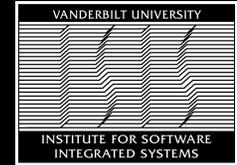


Institute for Software Integrated Systems

Vanderbilt University



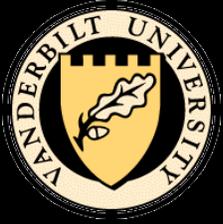
The Science of Security **Virtual Organization**

<http://cps-vo.org/group/sos/>

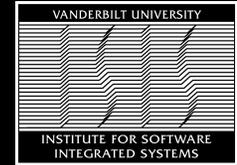
24th Nov 2012

Chris.vanBuskirk@vanderbilt.edu

Frankie King, Katie Dey & Anne Dyson



Outline



- What is the CPS-VO?
 - Objectives
 - Portal Services
 - Current Status & Timelines
- The SoS Presence on the VO
 - The *Science of Security* Group
 - The NSA SoS Lablets
- Planned Future Capabilities
- Discussion



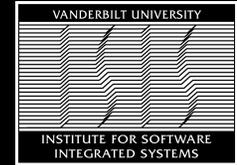
Objectives

- **Community Building**
 - promoting **collaboration** and close interaction between **academia, industry & government**
 - facilitating **interactions across technical disciplines & across applications areas**
 - **cross-fertilization** of research in CPS **Core Sciences and applied research** in domain- and mission-oriented problems in a multi-agency setting
- **Collaboration Support via the website**
 - **information flow** and awareness of CPS activities
 - **collaboration** and professional networking
 - **knowledge repository** to facilitate the open exchange of challenge problems, research results, tools, and educational materials

* Supporting CPS/NITRD community activities



The VO - Building a Collaboration Framework



Differentiators

- *Community*-oriented framework
- Meta-Data
- Taxonomic Search Engine
- Cohesive collection of loosely coupled web-sites (*a.k.a. Groups*)

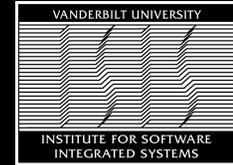
The CPS-VO Portal is not just a "web site"

Available *Group Services*

- Branding
- A Virtual Filesystem
- Revision Control
- Calendar
(*incl. Meeting Mgmt*)
- Discussion Forums
- Email Announcements
- Domain-Specific Search Engine
- Subscriptions Service
- Configurable Security Policies

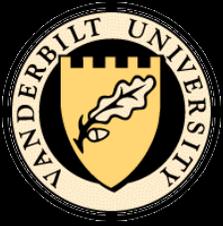


Common Use Cases

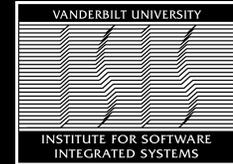


- Research Projects
- Special Interest Groups
- Conference/ Workshop Planning
- Proceedings Archival

| Group Name | Description | Group Type |
|--|--|-------------------------|
| CPS Certification (CERT) | To discuss and identify research needs in the... | Special Interests Group |
| VO Admins | | |
| VO Moderators | * This is group #267 | |
| Medical CPS | The group brings together researchers and... | Special Interests Group |
| Science of Integration | Our mission is to provide reports,.... | Research Project |
| CPS PI Meeting 2010 | Start: Aug 10 2010 End: Aug 12 2010 | Conference Proceedings |
| CPS PIs Group | The CPS PI Group supports information... | Special Interests Group |
| Science of Security | Virtually every computing system today is at... | Special Interests Group |
| DARPA AVM Meta-X | The ultimate goal of the META program is to... | Research Project |
| Automotive | This call for position papers invites you to... | Special Interests Group |
| Aviation | Identify key challenges related to the Next... | Special Interests Group |
| Education | Working with the CPS community, VU-ISIS will... | Special Interests Group |
| CPS PI Meeting 2011 | The CPS Principal Investigator... | Event Planning |
| 2011 HCSS Conference Program Committee | A world class community of researchers will... | Event Planning |
| Transportation | | Special Interests Group |
| National CPS PI Meetings | RELATED EVENTS: • ... | Conference Proceedings |
| Automotive CPS Workshops | The goal of this workshop series is to... | Workshop Proceedings |
| 2011 Automotive CPS Workshop | Workshop for Developing Dependable Automotive... | Workshop Proceedings |
| HCSS Conferences | | Proceedings Archival |
| CPS Architectures | The mission of this online community of CPS... | Special Interests Group |
| NITRD | High Confidence Software and Systems... | Special Interests Group |
| Software Certification Consortium | The SCC is organized to pursue the following... | Special Interests Group |
| Run Time Assurance of Safety Critical Cyber Physical Systems | Our mission is to enable certification... | Special Interests Group |
| 2012 CPS Time-Critical Systems Workshop | | Event Planning |
| 2012 CPS Medical Devices Workshop | | Event Planning |
| Meta-X Private | | Research Project |
| mass mailing | | |
| 2012 HCSS Conference Program Committee | | Event Planning |
| Academic Executive Board | | Special Interests Group |
| NCSU Science of Security Label Research Initiative | | Research Project |
| NSA SoS Labelts | | Research Project |
| CMU Science of Security Label Research Initiative | | Research Project |
| UIUC Science of Security Label Research Initiative | | Research Project |

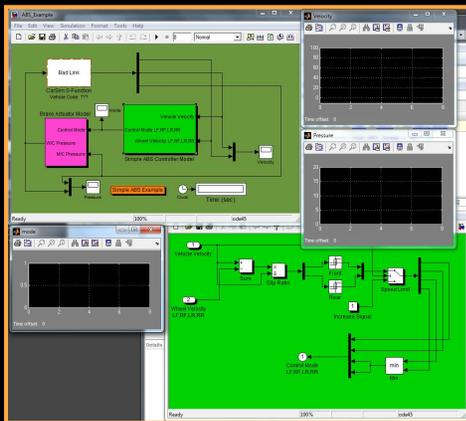


Example Research Project



Science of Integration

- Research Findings
- Meeting Coordination
- Automotive Experimental Platform (AEP)
- Publishing Models



The screenshot shows the Science of Integration website interface. The browser address bar displays 'http://cps-vo.org/group/soi'. The website has a navigation menu with options like 'CPS-VO', 'NEWS', 'BROWSE', 'COLLABORATE', 'SEARCH', 'ADMINISTRATION', and 'MY GROUPS'. A search bar is located in the top right corner. The main content area features a large image of a computer keyboard with a 'Science of Integration' logo. Below the image, there is a mission statement: 'Our mission is to provide reports, presentations and a science-based predictable tool suite to the Cyber Physical Systems (CPS) community related to our work in developing a new Science of Integration for CPS. This new science re-examines the fundamentals of composition in heterogeneous systems, develops foundations and tools for system integration and validates the results in experiments using automotive and avionics System-of-Systems experimental platforms. Building on the rigorous foundations, our aim is to provide the latest theories and methods for achieving constructivity and predictability in CPS integration. Our group includes an interdisciplinary group of researchers in: i) Model-Based Design and Software Engineering from Vanderbilt University (VU) and the University of Maryland (UMD); ii) Systems Science and Engineering from University of Notre Dame (ND) and UMD; iii) Control Theory and Engineering (ND, UMD, VU); iv) Computer Engineering and Networking (VU, UMD); and v) providing simulation-based and real-life electrical architecture testbeds, challenge problems, evaluation metrics, and development tools from General Motors Global R&D Center.'

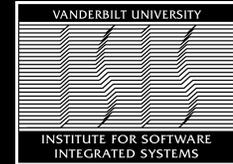
Below the mission statement, there is a list of publications:

- LateralMotionPlot.pdf** (FILE)
Submitted by eyislep on Fri, 2011-11-04 09:46. Contributor:
38.96 KB | 0 views | 0 downloads > Download
- ABS_Example**
- LongitudinalMotionPlot.pdf** (FILE)
Submitted by eyislep on Fri, 2011-11-04 09:46. Contributor:
43.75 KB | 0 views | 0 downloads > Download
- ABS_Example**
- NI-RT_ABS_Vs_No_ABS.wmv** (FILE)
Submitted by eyislep on Thu, 2011-11-03 14:22. Contributor:
1.9 MB | 0 views | 0 downloads > Download
- ABS_Example**

On the right side, there is a 'Group toolbar' with options: Create File, Create Forum topic, Create Event, Create Meeting, Create Page, Create Video, Group forums, Manage group forums, 17 members, and Manager: Xenofon Koutsoukos.



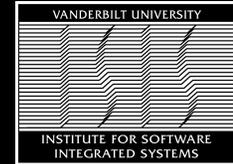
AVM's META-X Software Distribution Website



The screenshot shows a web browser window displaying the MetaX website. The browser's address bar shows the URL <http://cps-vo.org/group/avm/metax>. The website has a dark blue header with navigation tabs: CPS-VO, NEWS, BROWSE, COLLABORATE, SEARCH, ADMINISTRATION, and MY GROUPS. A user greeting "Hello [Chris.vanBuskirk]. > My Account > Log out" is visible. Below the header is a banner image featuring a satellite, a globe, and a DARPA logo. The main content area is titled "DARPA AVM Group" and includes a navigation menu with links for Home, Members, Calendar, Search, MetaX, Help, Moderation, Forums, and Files. A search bar is located on the right. The main content area displays a post titled "The MetaX Tool Suite" submitted by Chris.vanBuskirk on Sun, 2011-10-09 09:08. The post includes a video player showing a grid of software windows and a "Execute Matlab/Simulink Simulation" button. To the right of the video is a section titled "META: Sep'11 Beta Software Release" with a paragraph of text and a numbered list of two options. Below the video and text are several category tags: Design Automation Tools, Automotive, Ground Vehicles, Composition, Modeling, Science of System Integration, Simulation, Verification, Academia, and Videos.



Special Interest Groups: Software Certification Consortium



Software Certification Consortium | CPS-VO

http://cps-vo.org/group/scc

Dashboard [Jenkins] My groups | CPS-VO Automotive | CPS-VO Software Certification Consor...

CPS-VO NEWS BROWSE COLLABORATE SEARCH ADMINISTRATION MY GROUPS Hello [Chris.vanBuskirk.] > My Account > Log out



Software Certification Consortium

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Software Certification Consortium [EDIT] [TAXONOMY] [BROADCAST] [PAGES]

The SCC is organized to pursue the following objectives:

- To promote the scientific understanding of certification for Systems containing Software (ScS) and the standards on which it is based;
- To promote development and improvement of consensus standards supporting certifiable software-intensive systems and their certification, through transfer of knowledge to existing standards organizations;
- To promote public, government and industrial understanding of the concept of ScS certification and the acceptance of the need for certification standards for software related products;
- To co-ordinate software certification initiatives and activities to further the above objectives.

Group toolbar

- > Create File
- > Create Forum topic
- > Create Event
- > Create Meeting
- > Create Page
- > Create Video
- > Group forums
- > Manage group forums
- > Invite colleague
- > **142 members**
- Manager: > pjoannou
- > My membership

Agenda - SCC Meeting 8: Nov 9-10 2011 [FILE]

Submitted by pjoannou on Sun, 2011-10-30 07:15. Contributor: Paul Joannou

83.52 KB | 0 views | 3 downloads > Download

Meeting #8

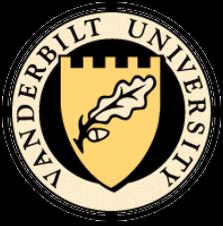
Measuring and Assessing Software Trustworthiness: Approaches and Challenges [FILE]

Submitted by pjoannou on Sun, 2011-09-25 10:27. Contributor: Elizabeth Fong

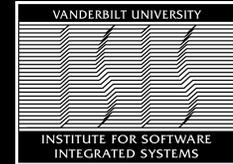
323.32 KB | 0 views | 3 downloads > Download

Presentation Meeting #6

The Rational Design Process Used for the Darlington Shutdown Systems [FILE]



VO-Hosted Conference Proceedings



HCSS

Annapolis, MD

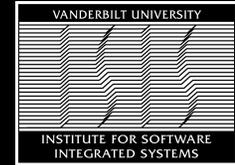
May, 2011

1. Conference Proceedings
2. Program Planning
Upcoming: May, 2012

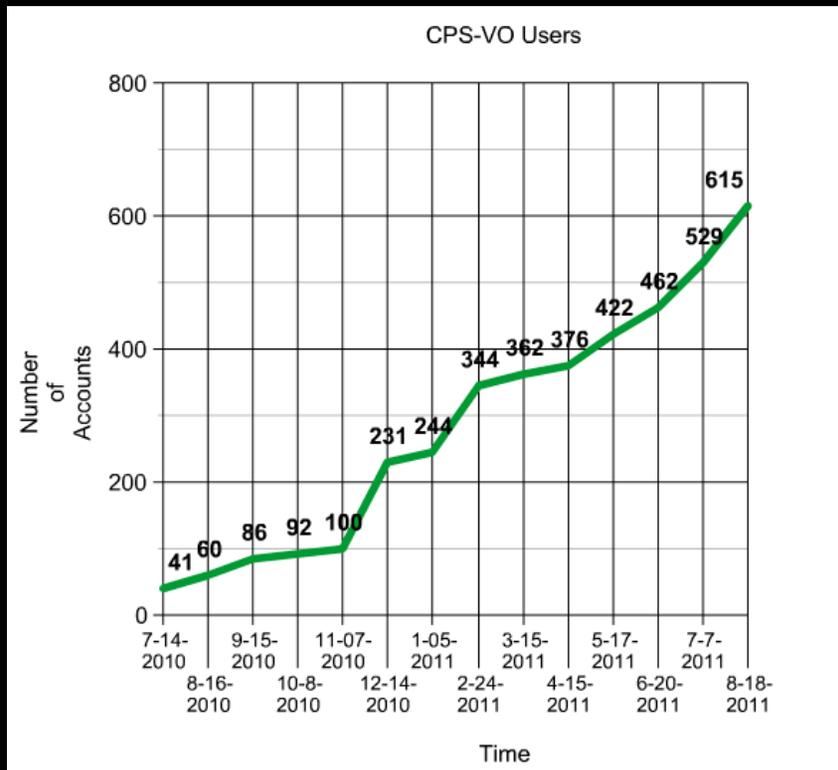
The screenshot shows the website for the High Confidence Software and Systems 11th Annual Conference. The page features a navigation menu with options like 'CPS-VO', 'NEWS', 'BROWSE', 'COLLABORATE', 'SEARCH', 'ADMINISTRATION', and 'MY GROUPS'. A search bar is visible in the top right. The main content area displays a banner for the conference and a list of presentations. Each presentation entry includes the title, submission date, contributor, and a 'Download' link. The right sidebar contains a 'Group toolbar' with options like 'Create File', 'Create Forum topic', and 'Create Event', along with a 'Subgroups' section showing a hierarchy of groups including 'Science of Security' and 'HCSS Conferences'.



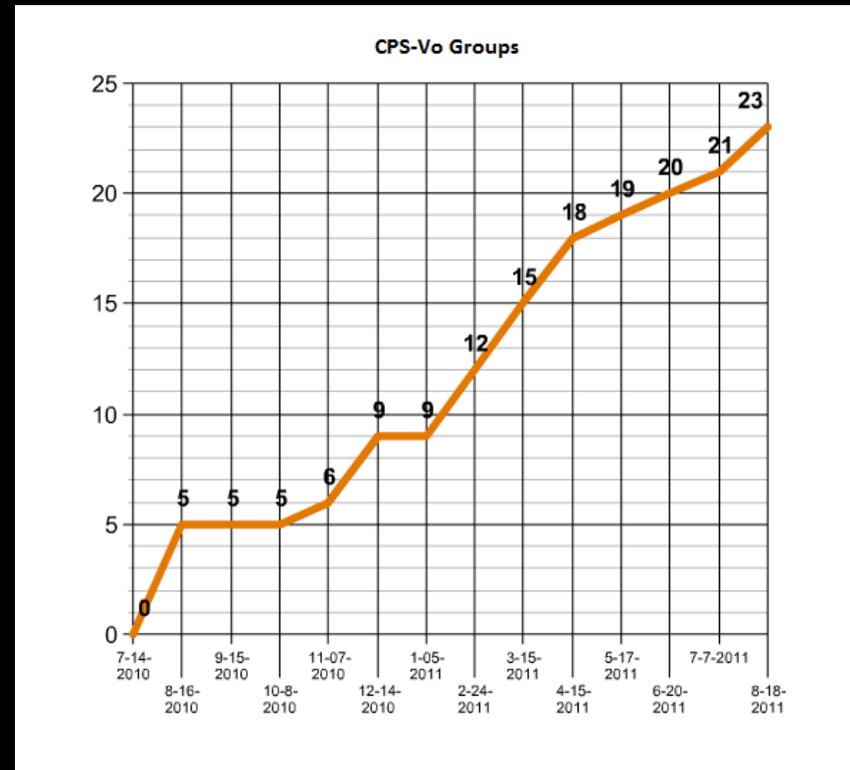
CPS-VO Growth, Year #1



Registered Users



Community Groups

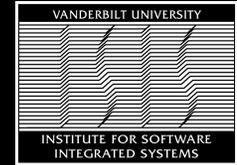


Jan 23rd, 2012: ~850 Users

33 Groups



Outline



- What is the CPS-VO?
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Current Research

[NSA SoS Lablets](#)
[NSF TRUST Center](#)
[AFOSR MURI](#)
[ASD\(R&E\) JASON Study](#)

Upcoming Events

[Lablet Quarterly Meeting](#)
 Date: 01/24/12
 First Science of Security Quarterly Meeting...

[SoS Group Meeting](#)
 Date: 01/26/12
 Meeting to discuss the SoS VO.

[Conference on High Confidence Networked Systems \(HiCoNS\)](#)
 Date: 04/17/12 - 04/18/12
 This conference aims to foster collaborations...

[Lablet Quarterly Meeting](#)
 Date: 04/17/12
 Quaterly Meeting at University of Illinois,...

[Twelfth Annual HCSS Conference](#)
 Date: 05/06/12 - 05/11/12

Highlights



Nicol leads new Science of Security "Lablet" at Illinois

The University of Illinois at Urbana-Champaign, Carnegie Mellon University, and North Carolina State University are each receiving an initial \$1 million in grant funds from the U.S. National Security Agency (NSA) to stimulate the creation of a more scientific basis for the design and analysis of trusted systems.

[Read more >](#)

Recent Posts

IEEE Security & Privacy

Submitted by [Katie Dey](#) on Mon, 2012-01-23 20:55

NEWS

The Next Wave: The Science of Cybersecurity

Submitted by [Katie Dey](#) on Mon, 2012-01-23 20:14

NEWS

Is it Possible to Do Scientific Experiments in Security?

Submitted by [Katie Dey](#) on Sun, 2012-01-22 19:40. Contributor: [Roy Maxion](#)

102.61 KB | 0 views | 0 downloads > [Download](#)

FILE

[Science of Security](#)
[Carnegie Mellon University](#)
[2008 NSF-IARPA SoS Workshop](#)
[Presentation](#)

[Academia](#)
[Science of Security](#)
[2008 NSF-IARPA SoS Workshop](#)

Towards a Science of Security

Submitted by [Katie Dey](#) on Sun, 2012-01-22 18:40. Contributor: [Fred Schneider](#)

284 KB | 0 views | 0 downloads > [Download](#)

FILE

[Science of Security](#)
[Cornell University](#)
[Presentation](#)
[Academia](#)
[JASON 2010 Summer Study](#)

Related Groups

[NSA SoS Lablets](#)
[HCSS Conferences](#)

Vision and Goals

While certain subfields of security have a strong scientific basis (e.g., cryptography, formal methods), there is no comprehensive scientific basis for constructing systems that are trustworthy by design. This lack of a disciplined and rigorous scientific basis profoundly limits our ability to design, deploy, and trust most large-scale and cyber-physical systems (CPS). A foundational science of security is needed now. To this end, the CPS-VO Science of Security Group will provide a portal for community awareness, collaboration, and information all directed toward the maturing of the scientific basis for security.

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Recent Events

- Eleventh Annual High Confidence Software and Systems Conference (HCSS)
- Workshop on Foundations of Secure Cyber-Physical Systems (FDSCPS)
- Second Annual CPS-PI Meeting
- NSA Science of Security Lablet Pre-meeting

Future Events

- First SoS Lablet Meeting
- First High Confidence Networked Systems Conference (HiCoNS)
- Second SoS Lablet Meeting
- Twelfth Annual High Confidence Software and Systems Conference
- First Secure and Trustworthy Computing PI Meeting
- First Science of Security PI Meeting

Group toolbar

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- › Create News Item
- › Create Page
- › Create Video
- › Create Wiki page
- › Group forums
- › Manage group forums
- › 28 members
- Manager: › brad_martin
- › My membership

Subgroups

- Science of Security
 - NSA SoS Lablets
 - NCSU Science of Security Lablet Research Initiative
 - CMU Science of Security Lablet Research Initiative
 - UIUC Science of Security Lablet Research Initiative

› Year › Month › Week › Day

| January 2012 | | | | | | | | |
|--------------|-----|-----|--------------------------------|-----|-------------------------|-----|-----|--------|
| « Prev | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Next » |
| 1 | 1 | 2 | 3 | 4 | 5 SoS Group Meeting | 6 | 7 | |
| 2 | 8 | 9 | 10 | 11 | 12 SoS Group Meeting | 13 | 14 | |
| 3 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | |
| 4 | 22 | 23 | 24 Lablet Quarterly Meeting | 25 | 26 SoS Group Meeting | 27 | 28 | |
| 5 | 29 | 30 | 31 | | | | | |



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|---|-----------|----------|-----------|---------------------|
| SoS: Topics | | | | 170.95 MB 95 |
| Core Background Material | | | | 0 bytes 0 |
| JASON 2010 Summer Study | | | | 11.49 MB 4 |
| Roadmap | | | | 2.64 MB 1 |
| Agenda | | | | 130.45 KB 2 |
| Authentication | | | | 824.76 KB 2 |
| Composition | | | | 22.22 KB 1 |
| Cybersecurity | | | | 23.06 MB 14 |
| Cyberspace Policy Review | | | | 780.5 KB 2 |
| Encryption | | | | 570.53 KB 1 |
| Infrastructure | | | | 710.5 KB 1 |
| Measuring Security | | | | 7.43 MB 5 |
| Is Finding Security Holes a Good Idea? | | | | 109.69 KB [details] |
| Measuring Cyber Security and Information Assurance: A State of the Art... | | | | 4.47 MB [details] |
| Measuring Security | | | | 15.31 KB [details] |
| NSA SVP Hard Problem Overview | | | | 192.04 KB [details] |
| Report on Measuring Security Workshop | | | | 2.65 MB [details] |
| Network Monitoring | | | | 391.42 KB 1 |
| Science of Security | | | | 122.99 MB 61 |
| SoS: Contributor(s) | | | | 134.16 MB 47 |
| Alessandro Acquisti | | | | 124.12 KB 1 |
| Alfred Hero | | | | 391.42 KB 1 |

Create Folder:

File upload

[Add File](#)

Audience:

- 2011 Automotive CPS Workshop
- 2011 HCSS Conference Program Committee
- 2012 CPS Medical Devices Workshop
- 2012 CPS Time-Critical Systems Workshop
- 2012 HCSS Conference Program Committee

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- [Create Event](#)
- [Create Online Meeting](#)



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 Search

Forums

> Post new Forum topic

| Forum | Topics | Posts | Last post |
|----------------------------|------------|-------|-------------------------------------|
| General discussion | 0 | 0 | n/a |
| What is Science? | 0 | 0 | n/a |
| Role of Experimentation | 0 | 0 | n/a |
| Adversary Models | 0 | 0 | n/a |
| Ideas for new forum topics | 0 | 0 | n/a |
| Feedback | 4 3 new | 4 | 14 hours 52 min ago by Katie Dey |

Group toolbar

- > Create File
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- > Create Page
- > Create Video
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- > Manage group forums
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- Manager: > brad_martin
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Subgroups

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 - NSA SoS Lablets
 - NCSU Science of Security



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Guided search

Click a term to initiate a search.

SoS: Topics

[JASON 2010 Summer Study](#) (4)
[Roadmap](#) (1)
[Agenda](#) (2)
[Authentication](#) (2)
[Composition](#) (1)
[Cybersecurity](#) (14)
[Cyberspace Policy Review](#) (2)
[Encryption](#) (1)
[Infrastructure](#) (2)
[Measuring Security](#) (5)
[Network Monitoring](#) (1)
[Science of Security](#) (70)

Contributor(s)

[A. Gray](#) (1)
[A. Prasad Sistla](#) (1)
[A.C. Jensen](#) (1)
[A.J. Ramirez](#) (1)
[Aaron Ridley](#) (2)
[Aaron Tomb](#) (1)
[Adam Anderson](#) (2)
[Adam Wick \(Galois\)](#) (1)

Tags in SoS: Contributor(s)

[Alessandro Acquisti](#)
[John Mitchell \(Stanford\)](#)
[Kaliappa Ravindran \(The City University of New York\)](#)
[Melissa Hathaway](#)
[Michael Lesk](#)
[Michelle Crawford \(Alabama State University\)](#)
[Roy A. Maxion \(CMU\)](#)
[Saurabh Amin \(UC Berkeley\)](#)
[Shankar Sastry \(UC Berkeley\)](#)
[Stephanie Forrest \(UNM and Santa Fe Institute\)](#)
[Sujata Millick \(HP Labs\)](#)
[Vicraj Thomas](#)

[more tags](#)

Tags in SoS: Topics

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[Authentication](#)
[Composition](#)
[Cybersecurity](#)
[Cyberspace Policy Review](#)
[Encryption](#)
[Infrastructure](#)
[JASON 2010 Summer Study](#)
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- › [Create Page](#)
- › [Create Video](#)
- › [Create Wiki page](#)
- › [Group forums](#)
- › [Manage group forums](#)
- › [28 members](#)
- Manager: › [brad_martin](#)
- › [My membership](#)

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NSA Science of Security Lablets Research Initiative

Mission and Goals:

It is widely understood that critical cyber systems must inspire trust and confidence, protect the privacy and integrity of data resources, and perform reliably. To tackle the ongoing challenges of securing tomorrow's systems, the NSA concluded that a collaborative community of researchers from government, industry, and academia is a must.

To that end, the NSA grant will seed academic "Lablets" focused on the development of a Science of Security (SoS) and a broad, self-sustaining community effort to advance it. A major goal is the creation of a unified body of knowledge that can serve as the basis of a trust engineering discipline, curriculum, and rigorous design methodologies. The results of SoS Lablet research are to be extensively documented and widely distributed through the use of a new, network-based collaboration environment. The intention is for that environment to be the primary resource for learning about ongoing work in security science, and to be a place to participate with others in advancing the state of the art.

Currently Funded Lablets:

- [Carnegie Mellon University](#)
- [North Carolina State University](#)
- [University of Illinois at Urbana-Champaign](#)

Group toolbar

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- › [Group forums](#)
- › [Manage group forums](#)
- › [18 members](#)
- Manager: › [Katie Dey](#)
- › [My membership](#)

Subgroups

- [Science of Security](#)
 - [NSA SoS Lablets](#)
 - [NCSU Science of Security Lablet Research Initiative](#)
 - [CMU Science of Security Lablet Research Initiative](#)
 - [UIUC Science of Security Lablet Research Initiative](#)



North Carolina State University

NSA Science of Security Lablet

ABSTRACT

Building on its core strengths in Applied Mathematics, Statistics and Computer Science, North Carolina State University (NCSU) has, over the last five years, emerged as a leader in both Analytics education and research. Through university-wide collaboration, our Institute for Advanced Analytics with its pioneering graduate education program, and our Institute for Next Generation Information Technology (ITng) with its security research and translation services, NCSU is well-positioned to apply advanced analytics toward such critical areas as building the scientific underpinnings to software security.

LEAD PI

[Laurie Williams](#) is a Professor in the Computer Science Department of the College of Engineering at North Carolina State University (NCSU). Her research focuses on software security particularly in relation to healthcare IT; agile software development practices and processes; software reliability, software testing and analysis; open source software development; and broadening participation and increasing retention in computer science. Laurie has more than 170 refereed publications.

PROJECTS

- [Developing a User Profile to Predict Phishing Susceptibility and Secure Technology Acceptance](#) – Christopher B. Mayhorn, PhD and Emerson Murphy–Hill, PhD
- [An Adoption Theory of Secure Software Development Tools](#) – Emerson Murphy–Hill, PhD

PUBLICATIONS

- Totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatu.
- Neque numquam eius modi tempora incidunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim ad minima

Group toolbar

- › Create File
- › Create Forum topic
- › Create Event
- › Create Online Meeting
- › Create News Item
- › Create Page
- › Create Video
- › Create Wiki page
- › Group forums
- › Manage group forums
- › 13 members
- Manager: › [Katie Dey](#)
- › My membership

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NCSU Science of Security Label Research Initiative

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Project Page

EDIT REVISIONS TAXONOMY BROADCAST PAGES

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An Adoption Theory of Secure Software Development Tools

North Carolina State University | Seedling Proposal

LEAD PI: [Emerson Murphy-Hill](#)

ABSTRACT

The purpose of this research is to investigate why developers use (and do not use) a variety of security tools, as well as investigate the barriers that current security tools present. Previous research has typically focused on improving individual security of tools in a number of dimensions, such as reducing the number of false-positive security warnings.

The goal of this research is to develop a theory that predicts how well a given tool will help a given developer improve the security of her software. This is useful in three ways. First, it will help individual developers and organizations predict return on investment when introducing a new security tool, given current practices and infrastructure. Second, it will help educators to decide what to teach students to ensure that future developers are best equipped to use security tools.

Third, it will help researchers determine how to align security tools with the needs and practices of software developers.

iPad 6:58 AM 99%

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Tools | CPS-VO

NCSU Science of Security Lablet Research Initiative

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FLAVUS RATIONIS

Flauto Vulgariter Ratihabere Nisus



The University of North Champaign-Mellon

[Home](#) | [People](#) | [Screenshots](#) | [Documentation](#) | [Download](#) | [Mailing List](#)

OVERVIEW

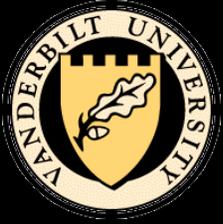
FLAVUS RATIONIS is a software tool for ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt. Neque porro quisquam est, qui dolorem ipsum quia dolor sit amet, consectetur, adipisci velit, sed quia non numquam eius modi tempora incidunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim ad minima veniam, quis nostrum exercitationem ullam corporis suscipit laboriosam, nisi ut aliquid ex ea commodi consequatur? Quis autem vel eum iure reprehenderit qui in ea voluptate velit esse quam nihil molestiae consequatur, vel illum qui dolorem eum fugiat quo voluptas nulla pariatur.

FLAVUS RATIONIS FEATURES

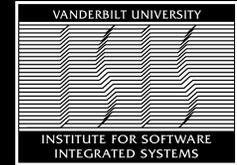
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- optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut rerum
- necessitatibus saepe eveniet ut et voluptates repudiandae sint et molestiae non recusandae. Itaque earum rerum hic tenetur a sapiente delectus
- ut aut reiciendis voluptatibus maiores alias consequatur aut perferendis doloribus asperiores repellat.

SUPPORTED PLATFORMS

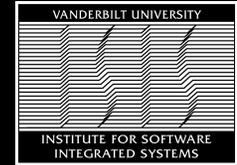
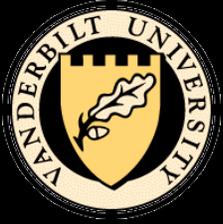
FLAVUS RATIONIS runs on Windows XP/Vista, Mac OS 10.5/10.6, and Ubuntu Linux 8.10/9.04/9.10.



Outline

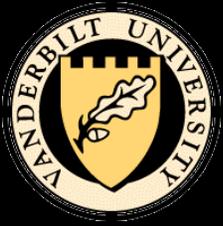


- What is the CPS-VO?
 - Objectives
 - Portal Services
 - Current Status & Timelines
- The SoS Presence on the VO
 - The *Science of Security* Group
 - The NSA SoS Lablets
- • Planned Future Capabilities
- Discussion

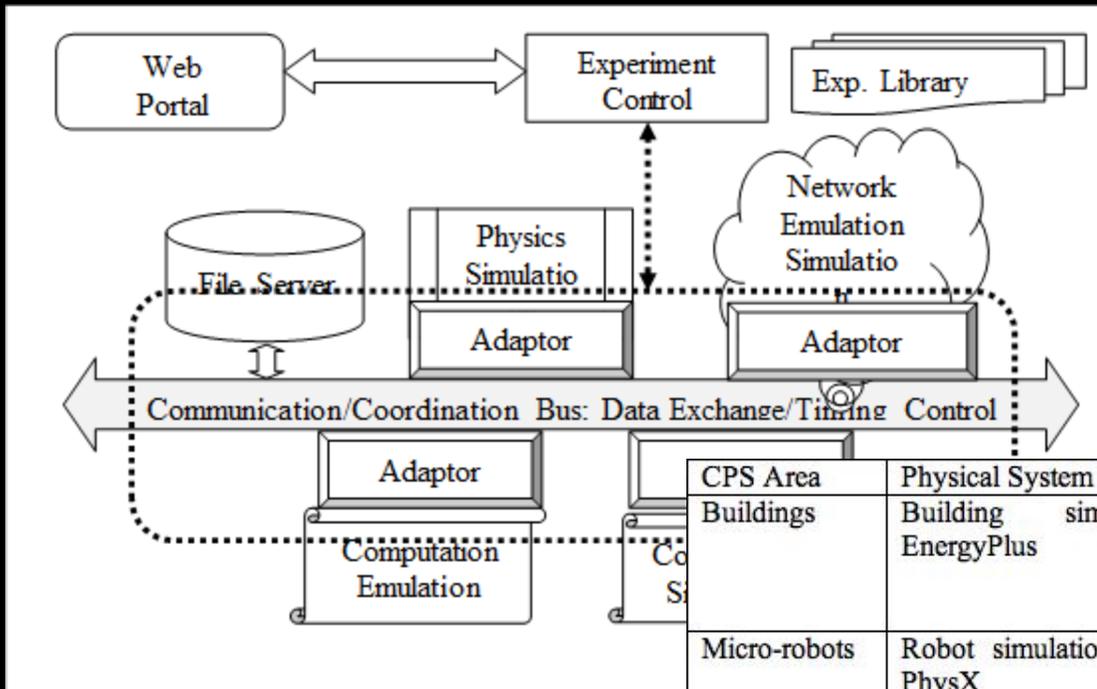
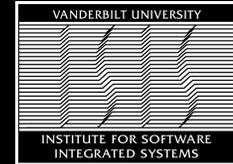


New Capabilities

- Move from the document-centric paradigm of *File* sharing to more generalized, ubiquitous sharing of *Artifacts*. Including, for example:
 - » Challenge Problems
 - » Models
 - » Algorithms
 - » Simulators
 - » Tool Suites
 - » Computational Experiments
 - » Specification of formal semantics



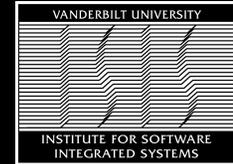
Open Experimental Platforms



| CPS Area | Physical System Simulation | Computing element | Network element |
|-----------------|---|---|--|
| Buildings | Building simulation in EnergyPlus | Embedded control algorithm running on a virtualized server node | Emulated building network in Emulab |
| Micro-robots | Robot simulation in AGEIA PhysX | Embedded control algorithm running on emulated processor | Wireless network simulated |
| Air vehicles | Simulated air vehicle, e.g. NASA AirStar UAV Platform (simulation in Simulink) or Open Source Flight Dynamics Simulator e.g. JSBSim | Flight control software running on emulated processor/s | Time-triggered Ethernet (TDMA) network simulation for on-board network |
| Ground vehicles | Unmanned Ground Vehicle Simulation e.g. MissionLab | Control algorithm running in Simulink | Wireless network simulated |
| Medical devices | Physiological process simulator | Embedded control algorithm running on emulated processor | Wireless network simulated |



Meetings: Real-Time Document Sharing



The screenshot shows a web browser window titled "BigBlueButton" with the URL "http://129.59.129.101/client/BigBlueButton.html#". The browser's address bar and tabs are visible. The main content area displays a presentation slide with the following text:

Cyber-Physical Systems (what are?)

- Are engineered systems that involving a tight conjoining between computational components and the physical world ...

Especially when many distributed entities—connected by a communications fabric—work

- together to exhibit complex and intelligent behaviors.

"Systems you can bet your life on."

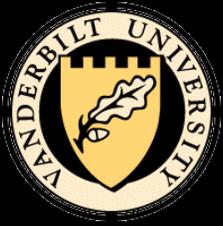
On the left side of the interface, there is a "Users" panel with a table:

| Role | Name | Status |
|-------------|------------------|--------|
| admin (you) | | |
| | Chris.vanBuskirk | |

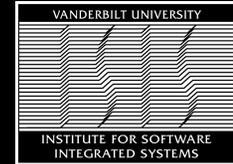
Below the users panel is a "Listeners" panel which is currently empty. On the right side, there is a "Chat" window with a message:

Mar 9th: Electronic Meeting Test 11:25
Chris... @Bill: I've uploaded my slides to the meeting, and I have a small demo that I can show, if we have time. 11:34

At the bottom left of the browser window, there is a copyright notice: "(c) 2011, BigBlueButton build 3818-2011-01-18 - For more information see http://www.bigbluebutton.org/."



Meetings: Desktop Sharing



The screenshot displays a desktop sharing session. The main window is a CAD software interface titled "CyPhyML - CB15JB - RLC Lib/ElectricalComponents/10.Resistors". The interface includes a "Port Browser" on the left, a central workspace with a circuit diagram, and a "Component" panel on the right. The circuit diagram shows an "Acoustic Power Port" connected to a resistor "R", which is in turn connected to a "Thermal Power Port". The "Component" panel lists parameters for the resistor: "PARAM VALUE = 2 RParam", "PARAM VALUE = 15 Range: [0,10] PowerRating", and "PARAM VALUE = ThickFilm Composition".

On the right side of the desktop, there is a chat window titled "Electronic Meeting Test". The chat history shows the following messages:

- 11:25
- 11:34
- ploded my slides to the meeting, and I have a small demo that I have time.

The desktop also features a "Users" panel on the left with a table of users:

| Role | Name | Status |
|-------------|------------------|--------|
| admin (you) | | |
| | Chris.vanBuskirk | |

At the bottom of the desktop, there is a taskbar with the "start" button and several open applications, including "BigBlueButton - Wind...", "Z:\SV\PIETA\sando...", "Command Prompt", and "CyPhyML - CB15JB - /...". The system tray shows the time as 10:46 AM on 10/18/2011.

VO QuickStart

- [Create an Account](#)
- [Create a Calendar Event](#)
- [Create a Forum Topic](#)
- [Join a Group](#)
- [Send a Message](#)
- [Upload a File](#)

Who are we?

The Cyber Physical Systems Virtual Organization (CPS-VO) is a broad community of interest for CPS researchers and developers. The CPS-VO includes institutions from academy and industry, and people who work on a wide range of related disciplines with different approaches, methods, tools and experimental platforms. These entities are all interconnected and evolve driven by a shared goal, to advance our knowledge in the science and engineering of CPS.

- [More about the portal](#)
- [Vision, Goals, and Objectives](#)
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- › [Create Page](#)
- › [Create Video](#)
- › [Create Wiki page](#)
- › [Group forums](#)
- › [Manage group forums](#)
- › [28 members](#)
- Manager: › [brad_martin](#)
- › [My membership](#)

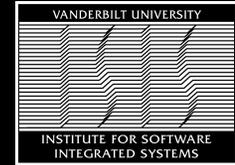
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Messages **Notifications** OpenID identities Track Contact delicious File browser

overview **subscriptions** author content type thread add subscription

Filter

Update options

Activate

| <input type="checkbox"/> | Type | Description | Send method | Send interval | Status | Operations |
|--------------------------|-----------------------|---|-------------|---------------|--------|------------|
| <input type="checkbox"/> | Content type in group | UIUC Science of Security Lablet Research Initiative, Video | HTML Mail | Immediately | active | edit, drop |
| <input type="checkbox"/> | Content type in group | UIUC Science of Security Lablet Research Initiative, Page | HTML Mail | Immediately | active | edit, drop |
| <input type="checkbox"/> | Content type in group | UIUC Science of Security Lablet Research Initiative, News Item | HTML Mail | Immediately | active | edit, drop |
| <input type="checkbox"/> | Content type in group | UIUC Science of Security Lablet Research Initiative, Online Meeting | HTML Mail | Immediately | active | edit, drop |
| <input type="checkbox"/> | Content type in group | UIUC Science of Security Lablet Research Initiative, Event | HTML Mail | Immediately | active | edit, drop |

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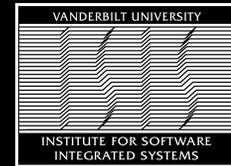
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Welcome to the CPS-VO community!

Highlights

Upcoming Events

- ICCPS 2011
- BoF: CPS Web Portals
- CPS Community Forum
- ECBS 2011
- Georgia Tech Summer School on CPS: 2011
- CyPhy'11
- SPCC'11
- ESWeek 2011

Groups

- High Confidence Software and Systems 11th Annual Conference
- Science of Integration
- 2010 National CPS PI Meeting
- Aviation
- Science of Security
- Medical CPS

Related Research

- [A Framework for Enabling Energy-Aware Smart Facilities](#)
- [Addressing Design and Human Factors Challenges in Cyber Transportation Systems](#)
- [Abstraction of Cyber-Physical Interplays and Its Application to CPS Design](#)
- [Timing-Centric Software](#)
- [Center for Autonomous Transportation Systems](#)
- [Infrastructure and Technology Innovations for Medical Device Coordination](#)
- [Self-Sustaining CPS for Structural Monitoring](#)
- [Mathematical, Computational, and Perceptual Foundations for Interactive Cyber-Physical Systems](#)
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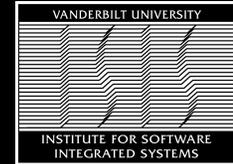
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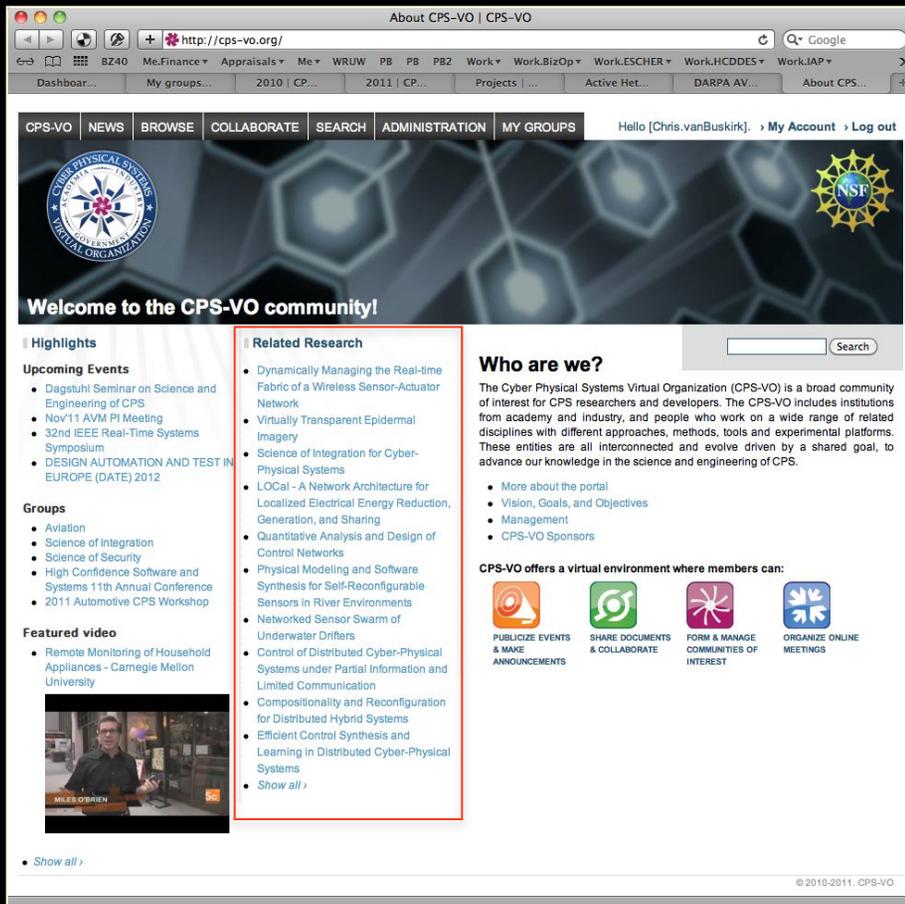


Catalog of Funded Projects



Community Research Highlights

Individual Project Overviews



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Highlights

Upcoming Events

- Dagstuhl Seminar on Science and Engineering of CPS
- Nov'11 AVM PI Meeting
- 32nd IEEE Real-Time Systems Symposium
- DESIGN AUTOMATION AND TEST IN EUROPE (DATE) 2012

Groups

- Aviation
- Science of Integration
- Science of Security
- High Confidence Software and Systems 11th Annual Conference
- 2011 Automotive CPS Workshop

Featured video

- Remote Monitoring of Household Appliances - Carnegie Mellon University

Related Research

- Dynamically Managing the Real-time Fabric of a Wireless Sensor-Actuator Network
- Virtually Transparent Epidermal Imagery
- Science of Integration for Cyber-Physical Systems
- LOCAL - A Network Architecture for Localized Electrical Energy Reduction, Generation, and Sharing
- Quantitative Analysis and Design of Control Networks
- Physical Modeling and Software Synthesis for Self-Reconfigurable Sensors in River Environments
- Networked Sensor Swarm of Underwater Drifters
- Control of Distributed Cyber-Physical Systems under Partial Information and Limited Communication
- Compositionality and Reconfiguration for Distributed Hybrid Systems
- Efficient Control Synthesis and Learning in Distributed Cyber-Physical Systems
- Show all >

Who are we?

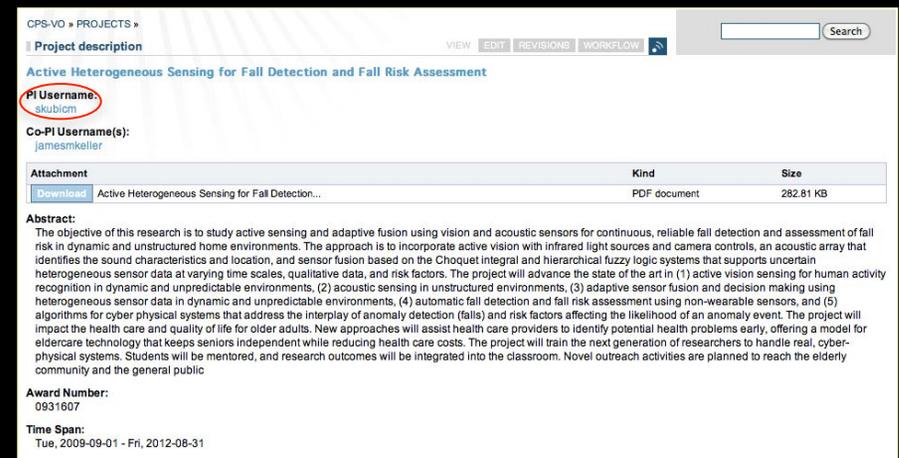
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CPS-VO » PROJECTS »

Project description VIEW EDIT REVISIONS WORKFLOW

Active Heterogeneous Sensing for Fall Detection and Fall Risk Assessment

PI Username: skubicm

Co-PI Username(s): jamesmkeller

| Attachment | Kind | Size |
|---|--------------|-----------|
| Download Active Heterogeneous Sensing for Fall Detection... | PDF document | 282.81 KB |

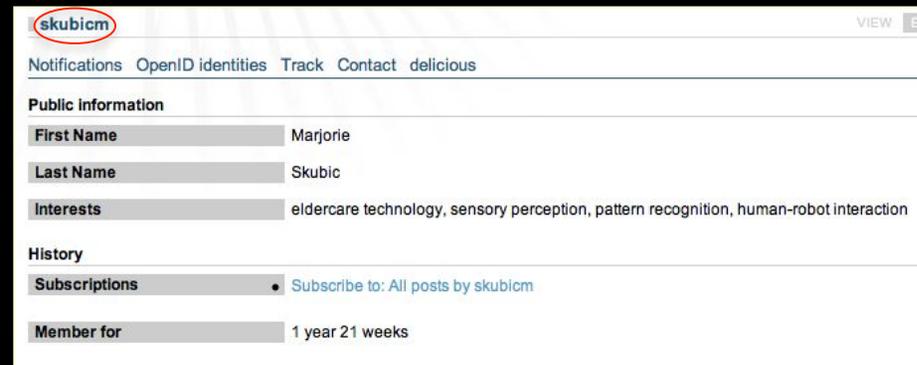
Abstract:

The objective of this research is to study active sensing and adaptive fusion using vision and acoustic sensors for continuous, reliable fall detection and assessment of fall risk in dynamic and unstructured home environments. The approach is to incorporate active vision with infrared light sources and camera controls, an acoustic array that identifies the sound characteristics and location, and sensor fusion based on the Choquet integral and hierarchical fuzzy logic systems that supports uncertain heterogeneous sensor data at varying time scales, qualitative data, and risk factors. The project will advance the state of the art in (1) active vision sensing for human activity recognition in dynamic and unpredictable environments, (2) acoustic sensing in unstructured environments, (3) adaptive sensor fusion and decision making using heterogeneous sensor data in dynamic and unpredictable environments, (4) automatic fall detection and fall risk assessment using non-wearable sensors, and (5) algorithms for cyber physical systems that address the interplay of anomaly detection (falls) and risk factors affecting the likelihood of an anomaly event. The project will impact the health care and quality of life for older adults. New approaches will assist health care providers to identify potential health problems early, offering a model for eldercare technology that keeps seniors independent while reducing health care costs. The project will train the next generation of researchers to handle real, cyber-physical systems. Students will be mentored, and research outcomes will be integrated into the classroom. Novel outreach activities are planned to reach the elderly community and the general public

Award Number: 0931607

Time Span: Tue, 2009-09-01 - Fri, 2012-08-31

Community Researchers



skubicm VIEW

Notifications OpenID identities Track Contact delicious

Public information

First Name Marjorie

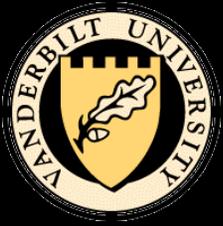
Last Name Skubic

Interests eldercare technology, sensory perception, pattern recognition, human-robot interaction

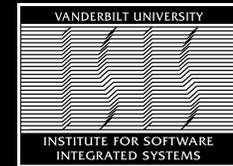
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Share Documents & Collaborate

Core services of the CPS-VO Portal support document sharing and collaboration. The current list of services are the following:

1. [Event browser for the CPS-VO Calendar.](#)
Details about using the Calendar can be found on the [Calendar How To page.](#)
2. [Document browser for the Document Repository.](#)
Details about using the Document browser can be found on the [Browse Repositories How To page.](#)
3. [Group browser for finding Communities of Interest in different CPS topics.](#)
Details about using the Group browser can be found on the [Browse Groups How To page.](#)
4. [Content search service using established vocabularies \(taxonomies\) for finding documents and events published on the Portal.](#)
Details about using the Search service can be found on the [Content Search How To page.](#)
5. [Tagcloud - based search for rapid browsing of massive amount of information.](#)
Details about using the Tagcloud service can be found on the [Tagcloud How To page.](#)
6. [Forum service is provided for each Community of Interest \(Groups\) for discussions on different topics.](#)
Details about joining and using the Forum service can be found on the [Participate in Group Forums How To page.](#)
7. [Each content type: events, documents, forums and others are complemented by a Notification service that sends subscribers a notification when a change has occurred.](#)
Details about joining and using the Notification service can be found on the [Subscribe Notifications How To page.](#)
8. [Each content type: events, documents, forums and others are complemented by a Comment service that allows readers to publish comments.](#)
Details about joining and using the Comment service can be found on the [Make a Comment How To page.](#)

Start Meeting | CPS-VO

http://cps-vo.org/tutorial/start-meeting

Failed to open page

Step 2: Start web meeting by clicking on "Moderate meeting" on your meeting post.

Theories in CPS Certification (CERT)

Submitted by admin on Tue, 2011-02-22 14:55

To discuss and identify research needs in the certifiable assurance of cyber-physical systems (CPS), focusing on uncert: validation of the complex logic on which these CPSs rely, whether the logic is implemented in software, field-programmable logic devices (FPGAs), application-specific integrated circuits (ASICs), etc. This growing issue cuts across many applicati devices, automobiles, commercial aircraft, and nuclear power plants.

Status: Meeting is not running

> Add new comment > Attend meeting > Moderate meeting > Subscribe to: This post > Subscribe to: Posts by admin

The screen shot below shows the layout of the web meeting.

1. Turn on sound.
2. Turn on visual.
3. Share your computer desktop.
4. This is your username.
5. Upload presentation into the viewer. (Such as a Power Point file.)
6. Reset the layout of the web meeting.
7. Leave the meeting.

Users: You can begin your discussion once participant have joined