



ACM SIGMETRICS 2018

International Conference on
Measurement and Modeling of Computer Systems

Irvine, California, USA

June 18-22, 2018



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Computing Machinery



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Message from the General Chair

Welcome to the 2018 SIGMETRICS Conference on Measurement and Modeling of Computer Systems, held at the Beckman Center, adjacent to the University of California, Irvine, June 18-22. The conference is the leading research venue in the area of performance analysis of computer systems, and the development of tools and innovative application of tools towards this end.

The conference opens on Monday, June 18, with three workshops: Workshop on Critical Infrastructure Network Security (CINS 2018), Workshop on Mathematical Performance Modeling and Analysis (MAMA 2018), and Workshop on Economics of Networks, Systems and Computation (NetEcon 2018). The main conference takes place Tuesday-Thursday, June 19-21, with Keynote Talks presented by Jon Kleinberg and Margaret Martonosi and a record number of 54 regular paper presentations. The conference wraps up Friday, June 22, with four tutorials by: Ivo Adan, Anima Anandkumar and Furong Huang, Aman Shaikh and Vijay Gopalakrishna, and Li Zhang.

SIGMETRICS 2018 was made possible by the hard work of many volunteers, and I would like to thank all of them for their time and dedication. To begin with, the TPC chairs Aditya Akella and Adam Wierman assembled a fantastic program committee, and led the review of 270 papers submitted over three submission deadlines. Their hard work, and the hard work of the technical program committee members, selected an outstanding set of papers to be accepted for the conference. Finance Chair Jia Wang worked meticulously on the budget, Local Arrangements Chair Athina Markopoulou successfully handled a myriad of local arrangements issues, Publications Chair Georgios Smaragdakis ensured a smooth publication process, Publicity Chair Marco Paolieri widely advertised the conference and kept the website attractive and coherent, Registration Chair Florin Ciucu carefully configured the registration site, Student Activities Chair Carlee Joe-Wong effectively arranged for student travel support, Tutorial Chair Y.C. Tay organized a spectacular set of tutorials, Workshop Chair Longbo Huang arranged an engaging set of workshops, and April Mosquos of ACM skillfully helped smooth conference coordination.

I would especially like to thank the National Science Foundation and our industry sponsors, silver sponsors Facebook and Microsoft Research, and bronze sponsors Cisco, Google, and Intel, for their generosity and continuing support of SIGMETRICS. Their contributions directly improved the quality and accessibility of the conference.

Enjoy the conference!

Konstantinos Psounis
SIGMETRICS 2018 General Chair

Message from the TPC Chairs

This year marks the forty-fifth anniversary of the initial SIGMETRICS conference, which started as the “First National SIGME Symposium on Measurement and Evaluation” in 1973. The past four decades have seen enormous changes in the field of computer science, but the importance of measurement, modeling, and performance evaluation remains as critical as ever, and this year’s program reflects the sustained ability of the conference to attract high quality submissions while evolving with the broad interests of the performance evaluation community. The conference program includes papers on topics that have been a mainstay since the founding of our SIG, including load balancing, scheduling, resource allocation, and performance measurement. However, the conference also highlights a variety of new application areas that have become prominent in recent years, such as the sharing economy, cryptocurrencies, network science, and machine learning.

This year marks the completion of a multi-year transition of SIGMETRICS to a so-called “jourference” model, where papers are reviewed using a journal procedure (including a one-shot revision), there are multiple submission deadlines throughout the year, and papers are accepted to appear in the ACM Proceedings on Measurement and Analysis of Computer Systems (POMACS). Papers were submitted to Summer, Fall, and Winter deadlines, and the full archival versions of accepted papers appear across three consecutive issues of POMACS.

The process was a resounding success and this year’s program includes 54 papers, which is the largest ever at a SIGMETRICS conference. All accepted papers from the three submission deadlines are presented in the conference, and extended abstracts of them appear in an issue of Performance Evaluation Review (PER), which serves as the conference proceedings. In total, we received 270 submissions (58 in the summer, 92 in the fall, and 120 in the winter) and accepted 54 papers across the three deadlines, 20 of which were accepted after a one-shot-revision. This gives a highly competitive acceptance rate of 20%, which is not far from the historical acceptance rate at SIGMETRICS. Note that the one-shot-revision process worked effectively to allow “exciting but flawed” papers to address concerns from the reviewers and then be accepted into the conference, and thus the acceptance rate is slightly higher than in recent years. As in prior years, during each deadline period, we performed reviews in two rounds. In the first round, each paper was assigned to three reviewers. In the second round, an additional two reviewers were assigned for papers with fewer than three completed reviews, papers with divergent review opinions, and papers fewer than two high-confidence reviews. All reviews were completed by the 65 members of our technical program committee (TPC), except for a handful of papers for which we sought external expert opinion. Decisions during the Summer and Fall deadlines were finalized via a virtual program committee meeting, and decisions during the Winter deadline were made during a physical program committee meeting in New York. Best paper awards were selected by a small subcommittee of the TPC and will be announced at the conference.

Many people contributed to the success of SIGMETRICS 2018. First, we would like to thank all the authors for contributing their work. We would also like to thank the TPC members for being the guinea pigs for a new process and for staying responsive and positive throughout the year-long endeavor. Our general chair, Konstantinos Psounis, has also provided crucial support and advice. We would additionally like to thank last year’s TPC chairs Augustin Chaintreau, Leana Golubchik, and Zhi-Li Zhang for being constantly available and willing to share their experiences.

We hope you enjoy SIGMETRICS 2018!

Adam Wierman and Aditya Akella

SIGMETRICS 2018 Technical Program Committee co-Chairs

Program at a Glance: Workshops (Monday, June 18, 2018)

Time	NetEcon 2018 (Balboa Room)	CINS 2018 (Newport Room)	MAMA 2018 (Huntington Room)	Time
08:00	Breakfast and Registration (08:00-09:00)			08:00
08:30				08:30
09:00	4 short talks (09:00-10:00)	Invited talk by David M. Nichol (09:00-10:00)	3 talks (08:30-10:00)	09:00
09:30				09:30
10:00	Break			10:00
10:30	2 short talks (10:30-11:00)	Invited talk by A. Keli (10:30-11:00)	3 talks (10:30-12:00)	10:30
11:00	Invited talk by Vijay V. Vazirani (11:00-12:00)	Invited talk by A. Ganguly (11:00-11:30)		11:00
11:30		Invited talk by A. Tofani (11:30-12:00)		11:30
12:00	Lunch (12:00-13:30)			12:00
12:30				12:30
13:00				13:00
13:30	Invited talk by Jacob LaRiviere (13:30-14:30)	Invited talk by B. Sikdar (13:30-14:00)	4 talks (13:00-15:00)	13:30
14:00		Invited talk by N. Tran (14:00-14:30)		14:00
14:30	2 short talks (14:30-15:00)	Invited talk by S. Soltran (14:30-15:00)		14:30
15:00	Break			15:00
15:30	2 short talks (15:30-16:00)	Invited talk by A. Das (15:30-16:00)	5 talks (15:30-18:00)	15:30
16:00	Invited talk by Adam Wierman (16:00-17:00)	4 full talks (16:00-17:20)		16:00
16:30				16:30
17:00				17:00
17:30		Panel Discussion/ Concluding Remarks (17:20-18:30)		17:30
18:00			18:00	

Program at a Glance: Main Conference June 19-21, 2018 (Auditorium)

Time	Tue June 19th	Wed June 20th	Thu June 21st	Time
08:00	Breakfast / Registration (08:00-08:30)	Breakfast and Registration (08:00-09:00)	Breakfast and Registration (08:00-09:00)	08:00
08:30	Opening and Awards (08:30-09:00)			08:30
09:00	Achievement Lecture (09:00-10:00)	Keynote: Jon Kleinberg (09:00-10:00)	Session: Learning II (09:00-10:00)	09:00
09:30				09:30
10:00	Break	Break	Break	10:00
10:30	Session: Emerging Areas (10:30-12:00)	Session: Learning I (10:30-12:00)	Session: Systems (10:30-12:00)	10:30
11:00				11:00
11:30				11:30
12:00	Lunch (12:00-13:30)	Lunch (12:00-13:30)	Lunch (12:00-13:30)	12:00
12:30				12:30
13:00				13:00
13:30	Keynote: Margaret Martonossi (13:30-14:30)	Session: Cloud (13:30-15:00)	Session: Load Balancing (13:30-15:00)	13:30
14:00				14:00
14:30	Break			14:30
15:00	Session: Resource Management I (15:00-16:00)	Break	Break	15:00
15:30	Break	Session: Networking (15:30-17:00)	Session: Resource Management II (15:30-17:00)	15:30
16:00				16:00
16:30				16:30
16:30	Session: Scheduling I (16:30-17:30)	Reception (Lawn, 17-18) Business Meeting (Auditorium, 17:15-18:00)		16:30
17:00	Reception & Poster Session (Atrium, 17:30-19:00)			17:00
17:30		17:30		
18:00		Banquet (Dining Terrace & Lawn, 18:00-20:00)		18:00

Program at a Glance: Tutorials (Friday, June 22, 2018)

Time	Huntington Room	Newport Room	Time
08:00	Breakfast and Registration (08:00-09:00)		08:00
08:30			08:30
09:00	The Role of Tensors in Deep Learning Anima Anandkumar, Furong Huang (9:00-10:30)	Techniques for Monitoring and Measuring Virtualized Networks Aman Shaikh, Vijay Gopalakrishnan (9:00-10:30)	09:00
09:30			09:30
10:00			10:00
10:30	Break (10:30-11:00)		10:30
11:00	Tutorial, continued (11:00-12:30)	Tutorial, continued (11:00-12:30)	11:00
11:30			11:30
12:00			12:00
12:30	Lunch (12:30-13:30)		12:30
13:00			13:00
13:30	Structured Markov Chains Ivo Adan, Johan van Leeuwen (13:30-15:00)	Performance Modeling and Analysis of Deep Learning Systems Li Zhang (13:30-15:00)	13:30
14:00			14:00
14:30			14:30
15:00	Break (15:00-15:30)		15:00
15:30	Tutorial, continued (15:30-17:00)	Tutorial, continued (15:30-17:00)	15:30
16:00			16:00
16:30			16:30

Tuesday, June 19th, 2018 (Main Conference - Auditorium)

08:30-09:00 | Opening and Awards

09:00-10:00 | Achievement Lecture: Jim Dai

10:00-10:30 | Break

10:30-12:00 | Session: Emerging Areas

Chair: Siva Theja Maguluri

Long Talks (20 minutes)

- **State Dependent Control of Closed Queueing Networks** by S. Banerjee (Cornell University), Y. Kanoria (Columbia University), P. Qian (Columbia University)
- **Dandelion++: Lightweight Cryptocurrency Networking with Formal Anonymity Guarantees** by G. Fanti (CMU), S. Venkatakrisnan (MIT), S. Bakshi (UIUC), B. Denby (CMU), S. Bhargava (UIUC), A. Miller (UIUC), P. Viswanath (UIUC)
- **Bootstrapped Graph Diffusions: Exposing the Power of Nonlinearity** by E. Buchnik (Tel Aviv University), E. Cohen (Google Research, Tel Aviv University)

Short Talks (10 minutes)

- **The Cost of Uncertainty in Curing Epidemics** by J. Hoffmann (University of Texas at Austin), C. Caramanis (University of Texas at Austin)
- **The Price of Fragmentation in Mobility-on-Demand Services** by T. Sejourne (Ecole Polytechnique), S. Samaranayake (Cornell University), S. Banerjee (Cornell University)
- **Censored Demand Estimation in Retail** by M. Amjad (MIT), D. Shah (MIT)

12:00-13:30 | Lunch

13:30-14:30 | Keynote: Margaret Martonossi

14:30-15:00 | Break

15:00-16:00 | Session: Resource Management I

Chair: Vishal Misra

Long Talks (20 minutes)

- **Delay Scaling in Many-Sources Wireless Networks without Queue State Information** by S. Borst (Nokia Bell Labs), M. Zubeldia (MIT)
- **Practical Bounds on Optimal Caching with Variable Object Sizes** by D. Berger (Carnegie Mellon University), N. Beckmann (Carnegie Mellon University), M. Harchol-Balter (Carnegie Mellon University)

Short Talks (10 minutes)

- **On Resource Pooling and Separation for LRU Caching** by J. Tan (The Ohio State University), G. Quan (The Ohio State University), K. Ji (The Ohio State University), N. Shroff (The Ohio State University)
- **An Optimal Randomized Online Algorithm for QoS Buffer Management** by L. Yang (The Chinese University of Hong Kong), W. Wong (The Chinese University of Hong Kong), M. Hajiesmaili (Johns Hopkins University)

16:00-16:30 | Break

16:30-17:30 | Session: Scheduling I

Chair: Mor Harchol-Balter

Long Talks (20 minutes)

- **Minimizing Queue Length Regret Under Adversarial Network Models** by Q. Liang (MIT), E. Modiano (MIT)
- **Dynamic Proportional Sharing: A Game-Theoretic Approach** by S. Zahedi (Duke University), R. Freeman (Duke University), V. Conitzer (Duke University), B. Lee (Duke University)

Short Talks (10 minutes)

- **SOAP: One Clean Analysis of All Age-Based Scheduling Policies** by Z. Scully (CMU), M. Harchol-Balter (CMU), A. Scheller-Wolf (CMU)
- **A Whittle's Index Based Approach for QoE Optimization in Wireless Networks** by A. Anand (University of Texas at Austin), G. de Veciana (University of Texas at Austin)

17:30 | Reception and Poster Session (on-site)

Wednesday, June 20th, 2018

09:00-10:00 | Keynote: Jon Kleinberg

10:00-10:30 | Break

10:30-12:00 | Session: Learning I

Chair: Leana Golubchik

Long Talks (20 minutes)

- **An Optimal Algorithm for Online Non-Convex Learning** by L. Yang (The Chinese University of Hong Kong), L. Deng (The Chinese University of Hong Kong), M. Hajiesmaili (Johns Hopkins University), C. Tan (The Chinese University of Hong Kong), W. Wong (The Chinese University of Hong Kong)
- **Asymptotic optimal control of Markov-modulated restless bandits** by S. Duran (CNRS, LAAS), I. Verloop (CNRS, IRIT)
- **Online Learning of Optimally Diverse Rankings** by S. Magureanu (Klarna AB), A. Proutiere (KTH Royal Institute of Technology), M. Isaksson (Spotify AB), B. Zhang (Spotify AB)

Short Talks (10 minutes)

- **Learning Proportionally Fair Allocations with Low Regret** by M.S. Talebi (KTH Royal Institute of Technology), A. Proutiere (KTH Royal Institute of Technology)
- **Multi-armed Bandit with Additional Observations** by D. Yun (Naver Corporation), S. Ahn (KAIST), A. Proutiere (KTH), J. Shin (KAIST), Y. Yi (KAIST)
- **Online Learning in Weakly Coupled Markov Decision Processes: A Convergence Time Study** by X. Wei (USC), H. Yu (USC), M. Neely (USC)

12:00-13:30 | Lunch

13:30-15:00 | Session: Cloud

Chair: Zhenhua Liu

Long Talks (20 minutes)

- **Hound: Causal Learning for Datacenter-scale Straggler Diagnosis** by P. Zheng (Duke University), B. C. Lee (Duke University)
- **Working set size estimation techniques in virtualized environments: One size does not fit all** by V. Nitu (IRIT/Toulouse University, France), A. Kocharyan

(IRIT/Toulouse University, France), H. Yaya (IRIT/Toulouse University, France), A. Tchana (IRIT/Toulouse University, France), D. Hagimont (IRIT/Toulouse University, France), H. Astsatryan (Institute for Informatics and Automation Problem, Armenia)

- **PreFix: Switch Failure Prediction in Datacenter Networks** by S. Zhang (Nankai University), Y. Liu (Tsinghua University), W. Meng (Tsinghua University), Z. Luo (Zhejiang University), J. Bu (Tsinghua University), S. Yang (Georgia Institute of Technology), P. Liang (University of Notre Dame), D. Pei (Tsinghua University), J. Xu (Georgia Institute of Technology), Y. Zhang (Nankai University), Y. Chen (Baidu, Inc), H. Dong (Baidu, Inc), X. Qu (Baidu, Inc), L. Song (Baidu, Inc)

Short Talks (10 minutes)

- **On Non-Preemptive VM Scheduling in the Cloud** by K. Psychas (Columbia University), J. Ghaderi (Columbia University)
- **Why Some Like It Loud: Timing Power Attacks in Multi-tenant Data Centers Using an Acoustic Side Channel** by M. Islam (UC Riverside), L. Yang (UC Riverside), K. Ranganath (UC Riverside), S. Ren (UC Riverside)
- **ECl-Cache: A High-Endurance and Cost-Efficient I/O Caching Scheme for Virtualized Platforms** by S. Ahmadian (Sharif University of Technology), O. Mutlu (ETH Zurich), H. Asadi (Sharif University of Technology)

15:00-15:30 | Break

15:30-17:00 | Session: Networking

Chair: Benny Van Houdt

Long Talks (20 minutes)

- **Supporting Mobile VR in LTE Networks: How Close Are We?** by Z. Tan (University of California, Los Angeles), Y. Li (University of California, Los Angeles), Q. Li (University of California, Los Angeles), Z. Zhang (University of California, Los Angeles), Z. Li (University of California, Los Angeles), S. Lu (University of California, Los Angeles)
- **Tomographic Node Placement Strategies and the Impact of the Routing Model** by Y. Pignolet (ABB Corporate Research, Switzerland), S. Schmid (Aalborg University, Denmark), G. Tredan (CNRS Toulouse, France)
- **LTERadar: Towards LTE-Aware Wi-Fi Access Points** by C. Vlachou (HPE Labs, USA), I. Pefkianakis (HPE Labs, USA), K. Kim (HPE Labs, USA)

Short Talks (10 minutes)

- **Network Resilience and the Length-Bounded Multicut Problem: Reaching the Dynamic Billion-Scale with Guarantees** by A. Kuhnle (University of Florida), V. Crawford (University of Florida), M. Thai (University of Florida)
- **Predictive Impact Analysis for Designing a Resilient Cellular Backhaul Network** by S. Yang (Georgia Institute of Technology), H. Yan (AT&T Labs - Research), Z. Ge (AT&T Labs - Research), D. Wang (AT&T Labs - Research), J. Xu (Georgia Institute of Technology)
- **Synthesis of Fault-Tolerant Distributed Router Configurations** by K. Subramanian (University of Wisconsin-Madison), L. D'Antoni (University of Wisconsin-Madison), A. Akella (University of Wisconsin-Madison)

17:00-18:15 | Reception (Business Meeting 17:15-18:00)

18:15 | Banquet (on-site)

Thursday, June 21st, 2018

09:00-10:00 | Session: Learning II

Chair: Devavrat Shah

Long Talks (20 minutes)

- **Reinforcement with fading memories** by K. Xu (Stanford University), S. Yun (KAIST)
- **On the Convergence Rate of Distributed Gradient Methods for Finite-Sum Optimization under Communication Delays** by T. Doan (University of Illinois Urbana-Champaign), C. Beck (University of Illinois Urbana-Champaign), R. Srikant (University of Illinois Urbana-Champaign)

Short Talks (10 minutes)

- **Distributed Statistical Machine Learning in Adversarial Settings: Byzantine Gradient Descent** by Y. Chen (Cornell University), L. Su (University of Illinois at Urbana-Champaign), J. Xu (Purdue University)
- **Neural Network Meets DCN: Traffic-driven Topology Adaption with Deep Learning** by M. Wang (Tsinghua University), Y. Cui (Tsinghua University), S. Xiao (Huawei Technologies), X. Wang (Stony Brook University), D. Yang (Beijing University of Posts and Telecommunications), K. Chen (Hong Kong University of Science and Technology), J. Zhu (Tsinghua University)

10:00-10:30 | Break

10:30-12:00 | Session: Systems

Chair: Shaolei Ren

Long Talks (20 minutes)

- **The CSI Framework for Compiler-Inserted Program Instrumentation** by T. Schardl (MIT), T. Denniston (MIT), D. Doucet (MIT), B. Kuszmaul (MIT), I. Lee (Washington University in St. Louis), C. Leiserson (MIT)
- **A Quantitative Evaluation of Contemporary GPU Simulation Methodology** by A. Jain (Purdue Univ.), M. Khairy (Purdue Univ.), T.G. Rogers (Purdue Univ.)
- **Improving 3D NAND Flash Memory Lifetime by Tolerating Early Retention Loss and Process Variation** by Y. Luo (CMU), S. Ghose (CMU), Y. Cai (SK Hynix), E. Haratsch (Seagate Technology), O. Mutlu (ETH Zurich)

Short Talks (10 minutes)

- **A Fine-grained Event-based Modem Power Model for Enabling In-depth Modem Energy Drain Analysis** by X. Chen (Purdue University), J. Meng

(Purdue University), Y. Hu (Purdue University), M. Gupta (Intel Corp.), R. Hasholzner (Intel Corp.), V. Ekambaram (Intel Corp.), A. Singh (Intel Corp.), S. Srikanteswara (Intel Corp.)

- **What Your DRAM Power Models Are Not Telling You: Lessons from a Detailed Experimental Study** by S. Ghose (Carnegie Mellon University), A. Yaglikci (Carnegie Mellon University), R. Gupta (Carnegie Mellon University), D. Lee (NVIDIA), K. Kudrolli (Carnegie Mellon University), W.X. Liu (Carnegie Mellon University), H. Hassan (ETH Zurich), K. Chang (Carnegie Mellon University), N. Chatterjee (NVIDIA), A. Agrawal (NVIDIA), M. O'Connor (NVIDIA / Univ. of Texas at Austin), O. Mutlu (ETH Zurich / Carnegie Mellon University)
- **Intel MPX Explained: A Cross-layer Analysis of the Intel MPX System Stack** by O. Oleksenko (TU Dresden), D. Kuvaiskii (TU Dresden), P. Bhatotia (University of Edinburgh), P. Felber (University of Neuchâtel), C. Fetzer (TU Dresden)

12:00-13:30 | Lunch

13:30-15:00 | Session: Load Balancing

Chair: Giulia Fanti

Long Talks (20 minutes)

- **A Refined Mean Field Approximation** by N. Gast (Inria), B. Van Houdt (University of Antwerp)
- **On the Power-of-d-choices with Least Loaded Server Selection** by T. Hellemans (University of Antwerp), B. Van Houdt (University of Antwerp)
- **Degree of Queue Imbalance: Overcoming the Limitation of Heavy-traffic Delay Optimality in Load Balancing Systems** by X. Zhou (The Ohio State University), F. Wu (The Ohio State University), J. Tan (The Ohio State University), K. Srinivasan (The Ohio State University), N. Shroff (The Ohio State University)

Short Talks (10 minutes)

- **Towards Optimality in Parallel Job Scheduling** by B. Berg (Carnegie Mellon University), J. Dorsman (University of Amsterdam), M. Harchol-Balter (Carnegie Mellon University)
- **On a Class of Stochastic Multilayer Networks** by B. Jiang (University of Massachusetts Amherst), P. Nain (Inria), D. Towsley (University of Massachusetts Amherst), S. Guha (University of Arizona)
- **Fork and Join Queueing Networks with Heavy Tails: Scaling Dimension and Throughput Limit** by Y. Zeng (The Ohio State University), J. Tan (The Ohio State University), C. Xia (The Ohio State University)

15:00-15:30 | Break

15:30-17:00 | Session: Resource Management II

Chair: Nicolas Gast

Long Talks (20 minutes)

- **Performance of Balanced Fairness in Computer Clusters: A New Approach** by T. Bonald (Telecom ParisTech), C. Comte (Nokia Bell Labs - Télécom ParisTech), F. Mathieu (Nokia Bell Labs)
- **Designing Low-Complexity Heavy-Traffic Delay-Optimal Load Balancing Schemes: Theory to Algorithms** by X. Zhou (The Ohio State University), F. Wu (The Ohio State University), J. Tan (The Ohio State University), Y. Sun (Temple University), N. Shroff (The Ohio State University)
- **Towards Fast-Convergence, Low-Delay and Low-Complexity Network Optimization** by S. Wang (The Ohio State University), N. Shroff (The Ohio State University)

Short Talks (10 minutes)

- **The PDE Method for the Analysis of Randomized Load Balancing Networks** by R. Aghajani (University of California San Diego), X. Li (University of North Carolina Charlotte), K. Ramanan (Brown University)
- **Safe Randomized Load-Balanced Switching By Diffusing Extra Loads** by S. Yang (Georgia Institute of Technology), B. Lin (University of California, San Diego), J. Xu (Georgia Institute of Technology)
- **Asymptotically Optimal Load Balancing Topologies** by D. Mukherjee (Eindhoven University of Technology), S. Borst (Eindhoven University of Technology and Nokia Bell Labs), J. van Leeuwen (Eindhoven University of Technology)

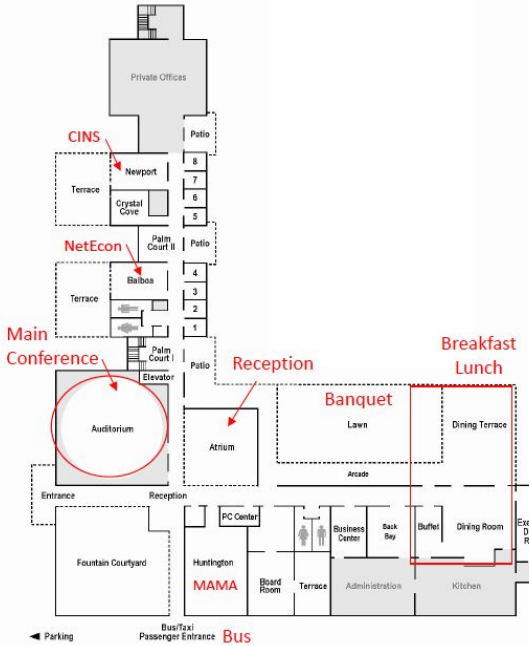
Local Arrangements

Conference Venue

The Arnold and Mabel Beckman Center of the National Academies of Sciences and Engineering

100 Academy Way
Irvine, CA 92617
Phone: (949) 721-2200

<http://www.thebeckmancenter.org/>

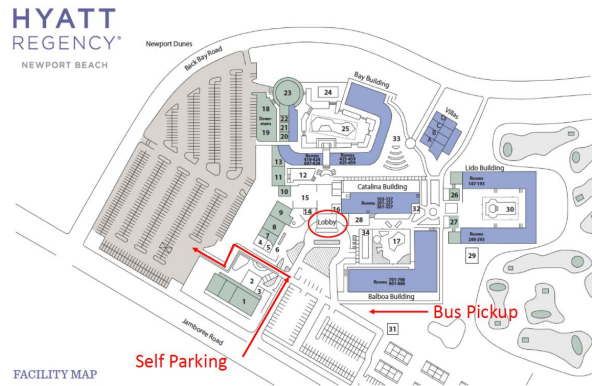


Conference Hotel

Hyatt Regency Newport Beach Hotel

1107 Jamboree Road
Newport Beach, CA 92660
Phone: (949) 729-1234

<https://newportbeach.regency.hyatt.com/>



Shuttle Bus Schedule:

There will be a shuttle between the hotel and the venue.

Check website for any updates on the schedule.

Departure Times	Morning (am) Hyatt → Beckman	Evening (pm) Beckman → Hyatt
Mon 6/18	7:45	18:30
Tue 6/19	7:45	19:15
Wed 6/20	8:00	20:15
Thu 6/21	8:00	17:15
Fri 6/22	8:00	-

Nearby Attractions: See website for more.

