Minutes
CSU Information Science and Technology Center
Industrial Advisory Council (ISTeC IAC)
Thursday, November 3, 2011, 11 a.m. to 4:15 p.m.
Intel, Fort Collins

1. Arrival, Lunch

2. Host Welcome – Don Soltis, Intel

3. Introduction of Attendees (see list attached)

4. ISTeC High School Day – Prof. Michael De Miranda, College of Education, CSU ISTeC Education Advisory Committee Member;
   Michael presented a video of the Nov 21, 2011 High School Day.
   The purpose of this annual event held at CSU is to gather about 200 high school students, advisors, and teachers from across Colorado to introduce students to IS&T career paths and educational opportunities at CSU. We do this by providing students with interaction with representatives from Colorado’s leading high tech corporations, and IS&T-based demonstrations and contests designed by IAC members and CSU faculty. This year there were approximately 185 students + 25 adult chaperons from 12 Colorado schools.
   IAC members who attended the function indicated they were very happy with the caliber of students who participated this year.

5. CSU Research Highlight: Embedded Computing Systems – Prof. Sudeep Pasricha, CSU ISTeC Education Advisory Committee Member
   Embedded Computing Systems are at the heart of the post-PC era, driving ubiquitous cyber-physical devices that will usher in ambient intelligence the likes of which we have never seen before. Research in this area involves a foray into computer architecture, CAD and adaptive learning algorithms, and emerging nano-technologies, and impacts a spectrum of computing systems from mobile to warehouse-scale. The talk will: (a) introduce on-going related research at CSU; and (b) seek to identify potential areas of common interest with the IAC companies. Feedback is sought from IAC members on how a more effective and concrete collaboration in this area with industry could be established.

6. Host IAC Member Presentation – Don Soltis, Intel
   Company overview of Intel, focusing on Colorado operations.

7. Front Range Consortium for Computing Research – Prof. Pat Burns, CSU Vice President for Information Technology (1:10 – 1:25 p.m.)
   ISTeC represents CSU in the Front Range Consortium for Computing Research (FRCRC) for sharing high performance computing research and education activities (please see www.frcrc.org). We will report on the “First Annual Front Range High Performance Computing Symposium,” organized by FRCRC and held September 23-24, 2011; discuss plans for our booth at the 2011 Supercomputing Conference; and review other possible future activities. We need to know what the IAC members think such a group should do and how it should be structured, and how IAC companies can participate and benefit.
HJ Siegel asked what kind of affinity groups would interest IAC members: Challenges of HPC architectures/systems; CPU memory bandwidth; modeling vetting – verification and validation, real-life examples.

8. **Joint CSU/Company Projects to Use the ISTeC HPC System** – Prof. H.J. Siegel, CSU ISTeC Director

ISTeC purchased (with NSF funding) and manages a Cray HPC system with 1,248 cores (please see http://istec.colostate.edu/istec_cray/). We welcome industry collaboration with CSU faculty and students on projects that exploit the computing power provided by this system. Are there collaborative projects involving the HPC system that IAC members would like to explore?

9. **2012 Future Visions Symposium** – Prof. Pete Seel, CSU ISTeC Education Advisory Committee Member

The biennial ISTeC symposium will be held Thursday, April 12, 2012, at CSU with 26 speakers providing their visions of the future for their respective fields. We will present a list of potential keynote and track session speakers.

IAC members were asked for feedback on the proposed speakers and topics; adoption of a TED-like presentation model with 17 minutes allotted for each track speaker received positive feedback; CSU student recruiting opportunities for IAC attendees during the speaker's lunch and the dessert session that will wrap up the symposium.

10. **IAC Member Presentation** – Eric Griffith (for Dave McAllister), IBM Company overview of IBM Colorado operations. This segued into a discussion about the possibility of a younger version of high school day (6th, 7th, 8th graders).

**21st Century Library Report and Collaborative Efforts between Google and CSU Libraries:**

This session will have three presentations, followed by an industry panel. This panel discussion will be an opportunity for IAC feedback and recommendations.


At the same time the CSU Morgan Library is going through a massive physical remodeling, it is also going through a philosophy remodel. The libraries are the “information hub” for the university and the region, and the amount of information available is expanding at an unprecedented rate. This philosophy remodeling includes the changing, storing, discovery, accessing, retrieving, collaborating, and consuming of this massive amount of information. Ways the CSU Libraries are addressing these challenges were presented.

A comment was made by an IAC member that he has found the CSU library appears to be moving away from public accessibility to the information. That as much as libraries are expanding their content availability through electronic means, licensing requirements are causing restrictions.

How can ISTeC help with accessibility?

12. **Collaborative Efforts between Google and CSU Libraries** – Tom Wyman, Google, and David Ramsay, CSU Libraries

Google and the CSU Libraries are focusing on a truly “Win/Win/Win relationship.” - adding value to each other. This partnership is born out of the fact that both have parallel goals: organizing information and making it accessible and more universally useful.
13. **Google Liquid Galaxy Display System** – Sofia Linn, CSU ISTeC Education Advisory Committee Member, and Dan Hamp, CSU Academic Computing and Network Services

Developed by Google’s volunteer engineers, Google Liquid Galaxy provides an immersive Google Earth experience. Consisting of an array of monitors, you can “fly” anywhere. Mountains, buildings, valleys, the ocean floor, even the Moon and Mars fill your peripheral vision. Google has partnered with the CSU Libraries and other groups at CSU to incorporate spatial data.


Panelists:
- Ian Isaacs, ESRI – Concerned about lack of education expenditures; Colorado is near the bottom. Involve the community by showcasing the availability of the technology. Hopefully this could begin the movement back to supporting education expenditures. Use Galaxy in the mining industry?
- Su Hawk, Colorado Technology Association – industry perspective: Sue spoke for her corporate constituency and they say “Make it Come Alive.” Be careful about how data is legally considered. Validation of the viability of the information. Remote access very important. How real-time is the information? Universal access. Training to access the information. Use crowdsourcing to determine need for information flow.
- Don Dulchinos, CableLabs – issues surrounding public versus private access to data;
- Dan Pacheco, BookBrewer – author’s are finding they don’t need to go to publishers anymore. They can publish their own electronic books. Push for eBook lending. Push for eBooks for curriculum.

**Panel Questions:**

a. From the IAC’s perspective, what technologies should the CSU Libraries be investigating and what groups and organizations should the CSU Libraries be connecting with to help meet this “information hub” challenge?

b. What other spatial data applications and groups could benefit from Google Earth and Google Liquid Galaxy and who should CSU and Google engage with at those groups?

c. How could other members of the IAC collaborate with Google and the CSU Libraries to make this relationship even more beneficial to all?

d. What has made this Google and CSU relationship work well and how could other groups at CSU and IAC learn from this relation?

e. What are other areas and ways for IAC/CSU Libraries collaboration?

f. What are other areas and ways for IAC/CSU collaboration in general?

- Pete Seel indicated that as an author knowing how many copies have sold is a metric you want to know.
- Mapster was successful because it was free. Albums/CDs are not as popular anymore because you have to buy the whole album for a lot of money whether you want all of the songs or not. iTunes us successful because individual the songs are available cheaply.
- Delivery mechanism for digital education need to move forward.
- CSU as a geo-portal – not just a repository?
- Information supply that is easy to manipulate so you can find the specific data you want without having to wade through it all.

15. **Ideas/Suggestions from IAC about New IAC Member Companies** – Prof. H. J. Siegel, CSU ISTeC Director (4:05 – 4:10 p.m.)
We would like IAC suggestions for companies we may want to add to the IAC.

16. **Spring 2012 IAC Retreat Agenda Ideas** – Prof. H. J. Siegel, CSU ISTeC Director
Suggestions for agenda items for our next ISTeC IAC retreat.
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<td>Lucinda Van Inwagen</td>
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<td>Melinda Laituri</td>
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<td>David Ramsay</td>
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<td>Pete Seel</td>
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<td>CSU - Electrical and Computer Engineering</td>
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<td>Michael De Miranda</td>
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<td>Sofia Linn</td>
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<td>Anthony Maciejewski</td>
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<td>MaryAnn Stroub</td>
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Multi-core Embedded Computing Systems (MECS) Lab

Research Spotlight

Sudeep Pasricha (sudeep@colostate.edu)
Colorado State University
03 Nov, 2011
Research Motivation

- According to forecasts, future of IT characterized by terms such as
  - Disappearing computer,
  - Ubiquitous computing,
  - Pervasive computing,
  - Ambient intelligence,
  - Post-PC era,
  - Cyber-physical systems.

- Basic technologies:
  - *Embedded Computing Systems*
  - Communication technologies
Most of the design and integration challenges for multicore computing systems are multi-dimensional:

- Power vs. performance vs. area vs. reliability vs. security, ...
- Huge design space of configurations and decisions
- Not possible to exhaustively or manually find "good" solutions

CAD to aid design space exploration and decision making:

- Automated system level floorplanning, PDN planning
- Exploration algorithms for interconnection NoCs
- Trade-offs b/w fault tolerance and power, performance
- 3D IC mapping and VI assignment algorithms
- System level performance, power, reliability, lifetime modeling
HW/SW Architectures for Multicore Chips

- Novel on-chip interconnection network architectures
  - Flow control protocols, topologies
  - Router architectures, routing schemes

- Studying architectural impact of emerging technologies
  - Photonic interconnects
  - CNT interconnects and transistors

- Memory hierarchy optimizations (L1, L2, L3, DRAM, Storage)
  - Non-temporal cache enhancements, DRAM power limiting, storage data aggregation techniques

- Task/thread software scheduling
  - Energy harvesting environments (NASA seed project)
  - Thermal aware, process-variation aware

- Metallic semiconducting SWCNT Bundle
- Mixed Bundle
Mobile Computing

- App based smartphones and tablets are the future of computing
  - Low power design is of paramount importance!

- How can battery lifetime and user experience be optimized?
  - User aware and app aware machine learning algorithms
  - CPU and Backlight Scaling Strategies
  - Sensor Shutdown and Duty Cycling
  - Wireless Radio Protocol and Link Selection Optimization
  - Offloading computations to the cloud

High Performance Computing

- Cooling and computational energy aware resource allocation
  - Cooling costs > computation costs today; will keep increasing
  - Adapt to changing workload in most cost effective manner
Teaching and Distance Education Efforts

- **Courses I Currently Teach**
  - ECE452: Computer Organization and Design
  - ECE554: Advanced Computer Architecture
  - CS/ECE561: Hardware/Software Design of Embedded Systems
  - ECE661: Advanced Topics in Embedded Systems

- **Embedded Systems Certification (Distance Ed; 12 credits)**
  - **Core Courses (8 credits)**
    - CS/ECE561: Hardware/Software Design of Embedded Systems
    - CS475: Parallel Programming
  - **Supplementary courses (choose one; 4 credits)**
    - ECE554: Advanced Computer Architecture
    - ECE661: Advanced Topics in Embedded Systems
    - CS560: Reconfigurable Computing
    - CS575: Parallel Processing
Past Embedded Projects (Undergraduate)
Current Undergraduate Projects

- Augmented Reality Games for Rehabilitation
  - Aid victims of stroke, cerebral palsy, ...

- Mobile Cloudlets
  - Offloading computations to the cloud

- LARVA Drone
  - Local Area Reconnaissance Visual Assistant

- Engine Generator Set Control
  - Collaboration with Woodward
Current Graduate Student Advisees

- Shirish Bahirat (Ph.D., MICRON)
- Yong Zou (Ph.D., BROADCOM)
- Yi Xiang (Ph.D.)
- Nishit Kapadia (Ph.D)
- Soohyun Kwon (Ph.D, visiting scholar, Kyuongpok Univ, Korea)
- Brad Donohoo (M.S.)
- Chris Ohlsen (M.S., WOODWARD)
- Miguel Salas (M.S., INTEL)
Wish List

- Research Collaborations
  - Computer architecture, CAD tools, embedded systems, mobile computing, datacenter resource management

- Senior Design and Course Project Collaborations
  - Targeted and sponsored short-term projects for teams of undergraduate and graduate students

- Equipment and Software Donations
  - Past donors: Blackberry, ARM, Synopsys, Xilinx

- Guest Lectures
  - Past lectures: Don Soltis (Intel)
Thank you!

sudeep@colostate.edu

http://www.engr.colostate.edu/~sudeep/
FutureVisions Symposium
The Future of Information
and Communication Technology

9 a.m. - 4 p.m.
Thursday, April 12, 2012
Note the revised date
4-12-12

Lory Student Center, CSU

A conference sponsored by ISTeC
with support from
the Industrial Advisory Council
FV 2012 Goals

• 1) Describe the **key themes and issues** that new ICT graduates will confront in the next 4-5 years

• 29 perspectives provided by **industry, academic, and government speakers**

• 2) **PROCESS** – initiate a dialogue between industry and academe in program planning

• 3) **VALUE ADDED** -- Create recruiting opportunities for sponsoring companies
FutureVisions timeline

• Last spring - Solicited your ideas for topics
• This fall – Identified possible 3-4 speakers for each of eight breakout tracks
• Today - Review the 2012 tracks and ID additional speakers
• This month – formally invite speakers
• December – confirm program
• Thursday, April 12th -- hold FutureVisions Symposium 2012
Possible Keynote Speakers (2)

• **Morning session keynote** (the 9 AM opening general session) *is still open for discussion:*

  • Suggestions are **Jaron Lanier** of UC Berkeley, VR pioneer, author of *You are Not a Gadget*
  
  • **Frank Biocca** of the MIND lab at MSU on augmented reality technology

• **Steven Levy** of *Wired*, Apple expert

• **David Pogue** of *NYT* – **other ideas?**

• **PM Keynote** -- Seeking speaker from IBM’s Deep QA team on the Watson A.I. project -- (PI was Dr. David Ferrucci) on **The Future of Artificial Intelligence**
Prior Breakout Sessions


• 2007 – (3) -- Future of ICT, Digital Visualization Futures, Trends in Computer Security

• 2010 – (3) -- Cloud Computing, Human-Computer Interaction, Future of Games

• 2012 – Plan to adopt TED (Technology, Entertainment & Design) model of 3-4 speakers in each of 8 sessions with 17 minutes each – short, sweet, and to the point
The Eight 2012 Breakout Tracks

- Visualization futures
- Digital Game futures
- Future of Cyber-Security
- Futures of The Cloud
- Digital Visualization futures
- Communication futures
- Social Network futures
- Future of Artificial Intelligence
- GIS-GPS futures
Visualization Futures

- **Industry:**
  - **Aidan Chopra** of Google, Boulder, CO. Aidan would be invited to speak on the future of 3D visualization tools such as SketchUp.
  - **Bruce Blaho**, HP fellow, on the future of workstations specifically designed for CGI (computer-graphics imaging) and digital animation.
  - **Duncan Ramsay** of Pixar Films, Emeryville, CA. Duncan would be invited to speak on the subject of the digital workflow at Pixar.
  - **OTHERS?** – please email me [pete.seel@colostate.edu](mailto:pete.seel@colostate.edu) with ideas.

- **Academy:**
  - **Melinda Laituri** (with **David Ramsay** of UL) would be invited to discuss the future of global visualization tools such as Google Liquid Galaxy.
Digital Game Futures

• **Academy:**
  • **Rosa Martey** (JTC) has agreed to speak about the future of digital games as tools for achieving educational outcomes. This is her present research area with a $2 million grant from Intelligence Advanced Research Projects Agency (IARPA Reynard Project).
  • **Jim Folkestad** (SoE) has agreed to speak on future of digital games as tools for achieving educational outcomes.

• **Industry:**
  • We still need 1-2 industry speakers on the future of games:
    • 1) **Speaker from Nintendo** on future of interactive Wii-style games (via teleconference?)
    • 2) **Speaker from Blizzard Entertainment** on future of MMORPGs (via teleconference?)

• Ideas?
Future of Cyber-Security

- **Industry:**
  - **Steve Gosnell.** Senior Principal Information Security Engineer, The MITRE Corporation, Colorado Springs.
  - **Dan Thomsen.** Principal Researcher, Smart Information Flow Technology. At SIFT, he works to improve the effectiveness of computer security using artificial intelligence and human factors research to manage the complexity of modern computer security mechanisms.
  - **Denny Georg.** Chairman, Secure64 Software Corporation. Greenwood Village, CO. Also long term member of the IAC
  - **Patrick Walsh.** CTO eSoft, Broomfield, CO
  - **Other suggestions? Please email Pete**

- **Academy:**
  - **Indrajit Ray.** Colorado State University. Current research is focused on two broad areas network survivability and pervasive computing.
Future of the Cloud

- **Industry:**
  - **Avinash Lakshman** or **Prashant Malik** at Facebook. They are the creators of Cassandra, the storage system that underpins Facebook content.
  - **Milind Bhandarkar** is the Chief Architect at Greenplum Labs at EMC. He was responsible for managing Hadoop (while he was at Yahoo). Hadoop implements MapReduce, which is the dominant programming model for cloud computing. Hadoop is the most widely used implementation of the model.
  - **Dennis Gannon** or **Dan Reed** at Microsoft Research. Dennis gave an excellent keynote at FutureVisions 2010 and has extensive experience in parallel/cloud computing.

- **Academy:**
  - **Shrideep Pallickara.** Colorado State University. Research interests are in the area large-scale distributed systems.
Communication Futures

- **Industry:** (invite top 2~3 based on feedback from IAC and EAC)
  - **Mike Dahlke,** Director of Management Programs at Level 3 Communications. Level 3 is a leading provider in commercial wireline internet solutions.
  - **Rusty Searle,** Strategy and Planning at HP
  - **Rick Stevens,** System Engineering at Cisco. Both HP and Cisco have strong wireless network units that provide commercial wireless sensing and surveillance solutions.
  - **James E. H. Dyal,** Manager of the Advanced Networking & Baseband Design at L3 Communications. The company is leader in C3ISR systems.
  - OTHER SUGGESTIONS? – please email Pete

- **Academy:** (invite 1 based on feedback from the faculty and EAC)
  - **Liuqing Yang,** Associate Professor, ECE.
  - **Anura Jayasumana,** Professor, ECE and CS.
  - **J. Rockey Luo,** Assistant Professor, ECE.
Social Network Futures

- **Industry**: (invite top 2~3 based on feedback from IAC and EAC)
  
  **Anders Gronstedt**, President of the Gronstedt Group, Inc. Gronstedt develops cost-effective, learning and communication solutions using virtual world tools and simulations.

- **Scott Green**, Google Boulder site manager. “Google+” provides similar functions as Facebook and Linkedin.

- **OTHER SUGGESTIONS?** – please email

- **Academy**: (invite 1 based on feedback from the faculty and EAC)
  
  **Stephen Hayne**, Computer Information Systems. His research involves Collaborative Technologies and Knowledge Management

  **Jim Folkestad**, School of Education and popular speaker. Co-chair of ISTeC. Focus on the power of networks to rapidly learn and innovate in order to compete globally for work.
Future of Artificial Intelligence

- *Industry (invite 2-3)*
- IBM rep on Deep Q/A Watson project
- Rep from SpaceX, El Segundo, CA
- Need IAC assistance here -- Any A.I. experts in your company?

- *Academy*
- **Dr. Chuck Anderson**. Professor in Computer Science on his research on brain-control of devices for the less-abled.
GIS - GPS Futures

- Industry (invite 2-3)
- **Mike Goss**, Google – Boulder. To speak about GIS.
- **Charlie Peterson**, Microsoft
- **Rep from SpaceX**, El Segundo, CA
- **Joseph Kerski**, Education Manager at ESRI in Broomfield
- Other suggestions for this track? Please email Pete

- **Academy**
- **Raj Khosla**, College of Agricultural Sciences – Precision Agriculture
Recruiting Opportunities

- Each **sponsor company will have an assigned table (with sign)** for lunch – students will chose tables based on interests – we’ll promote this **free lunch** with **juniors** and **graduate students**
- At PM keynote talk we’ll announce a **special dessert session with sponsor companies** immediately afterward from 2:30-3:30 PM -- similar table set-up, but can have formal tables for recruiting displays
- **Incentive to attend final session** – TWO iPads drawn with ticket lottery at 3:30 (**must be present to win** – sorry but faculty, staff, and sponsor reps can’t enter)
Thanks for your input... and talk with your recruiting staff about sponsoring FutureVisions

Dr. Pete Seel -- pete.seel@colostate.edu

Plan to attend FutureVisions on 4-12-12
The Video Project

• Met our goals of original concept was for 5-6 interviewees from CSU, industry, and recent CSU grad in industry

• TRT had to be under 6-7 minutes (suitable for playing in a middle or high school class via YouTube online)

• Final GIS-GPS video came in at

• Search YouTube for GIS-GPS careers

• Next career video will be about Digital Visualization – in spring 2012