IBIS Summit at IEEE-SIPI Symposium

Meeting Date: **August 4, 2023**
Meeting Location: **Hybrid Live / Teleconference**

VOTING MEMBERS AND 2023 PARTICIPANTS

Altair	(JuneSang Lee)
AMD (Xilinx)	(Bassam Mansour)
Analog Devices (Maxim Integrated)	(Don Greer)
Ansys	Curtis Clark, Wei-hsing Huang
Applied Simulation Technology	(Fred Balistreri)
Aurora System	Dian Yang, Raj Raghuram
Broadcom	(Yunong Gan)
Cadence Design Systems	Kyle Lake, Jared James, John Philips, Kristoffer Skytte
Celestica	(Sophia Feng)
Cisco Systems	(Stephen Scearce), Hong Wu, Shadi Ebrahimi Asl*
Dassault Systemes	Stefan Paret, Longfei Bai
GE Healthcare Technologies	(Balaji Sankarshanan)
Google	(Hanfeng Wang)
Honeywell	Bavish Vazhayil
Huawei Technologies	Danilo Di Febo, Marco De Stefano, (Hang (Paul) Yan)
Infineon Technologies AG	(Christian Sporrer)
Instituto de Telecomunicações	(Abdelgader Abdalla), Joana Catarina Mendes
Intel Corporation	Chi-te Chen*, Kinger Cai*, Michael Mirmak*, Hsinho Wu
Keysight Technologies	Pegah Alavi, Heidi Barnes, Douglas Burns, Majid Ahadi Dolatsara, Fangyi Rao, Hee-Soo Lee, Ming Yan.
Marvell	Steven Parker
MathWorks	Graham Kus*, Walter Katz, Kerry Schotz
Micron Technology	[Randy Wolff], Justin Butterfield, Akshay Shivaji Chaudhari, Dragos Dimitriu
MST EMC Lab	Jiahuan Huang*, Chulsoon Hwang*, Junyong Park*, Zhiping Yang*,
SerDesDesign.com	John Baprawski
Siemens EDA	Weston Beal*, Matthew Leslie, Arpad Muranyi, Mikael Stahlberg, Todd Westerhoff, Scott Wedge, Randy Wolff*
STMicroelectronics	Manish Bansal*, Olivier Bayet, Rahul Kumar*, Raushan Kumar*, Shivam Soni*, Sameer Vashishtha
Synopsys	Ted Mido, (Tushar Pandey), Wael Dghais
Teraspeed Labs	Bob Ross*
Waymo	[Zhiping Yang], (Ji Zhang)
ZTE Corporation	(Shunlin Zhu)
Zuken	[Michael Schäder], Markus Bücker, Ralf Brüning
Zuken USA	Lance Wang*

OTHER PARTICIPANTS IN 2023

Alphawave Semi	Adrien Auge, Todd Bermensolo
ASUS	Binchyi Tseng*
Ciena	Hugues Tournier
Hitachi Ltd.	Yutaka Uematsu
Honeywell	Bavish Vazhayil
IBM	Matteo Cocchini*
India Institute of Technology	Jai Narayan Tripathi, Vinod Verma
Ningbo DeTooLIC Technology Co.	Zhi Wang, Zhifei Xu*
Nokia	Ramiro Guzman*
OMNIVISION	Sirius Tsang
SAE-ITC	Charlie Cheng*
Samsung Electronics	Jinwook Song*
Signal Edge Solutions	Ben Dannan
SI Guys	Donald Telian
Socionext, Inc.	Raymond Yakura
University of Florida	Shuo Wang*
University of Illinois Urbana-Champaign	Jose Schutt-Aine
University of L'Aquila	Francesco De Paulis*
University of Tunisia, Electronic Laboratory	Malek Souilem
Unaffiliated	Wilfredo Henriquez*, Will Hobbs, Mike LaBonte, Jon Powell, Stephen Peters, Pranav Singh*
Zhejiang University	Jiarui Qiu*

In the list above, attendees present at the meeting are indicated by "*." Those submitting an email ballot for their member organization for a scheduled vote are indicated by "^." Principal members or other active members who have not attended are in parentheses "( )." Participants who no longer are in the organization are in square brackets "[ ]."

UPCOMING MEETINGS

The connection information for future IBIS teleconferences is as follows:

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting

Join with a video conferencing device
106010980@teams.bjn.vc
Video Conference ID: 114 666 897 5
Alternate VTC dialing instructions

Or call in (audio only)
+1 267-768-8015,554664847# United States, Philadelphia
Phone Conference ID: 554 664 847#
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All teleconference meetings are 8:00 a.m. to 9:55 a.m. US Pacific Time. Meeting agendas are typically distributed seven days before each Open Forum. Minutes are typically distributed within seven days of the corresponding meeting.

NOTE: "AR" = Action Required.

WELCOME

Lance Wang (Zuken USA, USA)

Chair, IBIS Open Forum

Note: this summit has been recorded and these minutes contain recording timestamp indices, where the recording itself is available at the following link:

https://www.ibis.org/summits/aug23/summit_recording.mp4

(Recording reference: 01:00)

Lance Wang welcomed attendees and introduced himself as the Chair of the IBIS Open Forum. Lance expressed thanks to the IEEE for sponsorship of the facility. He thanked the presenters for their contributed papers and thanked everyone for attending. Lance stated this is the 2nd IBIS Summit held in concert with the annual IEEE-SIPI Symposium, and the IBIS Open Forum is looking forward another successful meeting this year.

Lance stated there will be 9 presentations starting with the Chair's Report, and that approximately 10:00 am there would be a short 15-minute break. During that time, everyone online is encouraged to remain online. Lance stated that for the presenters attending via online/remote, to please have their presentations at-ready. He asked to please keep presentation timing according to schedules.

Lance asked if there were any questions. There were none asked.

IBIS CHAIR'S REPORT

(Recording reference: 04:45)

Lance Wang reported IBIS Open Forum membership as 29 Organization Members and showed a graphs indicating relatively consistent level of membership since 1995 to present.

For the Term of Office for June 2023- May 2024, officers are as follows:

- Chair – Lance Wang, Zuken USA
- Vice-Chair – Randy Wolff, Siemens EDA
- Secretary: Graham Kus, The MathWorks
- Treasurer: Bob Ross, Teraspeed Labs
- Librarian: Zhiping Yang, MST
- Postmaster: Curtis Clark, ANSYS
- Webmaster: Steve Parker, Marvell
- University Relations: Chulsoon Whang, MST EMC Lab
- IEEE DASC, IBIS Open Forum Liaison: Michael Mirmak, Intel

Lance continued to introduce the IBIS task groups and their topics of activity as follows:

Weekly teleconferences:

- Quality Task Group (Tuesdays 9:00am PT)
- Advanced Technology Modeling (ATM) (Tuesdays 12:00pm PT)
- Interconnect task group (Wednesdays 8:00am PT)
- Editorial task group (suspended)
- IBIS Open forum is every 3 weeks (Friday 8PT)
- IBIS Summit meetings (USA and international)
    - DesignCon USA, IEEE SPI Europe, IEEE EMC+SIPI USA, IBIS Summit Shanghai, China, and IBIS Summit Tokyo, Japan (JEITA-organized).
- Total Participants have been approximately 280 in 2022

Lance shared that the SAE-ITC is the parent organization for the IBIS Open Forum. The IBIS Open Forum is assisted by SAE employees in matters pertaining to legal, business, and working with organizations as a formal Specification.

Link to SAE-ITC: https://www.sae-itc.com/

Lance introduced IBIS Milestones slide highlighting certain topics.

IBIS Quality Specification:

IBIS developed a quality specification that has been new update to 3.0 draft 7, which adds power-aware models. Before 2.0 only covered other IBIS features. This has been mainly done by Weston Beal by Siemens EDA, and thanked him for the effort and contributions.

What’s next for IBIS:

- Expanded system level perspective
    - Clock-Data relationships, timing information, equalization training
- Power integrity focused modelling
    - Chip-level
- Multi-level analog buffer modeling
- Interconnect modeling
    - Touchstone 3.0 with Pole/Residue and port mapping support
    - IBIS-ISS expansions
- What else should we be looking at, bring your ideas! Contributions and suggestions welcome as this is an Open Forum format committee.

Participation in IBIS:

Lance related that the success of IBIS depends on active participation and volunteering- and encouraged everyone to participate as it is an Open Forum.

Lance presented a slide on how to bring ideas and talents to IBIS as a member or participant:

- Task Groups
- IBIS email reflectors
- Open Forum teleconference for event planning and voting
- Summit presentations
- IBIS Board and task group volunteering
- Writing BIRDs – Buffer Issue Resolution Documents
  - Official method for submitting a proposed change

<u>Information about the IBIS .org Website:</u>

- IBIS summits
- Regional forum information
- Task group info
- Member FAQ
- Specification documents
- *IRDs
- Email support
- Syntax Parser Downloads

Lance Wang discussed the IBISCHK parser as being available for free use, but for source code is required, that is available under license purchase for download. Lance asked if there were any questions. There were none asked.

Lance introduced the Papers Presentation portion of the summit.

ACCURATE IBIS MODEL FOR IOS HAVING MULTIPLE DRIVERS CAUSING DUAL-SLOPE

(Recording reference: 24:35)

Manish Bansal (STMicroelectronics, India)

Rahul Kumar (STMicroelectronics, India)

[Presented by Manish Bansal]

Topics:

- Challenges
- Circuit Brief
- Modeling using Driver Schedule (in IBIS)
- Results

Q+A Session: see recording

STANDARD COMPLIANT IBIS AMI MODEL FOR SYSTEM SIGN OFF WITH USB4 GEN2 AS AN EXAMPLE

(Recording reference: 44:00)

Zhifei Xu (Ningbo DeTooLIC Technology Co., China)

Zhiping Yang (Missouri S&T EMC Lab, USA)

[Presented by Zhifei Xu]

Topics:

- Background
- Build Standard Tx Compliant IBIS-AMI Model Approach
- Build Standard Rx Compliant IBIS-AMI Model Approach
- IBIS-AMI Auto Verification

Q+A Session: see recording

EQUALIZER MODELING FOR IBIS-AMI

(Recording reference: 01:08:27)

Junyong Park (Missouri S&T EMC Lab, USA)

Chulsoon Hwang (Missouri S&T EMC Lab, USA)

[Presented by Junyong Park]

Topics:

- IBIS-AMI Equalization modeling in the application of HDMI 2.0 and 2.1

Q+A Session: see recording

CHARACTERIZATION OF WORKLOAD-INDUCED VOLTAGE NOISES ON CPU POWER DELIVERY NETWORKS

(Recording reference: 01:31:36)

Shuo Wang (University of Florida, USA)

Zihao Zhan (University of Florida, USA)

Dean Sullivan (University of New Hampshire, USA)

[Presented by Shuo Wang]

Topics:
- The workload in a CPU will cause voltage fluctuations on the power delivery network (PDN).
- Effect 1: Power/EM side-channel leakage that expose computing states.
- Effect 2: di/dt voltage noise can interfere with the other components of the PDN, which can potentially be exploited to implement fault injection attacks.
- Can we find an approach that can accurately and efficiently estimate the impact of di/dt noise for any workloads?

Q+A Session: see recording

BREAK

HOW TO MAKE GOOD EMD MODELS

(Recording reference: 02:15:20)

Arpad Muranyi (Siemens EDA, USA)

Weston Beal (Siemens EDA, USA)

[Presented by Weston Beal]

Topics:
- General Overview
- The anatomy of EMD files
- What do we need to make an EMD file?
- Notes on power-aware modeling
- The S-parameter reference terminal problem
- Illustrations

Q+A Session: see recording

BIRD233: ADD SUPPORT FOR SPIM IN IBIS

(Recording reference: 02:57:10)

Kinger Cai (Intel, USA)

Chi-te Chen (Intel, USA)

[Presented by Kinger Cai]

Topics:
- Standard Power Integrity Model for IBIS-AMI modeling of PDNs

Q+A Session: see recording

USB3.0 IBIS-AMI MODEL CONSTRUCTION BASED ON MEASUREMENT AND NEURAL NETWORK

(Recording reference: 03:18:45)

Jiahuan Huang (Missouri S&T EMC Lab, USA)

Junho Joo (Missouri S&T EMC Lab, USA)

Hank Lin (ASUS, Taiwan)

Bin-Chyi Tseng (ASUS, Taiwan)

Chulsoon Hwang (Missouri S&T EMC Lab, USA)

[Presented by Jiahuan Huang]

Topics:
- Proposed method to construct a digital output model for USB3.0 Tx base on measurement
- Neural Network analysis is explored

Q+A Session: see recording

CLOSING REMARKS

Lance Wang thanked everyone for attending, especially thanks to the IBIS Summit sponsors, and the IEEE. Lance stated that the next scheduled IBIS Open Forum teleconference scheduled for August 25, 2023. The IBIS Summit meeting was concluded.

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NOTES

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This meeting was conducted in accordance with SAE ITC guidelines.

All inquiries may be sent to info@ibis.org. Examples of inquiries are:

- To obtain general information about IBIS.
- To ask specific questions for individual response.
- To subscribe to or unsubscribe from the official ibis@freelists.org and/or ibis-users@freelists.org email lists (formerly ibis@eda.org and ibis-users@eda.org):
    - https://www.freelists.org/list/ibis
    - https://www.freelists.org/list/ibis-users
- To subscribe to or unsubscribe from one of the task group email lists: ibis-macro@freelists.org, ibis-interconn@freelists.org, ibis-editorial@freelists.org, or ibis-quality@freelists.org:
    - https://www.freelists.org/list/ibis-macro
    - https://www.freelists.org/list/ibis-interconn
    - https://www.freelists.org/list/ibis-editorial
    - https://www.freelists.org/list/ibis-quality
- To inquire about joining the IBIS Open Forum as a voting Member.
- To purchase a license for the IBIS parser source code.
- To report bugs or request enhancements to the free software tools: ibischk7, tschk2, icmchk1, s2ibis, s2ibis2 and s2iplt.

The BUG Report Form for ibischk resides along with reported BUGs at:

http://www.ibis.org/bugs/ibischk/
http://www.ibis.org/ bugs/ibischk/bugform.txt

The BUG Report Form for tschk2 resides along with reported BUGs at:

http://www.ibis.org/bugs/tschk/
http://www.ibis.org/bugs/tschk/bugform.txt

The BUG Report Form for icmchk resides along with reported BUGs at:

http://www.ibis.org/bugs/icmchk/
http://www.ibis.org/bugs/icmchk/icm_bugform.txt

To report s2ibis, s2ibis2 and s2iplt bugs, use the Bug Report Forms which reside at:

http://www.ibis.org/bugs/s2ibis/bugs2i.txt
http://www.ibis.org/bugs/s2ibis2/bugs2i2.txt
http://www.ibis.org/bugs/s2iplt/bugsplt.txt

Information on IBIS technical contents, IBIS participants and actual IBIS models are available on the IBIS Home page:

http://www.ibis.org/

Check the IBIS file directory on ibis.org for more information on previous discussions and results:

http://www.ibis.org/directory.html

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SAE STANDARDS BALLOT VOTING STATUS (attendee X; absent -)

Organization	Interest Category	Standards Ballot Voting Status	June 2, 2023	June 23, 2023	July 14, 2023	Aug 4, 2023
Altair	User	Inactive	-	-	-	-
AMD (Xilinx)	Producer	Inactive	-	-	-	-
Ansys	User	Active	X	X	X	-
Applied Simulation Technology	User	Inactive	-	-	-	-
Aurora System	User	Active	-	-	-	-
Broadcom Ltd.	Producer	Inactive	-	-	-	-
Cadence Design Systems	User	Active	X	X	X	-
Celestica	User	Inactive	-	-	-	-
Cisco Systems	User	Inactive	-	-	-	X
Dassault Systemes	User	Inactive	-	-	-	X
GE Healthcare Technologies	User	Active	-	-	-	-
Google	User	Inactive	-	-	-	-
Honeywell	User	Active	-	-	-	-
Huawei Technologies	Producer	Inactive	-	-	-	-
Infineon Technologies AG	Producer	Inactive	-	-	-	-
Instituto de Telecomunicações	User	Inactive	-	-	-	-
Intel Corp.	Producer	Active	X	X	X	X
Keysight Technologies	User	Active	-	X	-	-
Marvell	Producer	Active	X	X	X	-
MathWorks	User	Active	X	X	X	X
Micron Technology	Producer	Active	X	-	-	-
MST EMC Lab	User	Active	X	X	X	X
SerDesDesign.com	User	Inactive	-	-	-	-
Siemens EDA	User	Active	X	X	X	X
STMicroelectronics	Producer	Inactive	-	-	-	X
Synopsys	User	Active	X	X	X	-
Teraspeed Labs	General Interest	Active	X	X	X	X
Waymo	User	Active	-	-	-	-
ZTE Corp.	User	Inactive	-	-	-	-
Zuken	User	Active	X	X	X	X

= Temporarily not a voting member

Criteria for SAE member in good standing:

- Must attend two consecutive meetings to establish voting membership.
- Membership dues current
- Must not miss two consecutive meetings (voting by email counts as attendance)

Interest categories associated with SAE standards ballot voting are:

- Users - members that utilize electronic equipment to provide services to an end user.
- Producers - members that supply electronic equipment.

General Interest - members are neither producers nor users. This category includes, but is not limited to, government, regulatory agencies (state and federal), researchers, other organizations, and associations, and/or consumers.