



The 19th IEEE Pacific Rim International Symposium on Dependable Computing (PRDC 2013)

Vancouver, BC, Canada. December 2-4, 2013

<http://prdc.dependability.org/2013/>

Program at a Glance

Monday Dec 2 nd , 2013 (8:00 AM to 7:30 PM)		
8:00 to 8:30 AM	Registration	
8:30 to 9:00 AM	Welcome and Plenary Session Remarks by General Chair, Remarks by Program co-chair Best paper award presentation	
9:00 to 10:00 AM	Keynote by Prof. Tadayoshi Kohno, University of Washington Computer Security and Everyday Objects: Case Studies with Medical Devices, Robots and Automobiles	
10:00 to 10:30 AM	Coffee Break	
10:30 AM to Noon	A1. Checkpointing and Voting	B1. Fault Injection and Test
Noon to 1:30 PM	Lunch	
1:30 to 3:00 PM	A2. Consensus	B2. Error Detection and Correction 1
3:00 to 3:30 PM	Coffee Break	
3:30 to 5:00 PM	A3. Fast abstracts (joint session)	
6:00 to 7:30 PM	Reception and poster session	
Tuesday Dec 3 rd , 2013 (8:30 AM to 10:00 PM)		
8:30 to 8:45 AM	Registration	
8:45 to 9:00 AM	Remarks regarding Excursion and Banquet	
9:00 to 10:00 AM	Keynote by Dr. Kenny Gross, Oracle Comprehensive Prognostics for Enhanced Dependability of Integrated Hardware/Software Enterprise Servers and Clusters	
10:00 to 10:30 AM	Coffee Break	
10:30 AM to Noon	A4. Modeling with Networks	B4. Industry Track Presentations
Noon to 1:30 PM	Lunch	
1:30 to 3:00 PM	A5. Distributed Systems	B5. Error Detection and Correction 2
3:00 to 3:30 PM	Coffee Break	
3:45 to 6:45 PM	Excursion to the Museum of Anthropology (MoA), UBC (Details on page 9)	
7:00 to 10:00 PM	Banquet Dinner at the Marriott Renaissance Vistas Restaurant (Details on page 10)	
Wednesday Dec 4 th , 2013 (8:15 AM to Noon)		
8:15 to 8:30 AM	Registration	
8:30 to 10:00 AM	A6. Security	B6. Modeling
10:00 to 10:30 AM	Coffee Break	
10:30 AM to Noon	A7. Safety & Robustness	B7. Software Reliability

Plenary Sessions

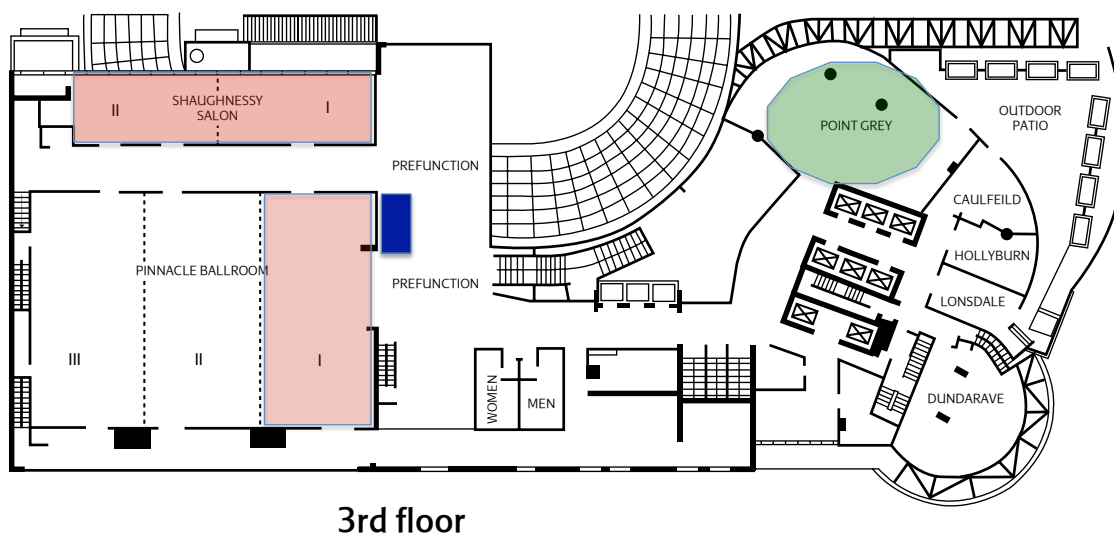
Breaks and Social Events

Parallel Sessions

Locations and Hotel Map

Date	Session A	Session B	Breaks/Lunches/Reception
Dec 2 nd and Dec 3 rd	Plenary Sessions: Pinnacle Ballroom 1		Point Grey
	Shaughnessy Salon	Pinnacle Ballroom 1	
Dec 4 th	Shaughnessy Salon 1	Shaughnessy Salon 2	

PRDC'13: Hotel Layout



Legend:

- Registration Desk (8 AM to 5 PM)
- Conference Room
- Breaks and Reception

Monday, December 2, 2013

Welcome and Plenary Session

- Remarks by General Chair,
- Remarks by Program Co-chair
- Best paper award presentation

Keynote 1: Prof. Tadayoshi Kohno, University of Washington

Computer Security and Everyday Objects: Case Studies with Medical Devices, Robots, and Automobiles

Abstract: Computers are now integrating into everyday objects, from medical devices to children's toys. This integration of technology brings many benefits. Without the appropriate checks and balances, however, these emerging technologies also have the potential to compromise our digital and physical security and privacy. This talk will explore case studies in the design and analysis of computer systems for three types of everyday objects: wireless medical devices, robots, and automobiles. We will discuss the discovery of vulnerabilities in leading examples of these technologies, the challenges to securing these technologies and the ecosystem leading to their vulnerabilities, and new directions for security. For example, we will discuss our experiments to wirelessly affect the behavior of an implantable defibrillator, our efforts to compromise the computers in an automobile from a thousand miles away, and the implications and consequences of these works.

Short Bio: Tadayoshi Kohno is an Associate Professor in the University of Washington Department of Computer Science and Engineering and an Adjunct Associate Professor in the UW Information School. His research focuses on helping protect the security, privacy, and safety of users of current and future generation technologies. Kohno is the recipient of an Alfred P. Sloan Research Fellowship, a U.S. National Science Foundation CAREER Award, and a Technology Review TR-35 Young Innovator Award. Kohno has authored more than a dozen award papers, has presented his research to the U.S. House of Representatives, was profiled in the NOVA scienceNOW "Can Science Stop Crime?" documentary, and chaired the 2012 USENIX Security Symposium.

Session A1: Checkpointing and Voting

Session Chair: Satoshi Fukumoto (Tokyo Metropolitan University)

Checkpointing Strategies with Prediction Windows, Guillaume Aupy, Yves Robert, Frédéric Vivien, and Dounia Zaidouni

On the Combination of Silent Error Detection and Checkpointing, Guillaume Aupy, Anne Benoit, Thomas Hérault, Yves Robert, Frédéric Vivien, and Dounia Zaidouni

Improving Reliability of Real-Time Systems through Value and Time Voting, Hüseyin Aysan, Iain Bate, Patrick Graydon, and Sasikumar Punnekkat

Session B1: Fault Injection and Test

Session Chair: Takashi Nanya (Canon, Inc.)

EDFI: A Dependable Fault Injection Tool for Dependability Benchmarking Experiments, Cristiano Giuffrida, Anton Kuijsten, and Andrew S. Tanenbaum

Towards Formal Approaches to System Resilience, Vishal Sharma, Arvind Haran, Zvonimir Rakamaric, and Ganesh Gopalakrishnan

Acceleration of Random Testing for Software, Shengfeng Wu, Yue Wu, and Shiyi Xu

Session A2: Consensus

Session Chair: Zvonimir Rakamaric (University of Utah)

A Generic Consensus Algorithm for Shared Memory, Catia Khouri, and Fabiola Greve

Probabilistic Analysis of a 1-of-n Selection Algorithm using a Moderately Pessimistic Decision Criterion, Negin Fathollahnejad, Emilia Villani, Risat Pathan, Raul Barbosa, and Johan Karlsson

Fault-Tolerant Leader Election in Mobile Dynamic Distributed Systems, Carlos Gómez-Calzado, Alberto Lafuente, Mikel Larrea, and Michel Raynal

Session B2: Error Detection and Correction 1

Session Chair: Shiyi Xu (Shanghai University)

Analyzing Reliability of Memory Subsystems with Double Chipkill Detect/Correct, Xun Jian, Nathan Debardeleben, Sean Blanchard, Vilas Sridharan, and Rakesh Kumar

Building Fast, Dense, Low-Power Caches Using Erasure-Based Inline Multi-Bit ECC, Jangwoo Kim, Mark McCartney, Mudit Bhargava, Hyunggyun Yang, Ken Mai, and Babak Falsafi

Reliability of Disk Arrays with Double Parity, S.J. Thomas Schwarz, Darrell D.E. Long, and Jehan-Francois Paris

Session A3: Fast Abstracts

Session Chair: Kalyan Vaidyanathan (Oracle Corp.)

On the Error Resiliency of Combinational Logic Cells – Implications for Nano-based Digital Design, P. Balasubramanian and S. Yamashita

dOSEK: A Dependable RTOS for Automotive Applications, Martin Hoffmann, Christian Dietrich, and Daniel Lohmann

Two-Phase Majority Decision Scheme Using Time-Stamps, Yuzuru Maya

Reliability Prediction of Smartphone Applications Through Their Failure Data Analysis, Sonia Meskini, Ali Bou Nassif, and Luiz Fernando Capretz

Consistency verification of UML diagrams based on process bisimulation, Tomoyuki Yokogawa, Sousuke Amasaki, Hisashi Miyazaki, Keisuke Okazaki, Yoichiro Sato and Kazutami Arimoto

Synthesis of Redundant Combinatorial Logic for Selective Fault Tolerance, Hao Xie, Li Chen, Adrian Evans, Shi-Jie Wen, and Rick Wong

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Classification of DNS queries for Anomaly Detection, Hongbo Shi and Kazuhiko Iwasaki

A Class of q -Ary Unidirectional Error Correcting Codes for MLC Flash Memories, Shohei Kotaki and Masato Kitakami

A Note on Influence of DC-DC Converter Noise in CAN Networks, Mamoru Ohara, Masayuki Arai, and Satoshi Fukumoto

Reducing Communication Delay by Finding Sink Location in Low-Duty-Cycle Wireless Sensor Networks, Yu-Yuan Lin, Kuo-Feng Ssu, Hau-Yu Chiang, and Chun-Hao Yang

A Delay-awareness Routing Protocol in Intermittently Connected Underwater Acoustic Sensor Networks, Chun-Hao Yang, Kuo-Feng Ssu, and Yu-Yuan Lin

Zero-Maintenance Disk Arrays, Jehan-Francois Paris, Darrell D.E. Long, and S.J. Thomas Schwarz

Posters

Enhancing Location Privacy in Host Identity Protocol using Multiple Forwarding Session Initiation, Li Wei and Takashi Minohara

Adaptive Redundant Data Allocation for Systems with Probabilistically Available Storage Elements, Kousuke Ota, Viet Ta Hong, and Haruhiko Kaneko

Characterizing and Understanding the Error Resilience of GPGPU Applications, Bo Fang, Karthik Pattabiraman, Matei Ripeanu, and Sudhanva Gurumurthi

Understanding the sources of reliability issues in JavaScript / HTML5 / CSS, Kartik Bajaj, Karthik Pattabiraman, and Ali Mesbah

Towards an Approach for Failure Prediction in Cloud Clusters, Xin Chen, Charng-Da Lu, and Karthik Pattabiraman

Locating Silent Data Corruption Causing Regions at Software Layer for Error Detection, Qining Lu, Jude Rivers, Meeta Sharma Gupta, and Karthik Pattabiraman

Tuesday, December 3, 2013

Keynote 2: Dr. Kenny Gross, Oracle

Comprehensive Prognostics for Enhanced Dependability of Integrated Hardware/Software Enterprise Servers and Clusters

Abstract: Business-critical enterprise computing servers are now being integrated with advanced telemetry agency to collect and archive hundreds of system performance, throughput, and load metrics (called "soft telemetry"), as well as digitized time-series signatures from distributed internal physical transducers (called "physics telemetry"). The merged, resampled, and phase synchronized soft and physics telemetry are monitored in real time by pattern recognition "Detectors" for the purpose of enhancing the reliability, availability, serviceability, and optimal energy efficiency of servers and clusters. Electronic Prognostics (EP) comprises a comprehensive methodology for proactively detecting and avoiding failures to achieve condition-based maintenance (CBM), where components, including N+1 redundant components, are proactively swapped based upon their condition and operational history, versus conventional reactive "fix-on-failure" maintenance. Oracle has for the last decade been developing EP innovations and productizing prognostic agency in enterprise servers. In the early days of pattern-recognition-triggered Software Aging and Rejuvenation (SAR), completely separate tools and techniques were developed in separate business units to address h/w-centric EP, versus s/w-centric SAR. Now, a unified monitoring methodology has been developed that embodies a symbiotic integration of heretofore separate EP and SAR to achieve proactive fault monitoring of integrated h/w-s/w systems and database appliances. The key enabler for achieving integrated EP-SAR functionality is Oracle's continuous system telemetry harness (CSTH). CSTH integrates physics telemetry (distributed temperatures, voltages, currents, fan RPMs, vibration levels), soft telemetry, and various quality-of-service (QOS) metrics that now include vibration-driven IO throughput latencies in systems with spinning disk drives. CSTH signals are continuously archived to a circular file (i.e. the "Black Box Recorder"), and are also processed in real time using advanced pattern recognition for proactive anomaly detection. The ability to distinguish software aging phenomena from vibration-related performance degradation is a vital functional requirement for integrated EP/SAR prognostic health management systems going forward. Oracle's CSTH coupled with advanced pattern recognition agency to achieve EP plus SAR are helping to increase component reliability margins and system dependability goals while reducing (through improved root cause analysis) costly sources of "no trouble found" (NTF) events that have become a significant sparing-logistics issue across the enterprise computing industry.

Short Bio: Kenny Gross is a Distinguished Engineer for Oracle and is team leader for the System Dynamics Characterization and Control team in Oracle's Physical Sciences Research Center in San Diego. Gross specializes in advanced pattern recognition, continuous system telemetry, and dynamical system characterization for improving the reliability and availability for enterprise computing systems and integrated database appliances. He has 219 US patents issued and pending, 180 scientific publications, and was awarded a 1998 R&D 100 Award for one of the top 100 technological innovations of that year, for an advanced statistical pattern recognition technique that

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was originally developed for nuclear and aerospace dependability applications and is now being used for a variety of applications to improve the dependability, quality-of-service, and optimal energy efficiency for enterprise computer servers. Gross' Ph.D. is in nuclear engineering.

Session A4: Modeling with Networks

Session Chair: Layali Rashid (Qualcomm)

Derivation of Stochastic Reward Net for Compatibility and Conformance Verification of Component Erroneous Behavior Model, Naif A. Mokhayesh Alzahrani and Dorina C. Petriu

Survivability Evaluation of Fluid Critical Infrastructure using Hybrid Petri Nets, Hamed Ghasemieh, Anne Remke and Boudewijn R. Haverkort

Probabilistic Modeling of Failure Dependencies Using Markov Logic Networks, Shalini Ghosh, Wilfried Steiner, Grit Denker and Patrick Lincoln

Session B4: Industry Track Presentations

Session Chair: Bob Yeh (Boeing)

Dragonfruit: Cloud Provider-Agnostic Trustworthy Cloud Data Storage and Remote Processing, Eric W.D. Rozier, Saman A. Zonouz, and David Redberg

Mobility-enabled Publish/Subscribe: A Case Study, Zigor Salvador, Alberto Lafuente, and Mikel Larrea

Mining Large Network Reconnaissance Data, Fyodor Yarochkin, Yennun Huang, Yung-Li Hu, and Sy-Yen Kuo

Session A5: Distributed Systems

Session Chair: Christian Engelmann (Oakridge National Labs)

Assessment Criteria for Cloud Identity Management Systems, Umme Habiba, Abdul Ghafoor Abassi, Rahat Masood, and Muhammad Awais Shibli

Exploring Time and Frequency Domains for Accurate and Automated Anomaly Detection in Cloud Computing Systems, Qiang Guan, Song Fu, Nathan DeBardeleben, and Sean Blanchard

Minotor: Monitoring Timing and Behavioral Properties for Dependable Distributed Systems, Olivier Baldellon, Jean-Charles Fabre, and Matthieu Roy

Session B5: Error Detection and Correction 2

Session Chair: Darrell Long (University of California Santa Cruz)

Power of One Bit: Increasing Error Correction Capability with Data Inversion, Rakan Maddah, Sangyeun Cho, and Rami Melhem

Tolerating Noise in MLC PCM with Multi-Bit Error Correction Code, Bing Li, Shan Shuchang, Hu Yu, and Xiaowei Li

Applying Reduced Precision Arithmetic to Detect Errors in Floating Point Multiplication, Kushal Seetharam, Lance Co Ting Keh, Ralph Nathan, and Daniel J. Sorin

Wednesday, December 4, 2013

Session A6: Security

Session Chair: Yennun Huang (Academia Sinica)

Sechduler: A Security-Aware Kernel Scheduler, Saman Zonouz, Rui Han, and Parisa Haghani

FloTracker: Log-Free and Instantaneous Host-Based Intrusion Root-Cause Analysis, Saman Zonouz, Ahmad Seyfi, Alejandro Mesa, and Gabriel Salles-Loustau

Secure Scan Design with Dynamically Configurable Connection, Yuta Atobe, Youhua Shi, Masao Yanagisawa, and Nozomu Togawa

Session B6: Modeling

Session Chair: Hiroyuki Okamura (Hiroshima University)

FuzzTrees - Failure Analysis with Uncertainties, Peter Tröger, Franz Becker, and Felix Salfner

User-Perceived Instantaneous Service Availability Evaluation, Rafael Rezende, Andreas Dittrich, and Mirosław Malek

Prediction and Classification of Performance Failures in Video-streaming Servers, Carlos Augusto Cunha and Luis Moura e Silva

Session A7: Safety and Robustness

Session Chair: Nobuyasu Kanekawa (Hitachi)

Safe Virtual Interrupts Leveraging Distributed Shared Resources and Core-to-Core Communication on Many-Core Platforms, Boris Motruk, Jonas Diemer, Philip Axer, Rainer Buchty, and Mladen Berekovic

Towards a Certifiable Integration of SRAM-based FPGAs in Safety-Critical Automotive Systems, Henning Sahlbach and Rolf Ernst

HLA Middleware Robustness and Scalability Evaluation in the Context of Satellite Simulators, Denise Rotondi Azevedo, Ana Maria Ambrósio, and Marco Vieira

Session B7: Software Reliability

Session Chair: Min Xie (City U. of Hong Kong)

Orthros: A High-Reliability Operating System with Transmigration of Processes, Kenji Yoshida, Shoichi Saito, Koichi Mouri, and Hiroshi Matsuo

Generalized Cox Proportional Hazards Regression-based Software Reliability Modeling with Metrics Data, Daisuke Kuwa, Tadashi Dohi, and Hiroyuki Okamura

Transaction-Based Process Crash Recovery of File System Namespace Modules, David C. Van Moolenbroek, Raja Appuswamy, and Andrew S. Tanenbaum

Directions for the Excursion (Dec 3rd, 2013 at 3:45 PM):

We will have an excursion to the world famous Museum of Anthropology (www.moa.ubc.ca) on December 3, 2013. The excursion ticket is included in the registration – please contact us at the earliest if you need to purchase additional excursion tickets at \$38 per ticket (for those accompanying you). Your excursion ticket is in the registration package, and must be shown prior to boarding the bus.

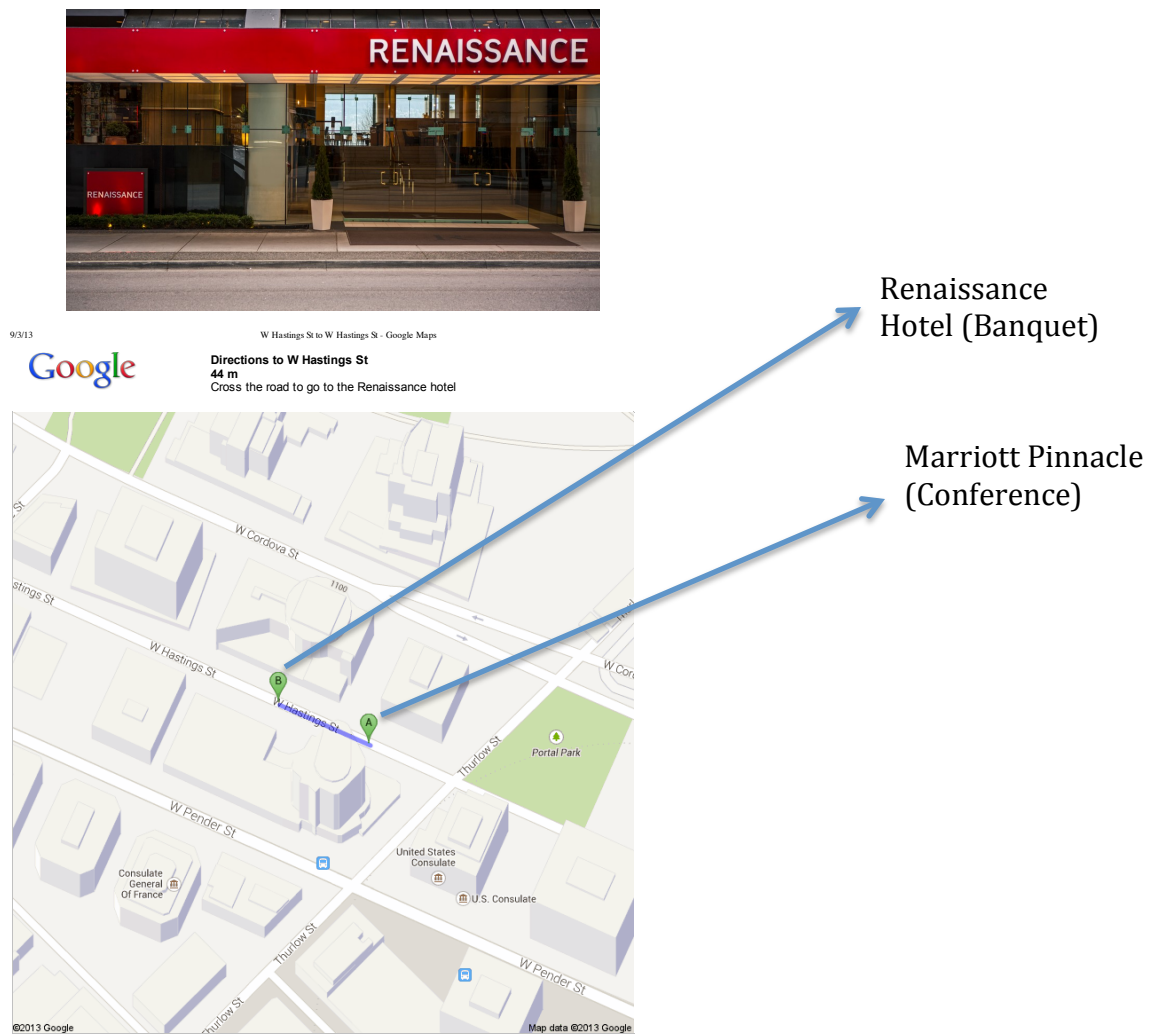
Some points to keep in mind during the excursion

1. Buses will leave for the museum starting at 3:45 PM on Dec 3rd. Please gather in the lobby of the hotel to board the bus, at 3:45 PM sharp as we have a rather tight schedule at the museum. If you miss the bus, you will not be able to get to the museum on time.
2. Once you arrive at the museum, you will be escorted by a tour guide for a museum tour. Tours last approximately 90 minutes and cover most of the museum's highlights. Please stick to your own tour group as far as possible.
3. Large bags are not allowed in the Museum Galleries and need to be checked in storage bins or lockers; valuables such as wallets and cameras should be taken with you and not left in storage bins.
4. The taking of photographs is permitted but the museum staff asks that you please restrict the use of flash photography as far as possible.
5. Some objects at MOA are touchable – they will have signs saying “Touch Gently”. If there is no sign, please do not touch any objects.
6. Food, drink, and gum are not permitted within the galleries.
7. Finally, buses will depart from the museum starting at 6:15 PM. This should give just enough time for you to take the guided tour and visit the gift shop. Please be sure to catch the return buses at the scheduled time so that we are back at the hotel in time for the banquet starting at 7 PM sharp.

Directions for the Banquet (Dec 3rd, 2013, 7 PM)

The banquet will be held in the VISTAS 360 restaurant, located on the 20th floor of the **Marriott Renaissance hotel**, which is located across the street from the conference hotel. To get there, please cross the street and walk to the Renaissance hotel (See maps below), and take the elevators to the top floor. There's a small flight of stairs you'll need to climb after getting off the elevator. The banquet will begin at 7 PM, though there will be a cash bar available from 6:30 PM onwards.

You need a ticket for the banquet. Your ticket is included in the registration package. If you need to buy additional tickets for those accompanying you, please contact the registration desk as soon as possible. Additional banquet tickets are \$92 a piece.



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