2013 annual report on training, education, and outreach activities of the Indiana University Pervasive Technology Institute and affiliated organizations

January 1 – December 31, 2013

Robert J. Ping
Therese Miller
Beth Plale
Craig Stewart

Indiana University

PTI Technical Report PTI-TR14-14

2014

PERVASIVE TECHNOLOGY
INSTITUTE

INDIANA UNIVERSITY

Table of Contents

1. Executive Summary

Indiana University (IU) Pervasive Technology Institute (PTI) is committed to engaging students at all levels. From non-traditional students (like those who attend Mini University) to K-12 students and everyone in between, PTI strives to develop a variety of programs in order to reach a broad audience. In addition, PTI proactively seeks conferences, workshops, and events where promotion of the research carried out by Indiana University faculty, staff, and students may occur.

In 2013, UITS Research Technologies, a cyberinfrastructure and service center of IU PTI, hired a manager of education and outreach to shape the EOT overall program and to engage more of the University population to use the services available within PTI. This is the first time a position of this nature has been added to the PTI community. This strategic hire is another sign of PTI's commitment to leveraging EOT activities.

PTI produced a comprehensive report on education, outreach, and training activities for calendar 2011 (http://hdl.handle.net/2022/14132). The PTI education and outreach strategy remains as initially described. The second annual report was released for calendar year 2012 (http://hdl.handle.net/2022/17577). Reading the three reports in their entirety alerts our constituents to the longevity of our programs, the commitment of our staff to education, outreach and training, and the directive Indiana University has taken with regards to improving the lives of the citizens of Indiana and, indeed, beyond.

2. Introduction

The mission of the Indiana University Pervasive Technology Institute is "to improve the quality of life in the State of Indiana and the world through novel research and innovation and service delivery in the broad domain of information technology and informatics." Educational activities that help educate a 21st century information workforce for Indiana and the US, and educational activities that enable the lay public of Indiana and the US to understand technology and use it securely are critical parts of PTI's work to fulfill its mission.

This report summarizes many of the educational, outreach, and training activities of the Indiana University Pervasive Technology Institute for Calendar Year 2013 (January 1 – December 31, 2013). It includes highlights of activities in education and outreach at the Kindergarten – grade 12 level; education and outreach to the IU community; outreach and education to the state of Indiana; and outreach to the national scientific community.

One of the distinctive features of PTI education, outreach, and training events is the extent to which there are major events involving all of PTI, or multiple centers. These very large events help raise IU's profile nationally and internationally. By bringing together multiple PTI Centers as part of one event, they demonstrate the value of PTI as a collaborative organization within IU. During the current reporting period, the largest and most high profile EOT events involving large groups from PTI were IEEE Cluster 2013, Supercomputing 13, and the Ready, Set, Robots! camp.

The Research Technologies Collaboration and Engagement Support (CES) group delivers and coordinates a baseline of education and outreach activities that are base funded by UITS. This baseline of activity serves as a foundation upon which PTI Research Centers can build. These activities can be referenced as a sign of PTI effectiveness in outreach to enhance competitiveness for grants. In addition, PTI Research Centers also leverage the considerable education and outreach efforts of the IU School of Informatics and Computing and other affiliated academic units.

3. Highlights of Education, Outreach, and Training activities

PTI engaged in numerous efforts to reach out to the public over the reporting period. We highlight several here:

- IU PTI hosted the IEEE Cluster 2013 Conference in Indianapolis, Indiana in September 2013. As a result of hosting the Cluster 13 conference, IU PTI contributed to the economic development of Indiana through professionals from around the world visiting Indianapolis and Bloomington for the conference. The conference enabled a large group of IU faculty, staff, and students to attend the local conference to learn about advances in cluster computing, network and engage with other professionals in their field, and created an atmosphere for skills acquisition in a supportive and communicative environment.

  The conference chair explicitly setout to raise awareness and the reputation of the Cluster conference series, to introduce innovative tracks, and to highlight student research. This was accomplished by engaging program chairs from a variety of institutions to participate in the planning and implementation of the conference, by introducing the Visualization Showcase as a new track, and by encouraging students to apply to present their research and participate as volunteers.

  Products of the conference include:

    o Proceedings available in IEEE Xplore ®
    o Images available in the IU PTI Multimedia Gallery
    o Video available on youtube and in the IU PTI Multimedia Gallery
    o Cluster 2013 website hosted by IU PTI
    o A complete report on the conference is located here: http://hdl.handle.net/2022/17580

Figure 1: General chair, Craig A. Stewart open the IEEE Cluster 2013 Conference

- Training School on Plenoptics: Andrew Lumsdaine taught at a five day workshop, June 16-20, 2013 at the EU COST Training School on Plenoptic Capture, Processing, and Reconstruction in Sundsvall, Sweden. "This training school is a post-graduate education for engineers, computer scientists, researchers, PhD-students, and other individuals interested in an overview and deepened knowledge of Plenoptic capture, processing and reconstruction. The training school consists of lectures, hands-on application of theories and processing techniques, as well as discussions on research and development issues. (http://www.plenoptics.se/trainingschool2013/)

- *HPC Education through Formal On-line On-demand Curriculum*, funded by National Science Foundation. This project made possible the near-term development and dissemination of a new on-demand course in high-performance computing for national distribution.

- Software Carpentry Boot Camp: CREST hosted the Software Carpentry Boot Camp on July 11 and 12. Thirty-one attendees participated in the workshop. Software carpentry teaches scientists and engineers the skills and tools they need to use computing in their research more productively. The workshop covered the following topics: using the Unix shell to get more done in less time, using version control to manage and share information, basic Python programming, how to test programs, and working with relational databases.

- In September, 2013, HathiTrust Research Center (HTRC) held it's second annual HTRC UnCamp in Urbana-Champaign, Illinois. The 120 attendees received hands-on experience with new software and services. Attendance grew over UnCamp 2012, and excitement with the new features was high. A monthly user group meeting, in the format of conference call, has been organized since October to collect user needs, use cases, and user feedback. HTRC staff wrote several technical documents to help new users quickly get up to speed with HTRC. In addition to these community building and user education activities, hands-on sessions, workshops, tutorials, and presentations were delivered at academic conferences and institutions, locally and internationally, e.g.:

    - Joint Conference on Digital Libraries (JCDL) 2013

    - Digital Humanities 2013, National Library of the Netherlands

    - Catapult Center for Digital Humanities & Computational Analysis at Indiana University

- Data Panel for IEEE Cluster Conference – Robert H. McDonald organized a data panel on behalf of the Research Data Alliance at the IEEE Cluster Conference 2013 held in Indianapolis, IN on Sept 24-26, 2013. This panel featured members of the RDA working groups that included D2I Postdoc Inna Kouper, McDonald, Professor Reagan Moore-UNC, and Giridhar Manepalli from the Corporation for National Research Initiatives.

- Panel for Educause Annual Conference 2013 on HathiTrust Research Center – Robert H. McDonald organized a panel for the HathiTrust Research Center at this year's Educause Annual Conference held in Anaheim, CA on Oct 15-18, 2013. McDonald along with HTRC Executive Committee Members John Unsworth and Beth Sandore showcased current HTRC accomplishments at this event.

- During this program period Professor Swany was co-Chair of the SCinet program at the SuperComputing 2013 (SC13) conference. The SCinet program is created each year for the conference, SCinet brings to life a very high capacity network that supports the revolutionary applications and experiments that are a hallmark of the SC conference. SCinet will link the Colorado Convention Center to research and commercial networks around the world. In doing so, SCinet serves as the platform for exhibitors to demonstrate the advanced computing resources of their home institutions and elsewhere by supporting a wide variety of bandwidth-driven applications including supercomputing and cloud computing.

- IU's Advanced Visualization Lab hosted a week of activities centered around the new Science on a Sphere (SOS) display. These activities offered the IU community as well as the general public the chance to see the new spherical display, interact with hundreds of datasets, learn from experts, dialog about new potential uses, and even create their own datasets. SOS is a six-foot sphere illuminated by high-definition projectors and capable of displaying a wide range of data, including oceanographic, atmospheric, astronomical, political, and economic data. IU's SOS is installed in the Wrubel Commons in the Cyberinfrastructure Building (CIB) and is now available for demonstrations and use by IU faculty, students, and staff. The event took place September 16-20, 2013, and featured presentations, demonstrations, and interactive sessions with local experts including internationally renowned journalist and artist Ingo Gunther. Mr. Gunther temporarily installed his WorldProcessor exhibit to provide additional background and inspiration for new ways to interact with and create spherical visualizations.

Figure 2: IU's Advanced Visualization Lab hosted a week of activities centered around the new Science on a Sphere (SOS) display, shown here.

- On September 10-11, 2013, a small group of privacy advocates, business affiliates, and government officials met in Westerly, Rhode Island for an off-the-record discussion about the past, present, and future role of the Federal Trade Commission ("FTC" or "the Commission") on information security and privacy. Over the past decade, the Federal Trade Commission has engaged in aggressive efforts to police unfair and deceptive data privacy and security practices, while increasing efforts to educate

the public on a variety of issues facing consumer privacy. CACR is part of this one-time and ongoing discussion.

- In its first year, one of the Center for Trustworthy Scientific Cyberinfrastructure's (CTSC) major leadership initiatives centered on re-establishing the NSF cybersecurity summits, which were last held in 2009. Through a supplemental grant from NSF and support from CACR, CTSC convened a program committee; developed a summit program with tutorials, plenary sessions, and working groups for a three-day period; and executed the summit that was held September 30 – October 1 at the Arlington Hilton in Arlington, VA. The 2013 NSF Cybersecurity Summit for Cyberinfrastructure and Large Facilities developed around the theme, ***Designing Cybersecurity Programs in Support of Science***, with an explicit focus on the challenges of supporting the community of practitioners and stakeholders who must secure scientific CI. Sixty-nine (69) people attended the summit, with 31 playing some role beyond pure attendance -- from leading a tutorial, to sitting on a discussion panel, to reporting on the discussions and action items developed by the working groups.
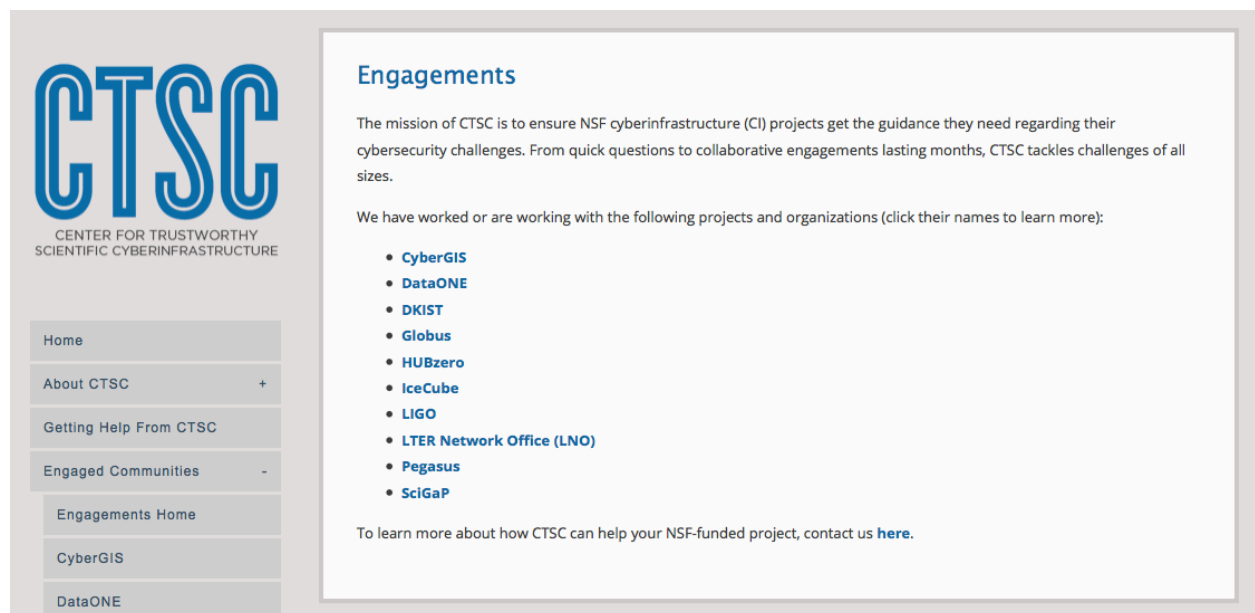
Figure 3: The Center for Trustworthy Scientific Cyberinfrastructure (CTSC) re-established the NSF Cybersecurity Summit which had a three year hiatus.

- STEM K-12: During this reporting period UITS Research Technologies engaged in activities that demonstrated Indiana University's long-term commitment to education and STEM. Activities included:

  - Ready, Set, Robots! - computer programming involving robots. In this year alone (the programs 8th year) we presented two sessions of our traditional 2-day camp in Bloomington, two sessions to the Minority Engineering Advancement (MEAP) program in Indianapolis, and three sessions during the local Adventures in STEM camp. New this year, we also presented a 4-day camp to students at the Extreme Science and Engineering Discovery Environment (XSEDE) conference in San Diego, California and presented Ready, Set, Robots! in action during in a miniature arena at The International Conference for High Performance Computing, Networking, Storage and Analysis (SC13) in Denver, Colorado.

Figure 4: A curious youth interacting with Ready, Set, Robots! at Supercomputing 2013 in Denver, Colorado

Figure 5: Students at Ready, Set, Robots! camp during the XSEDE conference test their computer program in the arena

o   Curiosity Fair at Conner Prairie and Celebrate Science at the Indianapolis Motor speedway. IU PTI went on the road to meet families from across Indiana with demonstrations about innovative technologies developed at IU for iPads, physics experiments, computer building, and light/water/fiberoptics.

Figure 6: UITS Research Technologies' manager, Therese Miller engages youth in a water and light demonstration at the Curiosity Fair at Conner Prairie, Indianapolis, Indiana

Figure 7: Mike Boyles, manager of the Advanced Visualization Lab encourages students to try the iPad demonstration at Celebrate Science Indiana at the Indianapolis Motor Speedway

Figure 8: Chauncey Frend greets visitors to the IU booth while an up and coming visualist masters the iPad.

Figure 9: Jr. High and High School students try to reach for the 3D images floating in front of them or look on as they learn about astronomy through 3D vision at the American Astronomical Society Student Outreach Program in Indianapolis

- o As a result of UITS Research Technologies' involvement in the 222nd American Astronomical Society meeting, RT was invited to participate in the middle school and high school Student Outreach Program. Students from schools across Indiana visited the IU booth to view stereoscopic 3D videos. RT also donated 3D glasses and a 3D postcard which the students found in their goodie bag after visiting the exhibit hall.

Of the 204 PTI-sponsored outreach events (Jan – Nov 1, 2013) , summarized in Table 1 by center, breakdowns by audience type both in terms of proportion of events and of attendance are shown. The types of audiences reached by these events reflect the several facets PTI's outreach mission: IT research, science-humanities-scholarship, general public, education (K-12 + college), and business audiences. It is notable that attendance by members of the general public is almost on par with IT researchers. Audience counts are not included for videos, biasing results towards live presentations only.

Outreach and Training	Education, Outreach, and Training Event Count
Digital Science Center	20
Data to Insight Center	82
Center for Applied Cybersecurity Research	7
Center for Research in Extreme Scale Technologies	3
Research Technologies (S&CI)	91
National Center for Genome Analysis Support (S&CI)	1
PTI Total	204

Table 1: Education, outreach, and training event counts broken out by sponsoring center
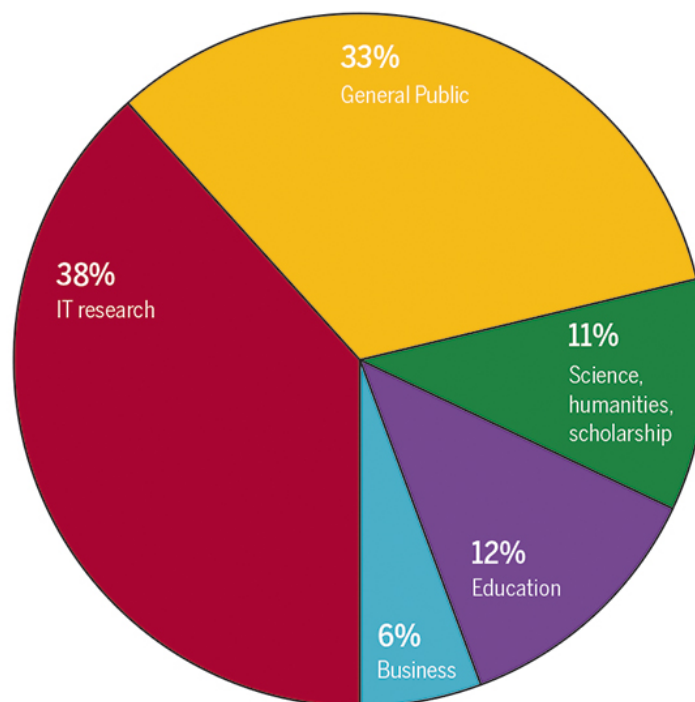
Figure 10: Proportions of event attendance by audience type

PTI EOT Events by Audience Type

Total number of event instances during reporting period: 204
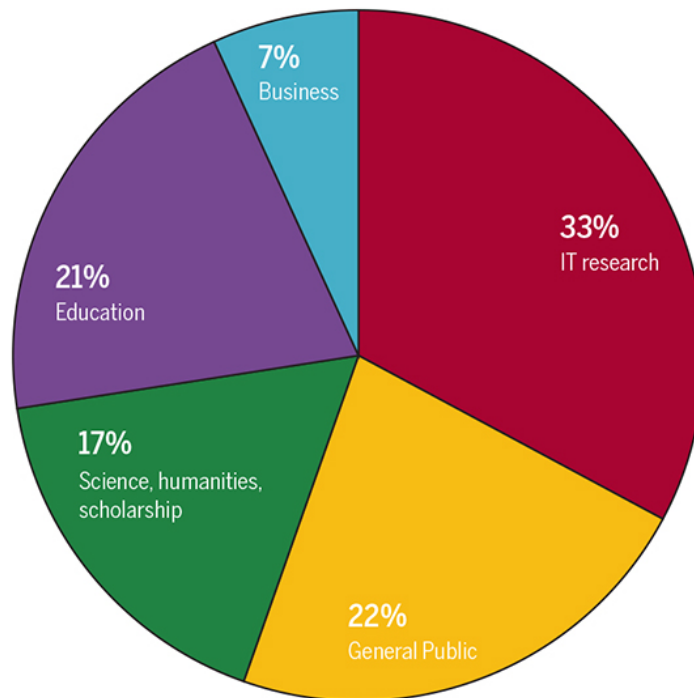
Figure 11: Education, outreach, and training event proportions broken out by audience type.

Figure 10 indicates our audience type between January 1 and November 1, 2013. Education events that reach students (21%); business events that target a business community (7%); science, humanities, scholarship events that target scholarly researchers in non-IT domains (17%); events which benefit or are presented to the general public (22%); and IT research events aimed at our peers (33%).

4. PTI Broader Impacts

An important impact measure of a research and innovation institute like PTI is how effectively it flows research ideas into educating its next generation scholars and practitioners. In this section we discuss the ways in which Institute leadership and senior personnel have been effective during this reporting period in broader impacts of research:

- Completion of the first Massive Open Online Course on FutureGrid: (https://fgmoocs.appspot.com/project/course) FutureGrid has a set of MOOC's that cover core capabilities and various advanced capabilities and tools. In core capabilities we have an introduction to FutureGrid and a presentation that gives more detail. These presentations are divided into separate lessons. Then we offer MOOC's on additional core capabilities: setting up a portal account and project; using non virtualized HPC nodes. Then we have two approaches to virtual machines: using OpenStack Grizzly release and using the Eucalyptus system. The advanced topics currently cover IP-over-P2P (IPOP) technology but more topics will be added. An example: https://bigdatacourse.appspot.com/preview

- Research Experiences for Undergraduates.
    - o Thomas Sterling, CREST Executive Associate Director, and Larisse Voufo, CREST Graduate Student, participated in the "Undergraduate Research Opportunities in Computing (UROC)" program. UROC is an undergraduate research mentoring program hosted by the School of Informatics and Computing. Sterling and Voufo are mentoring four undergraduate students that are focusing on research in areas of high-performance computing.
    - o CNetS As part of our School's diversity program, our center sponsored two students, Bryce Lewis & Kehontas Rowe as part of the REU (Research Experience for Undergraduates)/SROC (Summer Research Opportunities in Computing) program from June 1-July 26, 2013.
    - o NCGAS started providing computational support to SUGAR, the Schaack Undergraduate Genomics at Reed. This effort exposes seven undergraduate students to genomic data analysis on NCGAS HPC systems. NCGAS hosted two virtual interns from Clark State University over the Fall term. The students worked installing bioinformatics applications on national scale supercomputers.
    - o DSC supported the NSF-funded Research Experiences for Undergraduates summer program held at Indiana University, utilizing the FutureGrid testbed as the platform for educating these students from minority serving institutions on cloud computing.
- Workshops: HathiTrust Research Center delivered introduction to HTRC rationale, products, and services to multiple groups of audience during the period: a classroom lecture to the ILS (information and library science) students and a hands-on session at the Catapult Center to digital humanities audience.
- Courses taught by PTI faculty: Swany taught CSCI-P 536 Advanced Operating Systems- Fall 2013 and CISC-P 438 Networks- Fall 2013; CNetS taught I501-Introduction to Informatics, I400/I590-Collective Intelligence, I601-Introduction to Complex Systems, and H400/I400/I590-Data Visualization

5. PTI-related videos released during the reporting period.

Videos distributed over the web are a powerful way to disseminate information. PTI has made extensive use of videos presented on the web to communicate about activities. A listing of videos created by PTI in the reporting period follows:

- *Big Red II: Embracing the spirit of Indiana University*. Big Red II helps researchers accelerate new breakthroughs in fields that are changing the way we live, work, learn, and grow. The Cray XE6/XK7 supercomputer is capable of one petaFLOPS, making it one of the fastest university-owned and operated supercomputers in the world.
http://www.youtube.com/v/JJpLXWo1aAA&rel=1&autoplay=1

- *SC 13 Ready, Set, Robots Demonstration*. Moving at the Speed of Innovation - the Indiana University Pervasive Technology Institute at Supercomputing 2013 in Denver, CO.
http://www.youtube.com/v/C9AoMh8fIh8&rel=1&autoplay=1

- *Aspire: The IT@IU Manifesto*. IU leads higher education in the advancement of information technology. But for all of our accomplishments, we still aspire to do more. "Almost Everything" Words and Music by William Michael Grubbs. Used Under License from Imagem Music, Inc.
http://www.youtube.com/v/bSLA3gXsTbE&rel=1&autoplay=1

- *Big Red II Dedication – Timeline*. Selected events from the Historic Timeline of Indiana University IT Evolution for the Big Red II Dedication Ceremony.
http://www.youtube.com/v/vc2byQETxUA&rel=1&autoplay=1

- *David Keyes: To compute, to breathe: computing in the 21st century university*. David Keyes, founding dean of the King Abdullah University of Science and Technology's (KAUST) division of Computer, Electrical, and Mathematical Sciences and Engineering, delivers the opening keynote address at the IEEE Cluster 2013 Conference, September 24, 2013 in Indianapolis. http://www.youtube.com/v/0vu0XW4kCCE

- *BoF: HPC Cluster Interconnect Topologies: Is Fat Tree the Right Answer*. At the IEEE Cluster 2013 Conference hosted by the Indiana University Pervasive Technology Institute, Steve Lyness, VP, Cluster Solutions Engineering at Cray Inc., discusses an overview of cluster configuration variations with FDR Infiniband, Gigabit Ethernet to 40 GigE or with proprietary interconnects like Quadrics and Myrinet and Aries. He discusses the cost increase of components that don't give us more compute speed but are part of the infrastructure costs associated with a complete end–to-end system. In then end, he discusses buying a new cluster and whether we need to have a full fat tree interconnect topology or if there is something more cost effective.
http://www.youtube.com/v/j4IuggCPsKM

- *Dr. Paul Messina at the 2013 Peebles Lecture Series*. Scientific computing – will the lessons learned apply to the future? http://www.youtube.com/v/GTzIctGKttA&rel=1&autoplay=1

- *Brilliant Minds at IU Bloomington: Imag(in)ing Science*. Brilliant Minds is a series of short videos showcasing the research and creativity of faculty at Indiana University Bloomington. This video features faculty members from across campus who collaborated to explore the common ground shared between the visual arts and science.
http://www.youtube.com/v/8hpRjti24Tw&rel=1&autoplay=1

- *IFRI Tableviewer*. Demo for IFRI TableViewer.
http://www.youtube.com/v/XfBVWSwuDXE&rel=1&autoplay=1

- *IQ Tilt System Construction Timelapse*. This was our latest tech project in 2012. It is a 2x2 or 4 times HD display using Nvidia Mosaic technology to accelerate 3D apps across all 4 screens as one. The Touch overlay is custom from PQ-Labs and it can understand 32 points of touch.
http://www.youtube.com/v/y9AqHmimzuE&rel=1&autoplay=1

- *Apache Airavata: Building Gateways to Innovation*. Suresh Marru, Marlon Pierce, Lahiru Gunathilake. ApacheCon NA 2013. Apache in Science.
http://www.youtube.com/v/8tHIcGEnk-E&rel=1&autoplay=1

- *Apache Student Induction: Catalyzing Collaborative Student Research Projects*. Surest Marru, Marlon Pierce, Shahani Markus Weerawarana. ApacheCon NA 2013. Community Over Code. http://www.youtube.com/v/fMvcaxShhZE&rel=1&autoplay=1
- *The Pervasive Technology Institute – Innovation Through Collaboration*. Pervasive Technology Institute leaders and researchers discuss the mission of PTI in supporting all aspects of research education at Indiana University. http://www.youtube.com/v/HWQ0mU0h50U&rel=1&autoplay=1

6. Summary of student support by Pervasive Technology Institute

The support and of students obtaining undergraduate and graduate degrees is very important among the activities of the Pervasive Technology Institute.

Group	Undergraduate Student Employees /Interns	M.S. Students Employed or Supported	Ph.D. Students Employed or Supported	Undergraduate Degrees Awarded	M.S. Degrees Awarded	Ph.D. Degrees Awarded
PTI Research Centers						
Center for Applied Cybersecurity Research	0	0	5	0	0	0
Center for Research in Extreme Scale Technologies	2	1	11	0	1	1
Data to Insight Center	0	14	34	0	1	0
Digital Science Center	4	14	31	2	5	2
PTI CyberInfrastructure & Service Centers						
National Center for Genome Analysis	1	1	6	0	0	1
Research Technologies	2	3	2	0	0	0
PTI Total	**9**	**33**	**89**	**2**	**7**	**4**

Table 2. PTI support for undergraduate and graduate students, and degrees completed by students employed or supported by PTI.

7. Full listing of EOT events carried out during reporting period

The Pervasive Technology Institute led a total of more than 200 education, outreach, and training events during this calendar year. Attendance at these events totaled more than 24,000. A detailed listing of these events is below.

Type of event	Total # of events	Total # of participants
K-12	43	2,854
Lay public	45	6,156
Business / government	14	1,211
Technical	102	14,016

Table 3. Summary of education, outreach, and training events put on by the IU Pervasive Technology Institute during this reporting period.

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
Digital Science Center							
CGL	salsaDPI: A Dynamic Provisioning Interface for IaaS	Presentation	Indiana University	Jan 11	10	Technical	
CGL	Big Data and Clouds: Challenges and Opportunities	Panel on "Convergence of Cloud and Big Data"	NIST Cloud and Big Data Workshop, Gaitherburg, MD	Jan 15	400	Technical	
CGL	System Center 2012 Setup	Presentation	Indiana University	Jan 18	10	Technical	
CGL	Big Data and Clouds: Challenges and Opportunities	Presentation	MAGIC Telecon on Clouds and Testbeds	Feb 6	10	Telecon	
CGL	A MapRedeuce Framework on Heterogeneous Systems	Presentation	Indiana University	Feb 22	10	Technical	
CGL	FutureGrid RAIN: More than Dynamic Provisioning Across Virtual and Bare-metal Resources	Presentation	PTI major Project Review, Indiana University	Mar 7	~25	Technical	
CGL	Health Informatics, Big	Lecture	I400 Health Informatics	Feb 28 and Mar 7	20	Students	

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
	Data, Clouds, Data Analytics		class, Indiana University				
CGL	Integrating Remotely Sensed and Ground Observations for Modeling, Analysis, and Decision Support	Presentation	2013 IEEE Aerospace Conference, Big Sky, MT	Mar 2-9	50	Technical	
CGL	FutureGrid Computing Testbed as a Service	Presentation	National Science Foundation, Washington, DC	Apr 9	20	Experts	
CGL	Overview of Cyberinfrastructure and the Breadth of its Applicatio	Presentation	Cyberinfrastructure Day, Claflin University, Orangeburg, SC	Apr 12	40	Technical	Nearly All
CGL	Contributions to Data Science and Clouds	Presentation	Digital Science Center, Indiana University	Apr 18	10	Technical	
CGL	CReSIS Data Processing and Analysis	CReSIS Review	Elizabeth City State University, Elizabeth City, NC	Apr 24	30	Technical Review	15
CGL	Remarks on Cyberinfrastructure and Climate Change from a Polar Science Point of View	Hackathon	Earlham College, Richmond, IN	Apr 27	15	Mixed Technical	
CGL	Remarks on Big Data Clustering and its Visualization	Presentation	Big Data and Extreme-Scale Computing (BDEC), Charleston, SC	May 1	50	Technical	
CGL	Data Intensive Clouds Tool and Applications	Presentation	School of Informatics and Computing, Indiana University	May 2	50	Mixed Technical	
CGL	Semi-Automatically	Presentation	Radio Echo Sounding	May 6	50	Technical	

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
	Detecting Layers from Polar Radar Imagery		Tracing Workshop, Centre for Ice and Climate, Copenhagen, DK				
CGL	Layer-Finding in Radar Echograms using Probabilistic Graphical Models	Presentation	Radio Echo Sounding Tracing Workshop, Centre for Ice and Climate, Copenhagen, DK	May 6	50	Technical	
CGL	Future Challenges of Cloud Computing and Web Technologies (with a Big Data slant)	Panel Presentation	3rd Int'l Conference on Cloud Computing and Services Science (CLOSER 2013), Aachen, DE	May 8-10	100	Technical	
CGL	Data Science, Clouds and X-Informatics	Keynote	3rd Int'l Conference on Cloud Computing and Services Science (CLOSER 2013), Aachen, DE	May 8-10	100	Technical	
CGL	Iterative MapReduce and High Performance Data Mining	Seminar	Forschungszentrum Jülich GmbH, DE	May 8	30	Technical	
CGL	Training Data Scientists	Presentation	DELSA Workshop IV. Bethesda, MD	May 16-17	60	Technical	
CGL	Conference Opening	Presentation	2013 International Conference on Collaboration, Technologies, and Systems (CTS 2013), San Diego, CA	May 21	100	Audience	
CGL	Collaboration in	Presentation	2013	May 22	30	Technical	

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
	the Cloud and Online Education Environments		International Conference on Collaboration, Technologies, and Systems (CTS 2013), San Diego, CA				
CGL	Cloud Computing and Large Scale Computing in the Life Sciences: Opportunities for Large Scale Sequence Processing	Presentation	NGS-Translate World Forum, Cambridge, MA	May 30		Technical	
CNetS	Responsible Conduct of Research Series		IMU	Feb 18	30		
Data to Insight Center							
D2I - Plale	"Text Analytics At Scale with HathiTrust research Center"	Invited talk	Digital Humanities Seminar, Notre Dame University/ South Bend, IN	May 7	35	Staff, faculty, Students	
D2I-Swany	"Driving Software Defined Networks with XSP"	Presentation	Internet2 Members Meeting/Wah sington D.C.	Apr 21-26	810	Technical	
D21 - Plale	"Studies in Social-Ecological Systems Data Management"	Seminar	Interuniversity Consortium for Political and Social Research (IPCSR)/ University of Michigan (Ann Arbor, MI)	Apr 14-15		Technical/ Policy/ Students	
D2I-Swany	"Effective and Efficient Utilization of Networks"	Talk	UCSB CS Career Day/Santa Barbara, CA	Apr 4-5		Technical	
D2I	The Avalon Media System: An Open Source Audio/Video	Dunn, Jon W. presentation	Coalition for Networked Information (CNI)	Apr 4	41	technical/ policy	0

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
	System for Libraries and Archives		Membership Meeting, San Antonio, Texas				
D2I	Panel: Global Scientific Data Infrastructure	McDonald, R.H. Panel Chair	ASIS&T Research Data Access and Preservation Summit	Apr 4	100	policy	4
D2I	The Avalon Media System: A Next-Generation Solution for Media Management and Access	Dunn, Jon W. presentation	Indiana University Digital Library Brownbag Series	Mar 27	18	technical	1
D2I - Plale		Participant	Asia Flux (Asia GEO Grid), Biodiversity, and Environmental Observing Systems Workshop/ Bangkok, Thailand	Mar 24-25	30	Students/ Technical	
D2I - Plale	"Goals of the Research Data Alliance"	Steering Committee	24th PRAGMA Workshop/ Bangkok, Thailand	Mar 20-24	45	Students Technical	
D2I-Swany	"Unified Experiment Environment"	Panelist	The 16th GENI Engineering Conference/ Salt Lake City, Utah	Mar 19-21	220	Technical	
D2I - Plale		Plale Steering Committee and Organizer	Research Data Alliance Plenary 1 / Gothenburg, Sweden	Mar 16-20	230	Technical	
D2I -– Plale	"Unconscious Bias: Science Faculty's Subtle Unconscious Bias"	Sponsored by Center of Excellence for Women of Technology (CEWIT)	Indiana University	Mar 3	45	Social	All attendees were STEM females graduate students
D2I - Plale	"Big Data: from 1920's literature	Sponsored by Center of	Indiana University	Feb 15	35	Social	All attendees

19

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
	to science reproducibility"	Excellence for Women of Technology (CEWIT)					were STEM faculty
D2I	The Avalon Media System: A next Generation Hydra Head for Audio and Video Delivery	Klein, Michael presentation	Code4Lib 2013, Chicago, Illinois	Feb 12	300	technical	5
D2I - Plale	PRAGMA: Building the PRAGMA Multi-Cloud	Team meeting	PRAGMA/ Indianapolis, IN	Feb 5	60	Technical-Students	
D2I	The Avalon Media System	Dunn, Jon W. presentation	Opencast Matterhorn 2013 Unconference, San Diego, California	Jan 30	40	technical	4
D2I-Swany	"Developing a Unified Network Information Service"	Talk	2013 Winter Internet2/Joint Techs Conference/Keoni, HI	Jan 12-18	490	Technical	
D2I	Kuali OLE Overview	McDonald, R.H. presentation	Sponsored event by the GBV and HBZ Library Consortia	Jan 17	8	technical	0
D2I	SEAD Virtual Archive: Building a Federation of Institutional Repositories for Long-Term Data Preservation in Sustainability Science	Stacy Konkiel presentation	8th International Digital Curation Conference	Jan 14	55	technical/ policy	5
D2I	The SEAD (Sustainable Environment-Actionable Data) DataNet Prototype	McDonald, R.H. presentation	Technical Demonstration, 8th International Digital Curation Conference, IDCC Conference	Jan 14	120	technical	5
D2I - Plale	Research Data Alliance: International Sharing and	Plale Birds of Feather Session Organizer	ESIP/ Washington D.C	Jan 6-9	50	Technical	

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
	Exchange of Research Data						
D2I-Swany	"Tools and Resources for Software Defined Networks"	Talk	NSF GENI CC-NIE Workshop/Washington DC	Jan 6-8	60	Technical	
D2I	Challenges and Opportunities in Image Processing and Analysis of Historical Documents	Rahnemoonfar, M. presentation	Digital Library Brownbag Technical Presentation, Bloomington, IN	2013	20	technical	0
D2I	University-wide Data Management Services: Cross-campus Collaborations at Indiana University	Coates, H. presentation	Digital Library Brownbag Technical Presentation, Bloomington, IN	2013	18	policy	0
D2I	From a Vacant Liberian Mansion to the ICO: The William V.S. Tubman Photography Collection	Stone, V. presentation	Digital Library Brownbag Technical Presentation, Bloomington, IN	2013	18	technical	0
D2I	The Avalon Media System: A Next-Generation Solution for Media Management and Access	Notess, M. presentation	Digital Library Brownbag Technical Presentation, Bloomington, IN	2013	19	technical	0
D2I	SEAD Virtual Archive: Thin Layer for Scientific Discovery and Long-Term Preservation	Kouper, I. presentation	Digital Library Brownbag Technical Presentation, Bloomington, IN	2013	20	technical	0
Center for Applied Cybersecurity Research							
CACR	Multi-Gigabit Intrusion Detection with OpenFlow and Commodity Clusters	Speaker: Keith Lehigh Lead Security Engineer University Information Security Office	CACR Security Seminar Series/IU Maurer School of Law, room 335	Jan 17	30	Professional, faculty, graduate students, staff	2

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
		IUPUI					
CACR	Retrofitting Legacy Code for Security	Speaker: Somesh Jha, PhD Professor, Computer Science Department University of Wisconsin – Madison	CACR Security Seminar Series/IU Maurer School of Law, room 335	Feb 7	37	Professional, faculty, graduate students, staff	3
CAR	PlaceRaider: Virtual Theft in Physical Spaces with Smartphones	Speaker: Guoliang Xue, PhD Professor of Computer Science and Engineering Arizona State University	CACR Security Seminar Series/IU Maurer School of Law, room 335	Mar 21	35	Professional, faculty, graduate students, staff	2
CACR	Rules of Engagement for Cyber Operations	Speaker: David Fidler James Louis Calamaras Professor of Law Fellow, Center for Applied Cybersecurity Research Indiana University	CACR Security Seminar Series/IU Maurer School of Law, room 335	Apr 4	36	Professional, faculty, graduate students, staff	3
CACR	Keeping Tabs on the Cloud	Speaker: Reihaneh (Rei) Safavi-Naini AITF Strategic Research Chair in Information Security Department of Computer Science University of Calgary, Canada	CACR Security Seminar Series/IU Maurer School of Law, room 335	Apr 18	35	Professional, faculty, graduate students, staff	2
CACR	Designing Software Systems that Comply with Privacy and Security	Speaker: Annie I. Antón Professor and Chair of the School of Interactive	CACR Security Seminar Series/IU Maurer School of	Apr 29	33	Professional, faculty, graduate students, staff	2

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
	Regulations	Computing Georgia Institute of Technology	Law, room 335				
Center for Research in Extreme Scale Technologies							
CREST	Notre Dame Fab Lab Visit	Traveled to Notre Dame Fab Lab, December 2012. This trip to Notre Dame was to further development of an IU fab lab and to foster collaboration with Notre Dame.	Notre Dame, Indiana	Dec 7	2	Research	
CREST	Taught full-day short course	Taught a full-day short course titled, "Theory and Methods of Lightfield Photography"	SPIE 2013 Burlingame, CA	Feb 4-7	12	Research Scientists and Students	
Research Technologies							
RT - HTC	Using OSG-xsede	DIscussions with med-school faculty	IUPUI	Jan-13	7	IU	0
RT - AVL	IU Compliance and Risk Management Vendor Tour Feb. 5th	IU Compliance and Risk Management Vendor Tour Feb. 5th	IU	Jan-13	4	IU	2
RT - AVL	Quick Tour for IUPUI Admission Recruiters Feb 6th	Quick Tour for IUPUI Admission Recruiters Feb 6th	IU	Jan-13	3	IU	0
RT - AVL	Present my past student work and AVL to Defazio N100 class Feb. 13th 6pm	Present my past student work and AVL to Defazio N100 class Feb. 13th 6pm	IU	Jan-13	62	IU	4
RT - AVL	Tour for W131 and R110 Classes Feb. 26 10:30am-11:15am	Tour for W131 and R110 Classes Feb. 26 10:30am-11:15am	IU	Jan-13	18	IU	2

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
RT - AVL	Ivy Tech Informatics Guests Tour Feb. 26th 11:30am	Ivy Tech Informatics Guests Tour Feb. 26th 11:30am	IU	Jan-13	9	Lay	3
RT - AVL	Indiana Academy Visit Feb 26th 2013	Indiana Academy Visit Feb 26th 2013	IU	Jan-13	13	K-12	0
RT-CES	IU North Regional Campus Tour	UITS Outreach Event for Northern Regional Campuses	Kokomo, Northwest and South Bend Campuses of IU	Feb-13	70	IU	0
RT - SciAPT	Introductory Parallel Programming for Supercomputers	Hands on introduction to parallel programming.	IT 127, IUPUI	Feb-13	2	IU	0
RT - SciAPT	Introductory Parallel Programming for Supercomputers	Hands on introduction to parallel programming.	Wells Library, IUB	Feb-13	7	IU	0
RT - AVL	EOT: J Everett Light Center tours	EOT: J Everett Light Center tours	IU	Feb-13	37	K-12	8
RT - AVL	Avon Cub Scout Wolf Den Tour March 5th 6:30pm	Avon Cub Scout Wolf Den Tour March 5th 6:30pm	IU	Feb-13	15	K-12	0
RT - AVL	High School Student Tours March 22nd	High School Student Tours March 22nd	IU	Feb-13	69	K-12	28
RT - AVL	Student IT Ambassadors Tour March 22nd 3:30pm-4:30pm	Student IT Ambassadors Tour March 22nd 3:30pm-4:30pm	IU	Feb-13	33	IU	4
RT - AVL	April 3rd Small Tour for IUPUI IT Ambassadors that Couldn't make the last tour	April 3rd Small Tour for IUPUI IT Ambassadors that Couldn't make the last tour	IU	Mar-13	12	IU	0
RT - AVL	(JAG Days Tours Jan. 31, Feb. 27th, & April 8th)	(JAG Days Tours Jan. 31, Feb. 27th, & April 8th)	IU	Mar-13	48	Lay	9
RT - AVL	AVL overview to Sp13 S637 class	AVL overview to Sp13 S637 class	IU	Mar-13	18	IU	0

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
RT - AVL	Trevor Harris from WVU wants to visit with his students	Trevor Harris from WVU wants to visit with his students	IU	Mar-13	10	Technical	0
RT - AVL	Racek Class Tour and Chair Review Wednesday April 17th	Racek Class Tour and Chair Review Wednesday April 17th	IU	Mar-13	5	IU	0
RT - AVL	Merck-Regenstrief bootcamp tour	Merck-Regenstrief bootcamp tour	IU	Mar-13	21	Business	3
RT - AVL	Tour for Joseph Stone	Tour for Joseph Stone	IU	Mar-13	2	Business	0
RT - AVL	Tours for Informatics Spring Preview March 7, 28, April 18, & 25	Tours for Informatics Spring Preview March 7, 28, April 18, & 25	Iu	Mar-13	13	IU	0
RT - AVL	Girls Inc Sat. Tour April 27th	Girls Inc Sat. Tour April 27th	IU	Mar-13	117	K-12	89
RT - AVL	IUB AVL Open House - Apr 2013	IUB AVL Open House - Apr 2013	IU	Mar-13	30	IU	0
RT - HTC	Open Science Grid All Hands Meeting	Annual Open Science Grid Meeting - hosted by IU	IUPUI	Mar-13	131	Technical	0
RT - ABITC	IUPUI Research Day	Open House to share and celebrate IUPUI's cutting-edge research and scholarly activity	IUPUI	Apr 5	500		100
RT - SciAPT	Big Red II Pre-Launch Workshop	Workshop to showcase the utility and capability of Big Red II	CIB Wrubel Commons	Apr-13	77	IU	0
RT-All	Big Red II Dedication	Dedication and Launch of IU's new Cray XE6 system	IU	Apr-13	300	Lay	20
RT - CESG	IU South Bend Campus Presentation on RT Services	Invited talk to present on Research Technolgoies services	IU South Bend Campus	Apr-13	30	IU	0

Cntr / Lab / Group	EOT Event Title	Description	Conference Name / Location	Date(s)	Approximate # of Attendees	Audience Type	Under-represented Attendees*
RT - CESG	IUSE Regional Campus Overview	Outreach to educate IU regional campuses on RT Services	IU Southeast - New Albany, IN	Apr-13	20	Technical	1
RT	Christopher S. Peebles Memorial Lecture in Information Technology	Second in the lecture series in information technology	IUB	Apr-13	50	IU	4
RT - AVL	OTEAM Informatcs Tour	OTEAM Informatcs Tour	IUPUI AVL	May-13	46	IU	15
RT - SciAPT	Big Red II Open House and RT Fair	Open house to promote BRII and RT services	IU Cyberinfrastructure Bldg.	May-13	30	IU	0
RT - AVL	Tour for Albert's Stereo Class Jan. 14th at 12pm	Tour for Albert's Stereo Class Jan. 14th at 12pm	IU	Dec-13	14	IU	0
RT - AVL	Ivy Tech Informatics Guests Tour Jan. 18th 10:30am	Ivy Tech Informatics Guests Tour Jan. 18th 10:30am	IU	Dec-13	4	IU	3
RT - AVL	Informatics guest tour Girl Scouts of America	Informatics guest tour Girl Scouts of America	IU	Dec-13	6	Lay	0
RT - AVL	JAG Days Tours Jan. 31, Feb. 27th, & April 8th	JAG Days Tours Jan. 31, Feb. 27th, & April 8th	IU	Dec-13	16	Lay	0
RT-HTC	Intro to High Energy Physics and High Throughput Computing	Talked to approximately 500 science students at Lebanon High School	Lebanon High School	May 28	500	K-12	62
National Center for Genome Analysis Support							
NCGAS	NCGAS exhibits at PAG XX	Twentieth annual Plant and Animal Genomics meeting.	Plant and Animal Genomics XX, San Diego CA	Jan-13	3000, 200 of which interacted with NCGAS	Technical	0