



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.
Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013



**Welcome to the 21st edition of
Hot Interconnects!
August 21-23, 2013
San Jose, CA**

Generously hosted by



Thanks to Cisco!



Claudio DeSanti

– Cisco Fellow



Loukas Paraschis

– Senior Technology
Solution Architect

Filomena Pereira

– Local Arrangements

Kevin Nelson

– Local Arrangements



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013



Welcome to the 2013 21

21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

On the menu:

- 5 keynotes
- 2 invited presentations
- 1 panel
 - *Data Center Congestion Control: The Neglected Problem*
- 4 tutorials
 - Big Data, OpenStack, Optics in DCN & WAN, DCN Flow & Congestion Control
- A rich technical program

Keynotes (Wednesday)



Scale and Programmability in Google's Software Defined Data Center WAN (9:10 am)

– Amin Vahdat, Google



Networking as a Service (4:00 pm)

– Tom Anderson, U. Washington



The Network is the Cloud (5:15 pm)

– David Yen, Cisco



Welcome to the 2013
21st Annual
Symposium on High-Performance Interconnects

21

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

Keynotes (Thursday)



Hybrid Datacenter Networks (9:00 am)

– George Papen, UCSD



Changing Data Center (4:00 pm)

– Tom Edsall, Insieme Networks



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

IEEE Kobayashi Award Ceremony

- The 2013 IEEE Kobayashi Award will be presented to **Tom Anderson**
 - For contributions to understanding and improving the performance, reliability, and security of the Internet
 - Presented by Roberto de Marca, IEEE President-Elect
 - Wednesday at 5 pm (right after Tom' s keynote)



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

Evening Panel (Thursday)

“Datacenter Congestion Control: The Neglected Problem” (Thursday 5pm)

Albert Greenberg, *Microsoft*

Gilad Shainer, *Mellanox*

Mohammad Alizadeh, *Insieme Networks/Stanford*

Bruce Kwan, *Broadcom*

Mehul Dholakia, *Brocade*

Moderator: Mitch Gusat, IBM Research



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

HB Memorial Cocktail Reception

- In memory of Head Bubba, our recently departed colleague, friend, and long-time HOTI contributor
 - Wednesday at 6 pm
 - Location: Main conference room



HOTI
INTERCONNECTS

Welcome to the **2013** **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Thanks to our Platinum Patron



SOLARFLARE®

Special technical
presentation
tomorrow at 10am



HOT
INTERCONNECTS

Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Thanks to our Gold Patron

ORACLE®



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Thanks to our Silver Patrons

**Warthman
Associates**
Technical Writers
www.warthman.com

ALGORITHMS IN LOGIC
**ALGO-
LOGIC**
[HTTP://ALGO-LOGIC.COM](http://ALGO-LOGIC.COM)



MEMOIR
S Y S T E M S


Mellanox
TECHNOLOGIES
Connect. Accelerate. Outperform.™

HOT

INTERCONNECTS

Welcome to the **2013** **21**
*21st Annual
Symposium on High-Performance Interconnects*

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Conference Chairs



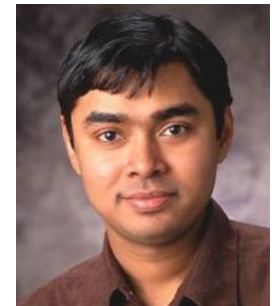
Fabrizio Petrini
– General Co-Chair

Cyriel Minkenberg
– Program Co-Chair



Torsten Hoefler
– General Co-Chair

Sudipta Sengupta
– Program Co-Chair



Madeleine Glick
– General Co-Chair



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

Organizing Committee

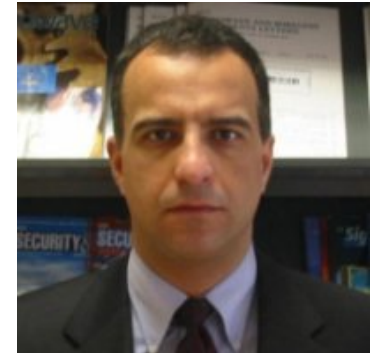


Dan Pitt

- Panel Chair
- Finance Co-Chair

Christos Koliass

- Local Chair



Ramesh Durairaj

- Finance Co-Chair
- Registration Chair

Songkrant Muneenaem

- Volunteer



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

Tutorial and Publication Chairs



Mitch Gusat

- Tutorial Chair
- Panel Co-Chair



Ada Gavrilovska

- Publication Co-Chair



Luca Valcarenghi

- Publication Co-Chair



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

Media Chairs



Bill Boas

– Media Co-Chair



Raj Channa

– Media Co-Chair



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

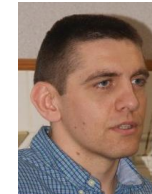
Steering Committee



John Lockwood



Dan Pitt



Patrick Geoffray



Allen J. Baum



Mark Laubach



Fabrizio Petrini



Keren Bergman



Raj Channa



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Logistics

- Registration
 - In the main room
- WiFi
 - SSID is guestnet
 - Each registrant has a personal login and password
 - E-mail from noreply@cisco.com
- Food
 - Breakfast, lunch, and breaks are also next to the main room
- Restrooms
 - Through door in the back



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013



Welcome to the 2013

21

*21st Annual
Symposium on High-Performance Interconnects*

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Technical Program

Paper Statistics

- 33 submissions (25 entered review phase)
- 9 accepted as long papers (36%)
- 5 accepted as short papers (20%)
- 2 invited talks
 - Matthew Mattina, Tiler: Architecture and Performance of the Tiler TILE-Gx8072 Manycore Processor
 - John Kenevey, Facebook: Overview and Next Steps for the Open Compute Project



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Paper Reviews

- 3-5 reviews for each paper
- 100 total reviews
- Average #reviews per paper was 4
- PC conference call for final selection
 - Each paper was discussed
 - Some very intensely!
 - We rejected when in doubt



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Technical Sessions

1. On-Chip Communications (Wed AM)
 - Chair: Ada Gavrilovska
2. TCP/IP (Wed PM)
 - Chair: Rami Melhem
3. OpenFlow and HPC (Thu AM)
 - Chair: Mohammad Alizadeh
4. Short Papers (Thu PM)
 - Chair: Patrick Geoffray



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Program Committee

Pavan Balaji, *Argonne National Lab*

Christian Bell, *Myricom*

Keren Bergman, *Columbia University*

Ron Brightwell, *Sandia National Lab*

Luca Carloni, *Columbia University*

David Cohen, *EMC*

Hans Eberle, *Sun Microsystems*

Yashar Ganjali, *University of Toronto*

Ada Gavrilovska, *Georgia Institute of Technology*

Patrick Geoffray, *Google*

Paolo Giaccone, *Politecnico di Torino*

Madeleine Glick, *Intel*

Brice Goglin, *INRIA*

Mitchell Gusat, *IBM Research*

Ron Ho, *Oracle*

Torsten Hoefler, *ETHZ*

- Ajay Joshi, *Boston University*

- Abdul Kabbani, *Google*

- Isaac Keslassy, *Technion*

- Sameer Kumar, *IBM Research*

- Rami Melhem, *University of Pittsburgh*

- Mondrian Nuessle, *Univ. of Heidelberg*

- Fabrizio Petrini, *IBM TJ Watson Research Center*

- Gregory Pfister, *Colorado State University*

- Galen Shipman, *Oak Ridge National Lab*

- Craig Stunkel, *IBM Research*

- Tor Skeie, *Simula*

- Keith Underwood, *Intel*

- Anujan Varma, *UCSC*

- Phil Watts, *University College London*

- Eitan Zahavi, *Mellanox*



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

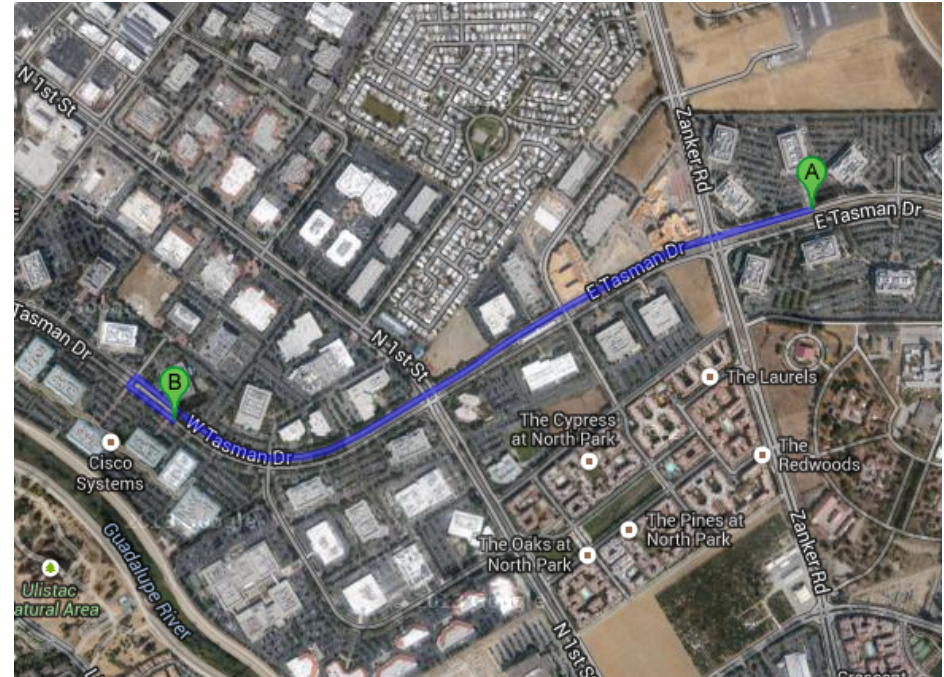
The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Tutorials on Friday, Aug 23

- Four half-day tutorials in two tracks
- These will take place in a different building!
 - Cisco Building C,
150 West Tasman Dr.
San Jose, CA 95134



HOT
INTERCONNECTS

Welcome to the **2013** **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Tutorials on Friday, Aug 23

		Track 1		Track 2
AM	T1	Accelerating Big Data with Hadoop and Memcached Using High Performance Interconnects: Opportunities and Challenges <i>D.K. Panda & Xiaoyi Lu, Ohio State University</i>	T2	Openstack & SDN - A Hands on Tutorial <i>Ramesh Durairaj, Oracle & Edgar Magana, PLUMgrid</i>
	T3	The role of optical interconnects in data-center networking, and WAN optimization <i>Loukas Paraschis, Cisco</i>	T4	Flow and Congestion Controls for Multitenant Datacenters: Virtualization, Transport and Workload Impact Mitch Gusat & Keshav Kamble, IBM



Welcome to the **2013** **21**
 21st Annual
 Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA
 August 21-23, 2013



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.
Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

Enjoy the
Symposium!



Welcome to the 2013

21

*21st Annual
Symposium on High-Performance Interconnects*

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Closing Remarks

Hot Interconnects 2014

- Thank you for a GREAT conference!
- See you next year!



Welcome to the 2013 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

Call for Papers : HOTI-22

- *Full papers due*
 - *April 2014*
- *Conference will take place*
 - *August 2014*
- **Details on Website**
 - <http://www.hoti.org/>



Welcome to the 20I3 **21**
21st Annual
Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013

We want your feedback

- Please complete the survey
- Your feedback on the conference is greatly appreciated

HOT *Welcome to the 2013 21*
21st Annual Symposium on High-Performance Interconnects
The international forum where the high-performance computing and high-speed networking communities meet.
Held at Cisco Headquarters, San Jose, CA
August 21-23, 2013

INTERCONNECTS

Conference Evaluation

1. Publicity
I found out about Hot Chips from (check all that apply, circle your answers):
Email from friend or co-worker _____
Email from a list (which list? _____)
Flyer posted in lobby/on wall (where? _____)
Already knew from the past (which year(s)? _____)
Web _____
Facebook Ad _____
Stanford Calendar _____
Palo Alto Calendar _____
San Jose Mercury News Calendar _____
EETimes article _____
IEEE Computer magazine _____
Hot Chips _____
other (please specify, e.g.: means/venue/type) _____

I thought advance program and registration materials arrived:
_____ too early _____ on time _____ too late (I need to know by _____)

2. Registration
I've attended Hot Interconnects: never before...last year...or... _____ times before (specify)

3. Food
On a scale of 1 (poor) to 10 (fantastic), the food is: (write N/A if you didn't eat)
_____ breaks _____ lunches _____ dinner
Breaks could use more: _____ Lunches could use more: _____ Dinner could use more: _____

4. Program
Please check box below for your favorite session(s), as well as your favorite overall presentation(s)

	Session	Paper 1	Paper 2	Paper 3
Wednesday				
Session 1: On Chip Networking				
Keynote I: CMOS Photonics				
Session 2: Switch Architecture				
Session 3: Network Security				
Industry Talks				
Panel - Multicore, Melt-down				
Thursday				
Session 4: Routing				
Keynote II: On-die Interconnect				
Session 5: Performance Eval.				
Session 6: OS/network interface				



Welcome to the **2013 21**
21st Annual Symposium on High-Performance Interconnects

The international forum where the high-performance computing and high-speed networking communities meet.

Held at Cisco Headquarters, San Jose, CA

August 21-23, 2013