



IEEE

**IEEE Industry Summit on
the Future of Computing
4 November 2019
San Mateo, California, USA**

Summit Logistics



**Industry Summit
on the Future of
Computing**



Wi-Fi & Event Mobile App

- The network is **Marriott_CONF**
- Passcode: **ieee19**
- Event Mobile App:
 - Download Whova app in the App Store or on Google Play:
https://whova.com/portal/iicrc_201911
 - Use the code: **iicpg**

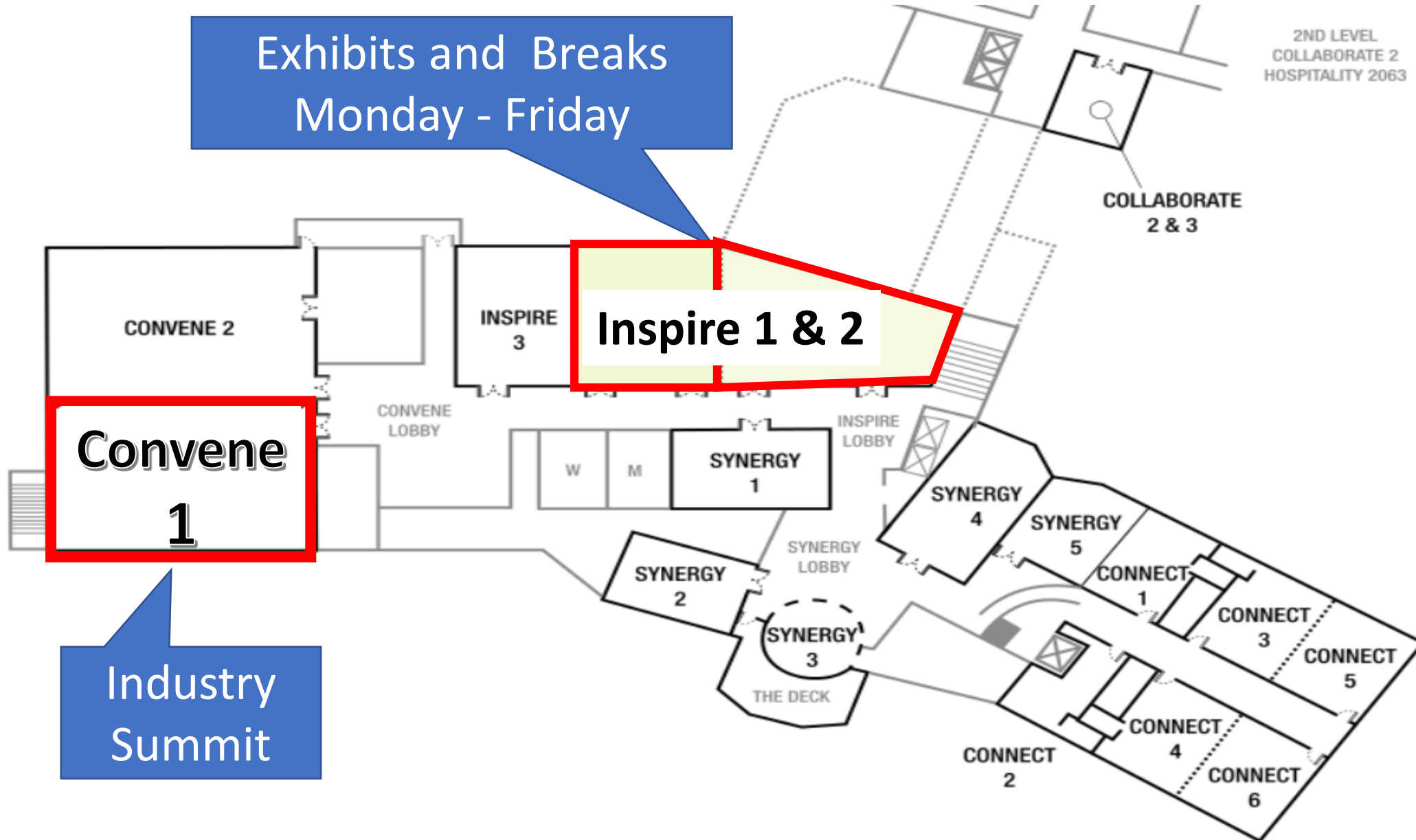
Marriott – 2nd floor

Exhibits and Breaks
Monday - Friday

Inspire 1 & 2

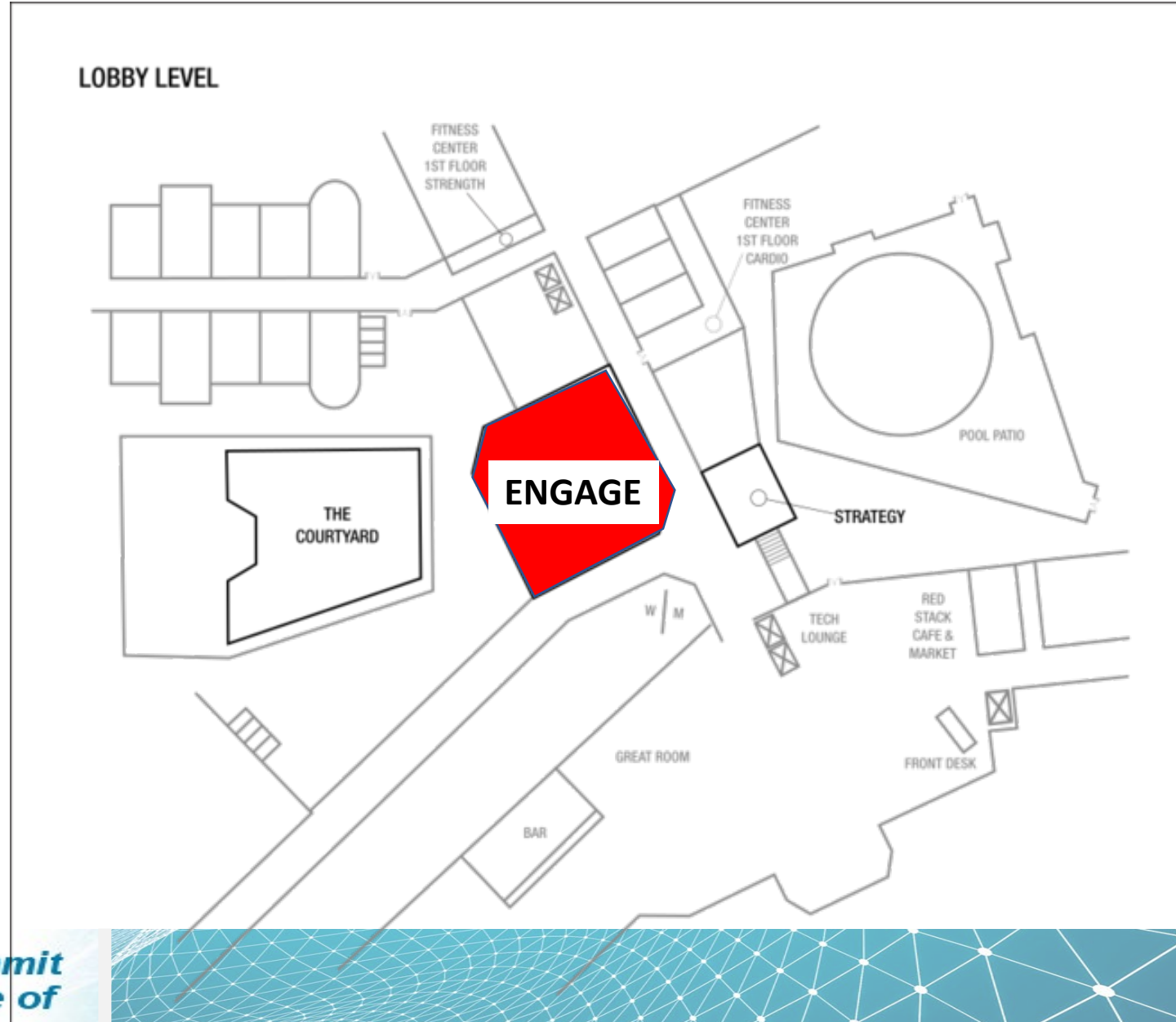
Convene
1

Industry
Summit



Marriott – 1st floor

Meals in
Engage



Industry Summit
on the Future of
Computing

Thanks to our Patrons



Diamond Patron



**Hewlett Packard
Enterprise**

Platinum Patron



Gold Patron



*Industry Summit
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David Stankiewicz

IEEE Meetings, Conferences & Events

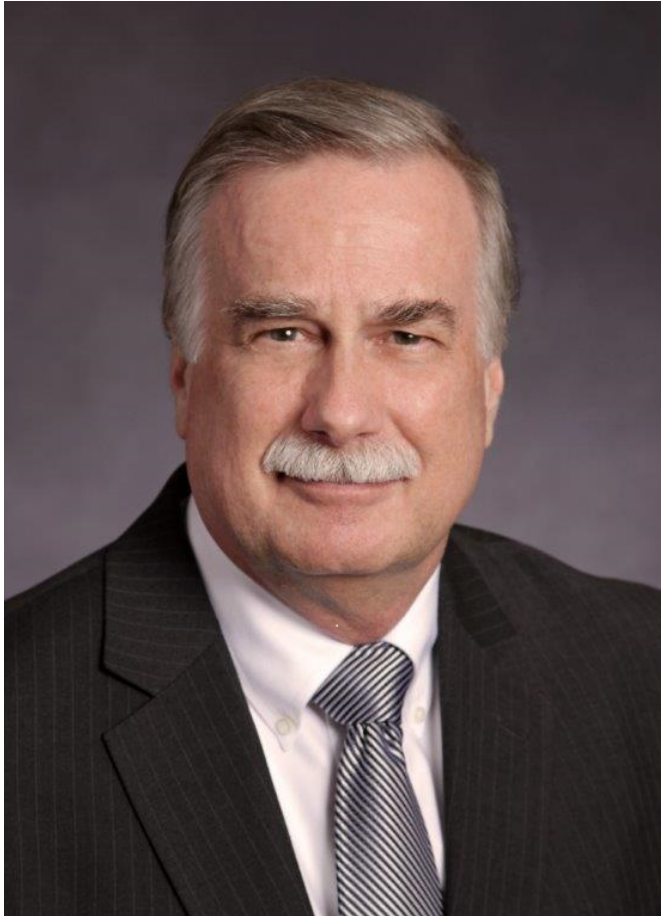
Event Producer



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Industry Summit - Volunteer Chairs



Bruce Kraemer



Tom Coughlin



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IEEE Overview



**Industry Summit
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IEEE - Advancing Technology for Humanity



IEEE Future Directions - Current Initiatives

<https://www.ieee.org/about/technologies.html>



[Blockchain](#) – expand this new technological foundation for conducting transactions, securing networks, and recording the validity and origin of data



[Brain](#) - advance technologies that improve the understanding of brain function, and develop new approaches to interface the brain with machines



[Digital Reality](#) - enable the coming Digital Transformation when the line between the physical world and the digital world will be increasingly less distinct



[Future Networks](#) - solve the challenges associated with the development and deployment of next-generation network infrastructure



[Quantum](#) - identify challenges and opportunities across the landscape of quantum technologies



[Rebooting Computing](#) – explore evolutionary and revolutionary approaches to computing

Rebooting Computing Overview



*Industry Summit
on the Future of
Computing*





Explores, from a holistic viewpoint, evolutionary and revolutionary approaches to computing.

Sponsors Summits, Workshops and Conferences drawing upon the expertise of many technical disciplines.

IEEE Rebooting Computing Initiative

- Draws from multiple IEEE technical Societies
- Circuits and Systems Society (CAS),
- Components, Manufacturing, and Manufacturing Technology Society (CPMT)
- Council on Electronic Design Automation (CEDA),
- Computer Society (CS),
- Technical Council on Superconductivity (CSC),
- Electron Devices Society (EDS),
- Magnetics Society (MAG),
- Nanotechnology Council (NTC),
- Reliability Society (RS)
- Solid-State Circuits Society (SSC)

Numerous Rebooting Computing Events

<https://rebootingcomputing.ieee.org/conferences-events>

Event	Dates	Location
International Conference on Computer Vision (ICCV 2019)	27 October - 1 November 2019	Seoul, South Korea
IEEE Industry Summit on the Future of Computing	4 November 2019	San Mateo, California
International Conference on Computer-Aided Design (ICCAD 2019)	4-7 November 2019	Westminster, Colorado
International Conference on Rebooting Computing (ICRC 2019)	6-8 November 2019	San Mateo, California
International Conference for High-Performance Computing, Networking, Storage, and Analysis (SC19)	17-22 November 2019	Denver, Colorado
International Electron Devices Meeting (IEDM 2019)	9-11 December 2019	San Francisco, California
Practical Quantum Computing	10-12 December 2019	San Jose, California
International Conference on Machine Learning and Applications (ICMLA 2019)	16-19 December 2019	Boca Raton, Florida
International Solid State Circuits Conference (ISSCC 2019)	16-20 February 2020	San Francisco, California
International Symposium on High-Performance Computer Architecture (HPCA 2020)	22-26 February 2020	San Diego, California
Design Automation and Test in Europe (DATE 20)	9-13 March 2020	Grenoble, France
Neuro-Inspired Computational Elements Workshop (NICE 2020)	24-27 March 2020	Heidelberg, Germany
ISC High Performance Computing Conference	21-25 June 2020	Frankfurt, Germany



More Information

Rebooting Home page

<https://rebootingcomputing.ieee.org/>



Low-Power Computer Vision Workshop 2019

<https://rebootingcomputing.ieee.org/lpirc>

Event Archive

<https://rebootingcomputing.ieee.org/rc-summits>

IEEE Rebooting Computing Week

<https://rebootingcomputing.ieee.org/rebooting-computing-week>

Artificial Intelligence and Machine Learning Applied to Cybersecurity

<https://rebootingcomputing.ieee.org/confluence>



New Technology Connections: Future Directions

<https://www.ieee.org/about/technologies.html>



RC Week Overview



**Industry Summit
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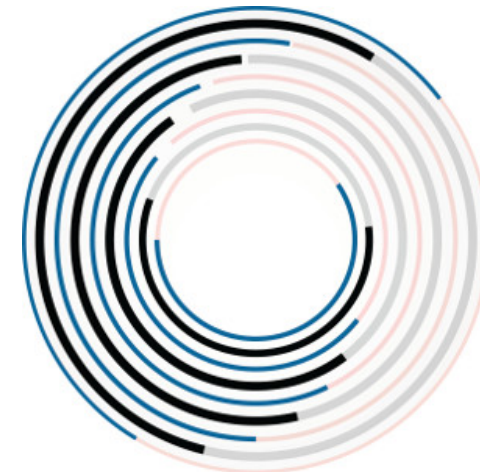


Rebooting Computing Week: Four Components



INTERNATIONAL ROADMAP FOR DEVICES AND SYSTEMS™

<https://irds.ieee.org/>



Industry Summit



RC Week Event Schematic

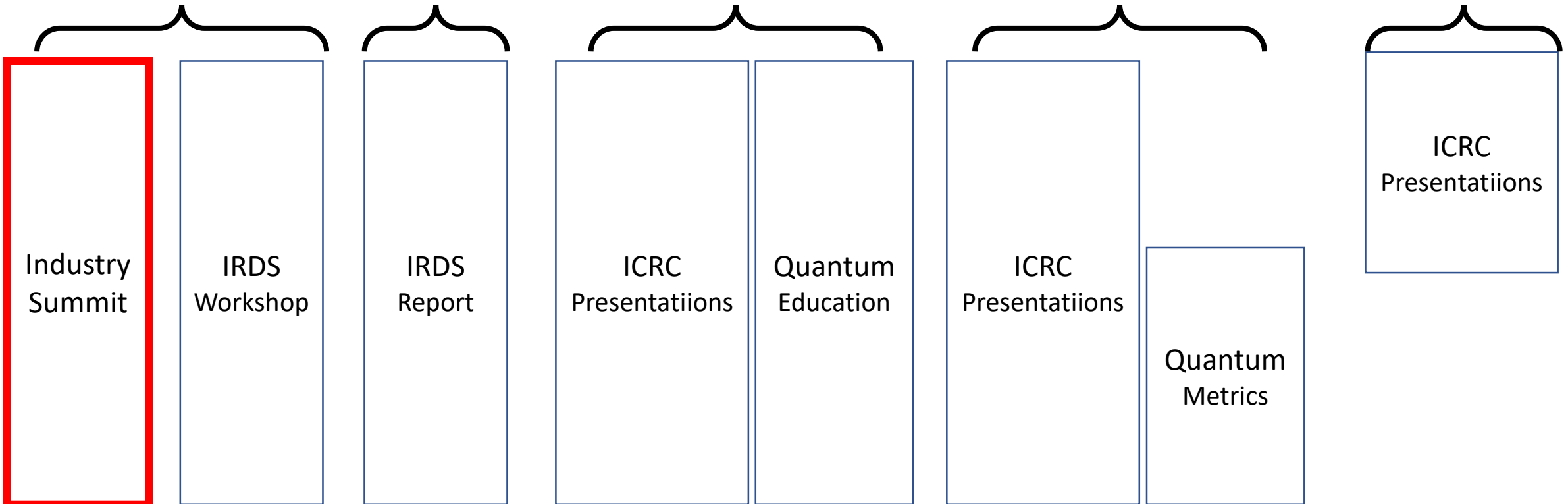
MON

TUE

WED

THU

FRI



IRDS Overview



**Industry Summit
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RC Week Event Schematic

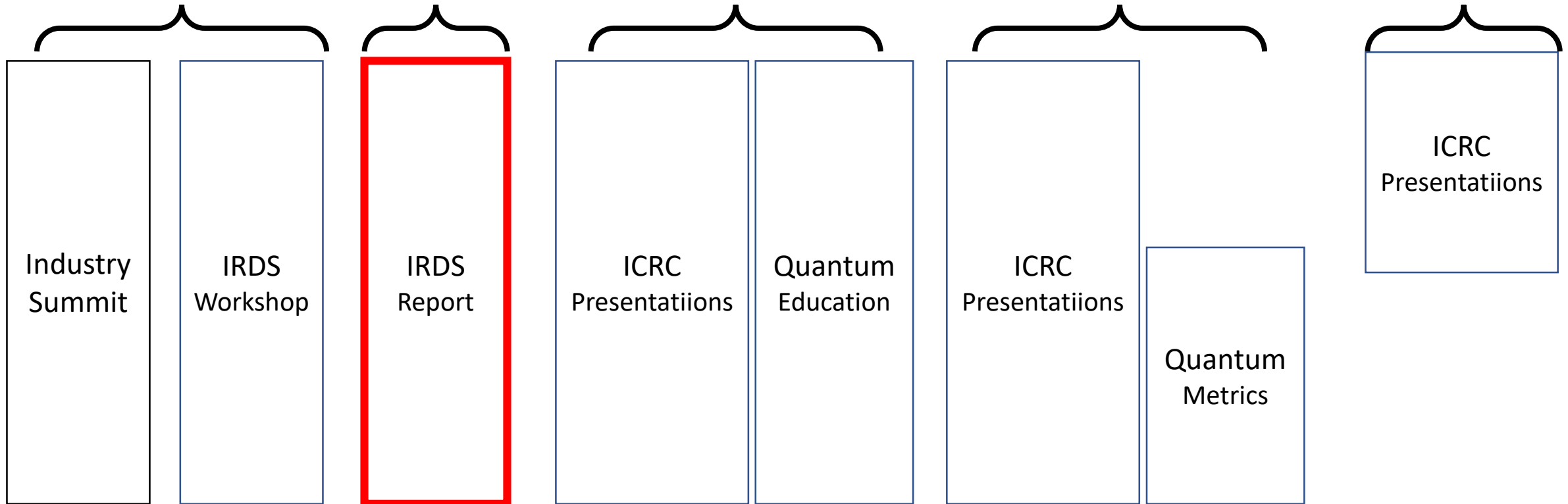
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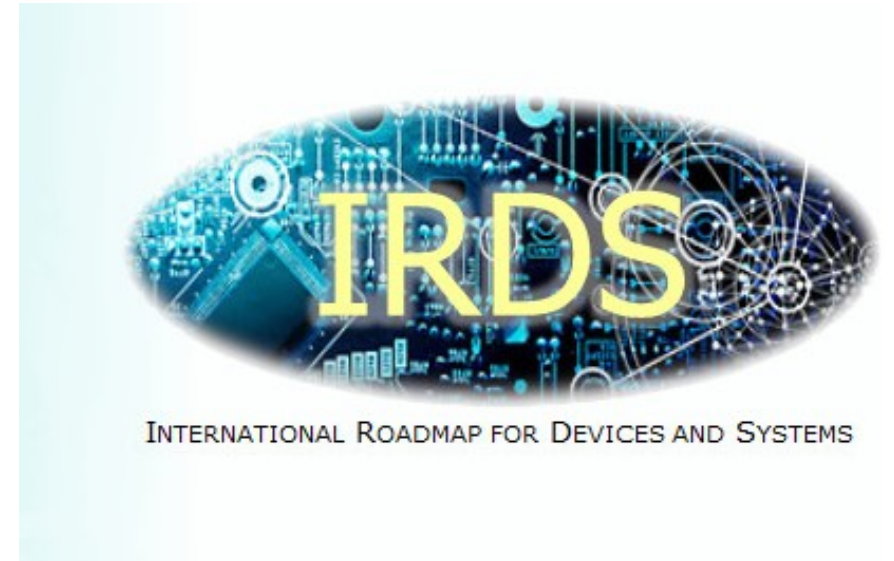
THU

FRI



International Roadmap for Devices and Systems

Paolo Gargini



IRDS Mission:

Identify the roadmap of electronic industry from devices to systems and from systems to devices

How to Download IRDS™ Reports

<https://irds.ieee.org/home/how-to-download-irds>

ICRC Overview



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RC Week Event Schematic

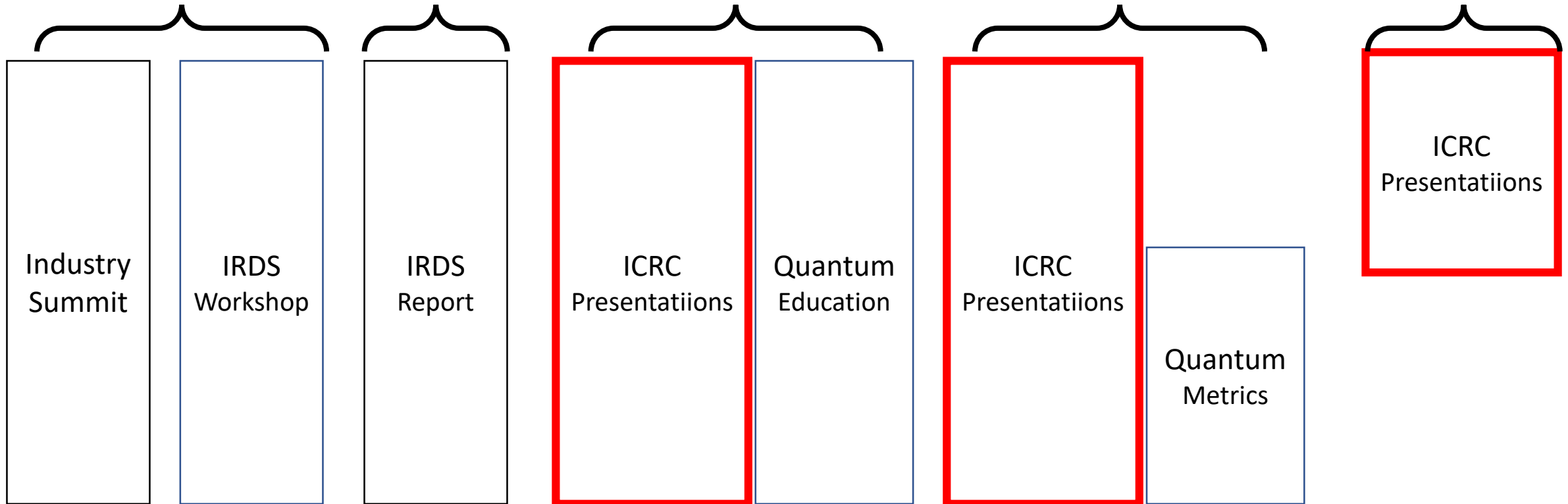
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IEEE International Conference on Rebooting Computing (ICRC)

An interdisciplinary conference with participation from a broad technical community, with interest in all aspects of the computing stack.



IEEE ICRC Overall Agenda: Wednesday November 6

<https://icrc.ieee.org/program/>

Schedule	Title
Wed AM	Intro and Keynote Talk
Wed AM: Session 1	Machine Learning Systems
Wed PM: Session 2	Technology for Machine Learning
Wed PM: Panel	Machine Learning in the Valley
Wed 6-8 PM	Banquet Dinner
Wed 8-9:30 PM	Wild and Crazy Ideas

IEEE ICRC Overall Agenda: November 7-8

Schedule	Title
Thurs AM	Intro and Keynote Talk
Thurs AM: Session 3	Quantum Computing
Thurs PM: Session 4	Future Computing Challenges
Thurs PM: Session 5	Novel Computing Approaches
Fri AM: Session 6	Photonics
Fri AM: Panel	SRC Decadal Plan

ICRC Keynote Speakers

► **Cliff Young, Google**

- **Neural networks have rebooted computer architecture; what should we reboot next?**

Wednesday, Nov 6, 9:00-10:00AM



► **Krysta Svore, Microsoft**

- **Developing our Quantum Future**

Thursday, Nov. 7, 9:00-10:00AM



Invited Panel Sessions

- **Machine Learning in the Valley,**

Wednesday, Nov. 6, 3:30-5:00PM

- Rob Schreiber, Cerebras
- Paul Master, Cornami
- Azalia Mirhoseini, Google
- Katie Lewis, Lawrence Livermore Natl. Lab
- Jennifer Glore, SambaNova

- **SRC Decadal Plan for Semiconductors,**

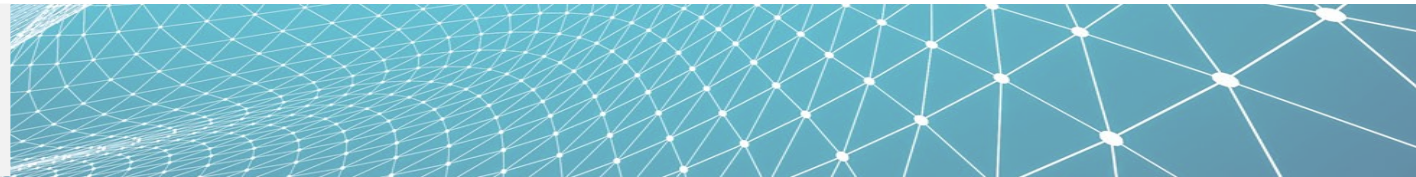
Friday, Nov. 8, 10:30AM - 12:30PM

- Victor Zhirnov, SRC
- Ian Young, Intel
- Heike Riel, IBM
- Titash Rakshit, Samsung
- Rafic Makki, Mubadala

Quantum Overview



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RC Week Event Schematic

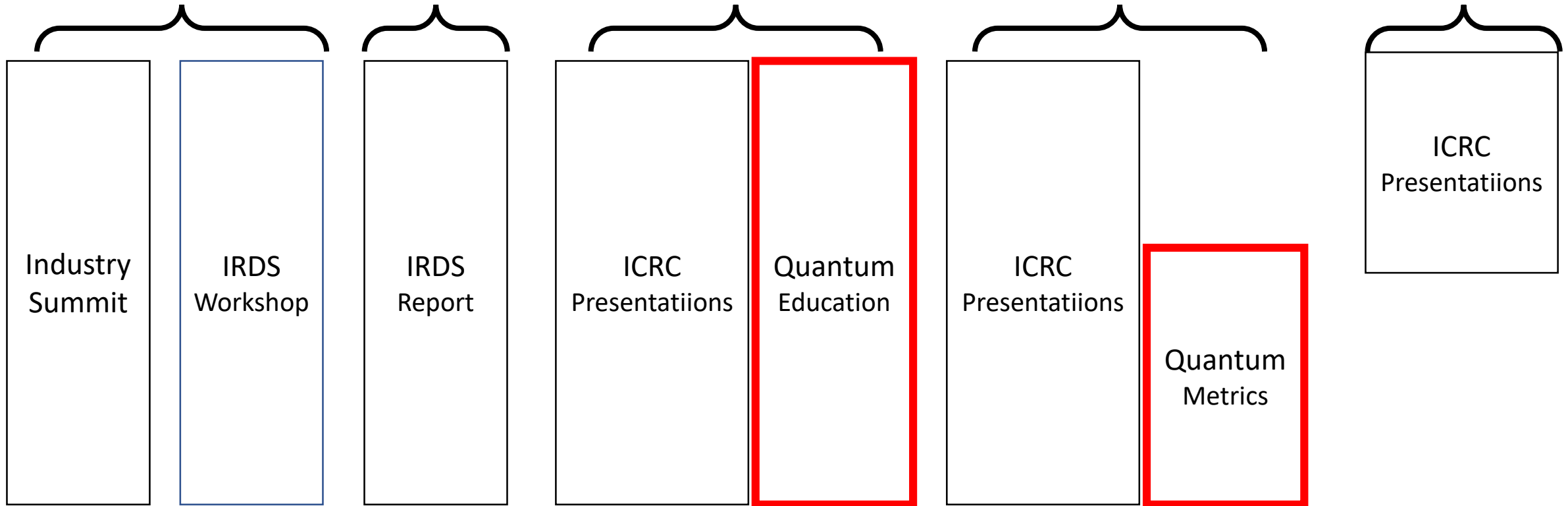
MON

TUE

WED

THU

FRI



IEEE Quantum Education Summit

Wednesday Nov 6 (within Rebooting Computing week)

Time	Speaker	Topic
10:30-10:32	Scott Koziol, Baylor University	Introduction
10:32-11:00	Stefan Leichenauer, X (formerly Google X)	Quantum Software Engineers of the Future
11:00-11:30	Abraham Asfaw, IBM Q	Getting the world quantum ready
11:30-12:00	Mariia Mykhailova, Microsoft	Teaching Quantum Computing through a Practical Software-driven Approach
12:00-1:30	Lunch/Exhibits	
1:30-2:00	Murray Thom D-Wave	Quantum Application Development Today
2:00-2:30	Heather Lewandowski, QED-C/ University of Colorado Boulder	Quantum Economic Development Consortium's Workforce Development Survey Results
2:30-3:00	Brian LaCour, ARL/University of Texas at Austin	Educational Programs in QIS at the University of Texas at Austin
3:00-3:30	Break/Exhibits	
3:30-4:00	Chuck Easttom, CEC-Security LLC/Capitol Technology University	Master's curriculum challenges
4:00-4:30	Allen Parrish, CSAB/Mississippi State University	Accreditation of Quantum Computing
4:30-5:15	Previous speakers & Diane Carr + Alex Condello (D-Wave)	Roundtable Discussion
5:15-5:30	Break/Exhibits	
5:30-7:30	X (formerly Google X)	Implementing Alphabet X's 'TensorNetwork' for AI & Physics

Workshop on Benchmarking Quantum Computational Devices and Systems

Thursday Nov 7 (within Rebooting Computing week)

Time	Speaker	Topic
1:30-2:00	<i>Kevin Young, Sandia National Laboratories Catherine McGeoch, D-Wave Systems</i>	<i>Metrics And Benchmarks For Quantum Computing</i>
2:00-2:30	<i>Joseph Emerson, Institute for Quantum Computing, University of Waterloo, and Quantum Benchmark Inc.</i>	<i>Assessing The Capabilities Of Quantum Computing Hardware And Improving The Reliability Of Quantum Computing Solutions</i>
2:30-3:00	<i>Daniel Lidar, University of Southern California</i>	<i>Quantum Algorithmic Breakeven: On Scaling Up With Noisy Qubits</i>
3:00-3:30	<i>Break</i>	
3:30-4:00	<i>Sergio Boixo, Google</i>	<i>Cross Entropy Benchmarking And Quantum Supremacy</i>
4:00-4:30	<i>Tim Proctor, Sandia National Laboratories</i>	<i>Demonstrating Scalable Benchmarking Of Quantum Computers</i>
4:30-5:00	<i>Tom Lubinski, Quantum Economic Development Consortium</i>	<i>The Role Of Metrics And Benchmarks In The Quantum Computing Industry</i>
5:00-5:15	<i>Organizers</i>	<i>Concluding Remarks</i>
5:30	<i>Conclude</i>	



The IEEE Future Directions Quantum Initiative invites you to IEEE Quantum Week 2020— IEEE International Conference on Quantum Computing and Engineering (QCE).

IEEE Quantum Week is a highly multidisciplinary quantum computing venue where you can discuss challenges and opportunities with quantum researchers, scientists, engineers, entrepreneurs, developers, students, practitioners, educators, and programmers.

Tutorials
Exhibits
Panels
Posters
Papers
Workshops

Summit Agenda

- <https://rebootingcomputing.ieee.org/rebooting-computing-week/industrycomputingsummit>



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Industry Summit Event Outline

Introduction

Quantum Speakers

AM Break

Quantum Panel/Q&A

Lunch

Startup panel/Q&A

AI and Computing Speakers

PM Break

AI and Computing Panel/Q&A

Computing Futures presentation

ICRC overview

Final remarks

End of Day

IRDS/Summit Welcome Reception (Engage)



Industry Summit - Part 1

Welcoming Remarks & Rebooting Computing Week Readout

Dr. Fabio Altomare | Experimental Physicist, D-Wave Systems

Dr. Suhare Nur | Senior Offering Manager, Honeywell Quantum Solutions

Pete Shadbolt | Co-Founder, PsiQuantum

AM Break

Panel Q&A

Welcoming Remarks & RC Week Readout

D-Wave Quantum Computer: A Technology Update

Shaping the Future of Quantum Computing

Useful Quantum Computing



Industry Summit - Part 2

Panelists opening presentations

Glenn Friedman, Cara Beasley, Aimee Rose, Alexei Marchenkov

Can Startups Unfold the Future of Computing?

Panel | Moderated Q&A w/audience participation



Industry Summit - Part 3

Julia Li Associate Director of Baidu Research Institute USA & Dr. Newsha Ardalani Senior Research Scientist at Baidu Research Institute	An In-Depth Look At Baidu's (BIDU) Artificial Intelligence Aspirations
Cindy K. Goldberg Program Director, IBM's AI Hardware Research Center	AI Systems in a Hybrid World
Bronis de Supinski CTO for Livermore Computing at LLNL	The LLNL Near and Long Term Vision for Large-Scale Systems
PM Break	
Panel Moderated Q&A	Supercomputers Adaptation to Better AI Tasks



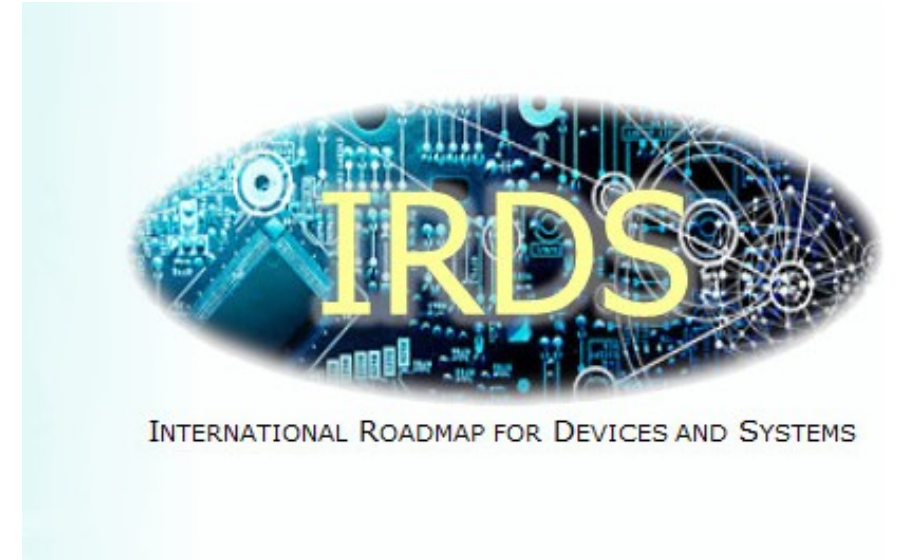
Industry Summit - Part 4

Steve Pawlowski VP Advanced Computing Solutions, Micron, Inc.	The Future of Computing from a Memory/Storage Centric Point of View
Audience Q&A w/ Steve Pawlowski	
Jim Ang Physical & Computational Sciences Manager, Pacific Northwest National Lab	ICRC plans
Closing Remarks	The Future of Computing: Final Thoughts



International Roadmap for Devices and Systems

Paolo Gargini



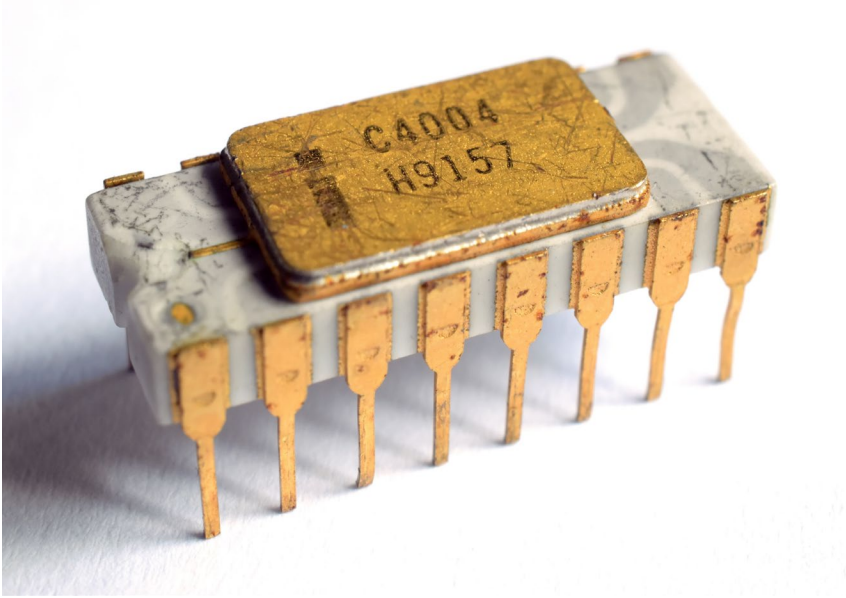
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International Roadmap for Devices and Systems

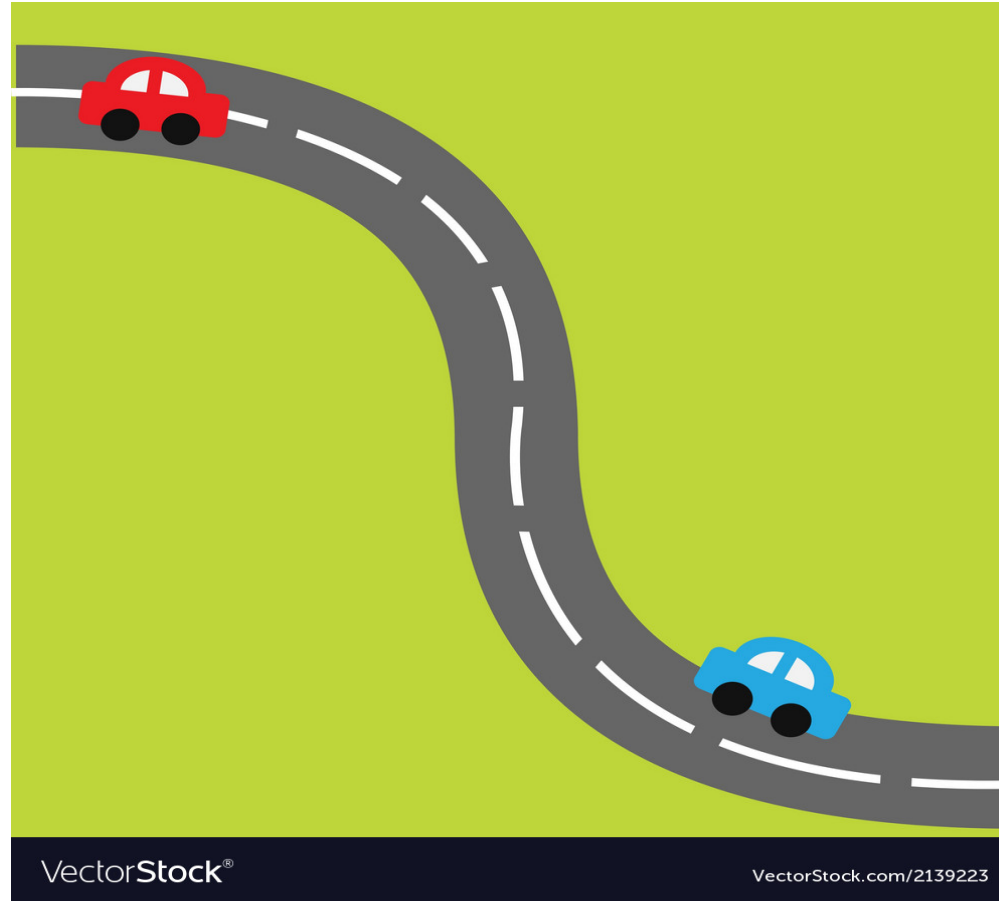


Intel 4004

Nov 15, 1971

10,000 nm feature size

2300 transistors



Summit Start



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Industry Summit - Part 1

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