Institute of Electrical and Electronic Engineers (IEEE)  
Association for Computing Machinery (ACM)  
Society of Industrial and Applied Mathematics (SIAM)  
Mathematical Association of America (MAA)  
Undergraduate Computational Science and Engineering Group (UCES)  
Project Kaleidoscope, Faculty-21 (PKAL-F21)
Committee Memberships  (2006 –present)

National Level
SIAM National Education Committee (2009 – present)
Member of the NCWIT Academic Alliance (2010 – present)
Lead member of the NCWIT Pacesetters Group (2010 – present)
Member of the Exec Committee of the California Computing Educ. Advocacy Group (2011-present)

Funded Grants - Honors/Awards  (Partial List)


CESaME –Cal Poly (PI-PD: I. Vakalis; 2007-08); “Broadening Participation in Computer Science”. Seed funds for seeking external funding. Funds: $5,000


Battelle Grant: “Computational Science Across the Curriculum”. (PI-Project Director; co-PIs: Karkowski A. Gilbert M.). Effective period: January 2001 - July 2003. A grant to support the creation of the Visualization Lab in Battelle and also serve as matching funds for the NSF CLLI grant. Funds: $209,216

Third Frontier Network: Obtained a $120,000 grant from the Ohio Board of Regents to connect Capital University to the Third Frontier Network (gigabit network). The grant was awarded on Dec. 2005.

UCES Award: National Award from the Krell Institute and the Department of Energy; Computational Science Educator of the Year. (Nov. 2005)

TopCat Award: Technology Educator of the Year Award; Columbus Ohio (Jan. 2006)
**Professional Talks** *(Partial list)*


- **Computer Science Education at Cal Poly**, California Computing Education Advocacy Group Meeting, Spring 2011

- **Models of Undergraduate Computational Science Curricula**, Joint Meeting of AMS/MAA, Washington D.C., January 5-9, 2009

- **Computational Science programs-Implementation and Dissemination**, Joint Meeting of AMS/MAA, San Diego, January 4-8, 2008

- **Implementing an Inter-Institutional Computational Science Program for Undergraduates**, Teragrid-2007 Conference, June 2007


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**Publications** *(Partial list)*


• **Ohio Educators Respond to Governor Tuft’s Initiative for New Science Frontier: A Call for Action**, (with Karkowski A.), *Ohio Journal of Science*. 104(5), 123-125, Jan. 2005


Appendix Three

Faculty Expertise
Related to Industry Needs in
Cyber Security
Faculty Expertise 
Related to Industry Needs in 
Cyber Security

**Associate Professor Phillip Nico**  
A.B. University of California, Berkeley  
M.S., Ph.D. University of California, Davis

**Department:** Computer Science

**Expertise:** Systems security and secure software. As the instructor of both our undergraduate and graduate computer security courses I'm also something of a security generalist.

**Associate Professor John Belardo**  
B.S., Cal Poly, M.S., Ph.D. UCSD

**Department:** Computer Science

**Expertise:** Networks, Operating Systems, Network Protocol-Level Security, and CubeSat flight software. Dr. Bellardo received his Ph.D. from UCSD where he studied network vulnerabilities and remedies for the popular 802.11 WiFi protocol. He has spent the past few years closely advising the team designing and developing CubeSat flight software. This effort includes uplink command authentication for CubeSat's embedded Linux software stack.

**Professor Franz J. Kurfess**  
M.S., Ph.D. Technical University Munich, Germany

**Department:** Computer Science

**Expertise:** Artificial Intelligence (AI), Knowledge-Based Systems (KBS), Human-Computer Interaction (HCI).

**Assistant Professor Jude Egan**  
B.A., University of California, Santa Cruz  
J.D., Ph.D. University of California, Berkeley

**Department:** Political Science
**Expertise:** Public Management, particularly high-consequence, low-probability events. Public Law.

Dr. Egan has consulted with the Los Alamos National Laboratory, FEMA and the Louisiana Governor’s Office of Homeland Security on issues related to the public management of high-consequence, low-probability events. This consulting work has been in the area of nuclear safety and security and disaster and emergency management. Dr. Egan maintains an ongoing relationship with the NSF-funded Public Policy and Nuclear Threats and the Berkeley High-Reliability Organizations working groups. He would bring both a public management/organizational development and a public law perspective to the process. Dr. Egan has published broadly in the peer-reviewed literature on the organizational causes of accidents and on High Reliability Organization Theory.

**Professor Clinton Staley**
B.A. Principia, MS PhD, UCSB

**Department:** Computer Science

**Expertise:** Online education, software engineering, algorithms

Dr. Staley’s current research interests are in developing online educational materials and tools for Computer Science instruction. He has been a founding member of several software startups, and has over a decade of industrial software development and project management experience across a variety of companies.

**Professor Tina Smilkstein**
B.S., Nanzan University, Nagoya, Japan
M.S., Ph.D. University of California, Berkeley

**Department:** Electrical Engineering

**Expertise:** Integrated circuits, medical technology.

Dr. Smilkstein manages the Cadence software and courses related to integrated circuit (IC) design for the EE department. The VLSI class has generated interest from industry in both hiring of students that have taken the class and in using students that have taken the class to do design work while they are still at Cal Poly. Her circuit design experience may be of use in designing novel systems to implement new security techniques. She also does her own research on clock distribution for high-speed circuits as well as in the medical technology realm. Security is paramount when dealing with patient’s medical data and Dr. Smilkstein will come to the security group with HIPAA knowledge as well as knowledge of present systems and methods used to protect such data.

**Professor Taufik**
B.S., Northern Arizona University
M.S., University of Illinois Chicago
Ph.D., Cleveland State University

**Department:** Electrical Engineering

**Expertise:** Power Electronics, Power Systems, Smart Grid (Utility Scale Power Electronics)
As the director of Cal Poly’s Electric Power Institute (EPI), Dr. Taufik oversees sponsored projects mostly related to the power areas (power systems, power electronics, renewable energy, smart grid). He and faculty members of EPI have collaborated with companies such as San Diego Gas and Electric, Chevron, Enerpro on several student projects.

**Associate Professor Bryan Mealy**  
B.S., M.S. Cal Poly State University San Luis Obispo  
Ph.D. University of California Santa Cruz  

**Department**: Electrical Engineering  

**Expertise**: Embedded Systems design and programming; Real-Time Operating Systems; FPGA-Based Digital Systems Hardware Modeling.

My industry experience is in the area of embedded systems programming, image processing, and hardware modeling. My Cal Poly experience includes the authoring two technical books and developing new course material for Cal Poly students. My main interests are in the area of embedded systems design, but I am currently focused on the area of embedded systems security. My current efforts are placed in developing an embedded security course in the Electrical Engineering department.

**Professor Saeed B. Niku**  
B.S.M.E., Tehran Polytechnic University  
M.S.M.E., Stanford University  
Ph.D., M.E., University of California, Davis  

**Department**: Mechanical Engineering  


Authors of two textbooks in product and system design and in robotics, involved in the development of many systems to aid the disabled.

**Assistant Professor Bruno Ribeiro**  
B.S., M.B.A., M.F.A. The Ohio State University  

**Department**: Art and Design  

**Expertise**: Interaction design, user interface design, user experience design, visual communication design.

My interest in cyber security lies mainly on the user’s side. We know that the user is one of the weakest links in cyber security. I would be interested in learning what leads to unsecured behavior, then using principles of usability and interaction design, I would like to contribute to prevent such behavior.

**Professor Bill Loving**  
B.A., J.D. Southern Methodist University
Department: Journalism

Expertise: Legal aspects of cyber security.
As a teacher of media law, I maintain some currency in legal aspects of cyber security focusing on litigation related to faked social media and some aspects of identity protection related to companies doing business on the Internet.

Professor Patricia McQuaid
B.S., Case-Western Reserve University
MBA, Eastern Michigan University
M.S., Ph.D., Auburn University – Computer Science, Engineering

Department: Orfalea College of Business, Management – Information Systems


Len Kawamoto
B.S. Computer Science, California Polytechnic State University

Department: Music (Part Time – Assistant Director of Marching Band)

Expertise: Primary job is with a local engineering company (as a software engineer) working in the power industry. As part of the engineering team, works with NERC CIP security requirements for company products.

Dr. Hisham Assal
M.S. Cal Poly, Ph.D. UCLA

Department: Computer Science – Collaborative Agent Design Research Center (CADRC)

Dr. Hisham Assal received his Ph.D. in Computational Design from the University of California, Los Angeles (UCLA) in 1996. He joined the Collaborative Agent Design Research Center at Cal Poly the same year. Dr. Assal designed, developed and supervised development of distributed, collaborative decision-support systems for military and industry applications. His interests include knowledge representation, knowledge management, intelligent agents, cyber security and complex systems.
Dr. Assal's experience covers a wide range of topics dealing with complex integrated systems. He worked on Ontology-based systems, intelligent agents, Business Process Management (BPM), knowledge management, and supply chain management. The areas of application for these systems included logistics and planning, transportation management, and air traffic control.
Dr. Patrick Lin
B.A., University of California, Berkeley; M.A., Ph.D., University of California, Santa Barbara

Department: Philosophy

Expertise: Technology ethics, esp. emerging military systems, such as cyberweapons, robotics, human enhancements, and other areas.

As the director of Cal Poly’s Ethics + Emerging Sciences Group, Dr. Lin has delivered briefings on the ethics of emerging military technologies to such organizations as UNESCO, National Research Council, DARPA, US intelligence community (CIA, State Dept., DHS, etc.), US Naval Academy, US Air Force Academy, and others.