The 38th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2008)

Anchorage, Alaska, USA, June 24-27, 2008

Sponsored by: IEEE Computer Society Technical Committee on Dependable Computing and Fault Tolerance
IFIP WG 10.4 on Dependable Computing and Fault Tolerance

In cooperation with: Carnegie Mellon University

Final Program

Message from the Conference General Chair

Welcome to the 2008 International Conference on Dependable Systems and Networks (DSN-2008). This is our community's 38th annual offering of this premier international conference series. This year marks the first time the conference has been held in Anchorage Alaska, the largest city in America's Last Frontier.

All of us depend upon computers in our everyday lives. But, as the complexity of computer-based systems and networks grows, it is ever more challenging to provide resilience to malicious attacks, accidental faults, design errors, and unexpected operating conditions. Beyond that, such systems are increasingly trusted to provide safety, confidentiality, and near-continuous operation. The challenges to providing computing that is truly dependable in all respects are significant, but meeting them is essential to the well being of corporations, individuals, governments, and our global economy.

DSN is the place where researchers in the international dependability community publish their very best work. The conference focuses on creating and assessing the dependability of computer systems and networks in all their forms, including embedded systems, enterprise systems and globe-spanning networks. These systems must have resilience to malicious attacks, accidental faults, design errors, and unexpected operating conditions. Increasingly, even "every-day" computing systems must provide near-continuous operation, security, and safety. The challenges to providing computing that is truly dependable in all respects are significant, but meeting them is essential to the well being of corporations, individuals, governments, and our global economy.

This year our technical program includes two main technical tracks: DCCS and PDS. The regular papers in these two tracks are of archival quality, having been selected via a rigorous review process. There is no selection quota – only excellent papers get in, with selectivity comparable to that of refereed professional society journals. Because these papers appear more quickly than journal publications, they are the most important publications in our research community. This main volume of the proceedings contains those papers and summaries of other key events in the conference. A supplemental volume contains workshop papers and material from other conference tracks.

Additional features of this year's program include a tutorial day, four workshops, two panel sessions, fast abstracts, a Student Forum, and two keynote speakers (Alex Hills and Tom Seder). New initiatives this year include: an Industry Forum track, Birds of a Feather sessions, and special support for families and accompanying persons, including discounted excursion tickets for children of attendees. Our excursion is a sightseeing cruise on Prince William Sound to see wildlife and glaciers.

We'd like to especially thank our organizing committee for getting all the pieces together to make this a successful event. We thank our steering committee for providing continuity, guidance, and valuable advice. And, of course, we thank you, our authors and attendees, without whom the conference would not be possible.

Philip Koopman
DSN 2008 General Chair

DSN 2008 Organizers

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Performance and Dependability Symposium (PDS)

Program Chair: Kimberly Keeton (HP, USA)

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Tatsuhiro Tsuchiya (Osaka University, Japan)
Aad van Moorsel (University of Newcasatle, UK)
Marco Vieira (University of Coimbra, Portugal)
Larry Votta (Independent Consultant)
Jun Xu (Google, USA)
Haifeng Yu (National University of Singapore, Singapore)
Yanyong Zhang (Rutgers University, USA)

Conference at a Glance

Tuesday, June 24th

08:30-09:00	**Registration** [Kenai + second floor hall - continues until 20:00]

09:00-12:30	**Tutorial 1** [Dillingham] Spam and Denial of Information Attacks and Defenses	**Tutorial 2** [Katmai] Software Patterns for Fault Tolerance	**Tutorial 3** [King Salmon] Database Replication and Clustering

12:30-14:00	**Lunch on your own**

14:00-17:30	**Tutorial 4** [Dillingham] Secure Event Dissemination in Publish-Subscribe Networks	**Tutorial 5** [Katmai] Architecting Dependable Systems: Preventing and Tolerating Faults	**Tutorial 6** [King Salmon] Soft Errors: Technology Trends, System Effects, and Protection Techniques

18:00-20:00	**Conference Registration** [Kenai + second floor hall] **and Welcome Reception** [Chart Room - Fifteenth Floor]

Wednesday, June 25th

08:00-09:00	**Breakfast** [Denali; Speakers' Breakfast: Iliamna] **and Conference Registration** [Kenai + second floor hall]
09:00-10:30	**Opening Ceremony** [Alaska Ballroom] **Keynote 1:** Dependability on the Last Frontier, Alex Hills, Carnegie Mellon University, USA
10:30-11:00	**Coffee Break**

11:00-12:30	**DCCS - 1A** [Aleutian] Hardware and Diagnosis	**PDS -1** [Alaska] Self-Managing Systems	**DCCS - 1B** [Dillingham] Modeling 1	**RADB - 1** [Katmai] Workshop 1	**F. Abstracts 1** [King Salmon]
12:30-14:00	**Lunch**				
14:00-15:30	**DCCS - 2A** [Aleutian] Hardware Reliability	**PDS - 2** [Alaska] Security 1	**DCCS - 2B** [Dillingham] Practical Exp. Reports	**RADB - 2** [Katmai] Workshop 1	**F. Abstracts 2** [King Salmon]
15:30-16:00	**Coffee Break**				
16:00-17:30	**DCCS - 3A** [Aleutian] <u>Panel:</u> Silent Data Corruption -Myth or Reality?	**PDS - 3** [Alaska] Practical Experience Reports and Demos	**DCCS - 3B** [Dillingham] Tools and Practical Experience Reports	**RADB - 3** [Katmai] Workshop 1	

17:30-...	**Dinner (on your own)**
	Birds of a Feather Sessions

18:00-20:00	**BoF - 1** [Dillingham] Key Dependability Issues and Future Directions for Research in the Area of Computing with Cell Phones	**BoF - 2** [Katmai] Reliability Issues and Opportunities for Multicore, Multithreaded Microprocessors	**BoF - 3** [King Salmon] Education in Resilient Computing Systems: why and how?

Thursday, June 26th

08:00-09:00	**Breakfast** [Denali] **Speakers' Breakfast** [Iiamna]

09:00-10:30	Student travel grant presentations [Alaska Ballroom] **Keynote 2:** Automotive Enhanced Vision Systems - Issues Arising from Placing Users in the Loop Thomas Seder, General Motors, Research & Development, USA				**CATARS - 1** [King Salmon] Workshop 2
10:30-11:00	**Coffee Break**				
11:00-12:30	**DCCS - 4** [Aleutian] Soft-Errors	**PDS - 4** [Alaska] Networks and Mobile Systems	**Industry Forum 1** [Dillingham] Depend. Considerations in Commercial Servers	**Student Forum** [Katmai]	**CATARS - 2** [King Salmon] Workshop 2
12:30-14:00	**Lunch**				
14:00-15:30	**DCCS - 5** [Aleutian] Storage and Server Dependability	**PDS - 5** [Alaska] **Panel:** Organizing Knowledge in Dependability Domain	**Industry Forum 2** [Dillingham] System-Level Dependability Challenges	**Fast Abstracts 3** [Katmai]	**CATARS - 3** [King Salmon] Workshop 2

16:45-23:30	**Excursion & Dinner -** Bus Boarding at 16:45. **Bus departure promptly at 17:00.**

Friday, June 27th

08:00-09:00	**Breakfast** [Denali] **Speakers' Breakfast** [Iiamna]

09:00-10:30	**DCCS - 6A** [Aleutian] Intrusion Tolerance	**PDS - 6** [Alaska] Evaluation and Measurement	**DCCS - 6B** [Dillingham] Dynamic Systems and Replication	**WDSN - 1** [Katmai] Workshop 3	**WADS - 1** [King Salmon] Workshop 4
10:30-11:00	**Coffee Break**				
11:00-12:30	**DCCS - 7A** [Aleutian] Security 2	**PDS - 7** [Alaska] Error Detection	**DCCS - 7B** [Dillingham] Distributed Protocols	**WDSN - 2** [Katmai] Workshop 3	**WADS - 2** [King Salmon]
12:30-14:00	**Lunch**				
14:00-15:30	**DCCS - 8** [Aleutian] Networks	**PDS - 8A** [Alaska] Storage Systems	**PDS - 8B** [Dillingham] Modeling 2	**WDSN - 3** [Katmai] Workshop 3	**WADS - 4** [King Salmon]

15:30-16:00	**Coffee Break**
16:00-17:30	**IEEE TC on Dependable Computing and FT business meeting** [Alaska Ballroom]

DSN 2008 Final Program

Tuesday, June 24th

08:30-09:00	Tutorial Registration

Parallel Tutorials

09:00-12:30	**Tutorial 1:** [Dillingham]	Spam and Denial of Information Attacks and Defenses *Calton Pu (Georgia Institute of Technology, USA)*
	Tutorial 2: [Katmai]	Software Patterns for Fault Tolerance *Robert Hanmer (Alcatel-Lucent, USA)*
	Tutorial 3: [King Salmon]	Database Replication and Clustering *Rui Oliveira (University of Minho, Portugal), Luís Rodrigues (IST/INESC-ID, Portugal), and José Pereira (University of Minho, Portugal)*

12:30-14:00	Lunch on your own

Parallel Tutorials

14:00-17:30	**Tutorial 4:** [Dillingham]	Secure Event Dissemination in Publish-Subscribe Networks *Ling Liu (Georgia Institute of Technology, USA)*
	Tutorial 5: [Katmai]	Architecting Dependable Systems: Preventing and Tolerating Faults *Rogério de Lemos (University of Kent, UK) and Cristina Gacek (Newcastle University, UK)*
	Tutorial 6: [King Salmon]	Soft Errors: Technology Trends, System Effects, and Protection Techniques *Subhasish Mitra (Stanford University, USA) and Pia Sanda (IBM, USA)*

18:00-20:00	Conference Registration and Welcome Reception

Wednesday, June 25th

08:00-09:00	**Breakfast** [Denali; Speakers' Breakfast: Iliamna] **and Conference Registration** [Kenai + second floor hall]

09:00-10:30	Opening Ceremony and Keynote Address [Alaska Ballroom] **Keynote Address 1: Dependability on the Last Frontier** [Alaska Ballroom] **Alex Hills,** *Carnegie Mellon University, USA*

10:30-11:00	Coffee Break

11:00-12:30	*DCCS - 1A: Hardware and Diagnosis* [Aleutian] Chair: Cristian Constantinescu (AMD, USA) **Coverage of a Microarchitecture-level Fault Check Regimen in a Superscalar Processor** *Vimal Reddy(Qualcomm Inc) and Eric Rotenberg (North Carolina State University, USA)* **Analysis and Solutions to Issue Queue Process Variation** *Niranjan Soundararajan, Aditya Yanamandra, Chrysostomos Nicopolous, Vijaykrishnan Narayanan, Anand Sivasubramaniam, and Mary Irwin (The Pennsylvania State University, USA)* **Trace-Based Microarchitecture-Level Diagnosis of Permanent Hardware Faults** *Man-Lap Li, Pradeep Ramachandran, Swarup Sahoo, Sarita Adve, Vikram Adve, and Yuanyuan Zhou (University of Illinois at Urbana-Champaign, USA)* *PDS – 1: Self-managing systems* [Alaska] Chair: Veena Mendiratta (Bell Labs/Alcatel-Lucent, USA) **An Integrated Approach to Resource Pool Management: Policies, Efficiency and Quality Metrics** *Daniel Gmach (Technische Universität München, Germany), Jerry Rolia (Hewlett-Packard Laboratories, USA), Ludmila Cherkasova (Hewlett-Packard Laboratories, USA), Guillaume Belrose (Hewlett-Packard Laboratories, UK), Tom Turicchi (Hewlett-Packard, USA), and Alfons Kemper (Technische Universität München, Germany)* **Scheduling for Performance and Availability in Systems with Temporal Dependent Workloads** *Ningfang Mi, Giuliano Casale, and Evgenia Smirni (College of William and Mary, USA)* **Hot-Spot Prediction and Alleviation in Distributed Stream Processing Applications** *Thomas Repantis and Vana Kalogeraki (University of California, Riverside, USA)*

DCCS – 1B: Modelling 1 [Dillingham]
Chair: Hermann Kopetz (TU Vienna, Austria)

A Study of Cognitive Resilience in a JPEG Compressor
Damian Nowroth, Ilia Polian, and Bernd Becker (Albert-Ludwigs-University, Germany)

Scheduling Algorithms for Unpredictably Heterogeneous CMP Architectures
Jonathan Winter and David Albonesi (Cornell University, USA)

Automated Duplicate Detection for Bug Tracking Systems
Nicholas Jalbert and Westley Weimer(University of Virginia, USA)

Workshop on Resilience Assessment and Dependability Benchmarking (RADB)

Welcome & Introduction

RADB – 1: Methodology for Measuring and Assessing Resilience [Katmai]
Chair: Henrique Madeira (University of Coimbra, Portugal)

Invited Talk: Resilience assessment and Dependability Benchmarking: the challenge of prediction
Lorenzo Strigini (City University, UK)

RODS: General Framework for Rigorous Observation of Distributed Systems
Lorenzo Falai (ResilTech s.r.l., Italy) and Andrea Bondavalli (University of Florence, Italy)

Trust Economics Feasibility Study
Robert Coles (Merrill-Lynch), Jonathan Griffin (HP Labs), Hilary Johnson (University of Bath, UK), Brian Monahan (HP Labs), Simon Parkin (Newcastle University, UK), David Pym (HP Labs & University of Bath, UK), Angela Sasse (University College London, UK), and Aad van Moorsel (Newcastle University, UK)

11:00-12:30

Fast Abstracts 1 [King Salmon]
Chair: Marc-Olivier Killijian (LAAS-CNRS, France)

Random-walk Gossip-based Manycast with Partition Detection
Mikael Asplund and Simin Nadjm-Tehrani (Linköping University, Sweden)

Architecting Fault Tolerance using Abstractions
Patrick Brito (State University of Campinas, Brazil), Rogerio de Lemos (University of Kent, UK), and Cecilia Rubira (State University of Campinas, Brazil)

A Framework for Assessing the Dependability of Supercomputers via Automatic Log Analysis
Catello Di Martino (Universita' di Napoli Federico II, Italy), Domenico Cotroneo (Universita' di Napoli Federico II, Italy), Zbigniew Kalbarczyk (University of Illinois at Urbana – Champaign, USA), and Ravishankar K. Iyer (University of Illinois at Urbana – Champaign, USA)

Black Hole Attack Injection in Ad hoc Networks
Jesus Friginal, Juan-Carlos Ruiz, David de-Andres, and Pedro Gil (Universidad Politécnica de Valencia, Spain)

AA – A Software Architecture Aware Environment for Dependable Systems
Cristina Gacek (Newcastle University, UK)

Closing the Dependability Gap: Converging Software Engineering with Middleware
Karl M. Goeschka, and Lorenz Froihofer (Vienna University of Technology, Austria)

From Dependability to Resilience
Jean-Claude Laprie (LAAS-CNRS, France)

On The Structure of Unstructured Overlay Networks
João Leitão (INESC-ID/IST, Portugal), José Pereira (University of Minho, Portugal), Luís Rodrigues (INESC-ID/IST, Portugal)

Towards Decentralized Management of Graceful Degradation in Distributed Embedded Systems
Osamah Rawashdeh (Oakland University, USA)

12:30-14:00

Lunch

14:00-15:30

DCCS – 2A: Hardware Reliability [Aleutian]
Chair: Subhashish Mitra (Stanford University, USA)

Validation of Hardware Error Recovery mechanism for the SPARC64 V Microprocessor
Hisashige Ando (Fujitsu Ltd., Japan), Ryuji, Kan (Fujitsu Ltd., Japan), Yoshiharu Tosaka (Fujitsu Laboratories, Japan), Keiji Takahisa (Osaka University, Japan), and Kichiji Hatanaka (Osaka University, Japan)

Using Likely Program Invariants to Detect Hardware Errors
Swarup Sahoo, Man-Lap Li, Pradeep Ramachandran, Sarita Adve, Vikram Adve, and Yuanyuan Zhou (University of Illinois at Urbana-Champaign, USA)

Detouring: Translating Software to Circumvent Hard Faults in Simple Cores
Albert Meixner and Daniel Sorin (Duke University, USA)

Wednesday, June 25th continued

	PDS – 2: Security 1 [Alaska] Chair: Marco Vieira (University of Coimbra, Portugal) **On Localization Attacks to Internet Threat Monitors: An Information-Theoretic Framework** *Wei Yu, Nan Zhang, Xinwen Fu, Riccardo Bettati, and Wei Zhao* **Automatic Security Assessment of Critical Cyber-Infrastructures** *Zahid Anwar, Ravinder Shankesi, and Roy Campbell (University of Illinois at Urbana-Champaign, USA)* **Evaluating Email's Feasibility for Botnet Command and Control** *Kapil Singh, Abhinav Srivastava, Jonathon Giffin, and Wenke Lee (Georgia Institute of Technology, USA)*
	DCCS – 2B: Practical Experience Reports [Dillingham] Chair: Dave Bakken (Washington State University, USA) **Towards Assessing the Security of DBMS Configurations** *Afonso Neto and Marco Vieira (University of Coimbra, Portugal)* **Experiences with Formal Specification of Fault-Tolerant File Systems** *Roxana Geambasu (University of Washington, USA), Andrew Birrell (Microsoft Research, USA), and John MacCormick (Dickinson College, USA)* **Using an Assurance Case to Support Independent Assessment of the Transition to a New GPS Ground Control System** *Elisabeth Nguyen, William Greenwell, and Myron Hecht (The Aerospace Corporation, USA)*
14:00-15:30	***Workshop on Resilience Assessment and Dependability Benchmarking (RADB)*** **RADB – 2: Hardware Assessment** [Katmai] Chair: Andrea Bondavalli (University of Florence, Italy) **A Field Failure Analysis of Microprocessors used in Information Systems** *Syed Z. Shazli, Mohammed Abdul-Aziz, Mehdi B. Tahoori, David R. Kaeli (Northeastern University, USA)* **Towards Dependability Benchmarking of Hardware Cores for Embedded Systems** *David de Andres, Juan-Carlos Ruiz, Daniel Gil and Pedro Gil (Universidad Politécnica de Valencia, Spain)* **A Framework based on Boolean Satisfiability for Soft Error Rate Estimation in Early Design Stages** *Syed Z. Shazli and Mehdi B. Tahoori (Northeastern University, USA)*
	Fast Abstracts 2 [King Salmon] Chair: Juan-Carlos Ruiz Garcia *(Universidad Politécnica de Valencia, Spain)* **STAMP: Toward Reclaiming Email Address Privacy** *Kurt Ackermann, Camille Gaspard, Ramana Kompella, and Cristina Nita-Rotaru (Purdue University, USA)* **Balancing of Dependability and Security in Online Auctions** *Lorenz Froihofer and Karl M. Goeschka (Vienna University of Technology, Austria)* **Dependability Assessment of Operating Systems in Multi-core Architectures** *Gabriela Jacques-Silva, Zbigniew Kalbarczyk, and Ravishankar K. Iyer (University of Illinois at Urbana-Champaign, USA)* **Robustness Measurement in OS Forecast and Selection** *Xiaoen Ju, Hengming Zou (Shanghai Jiao Tong University, China)* **Increasing SoC Dependability via Know Good Tile NoC Testing** *Hans Kerkhoff, Oscar Kuiken, and Xiao Zhang (University of Twente, Netherlands)* **Workload Representation in the Modeling of Border Inspection Points** *Mayra Sacanamboy, and Bojan Cukic (West Virginia University, USA)* **On Identifying Execution Hotspots in Kernel-mode Device Drivers** *Constantin Sarbu (Technische Universität Darmstadt, Germany), Andreas Johansson (Volvo Technology Corporation, Sweden), and Neeraj Suri (Technische Universität Darmstadt, Germany)* **A Test Model for Hardware and Software Development** *József Sziray (Széchenyi University, Győr, Hungary)*
15:30-16:00	Coffee Break

Wednesday, June 25th continued

16:00-17:30

DCCS – 3A: **Panel**: **Silent Data Corruption – Myth or Reality?**   [Aleutian]
Panel organizer: Cristian Constantinescu (AMD, USA)
Panelists: Ishwar Parulkar (Sun Microsystems, USA), Sarah Michalak (Los Alamos National Laboratory, USA), Hisashige Ando (Fujitsu, Japan)

PDS – 3: Practical Experience Reports and Demos   [Alaska]
Chair: Sy-Yen Kuo (National Taiwan University, Taiwan)

Scaling File Systems to Support Petascale Clusters: A Dependability Analysis to Support Informed Design Choices
Shravan Gaonkar, Eric Rozier, Anthony Tong, and William Sanders (University of Illinois at Urbana-Champaign, USA)

WS-DREAM: A Distributed Reliability Assessment Mechanism for Web Services
Zibin Zheng and Michael Lyu (The Chinese University of Hong Kong, China)

A Log Mining Approach to Failure Analysis of Enterprise Telephony Systems
Chinghway Lim (University of California, Berkeley, USA), Navjot Singh (Avaya Labs., USA), and Shalini Yajnik (Avaya Labs., USA)

Integration and Evaluation of Multi-Instance-Precommit Schemes within PostgreSQL
Paolo Romano and Francesco Quaglia (Sapienza Universit_a di Roma, Italy)

DCCS – 3B: Tools and Practical Experience Reports   [Dillingham]
Chair: Martin Hiller (Volvo, Sweden)

End-system tools for enhancing email reliability
Tim Moors and Patrick Chu (University of New South Wales, Australia)

Tempest: Towards Early Identification of Failure-prone Binaries
Thirumalesh Bhat (Microsoft Corporation) and Nachiappan Nagappan (Microsoft Research)

Statistical Fault Injection
Pradeep Ramachandran, Prabhakar Kudva, Jeffrey Kellington, John Schumann, and Pia Sanda (IBM, USA)

Workshop on Resilience Assessment and Dependability Benchmarking (RADB)

RADB – 3: Characterization of Resilience   [Katmai]
Chair: Aad van Moorsel (University of Newcasatle, UK)

Enhancing the NekoStat Tool with Uncertainty, Resolution and Intrusiveness Evaluation Capabilities
Andrea Bondavalli (Università degli Studi di Firenze, Italy), Andrea Ceccarelli (Università degli Studi di Firenze, Italy), Lorenzo Falai (ResilTech s.r.l., Italy) and Michele Vadursi (Università di Napoli "Parthenope", Italy)

Failure Characterization of a Large Enterprise Computing Environment
Mei-Chen Hsueh (Boeing, USA)

The AMBER Data Repository
Marco Vieira, Naaliel Mendes, João Duraes, and Henrique Madeira (University of Coimbra, Portugal)

Workshop Wrap-up

Birds of a Feather

18:00-20:00

BoF 1: Key Dependability Issues and Future Directions for Research in the Area of Computing with Cell Phones
[Dillingham]
Organizer: Shivakant Mishra (University of Colorado, USA)

BoF 2: Reliability Issues and Opportunities for Multicore, Multithreaded Microprocessors   [Katmai]
Organizer: Alan Wood (Sun Microsystems, USA) and Ishwar Parulkar (Sun Microsystems, USA)

BoF 3: Education in Resilient Computing Systems: why and how?   [King Salmon]
Organizer: Jean-Claude Laprie (LAAS-CNRS, France) and Luca Simoncini (University of Pisa, Italy)

Thursday, June 26th

08:00-09:00	**Breakfast** [Denali] **Speakers' Breakfast** [Iiamna]

09:00-10:30	Student travel grant presentations [Alaska Ballroom] **Keynote 2**: Automotive Enhanced Vision Systems - Issues Arising from Placing Users in the Loop [Alaska Ballroom] **Thomas Seder,** *General Motors, USA*

09:00-10:30	*Workshop on Compiler and Architectural Techniques for Application Reliability and Security* (CATARS) Welcome & Introduction *CATARS – 1: Architectural Techniques for Application Reliability and Security* [King Salmon] Chair: Karthik Pattabiraman (University of Illinois at Urbana-Champaign, USA) **Towards Transient Fault Tolerance for Heterogeneous Computing Platforms** *Nishant George, John Lach, and Sudhanva Gurumurthi (University of Virginia, USA)* **IOTA: Detecting Erroneous I/O Behavior via I/O Transaction Auditing** *Albert Meixner and Daniel J. Sorin (Duke University, USA)* **Using Open Compilation to Simplify the Design of Fault-Tolerant VLSI Systems** *Juan-Carlos Ruiz, David de Andrés, Pedro Gil, and Sara Blanc (Universidad Politécnica de Valencia, Spain)*

10:30-11:00	Coffee Break

11:00-12:30	*DCCS – 4: Soft-Errors* [Aleutian] Chair: Taksahi Nanya (University of Tokyo, Japan) **An Accurate Flip-flop Selection Technique for Reducing Logic SER** *Eric Hill, Mikko Lipasti, and Kewal Saluja (University of Wisconsin, USA)* **Combined Circuit and Microarchitecture Techniques for Effective Soft Error Robustness in SMT Processors** *Xin Fu, Tao Li, and José Fortes (University of Florida, USA)* --- *PDS – 4: Networks and Mobile Systems* [Alaska] Chair: Peter Kemper (College of William & Mary, USA) **Toward an Understanding of the Processing Delay of Peer-to-Peer Relay Nodes** *Kuan-Ta Chen and Jing-Kai Lou (Academia Sinica, Taiwan)* **TCP Covert Timing Channels: Design and Detection** *Xiapu Luo, Edmond Chan, and Rocky Chang (The Hong Kong Polytechnic University, China)* **A Smart Triggering Scheme to Reduce Service Interruption During Heterogonous Handovers** *Huaiyu Liu (Intel, USA), Christian Maciocco (Intel, USA),, Vijay Kesavan (Intel, USA),, and Andy Low (British Telecom Labs, Asian Research Center, Malaysia)* --- *Industry Forum on Critical Topics in Dependability* *Session 1: Dependability Considerations in Commercial Servers* [Dillingham] Chair: Brendan Murphy (Microsoft, UK) **z10 Processor Core: Design for Dependability** *Kevin Shum (IBM, USA)* **Error Processing Across A Multi-Initiator Network** *Tram Nguyen (IBM, USA)* **Increase System Availability with Concurrent Upgrade or Repair of Central Electronics Complex** *Kanisha Patel (IBM, USA)* Discussion and Q&A --- *Workshop on Compiler and Architectural Techniques for Application Reliability and Security* (CATARS) *CATARS – 2: Compiler techniques for Application Reliability and Security* [King Salmon] Chair: Shuo Chen (Microsoft Research, USA) **Count&Check: Counting Instructions to Detect Incorrect Paths** *Long Wang and Ravishankar K. Iyer (University of Illinois at Urbana-Champaign, USA)* **Reverse Stack Execution in a Multi-Variant Execution Environment** *Babak Salamat, Andreas Gal and Michael Franz (University of California, Irvine, USA)* **Intrusion Detection via Instrumented Software** *William Mahoney and William Sousan (University of Nebraska at Omaha, USA)*

	Thursday, June 26th continued
11:00-12:30	**Student Forum** [Katmai] Chair: Ravishakar Iyer (University of Illinois at Urbana-Champaign, USA) **Towards a Less Reactive and More Proactive Cloud** *Claris Castillo (North Carolina State University, USA)* **Dependability of the Wireless Multimedia Sensor Networks** *Mohamed Elsersy (University of Calgary, Canada)* **An Authentication Broker Service for Scalable EPC Network** *Imran Ali Jokhio (University of Leeds, UK)* **An Exception Handling Framework** *Nikolas Nehmer (University of Kaiserslautern, Germany)*
12:30-14:00	Lunch
14:00-15:30	**DCCS – 5: Storage and server dependability** [Aleutian] Chair: Matti Hiltunen (AT&T, USA) **Reliability of flat XOR-based erasure codes on heterogeneous devices** *Kevin Greenan (University of California - Santa Cruz, USA), Ethan Miller (University of California - Santa Cruz, USA), and Jay Wylie (Hewlett-Packard Labs, USA)* **ConfErr: A Tool for Assessing Resilience to Human Configuration Errors** *Lorenzo Keller, Prasang Upadhyaya, and George Candea (EPFL, Switzerland)* **Enhanced Server Fault-Tolerance for Improved User Experience** *Manish Marwah (Hewlett.Packard Laboratories, USA), Shivakant Mishra (University of Colorado, USA), and Christof Fetzer(TU-Dresden, Germany)*
	PDS – 5: Panel Discussion: "On Representing Knowledge in the Dependability Domain" [Alaska] **Panel organizer**: *Algirdas Avizienis (Vytautas Magnus University, Lithuania)* **Panelists**: *Ravishakar Iyer (University of Illinois, USA), Jean-Claude Laprie (LAAS-CNRS, France), Ruta Marcinkeviciene (Vytautas Magnus University, Lithuania)*
	Industry Forum on Critical Topics in Dependability **Session 2: System-Level Dependability Challenges** [Dillingham] Chair: Lisa Spainhower (IBM, USA) **Dependability Considerations for Safety Critical Electronics System** *Bob Yeh (Boeing, USA)* **Using Automated Discovery for End-to-End Availability Assessment** *Hari Govind Ramasamy (IBM Research, USA)* **Potential Dependability Consequences of Power Conservation** *Alan Wood (Sun Microsystems, USA)* Discussion and Q&A
	Workshop on Compiler and Architectural Techniques for Application Reliability and Security (CATARS) **CATARS – 3: Panel Discussion on "Towards fault- and attack- resilient applications: where processor architects and compiler designers should converge"** [King Salmon] *Moderator: Zbigniew Kalbarczyk (University of Illinois, USA)* *Panelists: Subhasish Mitra (Stanford University, USA), Brendan Murphy (Microsoft, UK), Calton Pu (Georgia Institute of Technology, USA), and Mohan Rajagopalan (Intel, USA)*
	Fast Abstracts 3 [Katmai] Chair: Xavier Défago (JAIST, Japan) **Design Analysis of Fault-Tolerant and Real-Time Robotic Systems** *Aigul Aktymbayeva (al-Farabi Kazakh National University) and Gulnar Balakayeva (Kazakh-British Technical University)* **Using Automated Reverse Engineering for the Safe Execution of Untrusted Device Drivers** *Vitaly Chipounov, George Candea, and Willy Zwaenepoel (EPFL, Switzerland)* **Detecting Hidden Shared Dependencies via Covert Channels** *Kaustubh Joshi (AT&T Labs Research, USA)* **Yield Enhancement Techniques for Content-Addressable Memories** *Shyue-Kung Lu (Fu Jen Catholic University, China), Guan-Quan Lin (Fu Jen Catholic University, China), and Sy-Yen Kuo (National Taiwan University, Taiwan)*

Thursday, June 26th continued

14:00-15:30

Fast Abstracts 3 *continued*   [Katmai]
Chair: Xavier Défago (JAIST, Japan)

On improving the Reliability of Cluster based Voice over IP Services
Ayari Narjess (France Telecom R&D, France), Lefevre Laurent (France Telecom R&D, France), Barbaron Denis (Université de Lyon, France), and Primet Pascale (Université de Lyon, France)

Self Tuning With Self Confidence
Miguel Matos, José Pereira, and Rui Oliveira (University of Minho, Portugal)

Software Fault Tolerance in Marine Systems
Torbjørn Skramstad (Norwegian University of Science and Technology, Norway) and Heidi Brovold (Det Norske Veritas Research & Innovation, Norway)

Component-Dependency based Micro-Rejuvenation Scheduling
Vinaitheerthan Sundaram, Matthew Tan Creti, Rajesh K. Panta, and Saurabh Bagchi (Purdue University, USA)

Multidimensional Analysis of System Logs in Large-scale Cluster Systems
Wei Zhou, Jianfeng Zhan, and Dan Meng (Chinese Academy of Sciences, China)

16:45-23:30

Excursion & Banquet
Bus Boarding at 16:45. **Bus departure promptly at 17:00.**

Friday, June 27th

08:00-09:00

Breakfast [Denali]   **Speakers' Breakfast** [Iliamna]

09:00-10:30

DCCS – 6A: Intrusion Tolerance   [Aleutian]
Chair: Bojan Cukic (West Virginia University, USA)

Towards an Understanding of Anti-virtualization and Anti-debugging Behavior in Modern Malware
Xu Chen (University of Michigan, USA), Jonathon Andersen (University of Michigan, USA), Z. Morley Mao (University of Michigan, USA), Michael Bailey (Univ. of Michigan, USA), and Jose Nazário (Arbor Networks, USA)

Security through Redundant Data Diversity
Anh Nguyen-Tuong, David Evans, John Knight, Benjamin Cox, and Jack Davidson (University of Virginia, USA)

Byzantine Replication Under Attack
Yair Amir (Johns Hopkins University, USA), Brian Coan (Telcordia Technologies, USA), Jonathan Kirsch (Johns Hopkins University, USA), and John Lane (Johns Hopkins University, USA)

PDS – 6: Evaluation and Measurement   **[Alaska]**
Chair: Felicita di Giandomenico (ISTI-CNR, Italy)

Evaluating Availability under Quasi-Heavy-tailed Repair Times
Sei Kato and Takayuki Osogami (IBM Research, Japan)

Anomaly? Application Change? or Workload Change?
Towards Automated Detection of Application Performance Anomaly and Change
Ludmila Cherkasova (Hewlett-Packard Labs, USA), Kivanc Ozonat (Hewlett-Packard Labs, USA), Ningfang Mi (College of William and Mary, USA), Julie Symons (Hewlett-Packard Labs, USA), and Evgenia Smirni (College of William and Mary, USA)

Survivability Quantification of Communication Services
Poul Heegaard (Norwegian Univ. of Science and Technology, Norway) and Kishor Trivedi (Duke University, USA)

DCCS – 6B: Dynamic Systems and Replication   [Dillingham]
Chair: Cristina Nita-Rotaru (Purdue University, USA)

A Robust and Lightweight Stable Leader Election Service for Dynamic Systems
Nicolas Schiper (University of Lugano, Switzerland) and Sam Toueg (University of Toronto, Canada)

A Fast Restart Mechanism for Checkpoint/Recovery Protocols in Networked Environments
Yawei Li and Zhiling Lan (Illinois Institute of Technology, USA)

Tempest: Soft State Replication in the Service Tier
Tudor Marian, Mahesh Balakrishnan, Ken Birman, and Robbert van Renesse (Cornell University, USA)

	Friday, June 27th continued
	Second Workshop on Dependable and Secure Nanocomputing (WDSN)
	WDSN – 1: Opening and Defect & Failure Modes in Nanoscale Technologies
	WDSN – 1a: Introduction and Invited Talk [Katmai] Chair: Ravishankar K. Iyer (University of Illinois at Urbana-Champaign, USA)
	Invited talk: Sustaining Error Resilience: Case Study of the IBM POWER6™ Microprocessor *Pia Sanda, IBM Systems & Technology Group, Poughkeepsie, NY, USA*
	WDSN – 1b: Defect and Fault Models in Nanoscale Technologies [Katmai] Chair: Alan Wood (Sun Microsystems, USA)
	Developing Fault Models for Nanowire Logic Circuits *Daniel Gil, David de Andrés, Juan-Carlos Ruiz, and Pedro Gil (Universidad Politécnica de Valencia, Spain)*
09:00-10:30	**SER Characterization of an Advanced Network Processor using Accelerated Neutron Beam** *Nelson Tam (Marvell Semiconductor, Inc., USA), ShiJie Wen (Cisco Systems, USA), Noam Lewis (Marvell Israel Ltd, Israel), Richard Wong (Cisco Systems, USA), Armen Karapetov (EZchip Technologies Ltd, Israel), Oded Rozenstein (EZchip Technologies Ltd, Israel), Oded Rozenstein (EZchip Technologies Ltd, Israel), Haim Boot (Marvell Israel Ltd, Israel), Reuven Cohen (Marvell Israel Ltd, Israel), and Usama Nassir (Marvell Semiconductor, Inc., USA)*
	Modeling Microprocessor Faults on High-Level Decision Diagrams *Raimund Ubar (Tallinn Univ. of Technology, Estonia), Jaan Raik (Tallinn Univ. of Technology, Estonia), Artur Jutman (Tallinn Univ. of Technology, Estonia), Maksim Jenihhin (Tallinn Univ. of Technology, Estonia), Martin Instenberg (Ilmenau Technical University, Germany), and Heinz-Dietrich Wuttke (Ilmenau Technical University, Germany)*
	Seventh Workshop on Architecting Dependable Systems (WADS)
	Welcome & Introduction
	WADS – 1: Architecting Dependable Service Oriented Architectures [King Salmon] Chair: Jean-Charles Fabre (LAAS-CNRS, France)
	Keynote: Search for the Holy Grail: Are SOAs the Answer? *Rick Schlichting (AT&T Labs Inc., USA)*
	Discussion
10:30-11:00	Coffee Break
	DCCS – 7A: Security 2 [Aleutian] Chair: Yair Amir (Johns Hopkins University, USA)
	AGIS: Towards Automatic Generation of Infection Signatures *Zhuowei Li (Indiana University at Bloomington, USA), XiaoFeng Wang (Indiana University at Bloomington, USA), Zhenkai Liang (Carnegie Mellon University, USA), and Michael Reiter(Univ. of North Carolina at Chapel Hill, USA)*
	Convicting Exploitable Software Vulnerabilities: An Efficient Input Provenance Based Approach *Zhiqiang Lin, Xiangyu Zhang, and Dongyan Xu (Purdue University, USA)*
	Mapping Software Faults with Web Security Vulnerabilities *José Fonseca and Marco Vieira (University of Coimbra, Portugal)*
	PDS – 7: Error Detection [Alaska] Chair: Armando Fox (University of California, USA)
	SymPLFIED : Symbolic Program-Level Fault-Injection and Error-Detection Framework *Karthik Pattabiraman, Nithin Nakka, Zbigniew Kalbarczyk, and Ravishankar Iyer (University of Illinois at Urbana-Champaign, USA) (William Carter Award for the best paper)*
11:00-12:30	**A Characterization of Instruction-Level Error Derating and its Implications for Error Detection** *Jeffrey Cook and Craig Zilles (University of Illinois at Urbana-Champaign, USA)*
	DCCS – 7B: Distributed Protocols [Dillingham] Chair: Xavier Defago (JAIST, Japan)
	A fault-tolerant directory-based cache coherence protocol for CMP architectures *Ricardo Fernández-Pascual (Universidad de Murcia, Spain), José García (Universidad de Murcia, Spain), Manuel Acacio (Universidad de Murcia, Spain), and José Duato (Universidad Politécnica de Valencia, Spain)*
	Probabilistic Quorum Systems in Wireless Ad Hoc Networks *Roy Friedman (Israel Institute of Technology, Israel), Gabriel Kliot (Israel Institute of Technology, Israel), and Chen Avin (Ben Gurion University of The Negev, Israel)*
	BAR Primer *Allen Clement (Univ. of Texas at Austin, USA), Harry Li (Univ. of Texas at Austin, USA), Jeff Napper (Univ. of Texas at Austin, USA), Jean-Philipe Martin (Microsoft Research, UK), Lorenzo Alvisi (Univ. of Texas at Austin, USA), and Mike Dahlin (Univ. of Texas at Austin, USA)*

Friday, June 27th continued

11:00-12:30	***Second Workshop on Dependable and Secure Nanocomputing (WDSN)*** ***WDSN – 2: Performance and Security Issues in Hardware Design*** ***WDSN – 2a: Asynchronous Circuits*** [Katmai] Chair: Nithin M. Nakka (University of Illinois at Urbana-Champaign, USA) **Performance Comparison between Self-timed Circuits and Synchronous Circuits Based on the Technology Roadmap of Semiconductors** *Masashi Imai and Takashi Nanya (The University of Tokyo, Japan)* **Concurrent Fault Detection for Secure QDI Asynchronous Circuits** *Konrad J. Kulikowski, Mark G. Karpovsky, Alexander Taubin, and Zhen Wang (Boston University, USA)* ***WDSN – 2b: Intrusion Detection Devices*** [Katmai] Chair: Daniel J. Sorin (Duke University, USA) **Hardware Implementation of Information Flow Signatures Derived via Program Analysis** *Paul Dabrowski (University of Illinois at Urbana-Champaign, USA), William Healey (University of Illinois at Urbana-Champaign, USA), Karthik Pattabiraman (University of Illinois at Urbana-Champaign, USA), Shelley Chen (SAIC, USA), Zbigniew Kalbarczyk (University of Illinois at Urbana-Champaign, USA), and Ravishankar K. Iyer(University of Illinois at Urbana-Champaign, USA)* **Low-Cost Self-Test of Crypto Devices** *G. Di Natale, M. Doulcier, M. L. Flottes, and B. Rouzeyre* **Quantum Wireless Intrusion Detection Mechanism** *Tien-Sheng Lin, I-Ming Tsai, Sy-Yen Kuo (Université de Montpellier, France)*

	Seventh Workshop on Architecting Dependable Systems (WADS) ***WADS – 3: Software Architectures and Dependability*** [King Salmon] Chair: Rogério de Lemos (University of Kent, UK) **Architecture-Based Software Reliability Estimation: Problem Space, Challenges, and Strategies** *Ivo Krka, Leslie Cheung, George Edwards, Leana Golubchik, and Nenad Medvidovic1(University of Southern California, USA)* **Architecting for Reliability – Detection Mechanisms** *Robert S. Hanmer and Veena B. Mendiratta (Alcatel-Lucent, USA)* **Toward a Reasoning Framework for Dependability** *Tacksoo Im and John D. McGregor (Clemson University, USA)* **Ensuring Architectural Conformance in Message-Based Systems** *Daniel Popescu and Nenad Medvidovic (University of Southern California, USA)*
12:30-14:00	Lunch

14:00-15:30	***DCCS – 8: Networks*** [Aleutian] Chair: Zbigniew Kalbarczyk (University of Illinois at Urbana-Champaign, USA) **Improving Dependability of Network Configuration through Policy Classification** *Sihyung Lee, Tina Wong, and Hyong Kim (Carnegie Mellon University, USA)* **Traffic Grooming in WDM Mesh Networks with Guaranteed Survivability** *Ataul Bari, Quazi Rahman, Arunita Jaekel, and Subir Bandyopadhyay (University of Windsor, Canada)* **Implementation and Evaluation of a Distributed and Cooperative Load-Balancing Mechanism for Dependable Volunteer Computing** *Yoshitomo Murata (Tohoku University, Japan), Tsutomu Inaba (NTT East Corporation, Japan), Hiroyuki Takizawa (Tohoku University, Japan), and Hiroaki Kobayashi (Tohoku University, Japan)*

	PDS – 8A: Storage Systems [Alaska] Chair: Aad van Moorsel (Newcastle University, UK) **Enhancing Data Availability in Disk Drives through Background Activities** *Ningfang Mi (College of William and Mary, USA), Alma Riska (Seagate Research, USA), Evgenia Smirni (College of William and Mary, USA), and Erik Riedel (Seagate Research, USA)* **Analyzing the Effects of Disk-Pointer Corruption** *Lakshmi Bairavasundaram (University of Wisconsin, USA), Meenali Rungta (Google, Inc., USA), Nitin Agrawal (University of Wisconsin, USA), Andrea Arpaci-Dusseau (University of Wisconsin, USA), Remzi Arpaci-Dusseau (University of Wisconsin, USA), and Michael Swift (University of Wisconsin, USA)*

	Friday, June 27th continued

PDS – 8B: Modelling 2   [Dillingham]
Chair: Peter Buchholz (University of Dortmund, Germany)

Architectural dependability evaluation with Arcade
Hichem Boudali (University of Twente, Netherlands), Pepijn Crouzen (Saarland University, Denmark), Boudewijn R. Haverkort (University of Twente, Netherlands), Matthias Kuntz (University of Twente, Netherlands, and Marielle Stoelinga (University of Twente, Netherlands)

An Information-Theoretic Approach to Detecting Performance Anomalies and Changes for Large-scale Distributed Web Services
Kivanc Ozonat (Hewlett-Packard Labs, USA)

A Recurrence-Relation-Based Reward Model for Performability Evaluation of Embedded Systems
Ann Tai (IA Tech, Inc., USA), Kam Tso (IA Tech, Inc., USA), and William Sanders (University of Illinois at Urbana-Champaign, USA)

14:00-15:30

Second Workshop on Dependable and Secure Nanocomputing (WDSN)

WDSN – 3: Mitigation and Resilience Techniques for Nanocomputing

WDSN – 3a: Fault Tolerance Techniques   [Katmai]
Chair: Juan-Carlos Ruiz (Universidad Politécnica de Valencia, Spain)

Blocking and Non-blocking Checkpointing and Rollback Recovery for Networks-on-Chip
Claudia Rusu (Université de Grenoble, France), Cristian Grecu (University of British Columbia, Vancouver, Canada), Lorena Anghel (Université de Grenoble, France)

No Free Lunch in Soft Error Protection?
Ilia Polian (Albert-Ludwigs-University, Germany), Sudhakar M. Reddy (University of Iowa, USA), Irith Pomeranz (Purdue University, USA), Xun Tang (University of Iowa, USA), Bernd Becker (Albert-Ludwigs-University, Germany)

WDSN – 3b: Reconfigurable Nanoscale Circuits   [Katmai]
Chair: Michael Nicolaïdis (TIMA, France)

Fault Tolerance of the Input/Output Ports in Massively Defective Multicore Processor Chips
Piotr Zając (LAAS-CNRS, France /Technical University of Lodz, Poland), Jacques Henri Collet (LAAS-CNRS, France), Jean Arlat (LAAS-CNRS, France), and Yves Crouzet (LAAS-CNRS, France)

BISM: Built-in Self Map for Crossbar Nano-Architectures
Mehdi Tahoori (Northeastern University, USA)

Combined Defect and Fault Tolerance for Reconfigurable Nanofabrics
David de Andrés, Juan-Carlos Ruiz, Daniel Gil, and Pedro Gil (Universidad Politécnica de Valencia, Spain)

WDSN – 3c: Workshop Wrap up   [Katmai]
Chair: Cristian Constantinescu (AMD, USA)

Seventh Workshop on Architecting Dependable Systems (WADS)

WADS – 2: Dependable Service Oriented Architectures   [King Salmon]
Chair: Cristina Gacek (Newcastle University, UK)

Invited Talk: Service-Oriented Management Software
Aad van Moorsel (Newcastle University, UK)

What SOA can do for Software Dependability
K. Goeschka, L. Froihofer, and S. Dustdar (Vienna University of Technology, Austria)

Analyzable Architectural Models of Service-Based Embedded Systems
J. Hudak, L. Wrage, and J. Hansson (Carnegie Mellon University, USA)

Behavioral Contracts and Service Substitutability: A Contribution to Dependable SOA
H. Samset and R. Bræk (Norwegian University of Science and Technology, Norway)

Wrap-Up/Future Directions

15:30-16:00	**Coffee Break**
16:00-17:30	**IEEE TC on Dependable Computing and FT business meeting** (Alaska Ballroom)

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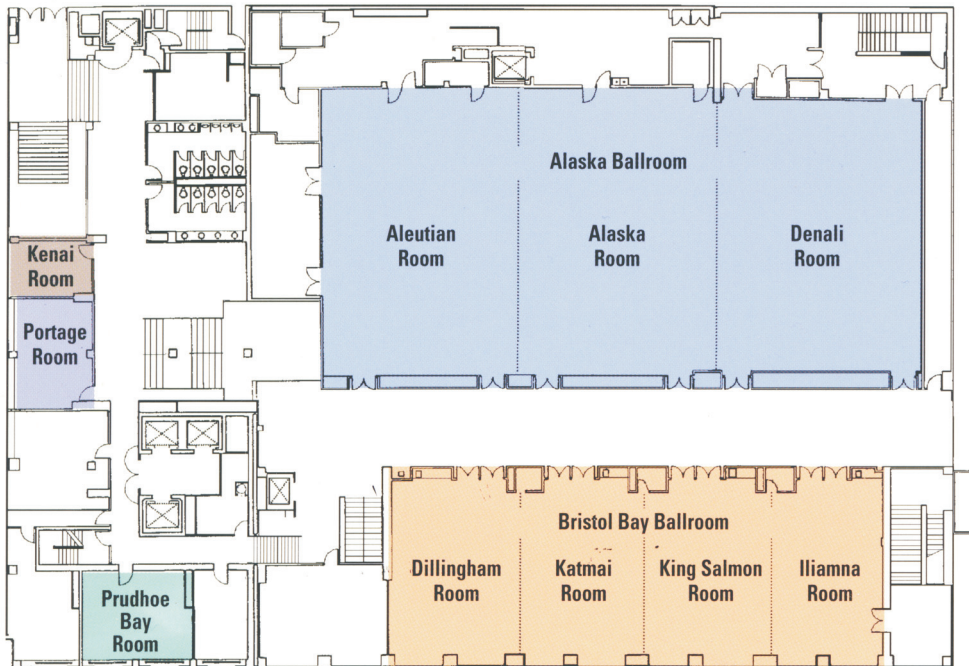**Additional Contributions:**

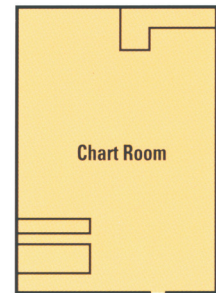Thanks also go to the following institutions for providing generous support for the organization of the conference.

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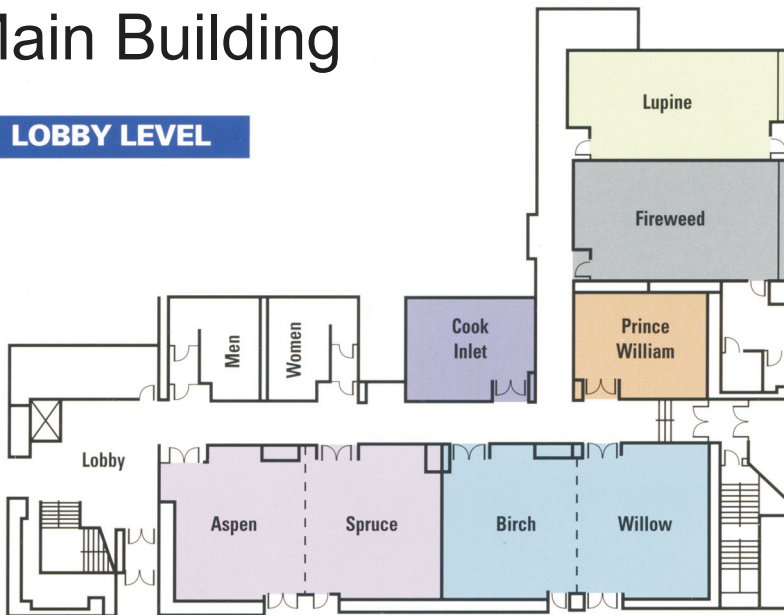
West Tower

SECOND FLOOR

Alaska Ballroom

Aleutian Room

Alaska Room

Denali Room

Kenai Room

Portage Room

Bristol Bay Ballroom

Dillingham Room

Katmai Room

King Salmon Room

Iliamna Room

Prudhoe Bay Room

FIFTEENTH FLOOR

Chart Room

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