COVER SHEET FOR GRANT PROPOSALS

State Board of Education

SBOE PROPOSAL NUMBER: (to be assigned by SBOE)	AMOUNT REQUESTED: **$1,982,800 cumulative over three years**

TITLE OF PROPOSED PROJECT: **IGEM Proposal: Multidisciplinary Cyber-Security Faculty Cluster Hire**

SPECIFIC PROJECT FOCUS:
Hiring of five new faculty in support of cyber-security research and education in computer science, electrical and computer engineering, civil engineering and sociology. Funding of technology and knowledge transfer activities including workshops, joint proposals and joint development activities. Hiring of research software engineer and IT support personnel. Support for visiting faculty position. Support for establishment of software security testing laboratory.

PROJECT START DATE: **7/1/2012**	PROJECT END DATE: **6/30/2015**
NAME OF INSTITUTION: **University of Idaho Office of Sponsored Programs**	DEPARTMENT: **Center for Secure and Dependable Systems (CSDS) in cooperation w/Computer Science Dept; Electrical & Computer Engineering Dept; Sociology Dept; and National Institute Advanced Transportation Technology (NIATT)**
ADDRESS: **PO Box 443020, Moscow, ID 83844-3020**	
	E-MAIL ADDRESS: osp@uidaho.edu / PI PHONE NUMBER: **208-885-4114**

	NAME:	TITLE:	SIGNATURE:
PROJECT DIRECTOR	**Jim Alves-Foss**	**Director, CSDS**	
CO-PRINCIPAL INVESTIGATOR	**Katherine G. Aiken**	**Dean of CLASS**	
CO-PRINCIPAL INVESTIGATOR	**Gregory W. Donohoe**	**Chair, CS Department**	
CO-PRINCIPAL INVESTIGATOR	**Brian K. Johnson**	**Chair, ECE Department**	
CO-PRINCIPAL INVESTIGATOR	**Karen R. Den Braven**	**Director, NIATT**	

	NAME:	SIGNATURE:
Authorized Organizational Representative		
	Larry Stauffer, COE Interim Dean	
	Polly Knutson, OSP Director SK	by 4/23/12

IGEM Proposal: Multidisciplinary Cyber-Security Faculty Cluster Hire

Submitted by University of Idaho Colleges of Engineering and Letters, Arts & Social Sciences

1. **Name of Idaho public institution:** University of Idaho (UI)
2. **Name of principal investigator directing the project:** Dr. James Alves-Foss

(Co-PIs: Dr. Gregory Donohoe, Dr. Brian Johnson, Dr. Karen Den Braven, Dr. Katherine Aiken)

3. **Project objective and total amount requested:** ($1,982,800 over a 3 year period)

This proposal is a request for a multidisciplinary faculty cluster hire in the area of cyber-security, with a specific focus on critical information infrastructure and support for secure software development. This is a significant enhancement to existing expertise at the University, focusing on development of critical technologies for Idaho industry. Cyber-security technologies improve the efficiency of corporate computing systems, whether they are for manufacturing controls, e-commerce or internal operations. In addition, the inclusion of cyber-security technologies in software products increases reliability of those products which in turn increases customer satisfaction and subsequent market share.

The University of Idaho has existing expertise in power systems engineering and transportation engineering, both related to the support of critical technologies for industry and the general populace. The inclusion of cyber-security research related to the information infrastructure in support of power and transportation is essential for long term reliable operations as we move to more advanced systems for these infrastructures. These critical technologies have great potential for economic growth in Idaho, which is why this proposal includes an emphasis in these areas, and why this proposal is supported by industry in this field, including Avista, Comtech EF Data Corp, Campbell Company, Idaho Power and Power Engineers (support letters are in Appendix C.). We fully expect to grow our relationships with these and other companies,

partnering with them on joint faculty hires and support for faculty research labs and research projects. Industry also needs an understanding of the societal and personal impacts of these technologies and cyber-security implications for privacy.

Growth of research and education through this multidisciplinary STEM (Science, Technology, Engineering and Mathematics) proposal supports Idaho's statewide higher education research strategic plan.

The federal government is very supportive of research and development in cyber-security and has solicited proposals from academia and industry in support of both basic and applied research, with a recent emphasis on results that lead to new products. We have a successful track record in obtaining these types of large federal grants and working with industry. This proposal will enhance the ability of the UI cyber-security team to partner with Idaho industry in response to these proposals as a mechanism for further enhancing academic research, and economic development in this area.

4. Resource commitment:

During the 2010-2011 academic year, UI reviewed internal research centers and institutes. The Center for Secure and Dependable Systems (CSDS) and the National Institute of Advanced Transportation Technology (NIATT) were among the few centers selected to continue as focus areas of research strength for UI. The University provides operating budgets and funding for directors and staff in CSDS and NIATT (descriptions of CSDS and NIATT are in Appendix A.)

The University requires annual evaluations of activities and productivity of these entities, and has a more intensive five year review process. UI commits to continuing support for these organizations through the life of the IGEM funding and beyond, as long as they remain productive units of the institution, building on our track record of success in these areas.

In direct support of this project, UI commits to providing office and laboratory space for the newly hired faculty, to support and mentor their growth, and to facilitate development of federally funded and industry collaborative research projects. UI will also financially support this project by paying fringe benefits of all faculty hires, and to use University funds and donations to enhance the startup and laboratory equipment needs of the cyber-security research faculty.

5. Specific project plan:

This proposal leverages existing cyber-security expertise, in conjunction with other areas of strength at UI, specifically transportation and power, and adds needed expertise in quantitative social science to develop a core multidisciplinary group of faculty as the foundation of a center of innovation in high assurance cyber-security for information infrastructures. The proposed five new tenure-track faculty hires, in conjunction with existing faculty at UI, and in collaboration with industry in the state and region, will provide a multidisciplinary research cluster of sufficient critical mass for fostering economic growth and development in this key technological area. The research and education expertise provided by these faculty will provide key technology transfer to Idaho and regional industry and government as well as foster intellectual innovation at UI. These new hires will be mentored by the co-PIs of this proposal, and by faculty within their research domains.

In addition to conducting research and transferring technological innovations, these faculty will also enable us to increase the number of undergraduate and graduate students with computing expertise, not only in computer science, but in electrical and civil engineering as well. This combination of knowledge and skill in computer science for critical information infrastructures as well as their particular engineering area will help them to enter the Idaho

workforce to meet the challenges of cyber-security in all aspects of computing technologies in industry. We propose these faculty hires be distributed as follows:

- An associate professor of computer science with a focus on research for secure software development and analysis to foster innovation in new computer security technologies in support of Idaho industry. This research will support the development of more secure technologies that better serve both industry and customers. This person will be responsible for reaching out to industry to develop collaborative proposals for federal funding, and working with industry to enhance the security of their software products. Part of this work will involve development and management of a proposed software security testing lab where products from industry partners can be tested and evaluated.
- An assistant professor of computer science focusing on critical infrastructure or embedded computing systems security, key technologies for future innovation. The majority of computing systems manufactured today are for embedded systems, such as mobile devices, printers, transportation and manufacturing equipment. Market analysts predict incredible growth in this area; industries that provide secure solutions will have an edge over others in their sector. We plan for this position to be a joint hire for the first two years between UI and an industry partner (to be determined during the first few months of this project). The new faculty member will work in conjunction with the industrial partner to co-develop technology and better transfer industry needs and future directions of technology development back into the university. During the third year and beyond, the individual will be fully working for the UI, though it is expected that they will maintain significant industrial collaborations.
- An assistant professor of electrical and computer engineering with a focus on power grid operation and control, specifically the dependability (assurance) of the information

communications systems for the modern smart grid. This is a great area of potential growth as new companies enter the industry to implement smart grid technologies, and this addition enhances the existing Power program at UI. We have the same intent for a joint hire with this position for the first two years, partnering with an industry partner.

- An assistant professor of civil engineering with a focus on transportation control systems, specifically the management and control of the information processed by those systems. The success of NIATT highlights the industrial potential and local leadership in this area. NIATT was recently awarded a large federal grant for traffic signal and routing technologies for reduced environmental impacts of congestion and greater energy independence. The project has a strong information system component that will require cyber-security technologies to ensure safety and reliability.
- An associate professor of social science with quantitative expertise, focusing on privacy/cyber-security policies as they relate to industry and their interaction with their customers, a key area of research that is needed in Idaho. The fallout from poor privacy policies has hurt industries in the past due to loss of customer confidence and subsequent loss of market share. Integration of people-oriented research and policies with the technologies discussed above is greatly needed. The James A. and Louise McClure Center for Public Policy Research at the UI could house this person and make use of the resources the center has for policy analysis.

In addition, we propose using the IGEM funding combined with support from our industrial partners to provide start-up funds for these positions as well as the hiring of a research software engineer and visiting faculty to support research activities in these areas. The research software engineer will be a staff researcher in CSDS to provide additional cyber-security expertise in

support of the research projects of the cyber-security faculty, will provide additional mentoring for students, and will assist in the technology and knowledge transfer to industry. The visiting faculty position will be used to enhance research expertise in specific areas of research as determined through our discussions and collaborations with our industry partners.

The new hires will bring technical expertise to UI, the state, and the region that will be seen through research, education, and outreach. These researchers will focus on understanding key cyber-security issues as they relate to critical infrastructure, computing technologies in support of industry, and secure software development. The quantitative sociologist will bring much-needed insight into the impacts these technologies will have on customers and society helping industry better meet consumer's privacy needs and improve customer acceptance of technology.

To foster better communication and knowledge transfer with industry we propose using the $30,000 of the funding from IGEM to support the establishment of workshops and conferences to bring together academia and industry on a regular basis.

To improve cyber-security features in industry software, we also propose using $50,000 of the funds from IGEM along with industry donations to establishing a software security testing laboratory within CSDS at UI. This laboratory will enable us to assist industry in improving the quality of their software products as well as providing a location for training and knowledge transfer to industry partners.

6. Potential economic impact

The impact this project will have on Idaho's economy can be understood from a recent statement by the U.S. Chamber of Commerce: *The rapid adoption of information technology has transformed global commerce. By using the internet, people can shop anywhere in the world, without ever leaving their homes. Thanks to the "Information Revolution", businesses are*

increasingly more productive, are open to additional markets, and more people have access to critical information faster than ever before….However, this same revolution that propels global commerce also emboldens hackers, thieves, and other cyber criminals. Unprotected computers are susceptible to viruses and worms that can damage or destroy a company's network. These risks must be effectively managed if businesses are to consolidate and build upon the opportunities created by the information revolution.

Every aspect of our economy is being revolutionized by the widespread use of comprehensive cyber infrastructure (CI). Advanced computational facilities (e.g., data systems, computing hardware, high speed networks) and instruments (e.g., telescopes, sensor networks, sequencers) are coupled with quantifiable models, algorithms, software, and other tools and services to support this complex CI of our modern society. Therefore the updated 2010-2020 US Bureau of Labor Statics' *Occupational Outlook Handbook* (released Mar 2012) predicts that 73% of the new jobs in STEM fields will be in computing careers.

Computing technology is now ubiquitous. The confidentiality, integrity and availability of data used by these systems are integral to success in research, development and business. It is essential for Idaho, national and global industries to have access to cyber-security technology to protect their computer systems so that they can compete and grow. Industries that integrate cyber-security technology into the products they ship, websites and servers that support their industries, and internal tools that fuel their operations and innovation will see more efficient operations, better customer relations, and enhanced potential for improved market share.

The development of software products does not require a large investment in physical infrastructure, manufacturing resources, or shipping, and can be conducted in both urban and rural communities. Software and information based industries are a good investment for Idaho.

Software engineers trained in cyber-security must have a good understanding of computing technologies and the interaction of those technologies with their environment; making them among the most talented software developers in the market place. Even if they do not develop security software, these cyber-security experts know how to make all types of software secure and reliable. Reliability of software for the power grid, transportation and manufacturing is essential for industry and citizens of the state. Some of the key software in these area is used for embedded devices (dedicated computing devices such as traffic signal controls or smart meters), which are related to devices in cars, airplanes, cell phones and printers.

7. Criteria for measuring success:

We propose to use the following metrics to evaluate this project:

- Number of personnel directly hired by funds in this project (including the faculty, staff researchers and also any students hired with faculty start-up funds).
- Number of copyrightable and patentable materials generated by individuals directly or indirectly funded (through new cyber-security research grants or contracts).
- External funding awarded to faculty hired through this initiative:
    - Dollar amount of grants and contracts received.
    - Dollar amount of expenditures from these grants and contracts.
    - Number of personnel hired for these grants and contracts.
- Partnerships with industry
    - Number of industry-academic collaborations (this includes joint projects, joint hires and industry sponsored university projects)
    - Number of technology transfer, training or small projects conducted in collaboration with industry.

- Economic impact of these collaborations as reported by the partner industry including new positions created, increase in revenue, and creation of new products or services.

8. Budget:

We are requesting $1,982,800 from IGEM to cover the expenses of this project over a three year period. The detailed breakdown of this request is in Appendix D.

9. **Budget justification**

Personnel: Dr. Alves-Foss will be paid 10% time to support this project for mentoring, establishment of industry partnerships, contacts with funding agencies and overall management of the cyber-security research activities ($17,300 annually from IGEM).

UI will hire four new faculty members during the first year of this project, all to start in Spring semester 2013 (all listed salaries are full academic year salaries). This includes the associate professor of computer science ($105,000) and an assistant professor of sociology ($75,000). In addition we will have two joint hires with industry partners with 50% of salaries and fringe benefits paid by industry partners: an assistant professor in computer science ($90,000) and an assistant professor in electrical and computer engineering ($85,000). During the second year we will hire an assistant professor of civil engineering ($85,000).

During the first year we will hire a research software engineer ($90,000) and an IT support person ($65,000) who will both start in Fall semester 2012 for a 75% annual appointment, and be funded from IGEM 62.5% in the second year and 50% in the third year, with the remaining funds coming from UI funds, external research grants and partnerships.

During the third year we will bring a visiting faculty member to campus ($100,000), funded 50% from IGEM with the rest from UI funds and external sources.

Fringe benefits: Fringe benefits for these positions will be funded by UI and industry partners ($88,400 and $201,500 and $238,500 for the three years respectively).

Start-up funds: To seed initial research and recruit the best new faculty, we will provide $150,000 to the associate professor, $100,000 to the other engineering and computer science professors and $75,000 for the sociology professor ($525,000 total with $400,000 from IGEM).

Operating expenses: We expect each faculty search to cost $10,000 in addition to 10% salary for moving expenses. We are also requesting $20,000 a year in general operating expenses and $25,000 a year in travel expenses to support CSDS faculty and student research activities, research supplies, travel to meet with industry partners, funding agencies and research conferences to keep CSDS faculty up to date with the rapidly changing research in this field. Some of these funds will also be used to support industry/academic workshops and meetings for knowledge and technology transfer.

Equipment: We will use $100,000 in year one and $50,000 in each of year two and three ($200,000 total with $95,000 from IGEM) to outfit the software security testing lab as well as enhance power and transportation labs as appropriate for industry led research projects.

10. Additional institutional and other sector support

In the few days since we were informed that this proposal was selected to move forward out of the UI campus, we have had discussions with the following industrial partners who support this project, as indicated by the letters in Appendix C. These partners have stated willingness to provide support to help this project succeed: Avista, Comtech EF Data Corp, Campbell Company, Idaho Power and Power Engineers.

Moving forward, in FY16 all tenure track salary expenses will come from internal university funds, federal research grants and industrial support.

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Appendix A: Facilities and Equipment:

CSDS: The University of Idaho offered its first computer security course in 1992, and has been active in research and education in cyber-security for the past two decades. CSDS was established in 1998 and was recognized as a National Center of Academic Excellence in Information Assurance Education in 1999, one of the first seven universities in the nation to receive this designation, receiving over $10 million in research funding since that time. We have been offering the federal Cybercorps Scholarship for Service to students since 2001, one of the founding five universities to have this program, receiving over $5 million in scholarship funds, and supporting more than 67 students to date. These research and scholarship funds have led to more than 100 academic publications, as well as the education and graduation of 24 Ph.D. students, 37 M.S. students focusing in cyber-security. In addition, since 2000, 178 undergraduates have taken the introduction to computer security course, many of whom have gone on to take other cyber-security courses offered at UI. This is more than 50% of the 296 students who have received B.S. degrees in computer science from UI during that time period.

This activity has led to a recognized national and international presence and leadership in design and analysis of secure computing systems, specifically for high assurance systems, such as those that control our power grid, transportation networks, avionics and communication systems. The focal point of this cyber-security research has been in CSDS and the Dept. of Computer Science.

CSDS consists of a 1000 sq ft suite of rooms for housing staff and graduate students. This space is adjacent to the Computer Science Department (CS) faculty offices. The CSDS space provides researchers with desktop and networked computing resources, development and testing software, and experimental single-board computer platforms for different embedded systems.

CSDS currently supports over $100,000 of donated or research-supported computing platforms and software licenses. Faculty affiliated with CSDS are given separate offices outside of this space and have access to departmental as well as CSDS space and resources. The CSDS equipment and software are currently maintained by the College of Engineering IT support staff and CSDS student employees.

The CS department provides additional office space for SFS students, networked computing systems, development software, and teaching labs for embedded systems and cyber-security. The equipment is maintained and supported by dedicated IT staff in CS.

NIATT: NIATT's mission is to develop engineering solutions (knowledge and technology) to transportation problems and to prepare our students to be leaders in the design, deployment, and operation of our nation's complex transportation systems. This mission is accomplished through multidisciplinary collaborative research activities conducted by NIATT affiliate faculty members and researchers.

NIATT (initially NCATT, the National Center for Advanced Transportation Technology) was established by the US Congress in 1991 as part of the surface transportation reauthorization (Intermodal Surface Transportation Efficiency Act). Congress provided $8 million towards the construction of a new engineering and physics building on campus to house the new transportation center. In 1998, NIATT was included in that surface transportation program reauthorization as a Tier 1 University Transportation Center (UTC), which provided base annual funding of $750,000. NIATT has since successfully recompeted to be a USDoT Tier 1 UTC in 2002, 2006, and most recently in 2011, and so has continuously remained a Tier 1 UTC. The most recent competition selected only ten centers across the nation from 46 highly competitive proposals. The UI was chosen to lead a team of five universities to make the nation's

transportation system more sustainable. Research work at NIATT is student intensive—in the last five years, 120 undergraduate and 69 graduate students have worked on NIATT research projects.

Many of the planned NIATT UTC projects will leverage the potential of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications. Security of these communication systems is of paramount importance for safety and performance assurance, so CSDS and NIATT will collaborate on ensuring the security of those systems.

The Center for Traffic Operations and Controls within NIATT has nine affiliate faculty members in the areas of civil engineering, mechanical engineering, electrical and computer engineering, and computer science, with extensive experience in real-time traffic control systems, hardware-in-the-loop simulation (HILS) modeling, smart signal applications, security and survivability of real-time control systems, highway and traffic safety, and engineering education and workforce development. These laboratories are used in the development and testing of signal and infrastructure control strategies.

Traffic controller laboratories with remote access capabilities allow state-of-the-art real-time traffic control research and advanced HILS microscopic modeling of traffic signal system operations. NIATT's controller interface device (CID) has been used by FHWA and more than 30 universities and research organizations across the U.S.

Power Lab: The University of Idaho has one of the finest power laboratory suites in the Northwest. The entire facility is quite new, with 60% of the floor space completely renovated in 2001 and the remaining 40% completely renovated in 2002. Nonetheless, care was taken during the renovation to retain and improve the exceptionally reliable machinery that has been the foundation of the lab for a number of years. All equipment within the laboratory suite is

compatible. This permits a great deal of flexibility in designing experiments. For example, a power electronic controller can be applied to a model power system that has several machines as components.

The laboratory suite includes an electric machinery lab with 14 integral horsepower motor-generator sets, ranging in size from 5 HP to 20 HP. Two of the sets have the capability of directly measuring torque. There is a mix of ac and dc machines, permitting flexible experimentation with active loads. The largest is a 20 HP synchronous generator modified for developing and testing scheme for protecting large generators from internal faults and will soon have power quality measurement equipment. The power electronics laboratory presently has four building blocks for developing power converters. The building blocks can be connected to implement any of the common converter configurations, including dc/dc converters, dc/ac inverters, and ac/dc rectifiers. Converter controls are programmed using microprocessor development systems, allowing the capability to change the control settings easily. The facilities have been used to distributed generation studies and externally funded energy storage projects using batteries, flywheel energy storage systems and ultracapacitors.

The Analog Model Power System (AMPS) lab facility has a scale power transmission system that can be configured to have four transmission line segments. The system has full instrumentation for SCADA and power system protection through contributions from Schweitzer Engineering Laboratories and Idaho Power Company. All of this is readily accessible for experiments originating and controlled from remote Internet locations. This enables a wide range of experiments in circuit protection, either by simulation or by connection to experimental hardware assembled using equipment in the laboratory. The system can also be used for modeling and testing power electronic controllers for grid control application.

The lab facilities also include a real time digital simulator (RTDS) capable of performing real time, hardware in the loop time domain simulation of power system. This system can be used to develop and test protection systems, smart metering and control applications and power electronic controllers for grid applications. The RTDS can be controlled remotely via a secure VLAN with some local assistance to connect the hardware under test with the system.
Both the RTDS and the AMPS can be interfaced the SCADA test bed that is housed in the same room. This test bed was developed

The ECE faculty members have close ties with engineers from SEL and POWER Engineers who assist undergraduate and graduate students in learning to fully utilize the protection and control devices and the RTDS. In the long run this is a win-win situation for the students, the university and the employers as it strengthens the students engineering abilities when they graduate.

Appendix B: Biographical Sketches and Individual Support:

Curriculum Vitae for Jim Alves-Foss
University of Idaho

NAME: Alves-Foss, James
RANK OR TITLE: Professor of Computer Science
DEPARTMENT: Computer Science
OFFICE LOCATION AND CAMPUS ZIP: JEB 225, 1010

DATE: June 13, 2011

OFFICE PHONE: (208) 885-5196
FAX: (208) 885-9052
EMAIL: jimaf@uidaho.edu

DATE OF FIRST EMPLOYMENT AT UI: August 1991
DATE OF TENURE: August 1998
DATE OF PRESENT RANK OR TITLE: July 2006
EDUCATION BEYOND HIGH SCHOOL:

Degrees:

Ph.D., Computer Science, 1991, University of California, Davis. Mechanical Verification of Secure Distributed Systems Specifications. Advisor: Dr. Karl N. Levitt.

Master of Science, Computer Science, 1989, University of California, Davis.

Bachelor of Science, Physics, Mathematics, and Computer Science, 1987, University of California, Davis.

EXPERIENCE:

Teaching, Extension and Research Appointments:

Assistant (1991)/Associate Professor (1998)/Professor (2006), University of Idaho Department of Computer Science, August 1991-present. Specialization in Formal Methods, Dependable Distributed Systems and Computer Security.

Director, Center for Secure and Dependable Systems, MRC Institute, University of Idaho, January 2004-present. Was co-founder and co-Director 1998-2001; and Associate Director July 2001-December 2003 while on leave at UC Davis.

Visiting Associate Professor, University of California at Davis, July 2001-June 2003. Specialization in Formal Methods and Computer Security.

Research Assistant, Division of Computer Science, University of California, Davis, January 1990-August 1991, under direction of LLNL/DOE. Specialization in Formal Methods and Computer Security.

Associate Instructor, Division of Computer Science, University of California, Davis, January-June 1990. Taught two introductory computer science course.

Research Assistant, Division of Computer Science, University of California, Davis, July 1988-December 1989, under direction of RADC. Specialization in Formal Methods

Teaching Assistant, Division of Computer Science, University of California, Davis, September 1987-June 1988.

Consulting:

Consultant, Wind River Corporation, 2010-2011. Provide secure software development training to software engineers.

Steering Committee Member, INL Knowledge Partnership Center, 2007-2008.

Consultant, Objective Interface Systems, July 2004-Nov 2007.. Provide software engineering process guidance for security products for embedded systems.

Consultant, Fish and Richardson P.C., October 2004-February 2005. Provided expert witness services for review of computer security related patents.

Consultant, SealedNet, June 2000-December 2001. Provided analysis and direction for development of computer security software.

Consultant, Christensen, O'Connor, Johnson, and Kindness, PLLC, September 1997. Provided analysis of patent claim.

NASA-ASEE-Stanford Summer Faculty Fellow, June-August 1993 and June-August 1994. Developed model and preliminary prototype for a computer security information flow monitoring system.

Consultant, Hydrologic Consultants, Inc., Davis, California, October 1988-January 1990. Provided technical support for small consulting firm.

Non-Academic Employment including Armed Forces:

Programmer, Army Corps of Engineers, Hydrologic Engineering Center, May-September 1987. Provided technical support for in-house engineers.

Programmer, Department of Human Physiology, University of California, Davis, January 1984-March 1987. Provided technical support for research lab.

TEACHING ACCOMPLISHMENTS:

Areas of Specialization:

Formal Methods, Computer Security, Design and Analysis of Dependable Software Systems

Courses Taught: (EO indicated concurrent Engineering Outreach offering –distance ed)

Lower Division:

CS 12: (at UC Davis) Introduction to Programming, Winter 1991, Spring 1991

CS 150: Computer Organization and Architecture, Spring 2005, Fall 2006, 2007, Spring 2008

Upper Division:

CS 140A: (at UC Davis) Programming Languages, Spring 2002

CS 336: Introduction to Information Assurance, Fall 2005, Spring 2006 (EO), Fall 2009, Fall 2010 (EO)
CS 341: Operating Systems, Fall 1992-94
CS 386: Derivational Programming, Spring 1997-98, Spring 2006
CS 395: Design and Analysis of Algorithms, Spring 2011
CS 420/520: Data Communications, Fall 1991-92, Spring 1994-96 (EO; joint undergraduate/graduate)
CS 421: Data Communications Lab, Spring 1995-96
CS 442/542: Computer Security Concepts, Spring 1992-93, Fall 1994, 1996, 1998-2000, 2003, 2004 (EO and NTU; joint undergraduate/ graduate). Also Taught as CS 153 at UC Davis Fall 2002 and Spring 2003.
CS 436/536: Advanced Information Assurance, Spring 2007, Fall 2008 (EO) (joint undergraduate/ graduate)
CS 438/538: Network Security Spring 2010 (EO), 2012 (EO) (joint undergraduate/ graduate, also offered through live video to WSU)
CS 445: Compilers, Spring 1998-2001 (EO 1998 and as pre-taped only 1999) Also Taught as CS 142 at UC Davis; Spring 2002.
CS 486/586: Software Specification, Fall 1995, 1997, Spring 2004 (joint undergraduate/ graduate)

Graduate:
ECS 274: (at UC Davis), Automated Deduction, Winter 2002
CS 504: Principles of Concurrent Programming, Spring 1992 (EO)
CS 510: Theory of Programming Languages, Spring 1994-98, Spring 2004, 2006 (EO), Fall 2009, 2011 (EO)
CS 520: (see 420/520)
CS 536: (see 436/536) separated into separate class starting Fall 2010 (EO)
CS 538: (see 438/538)
CS 541: Advanced Operating Systems, Fall 1993-98 (EO)
CS 542: (see 442/542)
CS 586: (see 486/586)

Students Advised:

Undergraduate Students:
Averaging 20-25 per year.

Graduate Student Thesis Advised as Major Professor:
16 PhD:
Xiohui He, Security Evaluation of Virtualization Technologies in Multi-Core Systems, Ph.D., C.S., Dec 2011.
David Manz. Group Key Management Protocols to Wireless Ad-hoc Networks without the assumption of View Synchrony. Ph.D., C.S., Dec 2009.
Jie Zhou. Policy-based Architectural Refinement Techniques for the Design of Multi-level Secure Systems, Ph.D., C.S., Nov 2008.
Carol Masuck. Analysis and Categorization of Software Faults to Assist Novice Programmer, Ph.D., C.S., July 2008.

Jon Son. Covert Timing Analysis in MLS Real-Time Systems, Ph.D., C.S., June 2008.

Luay A Wahsheh. Security Policy Design and Implementation in High Assurance Computer Systems, Ph.D., C.S., May 2008.

Daniel Conte de Leon,.Completeness of Implementation Traceability for the Development of High Assurance and Critical Computing Systems, Ph.D., C.S., Dec 2006

Huaquiang Wei. Layered Decision Model for Cost-effective Network Safeguarding, Ph.D., C.S., Dec 2006

Shanyu Zheng. A Communication-Computation Efficient Group Key Algorithm for Large and Dynamic Groups, Ph.D., C.S., Aug 2006

Dong Yu. A Novel Correlation and Confidence Fusion Framework in Intrusion Detection Systems, Ph.D. C.S, May 2006 (*I was major professor for only last few months due to resignation of original major professor*)

Jonathan Graham. Efficient Allocation in Distributed Object Oriented Databases with Capacity and Security Constraints. Ph.D., C.S., August 2005.

Carol Taylor. Techniques for the Survivability of Critical Computer Systems. Ph.D., C.S., June 2004.

Sreekanth Malladi. Formal Analysis and Verification of Password Protocols. Ph.D., C.S., June 2004.

Hyungjick Lee. Securing Mobile Agents through Evaluation of Encrypted Functions. Ph.D., C.S., August 2002.

Abdullah Al-Muhaitheef. The Firewall Mobile Customs Agents: A Distributed Firewall Architecture. Ph.D., C.S., August 2002.

Jie Dai. Logic Based Policy Engineering in Distributed Authorization. Ph.D., C.S., December 2001.

23 MS Thesis:

Achala Aryal, Evaluation of Hardware-Based I/O Virtualization Technology to Enhanced Virtual Machine Isolation M.S., C.S., Dec. 2011

Jessica Smith, A Security Review of the Cell Broadband Engine Processor, M.S., CompE., June 2010

Katie Smith, Proposed Architecture for Multi-Level Secure VOIP Conferencing Using The H.323 Protocol, M.S., C.S., Dec. 2008

Donna Meyers. An Attribute Grammar for Alert Aggregation in Intrusion Detection Systems, M.S., C.S., May 2007.

Jeffery Robinson. A High-Assurance Multi-Level Secure File Server, M.S., C.S., Dec 2006.

Jennifer Joy. A Content Guard for Adobe Portable Document Format (PDF), M.S., C.S., Aug 2006.

Bei Wang. Possibilistic Information Flow Analysis And Formal Verification Of Multiple Single-Level Secure Execution Monitoring Mechanisms For High Assurance Systems, M.S., C.S., May 2006.

David Manz. A Network Simulator for Group Key Management Algorithms M.S., C.S., December 2005

Donghui Yang. A Threat-Scenario-Driven Modeling Approach to the MMR. M.S., C.S., August 2005.

Tracy Mark Olaveson. Group Based Access Controls. M.S., C.S., January 2005.
Marc Laude, Middleware Guard: A Security Component in the MILS Architecture with CORBA/GIOP. M.S., C.S., August 2004.
Patrick O'Connell. The Idaho Partitioning Machine: A MILS Partitioning Kernel Model in ACL2, M.S., C.S., December 2003.
Daniel Conte de Leon. Formalizing Traceability Among Software Work Products. M.S., C.S., December 2002.
Sreekanth Malladi. A General Scheme to Prevent Replay Attacks on Security Protocols. M.S., C.S., December 2002.
Carol Taylor. NATE: Network Analysis of Anomalous Traffic Events, a Low-Cost Approach. M.S., C.S., December 2001.
Shankar Kundala. Formal Verification of Authentication Protocols Using the Watson Theorem Prover. M.S., C.S., December 1999.
Surekha Ghantasala. Multilevel Data Security for an Embedded Real-Time Operating System. M.S., C.S., August 1997.
Fong Shing Lam. Dynamic Denotational Semantics of Java. M.S., C.S., May 1997.
Charles P. Cavaiani. Mutual Authenticating Protocol in a Client/Server Environment. M.S., C.S., January 1996.
Munna. Mechanical Verification of Authentication Protocols for Distributed Systems. M.S., C.S., December 1995.
Darwin Anderson. Designing and Implementing a Network Security Protocol for Secure Network Communications. M.S., C.S., May 1995.
Shifeng Li. Formal Specification of a Secure Distributed Operating Systems Kernel. M.S., C.S., December 1993.
Salvador Barbosa. The Security Confidence Index: Measuring the Security of your System. M.S., C.S., May 1993.

4 MS Non-Thesis (project option) Advised as Major Professor:
Qinghua Tian , M.S., C.S., Dec 2011
Gary Kasten, M.S., C.S., Summer 2007.
Mohan Muppaleni, M.S., C.S., Spring 2007
Sol Espinosa. M.S., C.S., May 1999.
Minglong Wu. M.S., C.S., May 1999.

Current Major Advisor for:

PhD Students in Computer Science
Rachel Bonas, Jennifer Guild, Cheryl Hinds, Kevin Krause, Mark Rounds

MS Students in Computer Science
Lawrence Kerr, Evan Painter, Cynthia Rempel, Jia Song, Stephen Tutton, Joel Weis

External Committee Member for:

Michael Wilder (Ph.D., C.S, 2012)
James Conrad (Ph.D., C.S., 2010)
Paul Craven (Ph.D., C.S., 2009)
Barbara Endicott Popovksi (Ph.D., C.S., 2007)
Wayne Boyer (Ph.D., C.S., 2004)

Chung-Tong Hu (Ph.D., C.S., 2002)
Bart Rylander (Ph.D. C.S., 2001)
Terrence Soule (Ph.D. C.S., 1998)
Kristopher Watts (M.S., C.S., 2008)
Paul Ortman (M.S., C.S., 2005)
Frank Nathan Webber (M.S., C.S., 2005)
Jeremiah Duffy (M.S. C.S., 2005)
Michael Loosbrock (M.S., C.S., 2004)
David Lambert (M.Engr., EE., 2002)
Anant Naganathan (M.S., C.S., 2002)
Michael Chappel (M.S., C.S., 2000)
Miles Penner (M.S. C.S., 1999)
Bradford Harvey (M.S., C.S., 1999)
Chung-Tong Hu (M.S., C.S., 1997)
Cade Greenup (M.S., CompE., 1996)
Andrew Tomkins (M.S., C.S., 1995)
Craig Files (M.S., CompE., 1995)
Shailesh Niranjan (M.S., CompE., 1994)
Naell Ijaz (M.S., CompE., 1993)

Courses Developed:

CS 336: Introduction to Information Assurance
CS 442/542: Computer Security Concepts
CS 436/536: Advanced Information Assurance
CS 421: Data Network Laboratory
CS 541: Advanced Operating Systems

Honors and Awards:

College of Engineering Outstanding Faculty Member of the Year Award: 2000
UI ACM Teacher of Year Award: 2001 (CS student professional group).
College of Engineering Outstanding Faculty Member of the Year Award: 2007

SCHOLARSHIP ACCOMPLISHMENTS:

Publications (* indicates student co-author)**:**

Refereed/Adjudicated (evaluated by external reviewers whose opinion can result in rejection)**:**

Books:

J. Alves-Foss (ed). *Formal Syntax and Semantics of Java.* Lecture Notes in Computer Science Vol. 1523, Springer-Verlag, Berlin, 1999.

E.T. Schubert, P.J. Windley and J. Alves-Foss (Eds.) *Higher Order Logic Theorem Proving and Its Applications*. Lecture Notes in Computer Science Series Vol. 971, Springer-Verlag, Berlin, 1995.

Book Chapters:

J. Alves-Foss and D. Frincke. *A Formal Grammar of the Syntax and Static Semantics of Java.* In J. Alves-Foss (ed.). *Formal Syntax and Semantics of Java*, Lecture Notes in Computer Science Series Vol. 1523, Springer-Verlag, Berlin, 1999. pp. 1-40. (*Chapter was selected by external reviewers)*

J. Alves-Foss and *F. Lam. A Dynamic Denotational Semantics of Java. In J. Alves-Foss (ed.). *Formal Syntax and Semantics of Java*, Lecture Notes in Computer Science Series Vol. 1523, Springer-Verlag, Berlin, 1999, pp. 201-240. (*Chapter was selected by external reviewers)*

J. Alves-Foss (ed.). Participants Proceedings of International Workshop on Higher Order Logic Theorem Proving and Its Application: B-Track Presentations, September 1995.

Journals and Conference Proceedings Published:

R. Bradetich*, P. Oman, J. Alves-Foss, and T. Rice*. "Evaluating Multicore Architectures for Application in High Assurance Systems", in *Proc. Layered Assurance Workshop*, Dec 2011.

J. Alves-Foss, X. He* and J. Song*. "Layered Assurance Scheme for Multi-Core Architectures", in *Proc. Layered Assurance Workshop*, Dec 2011.

J. Alves-Foss. "Multiple Independent Levels of Security", in *Encyclopedia of Cryptography and Security*, Eds H. van Tilborg and S. Jajodi, Spring-Verlag, vol 2, Sept 2011, pp. 815-818.

X. He* and J. Alves-Foss. "A Lightweight Virtual Machine Monitor for Security Analysis on Intel64 Architecture", Journal *of Computing Science in Colleges*, 27(1):155--162, Oct. 2011 (originally appeared in *Proc. CCNC-NW* Oct 2011)

J. Weis* and J. Alves-Foss. "Securing Database-as-a-Service: Issues and Compromises", IEEE *Security and Privacy*, 9(6):49-55, 2011

T. Volmer*, J. Alves-Foss, M. Manic. "Autonomous Rule Creation for Intrusion Detection", In *Proc. IEEE Symposium on Computational Intelligence in Cyber Security*, 2011.

M. Wilder*, R. Rinker, and J. Alves-Foss, "Automated Preemptive Hardware Isolation of High-Risk Computing Applications", In *Proc. Secure and Resilient Cyber Architectures Conference*, Oct 2010.

P. Oman, R. Bradetich*, J. Alves-Foss, and J. Smith*. “Towards Resilient Multicore Architectures for Real-time Controls”, In *Proc International Symposium on Resilient Control Systems 2010*, August 2010.

J. Conrad*, J. Alves-Foss and S. Lee. “Analyzing uncertainty in TG protection graphs with TG/MC”, *Journal of Computer Security*, 18(5):667-699, August 2010.

D. Manz*, J. Alves-Foss and P. Oman “A Framework for Group Key Management Protocol Assessment Independent of View Synchrony”, J*ournal of Computer Sciences*, 6(30):229-234, March 2010.

J. Smith*, X. He* and J. Alves-Foss. “A Security Review of the Cell Broadband Engine Processor”, in HICCS, 2010.

C. Hinds* and J. Alves-Foss, “Detecting Compromised Nodes in Wireless Sensor Networks Using Trust”, In *International Conference on Sensor Networks and Applications*, Nov 2009

J. Son* & J. Alves-Foss, “A formal framework for real-time information flow analysis, Computers & Security”, 28(6):421-432, 2009, ISSN 0167-4048, DOI: 10.1016/j.cose.2009.01.005.

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L. A. Wahsheh* and J. Alves-Foss, “Security Policy Development: Towards a Life-Cycle and Logic-Based Verification Model”, *American Journal of Applied Sciences*, 5(9): 1117-1126, 2008.

H. Wei*, J. Alves-Foss. T. Soule, H. Pforsich, D. Zhang and D. Frincke, “A layered decision model for the design of cost-effective network defense”, International Journal of Information and Computer Security, 2(3):297-324, 2008.

J. Zhou* and J. Alves-Foss, “Security Policy Refinement and Enforcement in Secure Computer Systems Design”, *Journal of Computer Security*, 16(2):107-131, 2008.

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L. Wahsheh* and J. Alves-Foss, “Policy-Based Security for Wireless Components in High Assurance Systems,” *Journal of Computer Science*, 3(9):727-739, 2007.

J. Robinson*, W.S. Harrison, N. Hanebutte, P. Oman, and J. Alves-Foss, "Implementing Middleware for Content Filtering and Information Flow Control", *Proc. Computer Security Architecture Workshop*, Nov 2, 2007, pp. 47-53. http://doi.acm.org/10.1145/1314466.1314474

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*J. Dai and J. Alves-Foss. "A Formal Authorization Policy Model," In *Proc. Software Engineering Research & Applications (SERA '03),* June 2003, (8 pages).

*R. Corin, *S. Malladi, J. Alves-Foss and S. Etalle. "Guess What? Here is a New Tool That Finds Some New Guessing Attacks," In *Proc. Workshop on Issues in the Theory of Security (WITS '03)*, Warsaw, March 2003, (10 pages).

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*C. Taylor, A. Krings and J. Alves-Foss. "Risk Analysis and Probabilistic Survivability Assessment (RAPSA): An Assessment Approach for Power Substation Hardening," In *Proc. Scientific Aspects of Cyber Terrorism*, November 2002.

*D. Conte de Leon, J. Alves-Foss, A. Krings and P. Oman. "Modeling Complex Control Systems to Identify Remotely Accessible Devices Vulnerable to Cyber Attack," In *Proc. of Scientific Aspects of Cyber Terrorism*, November 2002.

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*J. Dai and J. Alves-Foss. “Certificate Based Authorization Simulation System,” In *Proc. COMPSAC 2001*, October 2001, pp. 190-195.

*C. Taylor and J. Alves-Foss. “NATE - Network Analysis of Anomalous Traffic Events, A Low-Cost Approach,” In *Proc. New Security Paradigms Workshop,* September 2001.

*B. Rylander, T. Soule, J. Foster and J. Alves-Foss. “Quantum Evolutionary Programming” In *Proc. International Conference on Genetic and Evolutionary Computing (GECCO)*, 2001, pp. 1005-1011.

M.R. Holmes and J. Alves-Foss. “The Watson Theorem Prover,” *Journal of Automated Reasoning,* 2001, 26:4, pp. 357-408.

J. Alves-Foss. “An Efficient Secure Authenticated Group Key Exchange Algorithm for Large and Dynamic Groups,” In *Proc. National Information Systems Security Conference,* October 2000.

J. Alves-Foss. “Cryptographic Protocol Engineering: Building Security from the Ground Up,” In *Proc. International Conference on Internet Computing 2000,* June 2000.

Sobel and J. Alves-Foss. “A Trace-Based Model of the Chinese Wall Security Policy,” In *Proc. National Information System Security Conference*, NIST, October 1999, pp. 121-137.

J. Alves-Foss. “Provably Insecure Mutual Authentication Protocols: The Two-Party Symmetric Encryption Case,” In *Proc. National Information System Security Conference*, NIST, October 1999, pp. 306-314.

J. Alves-Foss. “Multi-Protocol Attacks & The Public Key Infrastructure,” In *Proc. National Information Systems Security Conference*, NIST, October 1998, pp. 566-576.

J. Alves-Foss. “Security Implications of Quantum Technologies,” In *Proc. National Information Systems Security Conference*, NIST, October 1998, pp. 196-202.

J. Alves-Foss. “An Architecture of Secure Distributed Systems,” In *Proc. Hawaii International Conference on Systems Sciences*, IEEE Computer Society Press, January 1998.

*Munna and J. Alves-Foss. “A Methodology for Mechanically Verifying Protocols Using an Authentication Logic,” In *Proc. National Information System Security Conference*, NIST, October 1997, pp. 202-212.

J. Alves-Foss. “The Use of Belief Logics in the Presence of Causal Consistency Attacks,” In *Proc. National Information System Security Conference*, NIST, October 1997, pp. 406-417.

J. Alves-Foss and *T. Soule. “A Weakest Precondition Calculus for the Analysis of Cryptographic Protocols,” In *Proc. DIMACS Workshop on Design and Verification of Cryptographic Protocols*, September 1997.

J. Alves-Foss. “Specifying Trusted Distributed System Components,” *Journal of Computer and Information Science*, 2(1), 1996, pp. 238-257.

*C. Cavaiani and J. Alves-Foss. “A Mutual Authenticating Protocol with Key Distribution in a Client/Server Environment,” *ACM Crossroads* (student journal), 4(2), April 1996, (8 pages).

J. Alves-Foss and D. Frincke. “Applying TCSEC Guidelines in a Real-Time Embedded Controller Environment,” In *Proc. National Information Systems Security Conference*, NIST, October 1996, pp. 89-97, to be reprinted by McGraw-Hill’s Datapro Security Information Service.

J. Alves-Foss, G. Saghi, D. Frincke and *S. Ghantasala. “Multilevel Data Security for Real-Time Embedded Computer Systems: A Case Study,” In *Proc. Third AMAST Workshop on Real-Time Systems, Models, Properties and Control*, University of Ottawa, Canada, March 1996, pp. 60-71.

J. Alves-Foss. “Using Generic Specifications in Software Specification and Verification,” In *Proceedings of the International Conference on Software Engineering, Workshop on Formal Methods Application in Software Engineering Practice*, April 1995, pp. 150-157.

J. Alves-Foss. “An Overview of SNIF: A Tool for Surveying Network Information Flow,” In *Proc. Internet Society 1995 Symposium on Network and Distributed System Security*, IEEE Computer Society Press, February 1995, pp. 94-101.

J. Alves-Foss. “Modeling Non-Deterministic Systems in HOL,” In *Proc. 1992 International Workshop on Higher Order Logic Theorem Proving and Its Applications*, North-Holland, September 1992, pp. 295-304.

J. Alves-Foss and K. Levitt. “Mechanical Verification of Secure Distributed Systems in Higher Order Logic,” In *Proc. 1991 International Workshop on the HOL Theorem Prover and Its Applications*, IEEE Computer Society Press, August 1991, pp. 263-278.

J. Alves-Foss and K. Levitt. “Verification of Secure Distributed Systems in Higher Order Logic: A Modular Approach Using Generic Components,” *IEEE*

Symposium on Research in Security and Privacy, IEEE Computer Society Press, May 1991, pp. 122-135.

J. Alves-Foss and K. Levitt. "The Verification of Secure Distributed Systems," *Compcon '91 Digest of Papers*, February 1991, pp. 177-184.

Peer Reviewed/Evaluated: (not anonymous, single reviewer review, or abstract only review)

Journals and Conference Proceedings:

C. Masuck*, J. Alves-Foss and P. Oman, "Analysis of Fault Models for Student Use", SIGCSE Bulletin, 40(2):79-83, 2008.

J. Robinson* and J. Alves-Foss, "A High Assurance MLS File Server", to appear *ACM Operating Systems Review*, Jan 2007, pp. 45-53.

*J. Graham and J. Alves-Foss. "Efficient Allocation in a Distributed Object Oriented Database Using Genetic Algorithms." In *Proc. International Conference on Parallel and Distributed Computing Systems (PDCS 2003)*, Las Vegas, August 2003, (6 pages).

*T. Song, J. Alves-Foss, C. Ko, C. Zhang and K. Levitt. "Using ACL2 to Verify Security Properties of Specification-based Intrusion," In *Proc. ACL2 Workshop 2003*, Boulder, July 2003, (12 pages).

*J. Dai and J. Alves-Foss. "Logic Based Authorization Policy Engineering," In *Proc. 6th World Multiconference on Systemics, Cybernetics, and Informatics,* July 2002, pp. 230-238.

*Munna and J. Alves-Foss. "Mechanizing a Theory of Authentication in Higher Order Logic," In *Participants Proceedings of International Workshop on Higher Order Logic Theorem Proving and Its Application: B-Track Presentations*, September 1995, pp. 61-72.

J. Alves-Foss and *S. Barbosa. "Assessing Computer Security Vulnerability," *Operating Systems Review*, 29(3), July 1995, pp. 3-13.

J. Alves-Foss and *Munna. "Reasonable Authentication in Distributed Systems," *Proceedings of the 8th Annual INEL Computing Symposium*, October 1994, 15:3-5.

Other (Books and Edited Volumes):

M. Archer, G. Fisher, K. Levitt, R. Olsson, J. Alves-Foss, J. Buffenbarger, D. Frincke and D. Huang. *The Specification and Verification of Concurrent Programs.* RADC Technical Report, October 1989.

G. Cohen, M. Healy, K. Levitt, P. Windley, S. Kalvala, A. Jasuja, J. Pan, J. Alves-Foss, J. Buffenbarger and M. Sievers. *Formal Verification with HOL - An Aerospace Perspective.* NASA Contract Report 18586, August 1989.

Presentations and Other Creative Activities:

Invited Talk: "Computer Security Aspects of High Assurance Avionics Systems", National Workshop on Aviation Software Systems: Design for Certifiably Dependable Systems, Alexandria, VA., October 5-6, 2006

Invited Talk: "Enabling Security in Avionics Systems," Planning Meeting National Workshop on Software for Critical Avionics Systems, November 2005.

Invited Talk: "Implementing Secure Applications Using the MILS High Assurance Architecture," GOVCON 2005, March 3, 2005.

Panelist: Computing and Network Research: A University Perspective. Pacific Northwest National Laboratory Computational and Information Sciences Open House, October 12, 2004.

Presentation: "MILS CORBA Status Report," OMG Meeting, Boston, September 2003.

Presentation: "The Architecture of Secure Middleware," Software Technology Conference, Salt-Lake City, April 2003.

Presentation: "Merging Safety and Assurance: The Process of Dual Certification for Software," NSA High Confidence Software and Systems Conference, April 2002.

Panelist: Panel on Content in INFOSEC Education. Workshop on Education in Computer Security, Monterey, California, January 1997.

Presentation: "Measuring Security: A Methodical Approach," International Workshop on Enterprise Security, Stanford, California, June 1996.

Presentation: "Using WWW Resources in Combined Local and Distance Learning Classrooms," Idaho Academy of Sciences Annual Meeting, Moscow, Idaho, May 1996.

Panelist: Panel Session on Teaching Formal Methods. International Conference on Higher Order Logic Theorem Proving and Its Applications, Aspen Grove, Utah, September 1995.

Invited Talk: "Securing Network Information Flow," NASA-ASEE-Stanford Summer Faculty Fellowship Research Reviews, NASA-Ames Research Center, Moffett Field, California, August 1994.

Invited Talk: "Benefits and Limits of Formal Methods in Software Reliability Analysis," INEL Workshop on Software Reliability, INEL, Idaho Falls, Idaho, May 1994.

Invited Talk: "Securing Computer Information Flow," NASA-ASEE-Stanford Summer Faculty Fellowship Research Reviews, NASA-Ames Research Center, Moffett Field, California, August 1993.

Invited Talk: "Current Research in Formal Methods," UC Davis Computer Science Departmental Colloquium, Davis, California, June 1993.

Invited Talk and Discussion Leader: "Tracking Intruders Across the Internet," SRI Intrusion Detection Workshop, Menlo Park, California, May 1993.

Poster Session: "In Search of an Abstractable Security Property," IEEE Symposium on Research in Security and Privacy, Oakland, California, May 1993.

Invited Talk: "Specification and Verification of Verifiable Secure Distributed Systems," Aerospace Corp. Research Colloquium, El Segundo, California, June 1992.

External Research Grants and Contracts Awarded ($9.5M):

Wind River MILS 2.0 High Level Verification Phase III SOW 4 (extension) of the SKPP Verification Project, $250,000 funded by Wind River Corp., Sept 2011-Dec 2012 (Lead PI: J. Alves-Foss, Co-PIs: P. Oman, C. Jeffery, and T. Soule).

A New Operating System for Security Tagged Architectures in Support of MILS Compliant Systems, $450,000 funded by AFRL, Nov 2010 – Dec 2013 (PI: J. Alves-Foss).

Implications of Multi-core Architectures on the Development of Multiple Independent Levels of Security (MILS) Compliant Systems", $283,479 funded by AFRL, March 2010- April 2012, (Lead PI: J. Alves-Foss, Co-PI: P. Oman).

Cache Hardware Approaches to Multiple Independent Levels of Security (MILS), $249,744 funded by AFRL, March 2010- April 2012, (Lead PI: B. Rinker, Co-PIs: G. Donohoe and J. Alves-Foss).

INL Security Plan for DOE Knowledge Center, $71,097 funded by INL, Nov 2009 – Sept 2010 (Lead PI: J. Alves-Foss, Co-PI: P. Oman,)

Wind River MILS 2.0 High Level Verification Phase III SOW 4 of the SKPP Verification Project, $382,000 funded by Wind River Corp., Sept 2009-Aug 2011 (Lead PI: J. Alves-Foss, Co-PIs: P. Oman, C. Jeffery, and T. Soule).

Analysis of Security Capabilities of Dual-Core Processors for use in MLS Systems, $75,000 funded by Raytheon Corp. Sept 2008-Dec 2008, (Lead PI: J. Alves-Foss, Co-PI: P. Oman).

Wind River Proof System Tools SOW 3 of the SKPP Verification Project, $415,000 funded by Wind River Corp., July 2008-Aug 2009 (Lead PI: J. Alves-Foss, Co-PIs: P. Oman, C. Jeffery, and T. Soule).

Wind River Coding Guidelines, SOW 2 of the SKPP Verification Project, $32,000 funded by Wind River Corp., Jan 2008-May 2008 (PI: J. Alves-Foss, and P. Oman).

Wind River Coding Guidelines, SOW 1 of the SKPP Verification Project, $54,300 funded by Wind River Corp., Oct 2007-Dec 2007 (PI: J. Alves-Foss, and P. Oman).

Secure Labeling in the MILS Environment, $20,000 funded by Raytheon Corp. Oct. 2007-Sept 2008. (PI: J. Alves-Foss)

Using Honeynets for Attacker Forensic Evidence, $3,000, funded by Microsoft Corporation, Sept. 2006 (Lead PI: Carol Taylor, Co-PI J. Alves-Foss)

Theoretical Foundations of MILS CORBA Middleware (Renewal), $3,094,000, funded by DARPA, June 2003-September 2007, (Lead PI: J. Alves-Foss, Co-PI's P. Oman and S. Harrison). (*Contract was continued with new funds in 2004 and 2005*).

Feasibility and Planning Study for the Design, Specification and Verification of MILS CORBA Middleware running on a MILS RTOS, $119,169, funded by Lockheed-Martin Aero, October 2002-September 2003, (Lead PI; J. Alves-Foss, Co-PI with P. Oman).

Network Authentication Protocol Studies: Theory of Secure Designs, $462,500, funded by DARPA, June 2002-December 2003, (Lead PI: J. Alves-Foss, Co-PI with G.S. Hura.).

REU Site: Developing Undergraduate Research in Computer Network-Based Intrusion Detection and Information System Protection, $264,000, funded by NSF, June 2001-December 2004, (Lead PI: D. Frincke, Co-PI J. Alves-Foss).

Industrial Applications of Information Security to Protect the Electric Power Infrastructure, $775,000, funded by NIST, October 2001-May 2003, (Schweitzer Engineering Lab is lead agency; Lead-PIs: P. Oman and E. Schweitzer University of Idaho is a subcontractor for $220,000 with Co-PIs: J. Alves-Foss and A. Krings).

Information Assurance and Security Research, $980,000, funded by NSA, October 2000-September 2002, (Lead PI: D. Frincke, Co-PI: J. Alves-Foss).

Software Security Research, $483,000, funded by DARPA, September 1999-September 2000, (Lead PI: J. Alves-Foss, Co-PI: D. Frincke).

Digital Signatures and Network Security, $40,000, funded by INEEL, June 2000-September 2000, (PI: J. Alves-Foss).

Information Security and Reliable Computing, $159,000, funded by INEEL, June 1999-September 1999, (Co-PIs: J. Alves-Foss, P. Oman, D. Frincke and A. Krings).

Digital Signatures on Databases, $20,000, funded by INEEL, May 1999-September 1999, (PI: J. Alves-Foss).

A Life-Cycle Based Engineering Approach to the Design and Implementation of Reliable Software Systems, $257,000, funded by Army Research Office, March 1999-March 2002, (Lead-PI: J. Alves-Foss, Co-PI: P. Oman).

Security Implications of Quantum Technologies, $199,934, funded by National Security Agency, July 1998-June 1999, (Lead PI: J. Alves-Foss, Co-PI J. Foster).

Measuring System Dynamics for the Direct Assessment of Software Security Violation Characteristics, $140,000, funded by NSF, June 1998-June 2001, (Lead-PI: J. Munson , Co-PIs: J. Alves-Foss, D. Frincke and P. Oman).

Development of Secure and Reliable Software, $500,000, funded by DoD Office of Special Technology, June 1998-June 1999, (Lead-PIs: J. Alves-Foss, D. Frincke, and P. Oman, Co-PIs: J. Foster, A. Krings, J. Munson).

Reasoning about Limitations and Capabilities of Belief Logics, $75,192, funded by National Security Agency, August 1996-December 1997, (PI: J. Alves-Foss).

Automated Reasoning Using the Mark 2 Theorem Prover, $206,970, funded by Army Research Office, August 1996-July 1999, (PI: J. Alves-Foss; co-authored with Randall Holmes of BSU).

Multi-Level Security for Real-Time Embedded Open System Architectures, $20,000, funded by Texas Instruments, April 1995-December 1996, (Co-PIs: J. Alves-Foss, G. Saghi and D. Frincke).

A Verified Microprocessor with Security Features, $98,700, funded by National Security Agency, June 1991-August 1995, (PI: P. Windley, June 1991-August 1993; J. Alves-Foss, August 1993-August 1995).

NSF Scholarship Grants ($5M) :

Continuation of University of Idaho Scholarship for Service Program 2010, $1,587,173 funded by NSF, Oct 2010– Aug 2014 (PIs: J. Alves-Foss & P. Oman)

Continuation of University of Idaho Scholarship for Service Program, $824,065, funded by NSF, July 2006 – July 2009 (Lead PI: O. Oman, Co-PIs: J. Alves-Foss and C. Taylor).

Cyber Service Training and Education Supplement, $1,212,000, funded by NSF, January 2003-July 2007, (Co-PI with P. Oman, D. Frincke and R. Lewis)

Cyber Service Training and Education, $1,400,000, funded by NSF, July 2001-June 2005, (Co-PI with J. Dickinson, D. Frincke and R. Lewis).

Donations, Fellowships and Other Non-Research Grants ($492K) :

Secure MLS Voice over IP, $15,000 funded by Raytheon Corp. Dec 2006. (PI: J. Alves-Foss)

5 development seats of RTI DDS 4.x $ 86,655 US. Real-Time Innovations (RTI) University Program, Sept 2006. (MS student Elaine Mui was the lead student on this acquisition effort).

Network Security Software Development Support, $1,143 Software Donation, funded by Conjungi, February 1996, (PI: J. Alves-Foss).

NASA-Ames-Stanford Faculty Fellowship, $10,000 stipend, funded by NASA, 1994, (PI: J. Alves-Foss).

Settling Cyberspace: The Ethical Frontier, $5,000, funded by GTE Lectureship Series, January-May 1994, (Co-PIs: J. Alves-Foss, M. Barnett, J. Foster and D. Frincke).

NASA-Ames-Stanford Faculty Fellowship, $10,000 stipend, funded by NASA, 1993, (PI: J. Alves-Foss).

Computer Science Teaching Lab, $370,000 equipment grant, funded by Hewlett-Packard, 1993, (Co-PIs: J. Dickinson and J. Alves-Foss).

Other Internal or Institution Funding ($95K):

Reliable Communication, $5,000, funded by the National Center for Advanced Transportation Technology, March 1993-May 1994, (PI: J. Alves-Foss).

Software Fault-Tolerance and Reliability, $5,000, funded by Idaho Space Grant College and Fellowship Fund, October 1992-February 1994, (PI: J. Alves-Foss).

HOL Enhancements: Towards a Verified Microprocessor Chip Set for Reliable Digital Flight Control Systems, $25,000, funded to UC Davis by NASA, October 1991-September 1992, (PI: K. Levitt, co-authors K. Levitt, J. Alves-Foss, S. Kalvala and T. Schubert).

Towards a Verified Kernel for a Secure Distributed System (KSDS), $60,000, funded to UC Davis by National Security Agency, August 1991-July 1992, (PI: Karl Levitt, co-authors J. Alves-Foss and K. Levitt).

SERVICE:

Major Committee Assignments:

National and International Committees:

Minitrack co-chair, *Assurance Research for Dependable Software Systems (ARDSS)* minitrack of the *HICSS* conference 2011-2012

Sponsorship Chair, *Recent Advances in Intrusion Detection*, 2005

Program Committee Member *International Conference I-Warfare and Security 2006-2011.*

Program Committee Member, *New Security Paradigms Workshop 2003*

Program Committee Member, *National Institute of Standards and Technology (NIST) Workshop on Software Assurance Tools, Techniques, and Metrics*, 2005

Session Chair, International Conference on Computers and Information, 1996

Special Sessions Chair, International Workshop on Higher Order Logic Theorem Proving and its Applications, 1995

Program Committee Member and Reviewer, International Workshop on Higher Order Logic Theorem Proving and its Applications, 1993

Reviewer: Numerous Conferences and Journals

Department of Computer Science Committees:

Curriculum/Petitions Committee Fall 2008-Spring 2010 (chair)

Graduate Committee Fall 2006 – Spring 2008, (Chair Fall 2007 – Spring 2008)

Procedures and Bylaws, Policies and Procedures Committee, Spring 2004 – 2006

Chair, Tenure Recommending Committee, Fall 2005

Director Center for Secure and Dependable Systems, 2004 - present

Associate Director, Center for Secure and Dependable Systems, 2001-2003 (while on leave)

Co-Director, Center for Secure and Dependable Software, 1998-2001

Director of Department's Laboratory for Applied Logic, August l994-1998

Ph.D. Planning Committee, 1991-92

Hardware/Software Committee, 1991-96 (Chair, 1992-94)

Faculty Search Committees, Spring 1993, 1993-94, 1998-2001 (Chair 1998-2000)

Chair, Strategic Planning Committee 1998-2000

Graduate Committee, 1996-2001 (Chair Fall '97-'00), 2003-2004, 2006-2008 (Chair in 2008),

University Committees:

Quorum Committee, Fall 1995
University Computing Advisory Committee, 1993-96
Intellectual Property Committee, 1997-2000, 2006-present, (Chair 1999-2000, 2007-2008)
Borah Symposium Committee 2004-2006
University Research Council 2009-2012
Ad hoc Intellectual Property Dispute committee Fall 2010 (Chair)

Special Committees

UI Primary Representative to NSA Center of Excellence in Information Assurance Education (2004-present)
UI Primary Representative to Institute for Information Infrastructure Protection (2008-present)

Professional and Scholarly Organizations:

Association for Computing Machinery (ACM), Senior Member 2008
Institute of Electrical and Electronic Engineers (IEEE) Computer Society, Senior Member 2005
Object Management Group (OMG)
Open Group

Current and Pending Support for Jim Alves-Foss

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: James Alves-Foss

Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: IGEM Proposal: Multidisciplinary Cyber Security Faculty Cluster

Source of Support: Idaho SBOE/HERC

Total Award Amount: $1,982,800 Total Award Period Covered: 7/1/2012 – 6/30/2015

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: 0.5 Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Wind River MILS 2.0 High Level Verification Phase III SOW 4 of the SKPP Verification Project

Source of Support: Wind River Corporation

Total Award Amount: $ 632,000 Total Award Period Covered: 9/1/2009 – 12/31/2012

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: 3 Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: A New Operating System for Security Tagged Architectures in Support of MILS Compliant Systems

Source of Support: AFRL

Total Award Amount: $ 450,000 Total Award Period Covered: 11/1/2010—12/31/2013

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: 1.8 Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Continuation of University of Idaho Scholarship for Service Program 2010

Source of Support: National Science Foundation

Total Award Amount: $1,587,173 Total Award Period Covered: 10/1/2010-6/30/2014

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: 1 Acad: Sumr:

Support: ☐ Current ☐ Pending ☒ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Wind River MILS 2.0 High Level Verification Phase III SOW 4 of the SKPP Verification Project Extension

Source of Support: Wind River Corp.

Total Award Amount: $ 500,000 Total Award Period Covered: 6/1/2012-5/15/2013

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: Acad: 3 Sumr: 2

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

NSF Form 1239 (10/99) USE ADDITIONAL SHEETS AS NECESSARY

Biographical Sketch for Karen Den Braven

Director, National Institute for Advanced Transportation Technology
Professor, Mechanical Engineering Department Phone: (208) 885-7655
University of Idaho Fax: (208) 885-9031
P.O. Box 440901 Email: kdenb@uidaho.edu
Moscow, Idaho 83844-0901 Web: www.webs1.uidaho.edu/niatt/

Education:
Ph.D., Mechanical Engineering, 1987, Colorado State University, Fort Collins, Colo.
M.S., Mechanical Engineering, 1980, University of California, Berkeley
B.S., Mathematics, 1978, North Carolina State University, Raleigh

Professional Experience:
Director, National Institute for Advanced Transportation Technology, 2009–Present
Acting Chair, Mechanical Engineering, University of Idaho, 2009
Director, Center for Clean Vehicle Technology, University of Idaho, 2005–Present
Professor of Mechanical Engineering, University of Idaho, 2000 – Present
Associate Professor of Mechanical Engineering, University of Idaho, 1993–2000
Assistant Professor of Mechanical Engineering, University of Idaho, 1987–1993

Activities and Awards:
American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Geothermal Technical Committee
American Society of Mechanical Engineers (ASME):

- Fellow of ASME
- Energy Resources Board Member-at-Large for Division Operations, 2002–06
- Program Coordinator, Energy Resources Board, 1997–2000; Chair, 1999–2000; Vice Chair, 1998–99; Program Chair, 1994–96
- Advanced Energy Systems Division; Vice Chair of Heat Pump Technical Committee, 1989–91; Chair, 1991–94;

Associate Editor, ASME Journal of Solar Energy Engineering, 2000–2008
Society of Automotive Engineers:

- Best Paper Award, Small Engine Technology Conference, San Antonio, Nov., 2006
- Award for "Excellence in Oral Presentation" for presentation "Making the Connection: The University of Idaho Clean Snowmobile" at the SAE 2002 Spring Fuels and Lubricants Meeting, Reno, May 6–9, 2002.

Naval ROTC Battalion of the University of Idaho and Washington State University Faculty Excellence Award, 2007
UI Engineering Expo: Booth Award and Technical Session Award for the Clean Snowmobile Team, 2007 and 2011.

Research Grants from the Past Five Years:

"University Transportation Centers Program Tier 1 Grant: Transportation for Livability by Integrating Vehicles and the Environment," US Department of Transportation, 2012–2014, $3,500,000, Principal Investigator.

"University Transportation Centers Grant for the Pacific Northwest Transportation Consortium (Region 10): PacTrans", USDoT, 2012-2014, $600,000, Principal Investigator.

"Improving Vehicle Fleet Fuel Economy by Optimizing Traffic Control Operations", NIATT/USDoT, 2010–2012, $60,000, Co-Principal Investigator with Ahmed Abdel-Rahim.

"Pollution Emissions Reduction in a Two-Stroke Direct-Injection Snowmobile Engine", NIATT/USDoT, 2010–12, $85,000, Principal Investigator.

"Development of an Ethanol Blend Two-Stroke Direct-Injection Snowmobile for Use in the Clean Snowmobile Challenge", NIATT/US DoT, 2009–10, $85,000.

"Development of a Flex-Fuel Two-Stroke Snowmobile for Use in the Clean Snowmobile Challenge and National Parks", NIATT/USDoT, 2008–09, $81,429.

"Sustainable Transportation Engine and Fuel Systems", SBOE/HERC, 2008–10, $550,000, Co-Principal Investigator with Judi Steciak and Steven Beyerlein.

"Development of an Ethanol Fueled Two-Stroke Direct-Injection Snowmobile for Use in National Parks", NIATT/USDoT, 2007–08, $91,000. Principal Investigator.

"University Transportation Centers Program Tier 1 Grant," US Department of Transportation, 2007–2011, $3,000,000, Co-Principal Investigator with Michael Kyte.

Peer-Reviewed Publications from the Past Five Years (*denotes graduate student co-authors):

Cordon, D.*, Beyerlein, S., Steciak, J., and Den Braven, K., "Measuring and Comparing Accuracy of Emissions Analyzers for Use With IC Engines", ASME Paper IMECE2009-11295, November 2009.

Findlay, A.*, Harker, N.*, and Den Braven, K., "Brake Specific Fuel Consumption and Power Advantages for a Turbocharged Two-Stroke Direct-Injected Engine," ASME Paper IMECE2008-68371, November 2008.

Johnson, J.*, and Den Braven, K., "Comparison of Homogeneous, Stratified and High-Squish Stratified Combustion in a Direct-Injected Two-Stroke Engine", SAE2008-32-0030, Society of Automotive Engineers, September 2008. Also presented at the SAE Small Engines Technology Conference, Milwaukee, September 2008.

Johnson, J.*, Harker, N.*, Findlay, A.*, and Den Braven, K., "University of Idaho's Clean Snowmobile Design Using A Direct-Injection Two-Stroke Engine", Paper No. SAE2008-32-0031; also presented at the Society of Automotive Engineers Small Engine Technology Conference, Milwaukee, September 2008.

Johnson, J.* and Den Braven, K., "Comparison of Stratified and Homogeneous Combustion in a Direct-Injected Two-Stroke Engine for Snowmobile Applications", ASME Internal Combustion Engines Division Technical Conference, April 2008,

Den Braven, K. and Harker, N.*, Invited Paper: "Combining Education and Technology: the University of Idaho's Clean Snowmobile Team", World Congress of the Society of Automotive Engineers, April 2008.

Bradbury, N., Findlay, A, and Den Braven K., "Developing a Turbocharged Gasoline Direct-Injection Two-Stroke Engine for Snowmobile", Society of Automotive Engineers, 06SETC-144, 2006.

Current and Pending Support for Karen Den Braven

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Karen R. Den Braven	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: University Transportation Center (UTC) Year 4

Source of Support: USDoT

Total Award Amount: $ 925,700 Total Award Period Covered: 7/1/2010-6/30/2012

Location of Project: Moscow

Person-Months Per Year Committed to the Project. 3 Cal: 3 Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: University Transportation Centers: TransLIVE (Transportation for Livability by Integrating Vehicles and the Environment)

Source of Support: USDoT

Total Award Amount: $ 3,500,000 Total Award Period Covered: 2/1/2012-1/31/2014

Location of Project: Moscow (with subawards to four partner universities)

Person-Months Per Year Committed to the Project. 3 Cal: 3 Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: University Transportation Centers: Pacific Northwest Transportation Consortium (Region 10)PacTrans

Source of Support: USDoT/subaward from Univ. of Washington

Total Award Amount: $ 600,000 Total Award Period Covered: 2/1/2012-1/31/2014

Location of Project: Moscow (our portion)

Person-Months Per Year Committed to the Project. 0.75 Cal: 0.75 Acad: Sumr:

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: IGEM Proposal: Multidisciplinary Cyber Security Faculty Cluster

Source of Support: Idaho SBOE/HERC

Total Award Amount: $1,982,800 Total Award Period Covered: 7/1/2012 – 6/30/2015

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: $ Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

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*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

NSF Form 1239 (10/99) USE ADDITIONAL SHEETS AS NECESSARY

Biographical Sketch for Gregory W. Donohoe, Ph.D. P.E.

1. **Professional Preparation**
   B.S., Lake Superior State University, 1976.
   M.S., University of New Mexico, Electrical and Computer Engineering, 1982.
   Ph.D., University of New Mexico, Electrical and Computer Engineering, 1989.
2. **Appointments (Some overlap)**
   a. Sandia National Laboratories, 1976-1990. Senior Member of the Technical Staff (1987-1990).
      I. Physical Security, Intrusion Detection (1976-82)
      II. Intelligent Systems Division, Robot Sensing & Control, (1982-87)
      III. Exploratory Development Department, Machine Intelligence (1987-90)
   a. University of New Mexico. 1990-96. Assistant Professor.
      - Research in computing for digital image processing and pattern recognition
      - Teaching in computer engineering
   b. Microelectronics Research Center, University of New Mexico. 1997-2002. Research Assistant Professor.
      - Microelectronic on-board computing systems for spacecraft
   c. Kestrel Corporation, 1997-1998. Senior Scientist.
      - Research in computer-based medical imaging, medical information systems.
   d. Air Force Research Laboratory, 1998-2001. Senior Electronics Engineer, Deputy Program Manager, DARPA Project Officer.
      - Research in microelectronics computing systems for space
      - Space protection, spacecraft situational awareness.
   e. Center for Advanced Microelectronics and Biomolecular Research, University of Idaho, 2002-2006. Research Associate Professor.
      - Research in microelectronic systems, processor design for space.
   f. Electrical and Computer Engineering Department, University of Idaho, 2007-2009. Associate Professor (tenured 2008).
   g. EnTempo Corporation, President, 2006-2007. A software startup company focused on technologies for embedded computing.
   h. Computer Science Department, University of Idaho, 2009-present. Department Chair, Professor.

3. **Scholarly Activity**
   - Publication (author or co-author)
     - 3 book chapters
     - 129 technical articles
     - 25 other presentations and talks.

   A. G. Conde Guerra and G. W. Donohoe, "Reconfigurable Block Floating Point Processing Element on a Virtex Platform", 2011 International Conference on Reconfigurable Computing and FPGAs", Cancun, MX, Nov. 30 – Dec 2, 2011.
   B. Guillermo Conde*, G.W. Donohoe, S. Maheswaran*, "Low power, reconfigurable computing platform for spacecraft", *Proc. 2009 Conference on Reconfigurable Computing and FPGAs,* Cancun, MX, December 9-11, 2009.

C. W. Walker*, G. W. Donohoe, D. M. Buehler, K. J. Hass, C. Canine* and P.-S. Yeh, "*Field Programmable Processor Array Development and Testing"*, Proc. 13th NASA Symposium on VLSI Design, Post Falls, ID, May 5-6, 2007.
D. .M. Buehler, R. Rinker, G.W. Donohoe, F. Jones, and W. Walker, "Hardware and Software Development of the Field Programmable Processor Array", IEEE Symposium on Field Programmable Custom Computing Machinery, Napa Valley, CA, April 23-25, 2007.
E. D. Buehler, G. Donohoe, "A Software Tool for Designing Fixed-Point Implementations of Computational Data Paths", *Journal of Aerospace Computing, Information and Communication*, Vol. 3, pp. 388-401 (2006).

- Graduate Students: Major Professor
  - Supervised 23 Masters to completion of their degrees
  - Supervised 5 PhD students to the completion of their degrees
- Teaching
  - Taught 28 different classes in Electrical and Computer Engineering and Computer Science
  - Developed 5 undergraduate and graduate courses
- Principal Investigator on $6.2M in research

4. Role, Synergistic Activities

Dr. Donohoe's role in this effort is principally one of administration, mentoring and enabling, in support of the PI and the team. His experience as a deputy program manager for the Air Force Research Labs and project management for the Defense Advanced Research Projects Agency (DARPA), prepares him to take the large-scale programmatic view.

His relevant technical background is in embedded computing, which is a key element of the critical information infrastructure.

Dr. Donohoe has long been an advocate for bringing engineering and commerce together. He was an early supporter of the university's Vandal Innovation Enterprise Works (VIEW), a program design to bring engineering and business students together to study commercialization strategies and develop business plans around engineering students' capstone projects. Dr. Donohoe will continue to work with the business community to promote the transfer of technologies developed under this program to marketable products.

As chair of the Computer Science Department, Dr. Donohoe is responsible for Computer Science instruction, including curriculum, staffing, and instructional resources. He will be responsible for recruiting, hiring and mentoring the Computer Science faculty members associated with this effort. He will work closely with the PI to see that instructional and research resources will be brought to bear on this effort.

Current and Pending Support for Gregory Donohoe

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Gregory Donohoe	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: IGEM Proposal: Multidisciplinary Cyber Security Faculty Cluster

Source of Support: Idaho SBOE/HERC

Total Award Amount: $1,982,800 Total Award Period Covered: 7/1/2012 – 6/30/2015

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: GE/ONR Passive Electronic Components Phase 2

Source of Support: GE Global Research

Total Award Amount: $ 1,005,600 Total Award Period Covered: 1/1/2011 – 6/30/2013

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: 1.2 Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Biographical Sketch for Brian K. Johnson

Department Chair, Department of Electrical and Computer Engineering
Professor, Electrical and Computer Engineering Phone: (208) 885-6902
University of Idaho Fax: (208) 885-7579
P.O. Box 441023 Email: bjohnson@uidaho.edu
Moscow, Idaho 83844-1023 Web: www.ece.uidaho.edu/ee/power/brian

Education:
Ph.D., Electrical Engineering, August 1992, University of Wisconsin-Madison, Madison, Wisconsin
M.S.E.E, May 1989, University of Wisconsin-Madison, Madison, Wisconsin
B.S.E.E., December 1987, University of Wisconsin-Madison, Madison, Wisconsin

Professional Registration:
Registered Professional Engineer (Idaho #8368, Wisconsin #30895)

Professional Experience:
Dept. Chair, Department of Electrical and Computer Engineering, University of Idaho, 2006-
Interim Chair, ECE Department, University of Idaho, 2004
Professor, University of Idaho, 2004-
Associate Professor, University of Idaho, August 1997-2004
Assistant Professor, University of Idaho, August 1992-July 1997

Activities:
Member American Society for Engineering Education
Member of CIGRE (International Council on Large Electric Systems)
Senior Member IEEE
IEEE Industry Applications Society

- IEEE Violet Book Standards Working Group (co-author of one chapter)--Standard 511 IEEE Industrial Electronics Society
- IEEE Grey Book Standards Revision Working Group (contributor to one chapter), Standard 241 IEEE Industry Applications Society

Administrative Committee IEEE Intelligent Transportation Systems Council (2001-2003)
Board of Governors, IEEE Intelligent Transportation Systems Society (2004-2008)
IEEE Power Engineering Society

- Active in many working groups and task forces

Conference Chair, 2004 North American Power Symposium

Funded Research Grants from the Past Five Years:
[1.] Johnson, B.K. and J.D. Law. "Subsynchronous Resonance Risk Assessment and Countermeasures," LASR (with SEL), Mar. 2012-Jan. 2013, $35,881
[2.] Wall, R. W. (PI), (80%), D. Bauer and B.K. Johnson, Improving Pedestrian Safety at Signalized Intersections", USDOT UTC, Aug. 2011-Aug. 2012, $120,281.
[3.] Wall, R.W. (PI), (90%), and B.K. Johnson, "Smart Signals Countdown Pedestrian Signal", USDOT UTC, Aug. 2010-Aug. 2011, $124,633

[4.] Hess, H.L, and Johnson B.K., "AESD Auxiliary Power System Modification Feasibility Study" General Dynamics Information Technology, $24,871, Sept. 2010-Aug. 2011

[5.] Wall, R. and Johnson, B., "Closed Loop Operation of Network Based Accessible Pedestrian Signals." University Transportation Centers Program, Research and Special Programs Division, U.S. Department of Transportation, $124,633, Oct. 2010-July 2011.

[6.] Wall, R., Johnson, B, and Kyte, M., "Closed Loop Operation of Network Based Accessible Pedestrian Signals." University Transportation Centers Program, Research and Special Programs Division, U.S. Dept. of Transportation, $111,723, Sept. 2009-Jan. 2011.

[7.] Hess, H.L, and Johnson B.K., "SEAJET Battery Charger Control," Naval Surface Warfare Center/Acoustics Research Division, Bayview $24,871, Sept. 2009-Aug, 2010

[8.] Hess, H.L, and Johnson B.K., "LSV2 Battery Charger Control," Naval Surface Warfare Center/Acoustics Research Division, Bayview $24,871, Sept. 2008-Aug. 2009

[9.] Frenzel J.F., Wall, R.W. and Johnson, B.K., "Commercialization and Field Distribution of Smart Pedestrian Call Signals", USDOT UTC, $117, 357,Sept. 2008-Aug. 2009.

[10.] Wall, R.W., Frenzel, J.F., and Johnson, B.K., "Street Deployment Pedestrian Smart Signals," University Transportation Centers Program, Research and Special Programs Division, U.S. Department of Transportation, $85,099, Sept. 2008-Dec. 2009.

[11.] Hess, H.L., and Johnson. B.K., Advanced Electric Ship Demonstrator (SEAJET) Propulsion Powering Study," Naval Surface Warfare Center/Acoustics Research Division, Bayview, $24,900, Sept. 2007-Dec. 2008.

[12.] Dixon, M., Abdel-Rahim, A., and Johnson, B.K., "Mobile Data Collection System Enhancement, Deployment, and Testing," University Transportation Centers Program, Research and Special Programs Division, U.S. Department of Transportation, $133,625, Sept. 2007-Aug. 2008.

[13.] Johnson, B.K. and Hess, H.L. "Power Management of Small Naval Vehicles," Department of Defense EPSCoR Program, Office of Naval Research, $554,802, June 2007-May 2010.

Significant Publications (*denotes graduate student co-authors):

[1.] Taylor, D.I.*, J.D. Law, B.K. Johnson, and N. Fischer. "Single-Phase Transformer Inrush Current Reduction Using Prefluxing," *IEEE Transactions on Power Delivery*, Vol. 27, No. 1, January 2012, pp. 245-252.

[2.] A. Abdel-Rahim, P. Oman, B. Johnson and L. Tung, "Survivability Analysis of Large-Scale Intelligent Transportation System Networks ," *Transportation Research Record: Journal of the Transportation Research Board*, No. 2022, TRB of the National Academies, 2007, pp. 9-20.

[3.] M.P. Bahrman and B.K. Johnson, "The ABCs of HVDC Transmission Technologies," *IEEE Power and Energy Magazine.* Vol. 5, No. 2, pp. 32-44, March-April 2007.

[4.] W.V. Hassenzahl, D.W. Hazelton, B.K. Johnson, P. Komarek, M. Noe, and C.T. Reis, "Electric Power Applications of Superconductivity," *Proceedings of the IEEE.* Vol. 92, No. 10, pp. 1655-1674, October 2004

[5.] D. Bullock, B. Johnson, R.B. Wells, M. Kyte, and Z. Li, "Hardware in the Loop Simulation," *Transportation Research. Part C: Emerging Technologies*. Vol. 12, Issue 1, pp 73-89, February 2004.

[6.] P.F. Ribeiro, B.K. Johnson, M.L. Crow, A. Arsoy, and Y. Liu, "Energy Storage Systems for Advanced Power Applications," *Proceedings of the IEEE*. Vol. 89, No. 12, December 2001, pp 1744-1756

Current and Pending Support for Brian K. Johnson

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Brian K. Johnson	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Improving Pedestrian Safety at Signalized Intersections

Source of Support: US Department of Transportation UTC

Total Award Amount: $120,281 Total Award Period Covered: 8/1/2011 – 8/31/2012

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Subsynchronous Resonance Risk Assessment and Countermeasures

Source of Support: Laboratory for Applied Science and Research w/SEL

Total Award Amount: $ 31,126 Total Award Period Covered: 3/1/2011 – 1/31/2013

Location of Project: Post Falls, ID w/LASR

Person-Months Per Year Committed to the Project. Cal: 1.2 Acad: .28 Sumr: .69

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Renewable Energy Balancing

Source of Support: Shell Energy North America

Total Award Amount: $ 75,000 Total Award Period Covered: 1/1/2012—6/30/2012

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: 1.8 Acad: .14 Sumr: .46

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Optimal Allocation of FACTS Devices and PMUs in Qatar Power Grid

Source of Support: University of Qatar

Total Award Amount: $142,880 Total Award Period Covered: 7/1/2012-6/30/2014

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: 1 Acad: .45 Sumr: .92

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: Static Compensation Controlled via Synchrophasers to Enhance Operation in Future Qatar Smart Power System

Source of Support: University of Qatar

Total Award Amount: $ 142,886 Total Award Period Covered: 7/1/2012-6/30/2014

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: Acad: .45 Sumr: .92

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*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Current and Pending Support for Brian K. Johnson

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Brian K. Johnson	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title: IGEM Proposal: Multidisciplinary Cyber Security Faculty Cluster

Source of Support: Idaho SBOE/HERC
Total Award Amount: $1,982,800 Total Award Period Covered: 7/1/2012 – 6/30/2015
Location of Project: Moscow, ID Campus
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title:

Source of Support: GE Global Research
Total Award Amount: Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title:

Source of Support: L
Total Award Amount: Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title:

Source of Support:
Total Award Amount: Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support
Project/Proposal Title:

Source of Support:
Total Award Amount: Total Award Period Covered:
Location of Project:
Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Biographical Sketch for Katherine G. Aiken, Ph.D.

1. Professional Preparation

B.A., History, 1972, University of Idaho
M.A., History, 1974, University of Oregon
Ph.D. History, 1980, Washington State University

2. Appointments

a. Associate Dean, Continuing Education, Lewis Clark State College, 1980-1984
b. Project Director, "Humanities Programs for Rurally Isolated Nontraditional Students," National Endowment for the Humanities—Lewis Clark State College, 1985-1987
c. Assistant Professor of History, Univ. of Idaho, 1988-1994
d. Associate Professor of History, Univ. of Idaho, 1994-2000
e. Professor of History and Chair, Univ. of Idaho, 2000 to 2005
f. Associate Dean, College of Graduate Studies, Univ. Idaho, Spring 2003 and 2004
g. Associate Dean, College of Letters, Arts and Social Sciences, Univ. Idaho, 2005-2006
Dean, College of Letters, Arts and Social Sciences, Univ. of Idaho, July 2006 to present

3. Scholarly Activity

- Relevant Publication
    - *Idaho: The Heroic Journey* (with Kevin Marsh and Laura Woodworth-Ney), Cherbo Publishing, 2006.
    - *Kellogg Idaho's Bunker Hill: The Rise and Fall of a Great Mining Company, 1885-1981*, University of Oklahoma Press, 2005.
    - "Senator Church and His Constituents," in Russell A. Miller, ed., *U.S. National Security, Intelligence and Democracy: From the Church Committee to the War on Terror,* Routledge, 2008, 76-95.
    - "Idaho," in Benjamin F. Shearer, ed., *The United States: The Story of Statehood for the Fifty United States,* Greenwood Press, 2004, vol. 1:325-356.

- Graduate Students: Major Professor
    - 20 completed M.A. students since 1990
    - 6 completed Ph.D. students since 1991
    - Member of over 55 graduate committees since 1990
- Project Director/lead scholar grants from Idaho Humanities Council and National Endowment for the Humanities
- Project Humanist for twenty-eight Idaho Humanities Council Projects
- Over fifty public presentations and teacher institutes in last ten years
- Idaho State Board of Education Certification of Teacher Education Programs Team (College of Idaho, BYU-Idaho and Northwest Nazarene)
- State of Idaho, Department of Education, Professional Standards Commission, 2008—present
- Panelist for National Endowment for the Humanities nine times
- Consultant for United States Department of Justice
- Idaho Humanities Council Chair

Honors and Awards

- Idaho Woman Making History Award, 2011
- University of Idaho Panhellenic Council Outstanding Faculty Award, 1989 and 2009
- Virginia Woolf Distinguished Service Award, University of Idaho Women's Center, 2006
- Phi Kappa Phi Distinguished Professor, 2005
- Associated Students, University of Idaho, Outstanding Faculty Award, 2000 and 2004
- University of Idaho Professional Women's Association Woman of the Year, 2003
- Organization of American Historians/Japanese Association for American Studies Residency in Japan, Rikkyo University, 2001
- Student Disabilities Services Outstanding Faculty Award, 2001
- University of Idaho Award for Teaching Excellence, 2000
- Faculty Fellow, Excellence in Teaching the Humanities Program, 1998-99
- Naval ROTC Faculty Excellence Award, 1998, 1999
- Idaho Humanities Council Fellowship, 1991-1992
- Alumni Award for Excellence, 1989, 1996, 2000, 2003, 2007, 2009
- National Endowment for the Humanities Fellowship for College Teachers, 1983
- National Endowment for the Humanities Summer Seminar, 1981

4. Role, Synergistic Activities

Katherine Aiken's role in this project is to facilitate the social science elements. Her expertise in Idaho history will allow her to assist in framing social science research within the Idaho experience.

College of Letters, Arts & Social Sciences faculty are currently working on two major initiatives that feature research plans that are relevant to this proposal. With funding from MICRON, faculty have conducted focus groups in twenty Idaho communities to determine attitudes towards Science, Technology, Engineering, and Mathematics (STEM) education. They have developed a series of surveys based on information gleaned from the focus groups and are evaluating data from both sources. The James A. and Louise McClure Center for Public Policy Research is currently surveying Idahoans' attitudes towards energy and energy policy. Under the auspices of a grant from Idaho National Laboratories and Idaho Power Company, social scientists will analyze the survey results and write a white paper on Idaho residents' attitudes toward various sources of energy.

In a similar vein, the social scientist collaborator on this project will conduct research designed to determine the human responses to various implementation schemes for cyber-security.

Dr. Aiken will oversee the hiring of a social scientist and the creation of a social science research team who will work with other project participants to ensure that the information infrastructure and the products created align with community responses and considerations.

Current and Pending Support for Katherine Aiken

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Katherine Aiken	Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: ☐ Current ☒ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title: IGEM Proposal: Multidisciplinary Cyber Security Faculty Cluster

Source of Support: Idaho SBOE/HERC

Total Award Amount: $1,982,800 Total Award Period Covered: 7/1/2012 – 6/30/2015

Location of Project: Moscow, ID Campus

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support: GE Global Research

Total Award Amount: Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support: L

Total Award Amount: Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future ☐ *Transfer of Support

Project/Proposal Title:

Source of Support:

Total Award Amount: Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project. Cal: Acad: Sumr:

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*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Appendix C: Non-faculty Researchers and Letters of Support

Capabilities and responsibilities of non-faculty researchers: In addition to the hiring of five tenure-track faculty members, this proposal includes the hiring of a research software engineer and provides funds for a visiting faculty member.

The research software engineer will be an individual with a PhD in computer science with an emphasis in software engineering for secure systems. This person will be required to have a strong publication and research record and potential to work independently, to interact with industrial partners and to assist in the development of grant proposals for external funding. Thei primary job duties will involve working with cyber-security faculty in support of externally funded research projects (partially funded by these projects) by writing technical papers and reports, assisting student researchers and conducting independent research. In addition job duties will include working with the faculty in establishing and maintaining relationships with industrial partners, assisting in knowledge and technology transfer, assisting in development of external research proposals and assisting in the development and management of the software security testing laboratory.

The visiting faculty member will join us in the third year. By that time we will have expanded our relationships with industrial partners and our external research grants. We anticipate that there will be an area of cyber-security research where we have need of an external expert. We expect to bring on board an associate professor of computer science who will be on sabbatical from their home university and is interested in helping us strengthen our program in an area of need. This person will have to have a strong research and publication record in cyber-security and ability and interest in working with industrial partners.

Support from industrial partners: We have attached letters of support from some of our industrial partners who have all expressed an interest in seeing the project move forward. Several have expressed willing to explore potential joint hires and financial support for this project. These partners have a history of partnering with the university and providing funding for various projects.

Schweitzer Engineering has committed to supporting our joint hire in electrical and computer engineering in the power field with an emphasis on cyber-security for the power grid. They have committed to fund part of the start-up package for this joint hire as well.

Avista Corp.
1411 East Mission PO Box 3727
Spokane, Washington 99220-3727
Telephone 509-489-0500
Toll Free 800-727-9170

AVISTA Corp.

April 20, 2012

To the IGEM Evaluation Committee,

Avista Corporation is pleased to strongly support the University of Idaho's interdisciplinary cyber security proposal. As a corporation that owns and operates a multi-state energy transmission and distribution system (both electric and natural gas) we understand the need for investment in cyber security research and education. We see the needs for enhanced cyber security in our business operations computers, our public-facing websites; our systems control software and the communications infrastructure that allows us to support remote command and control of the critical power infrastructure that we support. A serious cyber attack against the natural gas and electric power infrastructure would be devastating to the citizens and industry in our service territory (Idaho, Oregon, and Washington).

The UI proposal is very interesting in the way they have structured a cluster of faculty hires to augment existing research and education expertise. This cluster of faculty will not support just a single department, but spans four separate departments touching on not only the key computer science faculty, but bringing in domain experts from power and transportation as well as the sociological side. We were pleased to see a break-down of the traditional barriers between departments and to see engineers and computer scientists interested in understanding and addressing the needs of the users of their technology and the impact it may have on quality of life in Idaho.

Avista Corporation serves an area roughly the size of South Carolina. Our customer base includes the second largest city in Washington and the growing population centers of the Idaho panhandle. Accordingly, we value secure service and are greatly encouraged by the potential value that the cyber security proposal brings to Avista.

In conclusion, I strongly recommend that you support the University of Idaho cyber security IGEM proposal, and I thank the state of Idaho for investing in the future of Idaho's economy by supporting such important research areas such as cyber security for critical information infrastructures.

Sincerely,

Tracy L. Rolstad
Senior Power System Consultant

450 W. MCGREGOR
BOISE, ID 83705
WWW.PEDSAFETY.COM

April 16, 2012

To IGEM Evaluation Committee,

Campbell Company is pleased to strongly support the University of Idaho's interdisciplinary cyber security proposal. As a corporation that designs and manufactures products that communicate via networks we understand the need for investment in cyber security research and education. We see the needs for enhanced cyber security in our business operations computers, our public-facing websites, our manufacturing control software and the communications infrastructure that allows us to support remote command and control of the critical power infrastructure that we support.

The UI proposal is interesting in the way they have structured a cluster of faculty hires to augment existing research and education expertise. This cluster of faculty will not support just a single department, but spans four separate departments touching on not only the key computer science faculty, but bringing in domain experts from power and transportation as well as the sociological side. We were pleased to see a break-down of the traditional barriers between departments and to see engineers and computer scientists interested in understanding and addressing the needs of the users of their technology and the impact it may have on quality of life in Idaho.

End user agencies are becoming dependent on the data reporting of our APS products. Accessibility and security are key concerns for engineers in the transportation segment. These are often at different ends of the concerns spectrum. The "cluster" design of this group will allow each of the specific concerns to be discussed in concert with the whole. These solution set to these concerns has a strong impact on the future viability of our products.

In conclusion, I strongly recommend that you support the University of Idaho cyber security IGEM proposal, and I thank the state of Idaho for investing in the future of Idaho's economy by supporting such important research areas such as cyber security for critical information infrastructures.

Best Regards,

Phil Tate

aha products group

April 16, 2012

To IGEM Evaluation Committee,

The AHA Products Group of Comtech EF Data Corporation is pleased to support the University of Idaho's interdisciplinary IGEM proposal, "Interdisciplinary Cyber Security Faculty Cluster". As a corporation that develops and produces products for telecommunications, we are keenly aware of the need for investment in education for critical information infrastructure. We see the need for reliable and secure computing and communication in our products, our business operations, our public-facing websites, our manufacturing control software and the communications infrastructure that we depend on.

We find the UI proposal interesting and unusual in that it does not narrowly focus on a particular discipline or academic program, but spans multiple departments and research entities, breaking down traditional barriers between departments and brings experts from different disciplines together to address the needs of the users of their technology and the impact it may have on quality of life in Idaho.

My company was founded over 20 years ago as a result of collaborative research with the University of Idaho and NASA. We continue to employ engineering graduates from the University of Idaho and provide high salaried employment within the state. I believe that the IGEM proposal has the potential to similary increase the technology base in Idaho and establish Idaho as a leader in the field of cyber security and critical information infrastructure. This field is growing in importance to e-commerce,tele-communications and all of industry and one of great interest to my company.

In conclusion, I strongly recommend that you support the University of Idaho Critical Information Infrastructure IGEM proposal. I thank the state of Idaho for investing in the future of Idaho's economy by supporting such important research areas such as cyber security for critical information infrastructures.

Best regards,

Bill

Bill Thomson

General Manager
AHA Products Group
Comtech EF Data Corporation
1126 Alturas Dr.
Moscow, Id. 83843

Lisa A. Grow
Senior Vice President
Power Supply

IDAHO POWER®
An IDACORP Company

April 16, 2012

To IGEM Evaluation Committee:

Idaho Power is pleased to strongly support the University of Idaho's interdisciplinary cyber security proposal. As an electric utility that relies on cyber security to deliver reliable electricity to southern Idaho and eastern Oregon, we understand the need for investment in cyber security research and education. We see the need for enhanced cyber security in our business operations computers, our public-facing websites, the new advanced metering systems, and the systems that control the generators and the operation of the grid infrastructure.

The UI proposal is very interesting in the way they have structured a cluster of faculty hires to augment existing research and education expertise. This cluster of faculty will not support just a single department but spans four separate departments touching on the key computer science faculty while bringing in domain experts from power and transportation as well as the sociological side. We were pleased to see a break-down of the traditional barriers between departments and to see engineers and computer scientists interested in understanding and addressing the needs of the users of their technology and the impact it may have on quality of life in Idaho.

Idaho Power has been a vital part of the economies of southern Idaho and eastern Oregon for almost one hundred years. In the last ten years our industry has seen historic technological innovation that has exponentially surpassed that which occurred in the previous ninety years. We have also seen a commensurate increase in customers' requirements and expectations. This convergence requires ongoing innovation, and we believe it is critical for us to partner with the state's universities and government to ensure we continue to deliver fair-priced, reliable electric service. However, this is not just an Idaho challenge. Because this is a global challenge, this could be a competitive edge for our state. We believe this could be a catalyst for a new industry creation.

In conclusion, I fervently recommend that you support the University of Idaho cyber security IGEM proposal, and I thank the state of Idaho for investing in the future of Idaho's economy by supporting important research areas such as cyber security for critical information infrastructures.

Sincerely,

Lisa Grow

1221 W. Idaho St. (83702)
P.O. Box 70
Boise, ID 83707

POWER ENGINEERS, INC.

2041 SOUTH COBALT POINT WAY
MERIDIAN, ID 83642 USA

PHONE 208-288-6100
FAX 208-288-6199

April 18, 2012

ENERGY
FACILITIES
COMMUNICATIONS
ENVIRONMENTAL

Larry Stauffer
Interim Dean
University of Idaho
College of Engineering
PO Box 441011
Moscow, ID 83844-1011

Dear Dean Stauffer:

POWER Engineers is pleased to strongly support the University of Idaho's interdisciplinary cyber security proposal. As a corporation that designs electric power infrastructure, we understand the need for investment in cyber security research and education. We see the need for enhanced cyber security in our engineering design solutions for electric power generation, delivery and industrial use. A serious cyber attack against the power infrastructure would be devastating to the citizens and industry in the state. Our ability to employ professionals having specific training in these areas is a benefit to the employees, our clients, this company, and the State of Idaho.

The UI proposal is very interesting in the way they have structured a cluster of faculty hires to augment existing research and education expertise. This cluster of faculty will not support just a single department, but spans four separate departments touching on not only the key computer science faculty, but bringing in domain experts from power and transportation as well as the sociological side. We were pleased to see a break-down of the traditional barriers between departments and to see engineers and computer scientists interested in understanding and addressing the needs of the users of their technology and the impact it may have on quality of life in Idaho.

POWER was founded in Idaho in 1976 and has grown to over 1500 employees across the US and in several foreign countries. Our focus is on the design of substations, transmission lines, power plants and the industrial facilities that use electric power. The safe, secure, dependable delivery of electric power requires that our designs be resistant to cyber attack. This requirement creates the opportunity for POWER to become more competitive by hiring and developing experts in this technical field. By working together to develop this program, the University of Idaho, its graduates, their employers (including POWER), and our clients all become more competitive as we address the threat of cyber attack.

In conclusion, I strongly recommend that you support the University of Idaho cyber security IGEM proposal, and I thank the state of Idaho for investing in the future of Idaho's economy by supporting such important research areas such as cyber security for critical information infrastructures.

Sincerely,

Bill Eisinger
Executive Vice President

c: John Kumm

Appendix D: Proposed Budget

PROPOSAL BUDGET – YEAR ONE, TWO, AND THREE						
Name of Institution: **University of Idaho**						
Name of Project Director: **Jim Alves-Foss**						
A. FACULTY AND STAFF						
Name/Title		Annual Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Jim Alves-Foss, Professor, CS and Director of CSDS		**$ 121,300 / AY**		**2.78**	**1.05**	**$ 51,900**
Cyber Security, TT, Associate Professor, CS		**$ 105,000 / AY**		**22.5**		**$ 262,500**
Embedded Security, TT, Assistant Professor, CS		**$ 95,000 / AY**		**13.5**		**$ 142,600**
Power, TT, Assistant Professor, EE		**$ 85,000 / AY**		**13.5**		**$ 127,600**
Transportation, TT Assistant Professor, CE		**$ 85,000 / AY**		**18.0**		**$ 170,000**
Social Research, TT Associate Professor, Sociology		**$ 75,000 / AY**		**22.5**		**$ 187,500**
Cyber Security, NTT Research Software Engineer, CSDS		**$ 90,000 / FY**	**22.5**			**$ 168,800**
% OF TOTAL BUDGET	**56.0%**	**SUBTOTAL**				**$ 1,110,900**
B. FACULTY AND STAFF						
Name/Title		Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Visiting Faculty		**$ 100,000 / AY**		**4.5**		**$ 50,000**
% OF TOTAL BUDGET	**2.5%**	**SUBTOTAL**				**$ 50,000**
C. POST DOCTORAL ASSOCIATES/OTHER PROFESSIONALS						
Name/Title		Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Computer Systems, Staff CSDS		**$ 65,000 / FY**	**22.5**			**$ 121,900**
% OF TOTAL BUDGET	**6.1%**	**SUBTOTAL**				**$ 121,900**
D. GRADUATE/UNDERGRADUATE STUDENTS						
Name/Title		Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
% OF TOTAL BUDGET		**SUBTOTAL**				**% OF TOTAL BUDGET**

E. FRINGE BENEFITS

Rate of Pay %	Salary Base	Dollar Amount Requested
University of Idaho to pay fringe benefits for all above employees		
	SUBTOTAL:	

F. EQUIPMENT (List each item with a cost in excess of $1000.00.)

Item/Description	Dollar Amount Requested
Computing and test equipment w/software	**$ 70,000**
SUBTOTAL:	**$ 70,000**

G. TRAVEL

Dates of Travel (from/to)	No. of Persons	Total Days	Transportation	Lodging	Per Deim	Dollar Amount Requested
Various						**$ 75,000**
					SUBTOTAL:	**$ 75,000**

H. Participant Support Costs

	Dollar Amount Requested
1. Stipends	
2. Travel (other than listed in section G)	
3. Subsistence	
4. Other	
SUBTOTAL:	

I. OTHER DIRECT COSTS	Dollar Amount Requested
1. Materials and Supplies **- software, moving expense, supplies, fees, workshop support, etc.**	**$ 155,000**
2. Publication Costs/Page Charges	
3. Consulting Services (Include Travel Expenses)	
4. Computer Services	
5. Subcontracts	
6. Other (specify nature & breakdown if over $1000) **- Start-up Funds targeted to support individual hires**	**$ 400,000**
SUBTOTAL:	**$ 555,000**
J. TOTAL COSTS (Add subtotals, sections A through I) **TOTAL:**	**$ 1,982,800**
K. AMOUNT REQUESTED **TOTAL:**	**$ 1,982,800**
Project Director's Signature	Date: **Apr 20, 2012**

INSTITUTIONAL AND OTHER SECTOR SUPPORT – YEARS ONE, TWO, AND THREE
(add additional pages as necessary)

A. INSTITUTIONAL / OTHER SECTOR DOLLARS

Source / Description	Amount
Fringe Benefits from UI and external funds	$528,400
Faculty/research salaries from external grants, contracts, partnerships and joint hires	$365,600
Startup Funds	$125,000
Equipment and Software from external donations	$105,000

B. FACULTY / STAFF POSITIONS

Description
Two faculty positions will be funded 50% for two years through partnerships with industry.
Visiting faculty member will be funded 50% from external sources in third year
Research Engineering will be funded 37.5% and 50% in second and third years from external sources

C. CAPITAL EQUIPMENT

Description
The hardware and software needs for the software security testing lab will be determined through conversations with industry
partners, to ensure that the lab is adequately equipped. We will then solicit donations in support of this lab.
We will solicit donations to enhance the power and transportation labs in support of research goals of our industry partners.

D. FACILITIES & INSTRUMENTATION

Description

PROPOSAL BUDGET – YEAR ONE

Name of Institution: **University of Idaho**

Name of Project Director: **Jim Alves-Foss**

L. FACULTY AND STAFF

Name/Title	Annual Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Jim Alves-Foss, Professor, CS and Director of CSDS	**$ 121,300 / AY**		**0.92**	**0.35**	**$ 17,300**
Cyber Security, TT, Associate Professor, CS	**$ 105,000 / AY**		**4.50**		**$ 52,500**
Embedded Security, TT, Assistant Professor, CS	**$ 95,000 / AY**		**2.25**		**$ 23,800**
Power, TT, Assistant Professor, EE	**$ 85,000 / AY**		**2.25**		**$ 21,300**
Transportation, TT Assistant Professor, CE	**$ 85,000 / AY**		**0.00**		**$ 0**
Social Research, TT Associate Professor, Sociology	**$ 75,000 / AY**		**4.50**		**$ 37,500**
Cyber Security, NTT Research Software Engineer, CSDS	**$ 90,000 / FY**	**9.0**			**$ 67,500**
% OF TOTAL BUDGET **34.3%**	**SUBTOTAL**				**$ 219,900**

M. FACULTY AND STAFF

Name/Title	Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Visiting Faculty	**$ 100,000 / AY**		**0.00**		**$ 0**
% OF TOTAL BUDGET	**SUBTOTAL**				**$ 0**

N. POST DOCTORAL ASSOCIATES/OTHER PROFESSIONALS

Name/Title	Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Computer Systems, Staff CSDS	**$ 65,000 / FY**	**9.0**			**$ 48,800**
% OF TOTAL BUDGET **7.6%**	**SUBTOTAL**				**$ 48,800**

O. GRADUATE/UNDERGRADUATE STUDENTS

Name/Title	Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
% OF TOTAL BUDGET	**SUBTOTAL**				**% OF TOTAL BUDGET**

P. FRINGE BENEFITS

Rate of Pay %	Salary Base	Dollar Amount Requested
University of Idaho to pay fringe benefits for all above employees		
	SUBTOTAL:	

Q. EQUIPMENT (List each item with a cost in excess of $1000.00.)

Item/Description	Dollar Amount Requested
Computing and test equipment w/software	**$ 50,000**
SUBTOTAL:	**$ 50,000**

R. TRAVEL

Dates of Travel (from/to)	No. of Persons	Total Days	Transportation	Lodging	Per Deim	Dollar Amount Requested
Various						**$ 25,000**
					SUBTOTAL:	**$ 25,000**

S. Participant Support Costs

	Dollar Amount Requested
5. Stipends	
6. Travel (other than listed in section G)	
7. Subsistence	
8. Other	
SUBTOTAL:	

T. OTHER DIRECT COSTS	Dollar Amount Requested
7. Materials and Supplies **- software, moving expense, supplies, fees, workshop support, etc.**	**$ 96,500**
8. Publication Costs/Page Charges	
9. Consulting Services (Include Travel Expenses)	
10. Computer Services	
11. Subcontracts	
12. Other (specify nature & breakdown if over $1000) **- Start-up Funds targeted to support individual hires**	**$ 200,000**
SUBTOTAL:	**$ 296,500**
U. TOTAL COSTS (Add subtotals, sections A through I) **TOTAL:**	**$ 640,200**
V. AMOUNT REQUESTED **TOTAL:**	**$ 640,200**
Project Director's Signature	Date: **Apr 20, 2012**

INSTITUTIONAL AND OTHER SECTOR SUPPORT – YEAR ONE
(add additional pages as necessary)

A. INSTITUTIONAL / OTHER SECTOR DOLLARS

Source / Description	Amount
Fringe Benefits from UI and external funds	$ 88,400
Faculty/research salaries from external grants, contracts, partnerships and joint hires	$ 45,000
Startup Funds	
Equipment and Software from external donations	$ 25,000

B. FACULTY / STAFF POSITIONS

Description
Two faculty positions will be funded 50% for two years through partnerships with industry for the second half of the first year.

C. CAPITAL EQUIPMENT

Description
The hardware and software needs for the software security testing lab will be determined through conversations with industry
partners, to ensure that the lab is adequately equipped. We will then solicit donations in support of this lab.
We will solicit donations to enhance the power and transportation labs in support of research goals of our industry partners.

D. FACILITIES & INSTRUMENTATION

Description

PROPOSAL BUDGET – YEAR TWO

Name of Institution: **University of Idaho**

Name of Project Director: **Jim Alves-Foss**

W. FACULTY AND STAFF

Name/Title	Annual Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Jim Alves-Foss, Professor, CS and Director of CSDS	**$ 121,300 / AY**		**0.92**	**0.35**	**$ 17,300**
Cyber Security, TT, Associate Professor, CS	**$ 105,000 / AY**		**9.00**		**$ 105,000**
Embedded Security, TT, Assistant Professor, CS	**$ 95,000 / AY**		**4.50**		**$ 47,500**
Power, TT, Assistant Professor, EE	**$ 85,000 / AY**		**4.50**		**$ 42,500**
Transportation, TT Assistant Professor, CE	**$ 85,000 / AY**		**9.00**		**$ 85,000**
Social Research, TT Associate Professor, Sociology	**$ 75,000 / AY**		**9.00**		**$ 75,000**
Cyber Security, NTT Research Software Engineer, CSDS	**$ 90,000 / FY**	**7.5**			**$ 56,300**
% OF TOTAL BUDGET **64.2%**	**SUBTOTAL**				**$ 428,600**

X. FACULTY AND STAFF

Name/Title	Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Visiting Faculty	**$ 100,000 / AY**		**0.00**		**$ 0**
% OF TOTAL BUDGET	**SUBTOTAL**				**$ 0**

Y. POST DOCTORAL ASSOCIATES/OTHER PROFESSIONALS

Name/Title	Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
Computer Systems, Staff CSDS	**$ 65,000 / FY**	**7.5**			**$ 40,600**
% OF TOTAL BUDGET **6.1%**	**SUBTOTAL**				**$ 40,600**

Z. GRADUATE/UNDERGRADUATE STUDENTS

Name/Title	Rate of Pay	No. of Months CAL	ACA	SUM	Dollar Amount Requested
% OF TOTAL BUDGET	**SUBTOTAL**				**% OF TOTAL BUDGET**

AA. FRINGE BENEFITS

Rate of Pay %	Salary Base	Dollar Amount Requested
University of Idaho to pay fringe benefits for all above employees		
	SUBTOTAL:	

BB. EQUIPMENT (List each item with a cost in excess of $1000.00.)

Item/Description	Dollar Amount Requested
Computing and test equipment w/software	**$ 10,000**
SUBTOTAL:	**$ 10,000**

CC. TRAVEL

Dates of Travel (from/to)	No. of Persons	Total Days	Transportation	Lodging	Per Deim	Dollar Amount Requested
Various						**$ 25,000**
					SUBTOTAL:	**$ 25,000**

DD. Participant Support Costs

	Dollar Amount Requested
9. Stipends	
10. Travel (other than listed in section G)	
11. Subsistence	
12. Other	
SUBTOTAL:	

EE. OTHER DIRECT COSTS	Dollar Amount Requested
13. Materials and Supplies **- software, moving expense, supplies, fees, workshop support, etc.**	**$ 38,500**
14. Publication Costs/Page Charges	
15. Consulting Services (Include Travel Expenses)	
16. Computer Services	
17. Subcontracts	
18. Other (specify nature & breakdown if over $1000) **- Start-up Funds targeted to support individual hires**	**$ 125,000**
SUBTOTAL:	**$ 163,500**
FF. TOTAL COSTS (Add subtotals, sections A through I) **TOTAL:**	**$ 667,700**
GG. AMOUNT REQUESTED **TOTAL:**	**$ 667,700**
Project Director's Signature	Date: **Apr 20, 2012**

INSTITUTIONAL AND OTHER SECTOR SUPPORT – YEAR TWO
(add additional pages as necessary)

A. INSTITUTIONAL / OTHER SECTOR DOLLARS Source / Description	Amount
Fringe Benefits from UI and external funds	$201,500
Faculty/research salaries from external grants, contracts, partnerships and joint hires	$148,100
Startup Funds	$ 75,000
Equipment and Software from external donations	$ 40,000

B. FACULTY / STAFF POSITIONS Description
Two faculty positions will be funded 50% through partnerships with industry for the second year.
Research Engineering will be funded 37.5% in second year from external sources

C. CAPITAL EQUIPMENT Description
The hardware and software needs for the software security testing lab will be determined through conversations with industry
partners, to ensure that the lab is adequately equipped. We will then solicit donations in support of this lab.
We will solicit donations to enhance the power and transportation labs in support of research goals of our industry partners.

D. FACILITIES & INSTRUMENTATION Description

PROPOSAL BUDGET – YEAR THREE						
Name of Institution: **University of Idaho**						
Name of Project Director: **Jim Alves-Foss**						
HH. FACULTY AND STAFF						
			No. of Months			
Name/Title		Annual Rate of Pay	CAL	ACA	SUM	Dollar Amount Requested
Jim Alves-Foss, Professor, CS and Director of CSDS		**$ 121,300 / AY**		**0.92**	**0.35**	**$ 17,300**
Cyber Security, TT, Associate Professor, CS		**$ 105,000 / AY**		**9.00**		**$ 105,000**
Embedded Security, TT, Assistant Professor, CS		**$ 95,000 / AY**		**6.75**		**$ 71,300**
Power, TT, Assistant Professor, EE		**$ 85,000 / AY**		**6.75**		**$ 63,800**
Transportation, TT Assistant Professor, CE		**$ 85,000 / AY**		**9.00**		**$ 85,000**
Social Research, TT Associate Professor, Sociology		**$ 75,000 / AY**		**9.00**		**$ 75,000**
Cyber Security, NTT Research Software Engineer, CSDS		**$ 90,000 / FY**	**6.0**			**$ 45,000**
% OF TOTAL BUDGET	**68.5%**	**SUBTOTAL**				**$ 462,400**
II. FACULTY AND STAFF						
			No. of Months			
Name/Title		Rate of Pay	CAL	ACA	SUM	Dollar Amount Requested
Visiting Faculty		**$ 100,000 / AY**		**4.50**		**$ 50,000**
% OF TOTAL BUDGET	**7.4%**	**SUBTOTAL**				**$ 50,000**
JJ. POST DOCTORAL ASSOCIATES/OTHER PROFESSIONALS						
			No. of Months			
Name/Title		Rate of Pay	CAL	ACA	SUM	Dollar Amount Requested
Computer Systems, Staff CSDS		**$ 65,000 / FY**	**6.0**			**$ 32,500**
% OF TOTAL BUDGET	**4.8%**	**SUBTOTAL**				**$ 32,500**
KK. GRADUATE/UNDERGRADUATE STUDENTS						
			No. of Months			
Name/Title		Rate of Pay	CAL	ACA	SUM	Dollar Amount Requested
% OF TOTAL BUDGET		**SUBTOTAL**				**% OF TOTAL BUDGET**

LL. FRINGE BENEFITS

Rate of Pay %	Salary Base	Dollar Amount Requested
University of Idaho to pay fringe benefits for all above employees		
	SUBTOTAL:	

MM. EQUIPMENT (List each item with a cost in excess of $1000.00.)

Item/Description	Dollar Amount Requested
Computing and test equipment w/software	**$ 10,000**
SUBTOTAL:	**$ 10,000**

NN. TRAVEL

Dates of Travel (from/to)	No. of Persons	Total Days	Transportation	Lodging	Per Deim	Dollar Amount Requested
Various						**$ 25,000**
					SUBTOTAL:	**$ 25,000**

OO. Participant Support Costs — Dollar Amount Requested

13. Stipends	
14. Travel (other than listed in section G)	
15. Subsistence	
16. Other	
SUBTOTAL:	

PP. OTHER DIRECT COSTS	Dollar Amount Requested
19. Materials and Supplies **- software, moving expense, supplies, fees, workshop support, etc.**	**$ 20,000**
20. Publication Costs/Page Charges	
21. Consulting Services (Include Travel Expenses)	
22. Computer Services	
23. Subcontracts	
24. Other (specify nature & breakdown if over $1000) **- Start-up Funds targeted to support individual hires**	**$ 75,000**
SUBTOTAL:	**$ 95,000**
QQ. TOTAL COSTS (Add subtotals, sections A through I) **TOTAL:**	**$ 674,900**
RR. AMOUNT REQUESTED **TOTAL:**	**$ 674,900**

Project Director's Signature	Date: **Apr 20, 2012**

INSTITUTIONAL AND OTHER SECTOR SUPPORT – YEAR THREE

(add additional pages as necessary)

A. INSTITUTIONAL / OTHER SECTOR DOLLARS

Source / Description	Amount
Fringe Benefits from UI and external funds	$ 238,500
Faculty/research salaries from external grants, contracts, partnerships and joint hires	$ 172,500
Startup Funds	$ 50,000
Equipment and Software from external donations	$ 40,000

B. FACULTY / STAFF POSITIONS

Description
Two faculty positions will be funded 50% for two years through partnerships with industry, including first half of the third year.
Visiting faculty member will be funded 50% from external sources in third year
Research Engineering will be funded 50% in third year from external sources

C. CAPITAL EQUIPMENT

Description
The hardware and software needs for the software security testing lab will be determined through conversations with industry
partners, to ensure that the lab is adequately equipped. We will then solicit donations in support of this lab.
We will solicit donations to enhance the power and transportation labs in support of research goals of our industry partners.

D. FACILITIES & INSTRUMENTATION

Description