

Welcome to QEST 2006

Welcome to California, to Riverside, to UCR, and to QEST 2006! The following pages should help making your visit more enjoyable and rewarding. If you need further help, ask me or one of the graduate student helpers wearing a yellow “UCR” t-shirt. Have a great conference and save a little time to visit our surroundings and to taste our world-famous oranges!

Gianfranco Ciardo, QEST 2006 General Chair
Department of Computer Science and Engineering
University of California at Riverside

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Social Events

To match our excellent technical program, we have prepared a great social program as well. We hope you enjoy both thoroughly.

The following social events are scheduled during QUEST 2006:

- **Monday, September 11, 2006 6:30pm – 8:30pm**

Welcome Reception and Visit at the California Museum of Photography

The UCR-managed California Museum of Photography will be open exclusively for the QUEST 2006 attendees. In addition to the permanent collection, the following current exhibits will be on display:

- Jonathan Hollingsworth, *What We Think Now*
- Alec Soth, *Sleeping By The Mississippi*
- Lise Sarfati, *American Series*

Light food and drinks will be served.

- **Wednesday, September 13, 2006 5:00pm – 7:00pm**

Visit to the Mission Inn Museum

Located within the historic Mission Inn in downtown Riverside, the Mission Inn Museum is an independent not-for-profit organization that interprets the history of the Inn and its part in the history of Southern California. Exhibits rich in artifacts range from Arts and Crafts furnishings to Asian sculpture. The larger collection includes works by major stained glass artists and California regional painters.

Groups of up to 20 people will be offered a docent-guided tours of the museum. Each tour lasts approximately 75 minutes, and groups will be spaced approximately 20 minutes apart, starting at 5:00pm.

- **Wednesday, September 13, 2006 7:00pm – 11:00pm**

Banquet at the Mission Inn

The banquet of QUEST 2006 is held at The Mission Inn, the premier hotel in the Inland Empire, and a National Historic Landmark.

After gathering in the open air Atrium for a small refreshment, the attendees will be seated in the magnificent Galleria Room, for a memorable evening of fine food and relaxation.

You are kindly requested to wear your registration badge throughout the conference, including during the above events and during the coffee breaks and lunches.

Restaurants in Riverside

University Avenue area, walking distance from Campus

- *Pho Saigon* \$ 951.369.0306 1450 University Avenue

[Very casual family-run Vietnamese. Try the pho soup with fish with extra vegetables and any type of spring rolls as an antidote to rich restaurant food.]

- *Rubio's* \$ 951.774.0023 1201 University Avenue

[Quality Mexican fast food; you can specify corn, flour or whole grain tortillas. Excellent salsa bar. Try their specialty, fish tacos.]

- *El Pollo Loco* \$ 951.682.7543 2200 University Avenue

[Quality Mexican fast food: with the option of mixed vegetables and non-refried beans for the health-conscious. Very good salsa bar. Try their specialty, excellent grilled chicken.]

Canyon Crest Shopping Center, 5225 Canyon Crest Drive, ~ 2 miles from UCR

- *Papi's Tacos Al Carbon* \$ 951.787.8334

[Quality Mexican fast food to order.]

- *Miyako Japanese* \$ - \$\$\$ 951.369.6110

[Well-prepared sushi and tempura. Inexpensive teriyaki bowls and large soups. Friendly local place.]

- *Jammin' Bread Bakery and Cafe* \$\$ 951.369.1869

[Local favorite for breakfast, lunch, and snacks. Excellent soups, sandwiches, salads, and desserts. 8am-6pm.]

Downtown near Mission Inn and Center hotels

- *Simple Simon's* \$\$ 951.369.6030 3639 Main Street (on the pedestrian mall)

[Excellent breakfast, lunch, and early dinner; deli and bistro food. Serving food 7am - 4pm (door locked at 5pm), and possibly until 8pm on Wednesdays.]

- *Cafe Sevilla* \$\$ - \$\$\$ 951.778.0611 3252 Mission Inn Avenue

[Tapas and Spanish cuisine. Great atmosphere, nice bar.]

- *Mi Tortilla Mexican Grill* \$ - \$\$ 951.341.5979 3203 Mission Inn Avenue

[Mexican specialties with excellent beer selection and salsa bar. Perfect for family or group.]

- *The Old Spaghetti Factory* \$\$ 951.784.4417 3191 Mission Inn Avenue

[Fun, family-oriented Italo-American restaurant in a great old building.]

- *Mario's Place* \$\$\$ - \$\$\$\$ 951.684.7755 3646 Mission Inn Avenue (across from the Mission Inn)

[Contemporary Northern Italian, one of the best Inland Empire restaurants. Reservations recommended.]

- *Las Campanas* \$\$ - \$\$\$ 951.341.6767 In the courtyard of the Mission Inn

[Excellent contemporary Mexican cuisine in a memorable outdoor setting. Beautiful at night.]

- *RAXX Barbecue and Brewing Co.* \$ - \$\$ 951.784.2739 3397 Mission Inn Avenue

[Microbrewery and great barbecue; a local favorite. Patio dining.]

Magnolia Center area, Riverside Plaza Shopping Center, ~ 5 miles from UCR

- *Market Broiler* \$\$ 951.276.9007 3525 Merrill Avenue (behind the Riverside Plaza)

[Quality fresh seafood. American-style broiled, fried, or sauteed platters.]

- *California Pizza Kitchen* \$\$ 951.680.9362 3540 Riverside Plaza

[Lively and fun chain restaurant with tasty pizzas and salads.]

- *Panera Bread Bakery-Cafe* \$\$ 951.369.8855 3560 Riverside Plaza Drive

[Great baked goods, soups, and sandwiches. Open through dinner. Free Wi-Fi.]

Off Chicago Avenue, 1.5 - 3.5 miles from UCR

- *Best Thai* \$\$ 951.682.4256 1735 Spruce

[Fresh, home-style Thai cuisine in a friendly and intimate setting; popular with the UCR community.]

- *Mexicali Bar and Grill* \$\$ 951.781.6682 1690 Spruce

[Latin American and Mexican cuisine in a contemporary setting. Large bar.]

- *Mr. Kebab* \$\$ 951.686.4904 365 Iowa Avenue

[Delicious Middle-Eastern specialties in a diner atmosphere.]

Coffeehouses

- *Back to the Grind* 951.784.0800 3575 University Avenue

[Funky coffeehouse with books galore.]

- *Starbucks* 951.786.0635 1299 University Avenue

[T-Mobile HotSpot wireless internet access]

- *Starbucks* 951.274.9605 1201 University Avenue, Suite 101 (at Iowa Avenue)

[T-Mobile HotSpot wireless internet access]

- *Starbucks* 951.683.4981 5225 Canyon Crest Drive

[T-Mobile HotSpot wireless internet access]

- *Coffee Roasters* 951.276.7181 5225 Canyon Crest Drive

- *Coffee Depot* 951.222.2263 3204 Mission Inn Avenue

[Great atmosphere and coffee.]

- *Coffee Depot* 951.222.2219 3540 Riverside Plaza

[Same company, new venue.]

What to Do in Riverside

- **UC-R Botanic Gardens**

Just a 5 minute walk from the Conference venue; see UCR map. The Botanic Gardens range over 40 hilly acres in the foothills of the Box Springs Mountains that delineate the eastern edge of the UCR campus. The Gardens offer more than four miles of scenic trails and 3,500 plant species.

- **Sycamore Canyon Park and hiking trail**

Central Avenue, just north of the intersection with Canyon Crest Drive. A 4 mile trail leads you amongst Southern California's "golden rolling hills". Water, comfortable shoes and long socks for tick protection are recommended.

- **California Citrus State Historic Park and interpretive trail**

Take the 91 Freeway to the Van Buren Boulevard exit, head south to Dufferin Avenue, take a left on Dufferin and a right into the parking lot. This park is dedicated to the history of the Southern California citrus industry, an economic powerhouse that made Riverside the wealthiest U.S. city (per capita) in 1900. This 1.3 mile easy "hike" is ideal for kids. http://www.localhikes.com/Hikes/CalCitrusSHP_4472.asp

- **Victoria Avenue drive**

Begin the drive at any of these three major cross streets: University, Central, or Arlington Avenue. Drive the historic palm-lined Victoria Avenue, which runs the length of Riverside's "Greenbelt". Many landmark homes from Riverside's Golden Age are still hidden behind the remaining orange groves along the avenue.

- **Riverside Art Museum**

951.684.7111 Hours: 10am - 4pm. Downtown area: 3425 Mission Inn Avenue, at the corner of Lime Street. Designed by America's most successful 20th century female architect, Julia Morgan, who also designed William Randolph Hearst's home, Hearst Castle, in San Simeon, CA. Current show: "Driven to Abstraction, SoCal and the Non-Objective World, 1950-1980".

Regional Attractions

- **Disneyland**

Anaheim, CA. 10am - 8pm. ~45 minute drive (this is the most congested highway in our area, so avoid the return drive between 2:30pm and 6pm, if possible, as rush hour can more than double your drive time). Take the CA-91 West from Central Avenue for ~30 miles. Bear right at exit 31 to CA-57 South. Exit on Katella Avenue and turn right/west. Take Katella to Harbor Boulevard and follow the Disneyland Park signs. This is the "Granddaddy" of all theme parks, even if it has been dwarfed by its successors! Having just celebrated its 50th Anniversary in 2005, Disneyland has undergone a facelift and is a worthy "retro" attraction, and of course, a great family destination.

- **Beach Towns: Laguna Beach, Dana Point, San Clemente**

~50 minute drive (50 miles) from the UCR campus. From the Central Avenue on-ramp, take the CA-91 West for 24 miles. Take the CA-241 South exit toward Irvine, drive 11 miles. Take the CA-133 South exit toward I-5, drive 6 miles (the 241 and 133 are toll roads, offering the quickest route to the beach for about \$10 each way; check your map for an alternative non-toll route). Continue on Laguna Canyon Road for 7.5 miles. Laguna Canyon Road becomes Broadway Street. Turn left on Forest Avenue, which becomes 3rd Street, or downtown Laguna Beach. Laguna Beach is an arts community and beach town. Check your map for other cities with public beaches. For a virtual beach visit, check out <http://www.earthcam.com/usa/california/laguna/>

Shopping

• University Village

1201 University Avenue at Iowa Avenue. 0.7 miles from the conference site.

Starbucks Coffee, student-oriented food and shopping, an excellent music/CD store and cinemas.

• Canyon Crest Shopping Center

9 or 10am - 6pm for most shops,;restaurants until 9:30pm or 10pm; drugstore and grocery open very late or 24 hours. Canyon Crest Drive and Central Avenue. ~2 miles from the conference site via Canyon Crest Drive.

Restaurants and fast food, drugstore, large grocery store, excellent gift shops.

• Riverside Plaza

At Riverside and Central Avenues. 5 miles/12 minutes by car. Take University Avenue for ~2 miles. Turn left onto Victoria Avenue for 1.7 miles. Turn right onto Central Avenue for 1 mile to Riverside Plaza.

Many restaurants, large cinema, local and national stores, coffeehouse, large Borders bookstore, Trader Joe's and Von's grocery.

• Galleria at Tyler Mall

10am - 9pm. At Tyler Avenue between the CA-91 freeway and Magnolia Avenue ~10 miles and a 15-20 minute drive on the CA-91. For a scenic route, drive historic Victoria Avenue its entire length; turn right on Tyler and the Mall will be on your right just beyond the overpass for CA-91.

Indoor mall with large department stores (Nordstrom, Macy's, JC Penney's), and many national chain stores. The entire area along Tyler Avenue has many mainstream American chain stores such as Target and Bed Bath & Beyond.

• Moreno Valley Mall

10am - 9pm. 22500 Town Circle, Moreno Valley. ~5 miles and a 10 minute drive: take the I-215 South/CA-60 East from University Avenue for ~2 miles. Exit at the Day Street off-ramp. From Day Street, turn left onto Canyon Springs Parkway and then left onto Town Circle.

Less glitzy indoor mall with large department stores (JC Penney's, Sears, Robinson's-May) and many national chain stores. The entire area around Day Street has many mainstream American chain stores such as Target, Lowe's, Pier 1 Imports, and Bed Bath & Beyond.

• Victoria Gardens

10am - 9pm. Day Creek and Foothill Boulevards, Rancho Cucamonga, CA. 20 miles/20 minute drive by freeway. Take the I-215 North/CA-60 West from University Avenue for 12 miles. Take the I-15 North for 6 miles; bear right onto the off-ramp for CA-66 West/Foothill Boulevard/Historic Route 66 and turn left onto Foothill Boulevard. You'll see the shopping center within 1/3 of a mile; take a right onto Day Creek Boulevard.

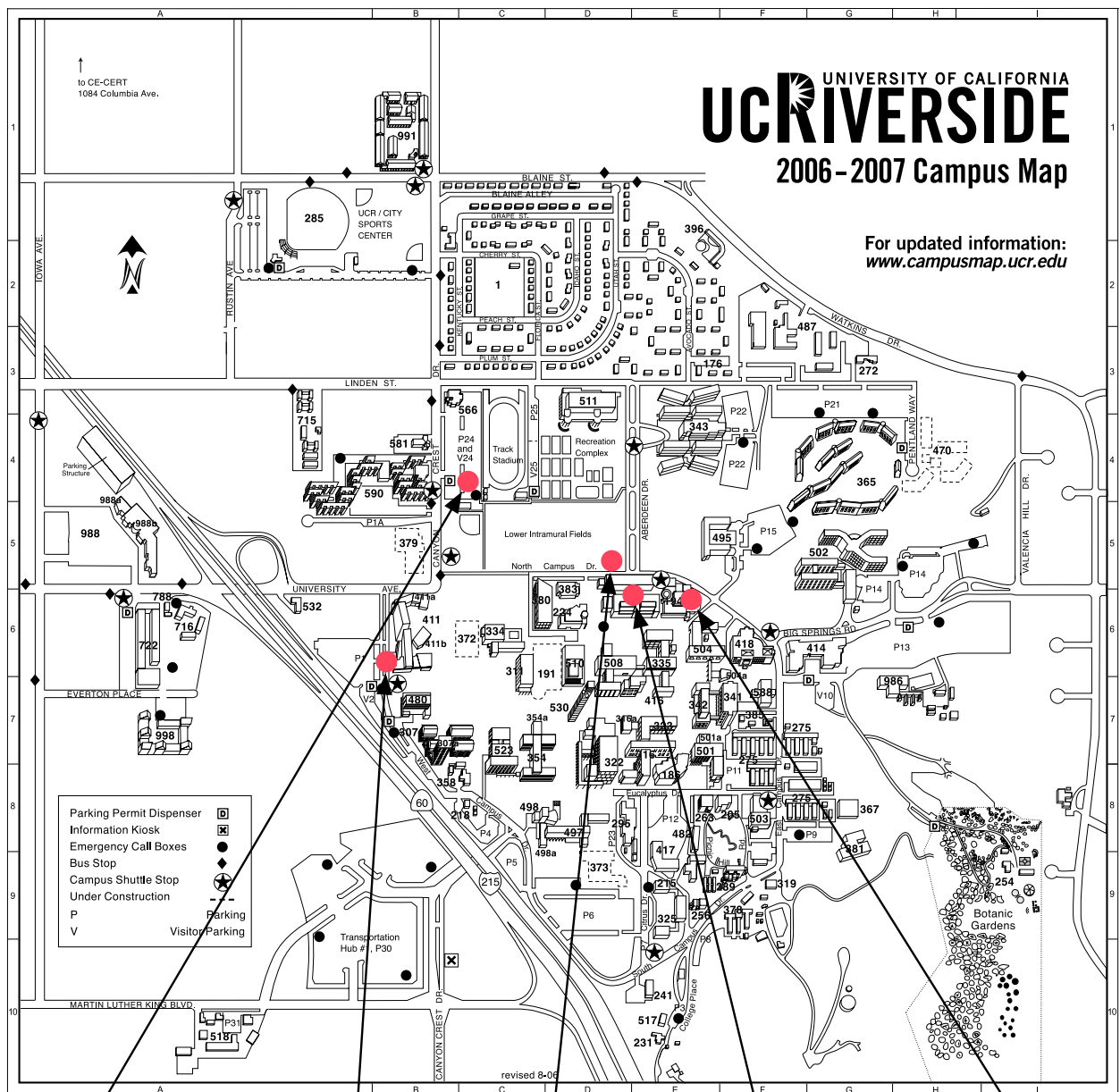
Brand-new, large outdoor shopping center with some of the higher-end American stores such as Coach, Williams-Sonoma, Pottery Barn, Abercrombie & Fitch, The Gap, Guess, Eddie Bauer. Department stores include Macy's, Robinson's-May, and JC Penney. Also cinemas.

<http://www.victoriagardensie.com/go/dirListing.cfm?FL=All>

UCR Campus Map and Parking Information

Bus service is being provided by UCR for exclusive use of QEST 2006 attendees. See the following page for bus stops and schedule.

If you choose to drive your own car, you can purchase a parking permit at the information and parking kiosk indicated on the map below. The cost is \$8 for one day or \$20 for the entire duration of QEST 2006. With this permit, you are allowed to park in Lot 24, just off Canyon Crest Drive.



Parking lot for attendees
(purchase permit at kiosk)

Information &
parking kiosk

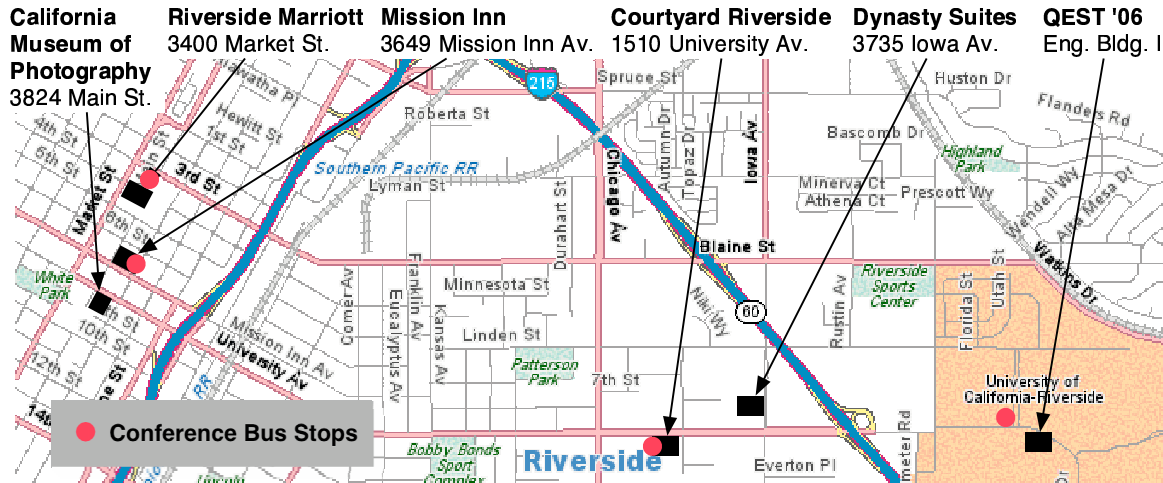
Conference
bus stop

Bourns Hall
(next to Eng. Bldg. II)

QEST '06
Eng. Bldg. II

Hotels and Bus Schedule

(↗ departure, ↘ arrival)



Monday, September 11, 2006

8:00am ↗ Marriott 8:05am ↗ Mission Inn
8:30am ↗ Marriott 8:35am ↗ Mission Inn

Monday, September 11, 2006

5:45pm ↗ UCR 5:50pm ↘ Courtyard
6:15pm ↗ UCR 6:20pm ↘ Courtyard

Monday, September 11, 2006

8:10pm ↗ CMP
8:40pm ↗ CMP

Tuesday, September 12, 2006

7:30am ↗ Marriott 7:35am ↗ Mission Inn
8:00am ↗ Marriott 8:05am ↗ Mission Inn

Tuesday, September 12, 2006

6:15pm ↗ UCR 6:20pm ↘ Courtyard
6:45pm ↗ UCR 6:50pm ↘ Courtyard

Wednesday, September 13, 2006

8:00am ↗ Marriott 8:05am ↗ Mission Inn
8:30am ↗ Marriott 8:35am ↗ Mission Inn

Wednesday, September 13, 2006

4:20pm ↗ UCR 4:25pm ↘ Courtyard
4:50pm ↗ UCR 4:55pm ↘ Courtyard
5:20pm ↗ UCR 5:25pm ↘ Courtyard

Wednesday, September 13, 2006

10:40pm ↗ Mission Inn
11:10pm ↗ Mission Inn

Thursday, September 14, 2006

8:00am ↗ Marriott 8:05am ↗ Mission Inn
8:30am ↗ Marriott 8:35am ↗ Mission Inn

Thursday, September 14, 2006

5:30pm ↗ UCR 5:35pm ↘ Courtyard
6:15pm ↗ UCR 6:20pm ↘ Courtyard
6:45pm ↗ UCR 6:50pm ↘ Courtyard

Morning bus to UCR

8:15am ↗ Courtyard 8:20am ↘ UCR
8:45am ↗ Courtyard 8:50am ↘ UCR

Afternoon bus from UCR

6:00pm ↘ Mission Inn 6:05pm ↘ Marriott
6:30pm ↘ CMP

Evening bus from CMP to Courtyard

8:20pm ↘ Courtyard
8:50pm ↘ Courtyard

Morning bus to UCR

7:45am ↗ Courtyard 7:50am ↘ UCR
8:15am ↗ Courtyard 8:20am ↘ UCR

Afternoon bus from UCR

6:30pm ↘ Mission Inn 6:35pm ↘ Marriott
7:00pm ↘ Mission Inn 7:05pm ↘ Marriott

Morning bus to UCR

8:15am ↗ Courtyard 8:20am ↘ UCR
8:45am ↗ Courtyard 8:50am ↘ UCR

Afternoon bus from UCR

4:35pm ↘ Mission Inn 4:40pm ↘ Marriott
5:05pm ↘ Mission Inn 5:10pm ↘ Marriott
5:35pm ↘ Mission Inn 5:40pm ↘ Marriott

Night bus from Mission Inn to Courtyard

10:50pm ↘ Courtyard
11:20pm ↘ Courtyard

Morning bus to UCR

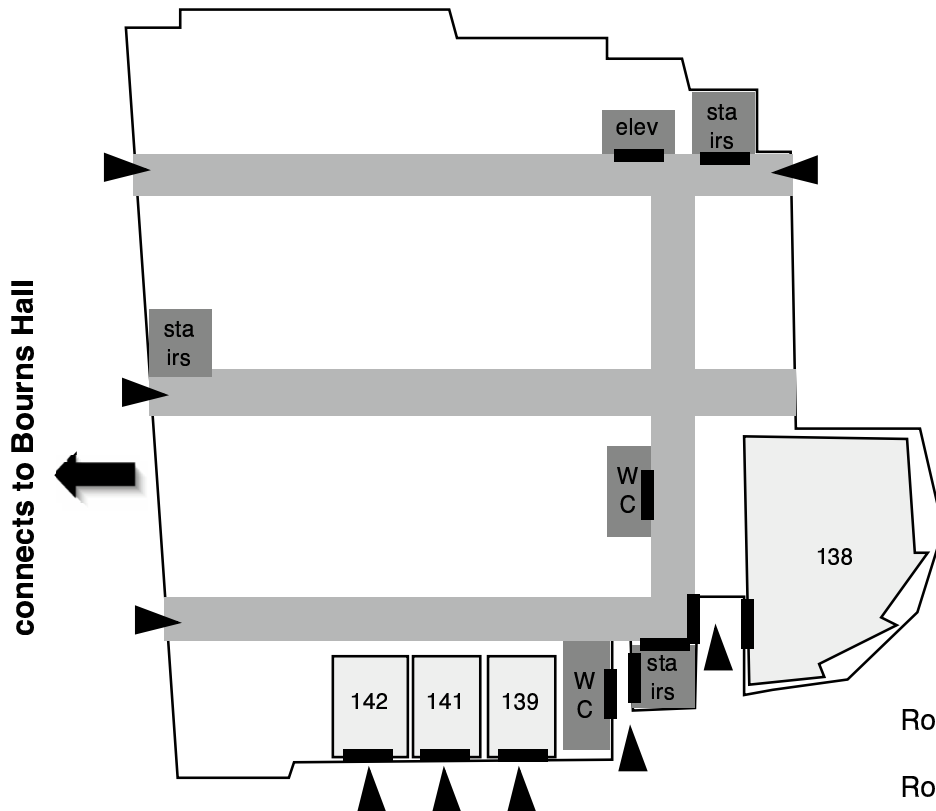
8:15am ↗ Courtyard 8:20am ↘ UCR
8:45am ↗ Courtyard 8:50am ↘ UCR

Afternoon bus from UCR

5:45pm ↘ Mission Inn 5:50pm ↘ Marriott
6:30pm ↘ Mission Inn 6:35pm ↘ Marriott
7:00pm ↘ Mission Inn 7:05pm ↘ Marriott

UCR Engineering Building II Map

Engineering Building II -- First Floor



Room 138: QEST Main Conference

Room 139: Registration, Coffee Breaks

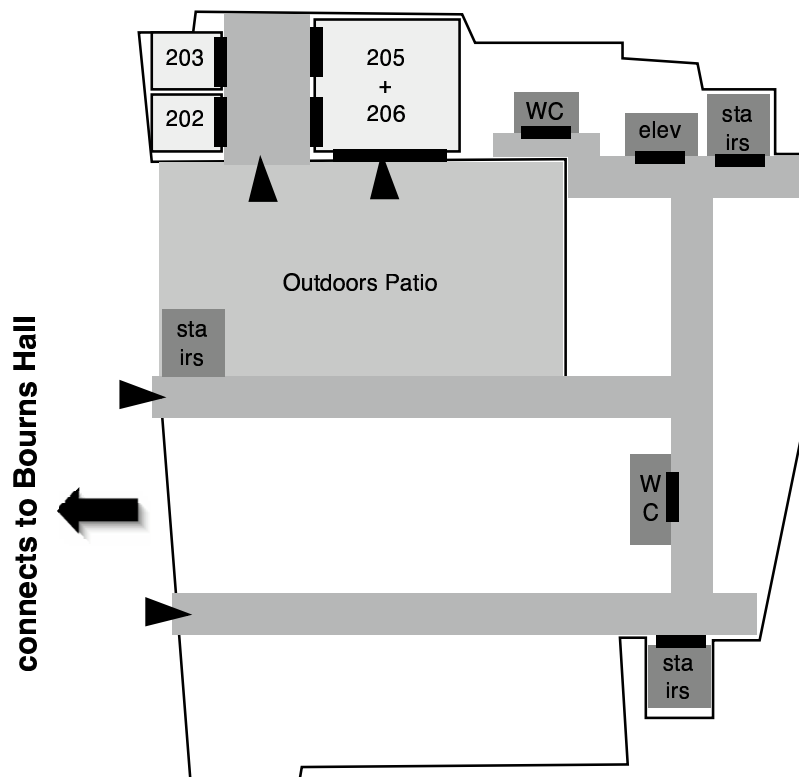
Room 141: Tutorials Track A (Monday)

Room 142: Tutorials Track B (Monday)

Room 202-203: Tool Demonstrations

Room 205-206: Lunches

Engineering Building II -- Second Floor



QEST 2006 Program at a Glance

Monday, September 11, 2006

- 9:00am - 12:30pm Morning Tutorials
TRACK A: *Quantitative evaluation of biological systems* J. Hillston
TRACK B: *Statistical techniques for performance measurement and evaluation* D.J. Lilja
- 12:30pm - 2:00pm LUNCH
- 2:00pm - 5:30pm Afternoon Tutorials
TRACK A: *Analysis of simulation traces by run-time verification* O. Sokolsky
TRACK B: *Probabilistic validation of computer system survivability* W.H. Sanders
- 6:30pm - 8:30pm RECEPTION AT THE CALIFORNIA MUSEUM OF PHOTOGRAPHY

Tuesday, September 12, 2006

- 8:30am - 9:00am Opening Session
- 9:00am - 10:00am *Causality, responsibility, and blame: a structural-model approach* J. Halpern
- 10:00am - 10:50am Session 1.1 Measurements
- 10:50am - 11:10am COFFEE BREAK
- 11:10am - 12:25pm Session 1.2 Storage Systems
- 12:25pm - 2:00pm LUNCH
- 2:00pm - 4:05pm Session 1.3 Network Models
- 4:05pm - 4:25pm COFFEE BREAK
- 4:25pm - 6:00pm Session 1.4 Tools

Wednesday, September 13, 2006

- 9:00am - 10:00am *Staffing and scheduling optimization problems in telephone call centers* P. L'Ecuyer
- 10:00am - 10:50am Session 2.1 Markov Decision Processes
- 10:50am - 11:10am COFFEE BREAK
- 11:10am - 12:25pm Session 2.2 Model Checking
- 12:25pm - 2:00pm LUNCH
- 2:00pm - 2:50pm Session 2.3 Lumpability
- 2:50pm - 4:05pm Session 2.4 Markov Models
- 5:00pm - 11:00pm MISSION INN MUSEUM TOUR AND BANQUET

Thursday, September 14, 2006

- 9:00am - 10:00am *Challenges in modeling enterprise storage systems* A. Merchant
- 10:00am - 10:50am Session 3.1 Optimization in Networks
- 10:50am - 11:10am COFFEE BREAK
- 11:10am - 12:25pm Session 3.2 Reachability
- 12:25pm - 2:00pm LUNCH
- 2:00pm - 3:40pm Session 3.3 Queuing
- 3:40pm - 4:00pm COFFEE BREAK
- 4:00pm - 5:15pm Session 3.4 Server Systems
- 5:15pm - 6:00pm Closing Session

QEST 2006 Detailed Program

Please note that the duration of each presentation, including questions and answers, is:

60 minutes for Invited papers

25 minutes for Regular papers

7 minutes for Tool papers

Monday, September 11, 2006

9:00am – 12:30pm Morning Tutorials (10:30am – 11:00am COFFEE BREAK)

TRACK A: Quantitative evaluation of biological systems

J. Hillston (University of Edinburgh)

TRACK B: Statistical techniques for performance measurement and evaluation

D.J. Lilja (University of Minnesota)

12:30pm – 2:00pm LUNCH

2:00pm – 5:30pm Afternoon Tutorials (3:30pm – 4:00pm COFFEE BREAK)

TRACK A: Analysis of simulation traces by run-time verification

O. Sokolsky, U. Sammapun, I. Lee (University of Pennsylvania)

TRACK B: Probabilistic validation of computer system survivability

W.H. Sanders (University of Illinois at Urbana-Champaign)

6:30pm – 8:30pm RECEPTION AT THE CALIFORNIA MUSEUM OF PHOTOGRAPHY

Tuesday, September 12, 2006

8:30am – 9:00am Opening Session

Welcome and Announcements

9:00am – 10:00am Invited Talk Chair: Pedro D'Argenio

Causality, responsibility, and blame: a structural-model approach

J. Halpern (Cornell University)

10:00am – 10:50am Session 1.1 Measurements Chair: Alma Riska

Behavior of available end-to-end bandwidth: non-parametric approach

A. Chobanyan, M.W. Mutka, S. Levental, N. Xi (Michigan State University)

Continuous bytecode instruction counting for CPU consumption estimation

A. Camesi, J. Hulaas, W. Binder (Ecole Polytechnique Fédérale de Lausanne)

10:50am – 11:10am COFFEE BREAK

11:10am – 12:25pm Session 1.2 Storage Systems Chair: Evgenia Smirni

Toolbox for dimensioning Windows storage systems

J. Boukhobza, C. Timsit (Université Versailles St. Quentin)

Long-range dependence at the disk drive level

A. Riska, E. Riedel (Seagate Research)

Rate-controlled scheduling of expired writes for volatile caches

S.R. Seelam, J. Suresh-Babu, P.J. Teller (The University of Texas at El Paso)

12:25pm – 2:00pm LUNCH

2:00pm – 4:05pm Session 1.3 Network Models Chair: Andras Horwath

A versatile infinite-state Markov reward model to study bottlenecks in 2-hop ad hoc networks

A. Remke, B.R. Haverkort, L. Cloth (University of Twente)

Performance analysis of delay tolerant networks with model checking techniques

M. Garetto, M. Gribaudo (Università di Torino)

Measuring and modeling of application flow length in commercial GPRS networks

R. Kalden (Ericsson Research), B.R. Haverkort (University of Twente)

Modeling fiber delay loops in an all optical switch

A. Bušić (Université Versailles St. Quentin), M. Ben Mamoun (Université Mohammed V and Université Versailles St. Quentin), J.-M. Forneau (Université Versailles St. Quentin)

Layered bottlenecks and their mitigation

G. Franks, D. Petriu, M. Woodside, J. Xu (Carleton University), P. Tregunno (Alcatel)

4:05pm – 4:25pm COFFEE BREAK

4:25pm – 6:00pm Session 1.4 Tools Chair: Enrico Vicario

QPME - Queueing Petri Net Modeling Environment

S. Kounev (University of Cambridge), C. Dutz, A. Buchmann (Darmstadt University of Technology)

Distributed simulation of colored stochastic Petri nets with TimeNET 4.0

M. Knoke (Technische Universität Berlin), A. Zimmermann, (Hasso Plattner Institute at Potsdam University)

Java modelling tools: an open source suite for queueing network modelling and workload analysis

M. Bertoli, G. Casale, G. Serazzi (Politecnico di Milano)

A PMIF semantic validation tool

D. García, C.M. Lladó, R. Puigjaner (Universitat de les Illes Balears), C.U. Smith (Performance Engineering Services)

Time Petri nets analysis with TINA

B. Berthomieu, F. Vernadat (LAAS/CNRS, Toulouse)

Uppaal 4.0

G. Behrmann, A. David, K.G. Larsen (Aalborg University), J. Håkansson, P. Petterson, W. Yi (Uppsala University), M. Hendriks (Radboud University Nijmegen)

Analysis of real time systems through the ORIS tool

L. Sassoli, E. Vicario (Università di Firenze)

APMC 3.0: approximate verification of discrete and continuous time Markov chains

T. Hérault (Université Paris XI), R. Lassaigne (Université Paris VII), S. Peyronnet (LRDE/EPITA)

LiQuor: a tool for qualitative and quantitative linear time analysis of reactive systems

F. Ciesinski, C. Baier (Universität Bonn)

MathMC: A mathematica-based tool for CSL model checking of deterministic and stochastic Petri nets

J.M. Martínez, B.R. Haverkort (University of Twente)

Traviando - debugging simulation traces with message sequence charts

P. Kemper, C. Tepper (Universität Dortmund)

Data analysis and visualization within the Möbius modeling environment

T. Courtney, S. Gaonkar, M. Griffith, V. Lam, M. McQuinn, E. Rozier, W.H. Sanders (University of Illinois at Urbana-Champaign)

Integration of an MPS modeling approach into Möbius

A. Bondavalli, S. Chiaradonna, P. Lollini, F. Squittieri (Università di Firenze)

PACMAN: A PerformAnce Counters MANager for Intel hyperthreaded processors

M. Curtis-Maury, C.D. Antonopoulos, D.S. Nikolopoulos (The College of William and Mary)

Wednesday, September 13, 2006

9:00am – 10:00am Invited Talk

Chair: Gerardo Rubino

Staffing and scheduling optimization problems in telephone call centers
P. L'Ecuyer (IRISA-INRIA and Université de Montréal)

10:00am – 10:50am Session 2.1 Markov Decision Processes

Chair: Jeremy Sproston

Game-based abstraction for Markov decision processes
M. Kwiatkowska, G. Norman, D. Parker (University of Birmingham)
Compositional performability evaluation for STATEMATE
E. Böde (Kuratorium OFFIS e.V.), M. Herbstritt (Albert-Ludwigs-University Freiburg), H. Hermanns, S. Johr (Saarland University), T. Peikenkamp (Kuratorium OFFIS e.V.), R. Pulungan (Saarland University), R. Wimmer, B. Becker (Albert-Ludwigs-University Freiburg).

10:50am – 11:10am COFFEE BREAK

11:10am – 12:25pm Session 2.2 Model Checking

Chair: Sylvain Peyronnet

Compositional quantitative reasoning
K. Chatterjee (UC Berkeley), L. de Alfaro (UC Santa Cruz), M. Faella (Università di Napoli "Federico II"), T.A. Henzinger (UC Berkeley and EPFL), R. Majumdar (UCLA), M. Stoelinga (University of Twente)
Model checking of continuous-time Markov chains by closed-form bounding distributions
M. Ben Mamoun (Université Mohammed V), N. Pekergin (Université Paris I), S. Younès (Université Versailles St. Quentin)
CSL model checking for generalized stochastic Petri nets
D. Cerotti, S. Donatelli, A. Horváth, J. Sproston (Università di Torino)

12:25pm – 2:00pm LUNCH

2:00pm – 2:50pm Session 2.3 Lumpability

Chair: Jane Hillston

Efficient lumpability check in partially symmetric systems
M. Beccuti, G. Franceschinis (Università del Piemonte Orientale), S. Baarir, J.-M. Ilié (Université Pierre et Marie Curie)
Lumping Markov chains with silent steps
J. Markovski, N. Trčka (Technische Universiteit Eindhoven)

2:50pm – 4:05pm Session 2.4 Markov Models

Chair: David Jansen

Optimization of Markov models with evolutionary strategies based on exact and approximate analysis techniques
P. Buchholz, P. Kemper (Universität Dortmund)
Bound preserving composition for Markov reward models
D. Daly (IBM T.J. Watson Research Center), P. Buchholz (Universität Dortmund), W.H. Sanders (University of Illinois at Urbana-Champaign)
Limiting behavior of Markov chains with eager attractors
P.A. Abdulla, N. Ben Henda (Uppsala University), R. Mayr (NC State University), S. Sandberg (Uppsala University)

5:00pm-11:00pm MISSION INN MUSEUM TOUR AND BANQUET

Thursday, September 14, 2006

9:00am – 10:00am Invited Talk

Chair: Andrew Miner

Challenges in modeling enterprise storage systems

A. Merchant (Hewlett-Packard Laboratories, Palo Alto, California)

10:00am – 10:50am Session 3.1 Optimization in Networks

Chair: Peter Kemper

Optimization of cache expiration dates in content networks

H. Cancela, P. Rodríguez-Bocca (Universidad de la República, Uruguay)

Optimal static pricing of reverse-link DS-CDMA multiclass traffic

Y. Hayel (IRISA/INRIA Rennes), V.M. Ramos R. (UAM-Iztapalapa), B. Tuffin (IRISA/INRIA Rennes)

10:50am – 11:10am COFFEE BREAK

11:10am – 12:25pm Session 3.2 Reachability

Chair: Gethin Norman

Strategy improvement for concurrent reachability games

K. Chatterjee (UC Berkeley), L. de Alfaro (UC Santa Cruz), T.A. Henzinger (UC Berkeley and EPFL)

Safe on-the-fly steady-state detection for time-bounded reachability

J.-P. Katoen (University of Twente and RWTH Aachen), I.S. Zapreev (University of Twente)

Probably on time and within budget: on reachability in priced probabilistic timed automata

J. Berendsen, D.N. Jansen (University of Twente), J.-P. Katoen (RWTH Aachen)

12:25pm – 2:00pm LUNCH

2:00pm – 3:40pm Session 3.3 Queuing

Chair: Giuliana Franceschinis

A tool support for automatic analysis based on the tagged customer approach

L. Bodrog, G. Horváth, S. Rácz, M. Telek (Technical University of Budapest)

On single-class load-dependent normalizing constant equations

G. Casale (Neptun R&D)

Exploring correctness and accuracy of solutions to matrix polynomial equations in queues

D. Thornley, H. Zatschler (Imperial College London)

Threshold workload control in the BMAP/G/1 queue

H.W. Lee, J.W. Baek (Sungkyunkwan University)

3:40pm – 4:00pm COFFEE BREAK

4:00pm – 5:15pm Session 3.4 Server Systems

Chair: Marco Gribaudo

Identifying low-profile web server's IP fingerprint

M. Xie, K. Tabatabai, H. Wang (The College of William and Mary)

The fast and the fair: a fault-injection-driven comparison of restart oracles for reliable web services

P. Reinecke (Humboldt-Universität zu Berlin), A.P.A. van Moorsel (University of Newcastle upon Tyne), K. Wolter (Humboldt-Universität zu Berlin)

Load balancing for performance differentiation in dual-priority clustered servers

N. Mi, Q. Zhang (The College of William and Mary), A. Riska (Seagate Research), E. Smirni (The College of William and Mary)

5:15pm – 6:00pm Closing Session

QEST business meeting

QEST 2006 Tutorials

MORNING TRACK A: Quantitative evaluation of biological systems

J. Hillston, University of Edinburgh

Abstract: Systems biology is an emerging multidisciplinary field which seeks to understand biological systems at a process level. Significant advances in biology in recent years mean that much is now known about the components which make up many biological systems. However, this essentially reductionist work does little to explain the processes which use these components and drive the biological functions which they perform. Systems biology seeks to form such explanations through combined use of modelling and laboratory experimentation.

Whilst static models which explain the inter-relationships between components are useful, quantitative kinetic models which allow dynamic properties of the system to be represented, are crucial. This tutorial will outline the challenges of systems biology and explain how some of the modelling and analysis techniques which have been developed for the quantitative analysis of computer systems over the last two decades are now proving useful in this new domain. Several examples of intra-cellular signalling pathways will be used to illustrate the ideas.

Only minimal biological knowledge will be assumed.

Speaker: Jane Hillston received the BA and MS degrees in Mathematics from the University of York (UK) and Lehigh University (USA), respectively. After a brief period working in industry, she joined the Department of Computer Science at the University of Edinburgh, as a research assistant in 1989. She received the PhD degree in computer science from that university in 1994. Her thesis was selected for publication as a Distinguished Dissertations in Computer Science in 1995. In 1995 she became a lecturer, and in 2001 a reader, in computer science at the University of Edinburgh. She is a member of the Laboratory for Foundations of Computer Science. Her principal research interests are in the use of process algebras to model computer systems and the investigation of issues of compositionality with respect to Markov processes. Her work on the stochastic process algebra PEPA was recognized by the British Computer Society in 2004 who awarded her the Roger Needham Award.

More recently she has been investigating the use of stochastic process algebra approaches to model cellular signal transduction pathways and other problems in systems biology. In 2005 she was awarded a five year Advanced Research Fellowship by the UK Engineering and Physical Sciences Research Council and in 2006 she was promoted to a Chair in Quantitative Modelling at the University of Edinburgh.

MORNING TRACK B: Statistical techniques for performance measurement and evaluation

D.J. Lilja, University of Minnesota

Abstract: Computer architects and system designers have made tremendous advances in the performance of computer systems over the past several decades. Unfortunately, the performance of a computer system is impacted by many different components in extremely complex and nonlinear ways. For example, it is well understood that simply increasing the clock rate will not necessarily produce a proportionate increase in the overall performance. These complex interactions introduce uncertainty into the measurements of a system's performance, which makes it difficult to determine the impact any changes made to the system actually have on the overall performance. This measurement noise also makes it difficult to compare the performance of different systems. This tutorial provides a gentle introduction to some of the key statistical tools and techniques needed to interpret noisy performance measurements and to sort through large collections of simulation results. It also presents techniques that can be used to appropriately design experiments to obtain the maximum amount of information for a given level of experimental effort.

Speaker: David J. Lilja received the Ph.D. and M.S. degrees, both in Electrical Engineering, from the University of Illinois at Urbana-Champaign, and a B.S. in Computer Engineering from Iowa State University in Ames. He is currently a Professor of Electrical and Computer Engineering, and a Fellow of the Minnesota Supercomputing Institute, at the University of Minnesota in Minneapolis. He also serves as a member of the graduate faculties in Computer Science and Scientific Computation. He has been a visiting senior engineer in the Hardware Performance Analysis group at IBM in Rochester, Minnesota, and a visiting professor at the University of Western Australia in Perth supported by a Fulbright award. Previously, he worked as a research assistant at the Center for Supercomputing Research and Development at the University of Illinois, and as a development engineer at Tandem Computers Incorporated (now a division of Hewlett-Packard) in Cupertino, California. He has served on and chaired the program committees of numerous conferences, was a distinguished visitor of the IEEE Computer Society, and was elected a Fellow of the IEEE "for contributions to statistical methodologies for performance assessment of computing systems". His primary research interests are in high-performance computer architecture, parallel computing, hardware-software interactions, and performance analysis.

AFTERNOON TRACK A: Analysis of simulation traces by run-time verification

O. Sokolsky, University of Pennsylvania

Abstract: Run-time verification is a dynamic analysis technique that has emerged in recent years. Run-time verification targets system models that are too complex to be exhaustively analyzed by model checking, or system implementations that do not have models suitable for verification. Instead of exploring the whole state space of the system, run-time verification techniques check system executions with respect to a set of formally specified requirements. Run-time verification resorts to instrumentation or other kinds of execution monitoring to extract a trace of observations and then applies formal verification to this trace. Presentation will be based on the MaC (Monitoring and Checking) tool, developed at the University of Pennsylvania.

In this tutorial, we will concentrate on the application of run-time verification techniques to simulation runs. We will discuss specification of properties for the runs, extraction of relevant observations, abstraction of observations, and efficient run-time checking of a trace. We will illustrate the presentation with a case study that considered analysis of an ad-hoc routing protocol executed in the ns2 simulator.

We will also consider several extensions to the basic run-time verification techniques to cover more expressive property specifications, gathering of statistics, and tuning of simulation parameters at run time.

Speaker: Oleg Sokolsky is a Research Assistant Professor at the Department of Computer and Information Science at the University of Pennsylvania. His main research interests lie in the area of formal methods and their application to software and systems engineering. For the past several years, he has been involved in the project that aims to increase safety assurance of deployed systems by means of run-time monitoring and checking. Other related projects involve the use of hybrid systems for the modeling of biological systems, formal schedulability analysis of real-time systems based on process-algebraic modeling, and analysis of software architectures.

AFTERNOON TRACK B: Probabilistic validation of computer system survivability

W.H. Sanders, University of Illinois at Urbana-Champaign

Abstract: There is a growing need for systems whose survivability in a specified use and/or attack environment can be assured with confidence. Many techniques have been proposed to validate individual components (e.g., formal methods) or a system as a whole (e.g., red teaming). However, no single technique can provide the breadth of evidence needed to validate a system with respect to high-level survivability requirements. To accomplish this, we propose an integrated validation procedure (IVP) that begins with the formulation of a specific survivability requirement and determines whether a system is valid with respect to the requirement.

The IVP employs a top-down approach that methodically breaks the task of validation into manageable tasks, and for each task, applies techniques best suited to its accomplishment. Stochastic methods, logical arguments (including formal methods), and experimental methods are all employed. These efforts can be largely independent, and the results, which complement and supplement each other, are seamlessly integrated to provide a convincing assurance argument. We then illustrate the IVP by applying it to an intrusion-tolerant information system being developed by the U.S. Department of Defense. In addition to validating the system against high-level survivability requirements, we demonstrate the use of model-based validation techniques, as a part of the overall validation procedure, to guide the system's design by exploring different configurations and evaluating tradeoffs.

Speaker: William S. Sanders is a Donald Biggar Willett Professor of Engineering and the Director of the Information Trust Institute at the University of Illinois. He is a professor in the Department of Electrical and Computer Engineering and the Coordinated Science Laboratory. He is a Fellow of the IEEE and the ACM. In addition, he serves on the editorial boards of Performance Evaluation and IEEE Security and Privacy and is the Area Editor for Simulation and Modeling of Computer Systems for the ACM Transactions on Modeling and Computer Simulation. He is a past Chair of the IEEE Technical Committee on Fault-Tolerant Computing and past Vice-Chair of IFIP Working Group 10.4 on Dependable Computing. Dr. Sanders's research interests include performance/dependability evaluation, dependable computing, and reliable distributed systems. He has published more than 160 technical papers in those areas. He served as the General Chair of the 2003 Illinois International Multiconference on Measurement, Modelling, and Evaluation of Computer-Communication Systems. He has served as co-Chair of the program committees of the 29th International Symposium on Fault-Tolerant Computing (FTCS-29), the Sixth IFIP Working Conference on Dependable Computing for Critical Applications, Sigmetrics 2003, PNPM 2003, and Performance Tools 2003, and has served on the program committees of numerous conferences and workshops. He is a co-developer of three tools for assessing the performability of systems represented as stochastic activity networks: METASAN, UltraSAN, and Möbius. Möbius and UltraSAN have been distributed widely to industry and academia; more than 400 licenses for the tools have been issued to universities, companies, and NASA for evaluating the performance, dependability, security, and performability of a variety of systems. He is also a co-developer of the Loki distributed system fault injector and the AQUA/ITUA middlewares for providing dependability/security to distributed and networked applications.