IBIS Chair's Report

Randy Wolff

Micron Technology

Chair, IBIS Open Forum
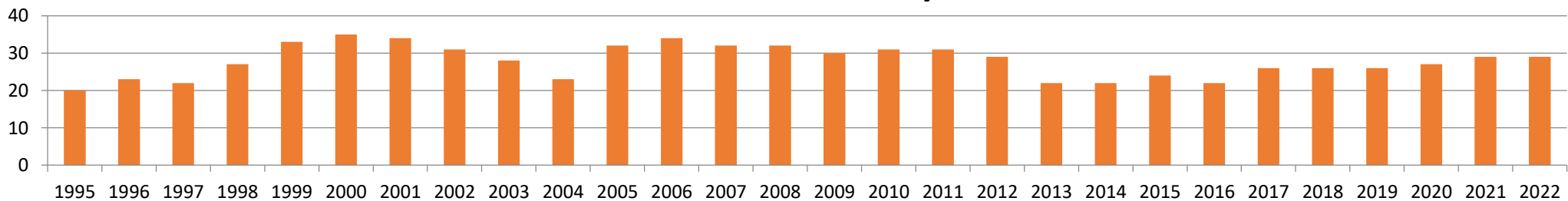
Virtual IBIS Summit at IEEE SPI 2022

May 26, 2022

29 IBIS Members (Organization-based)

Our Members

ANALOG DEVICES — AHEAD OF WHAT'S POSSIBLE™ · Ansys · Applied Simulation Technology · BROADCOM · cadence

Celestica · CISCO · DASSAULT SYSTEMES · Ericsson · Google

HUAWEI · Infineon · instituto de telecomunicações · intel · KEYSIGHT TECHNOLOGIES

LUMINOUS · MARVELL · MathWorks · Micron · MISSOURI S&T

SerDes Design.Com · SIEMENS · ST life.augmented · synopsys · Teraspeed Labs

WAYMO · XILINX · ZTE · ZUKEN

Number of Members by Year

IBIS Officers June 2021- May 2022

Chair: *Randy Wolff, Micron Technology*

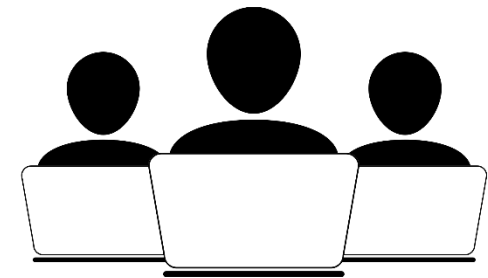Vice-Chair: *Lance Wang, Zuken USA*

Secretary: *Mike LaBonte, MathWorks*

Treasurer: *Bob Ross, Teraspeed Labs*
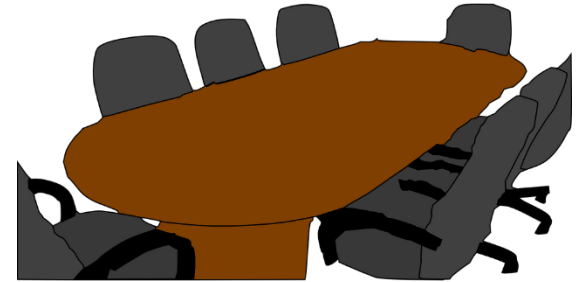
Librarian: *Zhiping Yang, Waymo*

Postmaster: *Curtis Clark, ANSYS*

Webmaster: *Steve Parker, Marvell*

- Currently in the election process for new officers for 2022
  - Nominations accepted through May 31
  - Actively seeking nomination for Secretary role

IBIS Meetings

- Weekly teleconferences
  - Quality task group (Tuesdays, 09:00 PT)
  - Advanced Technology Modeling (ATM) task group (Tuesdays, 12:00 PT)
  - Interconnect task group (Wednesdays, 08:00 PT)
  - Editorial task group (suspended)
- IBIS Open Forum teleconference every 3 weeks (Fridays, 08:00 PT)
- IBIS Summit meetings (USA and international)
  - DesignCon, IEEE SPI, IEEE EMC+SIPI, Shanghai, Taipei, Tokyo (JEITA-organized)
- Participants: ~275 in 2021

SAE ITC

- SAE Industry Technologies Consortia is the parent organization of the IBIS Open Forum

- IBIS is assisted by SAE employees José Godoy, Phyllis Gross, and Laurie Strom

- SAE ITC provides financial, legal, and other services

- https://www.sae-itc.com/

Task Groups

- Advanced Technology Modeling Task Group
  - Chair: Arpad Muranyi, Siemens EDA
  - https://ibis.org/atm_wip/
  - Develop non-interconnect technical BIRDs

- Editorial Task Group
  - Chair: Michael Mirmak, Intel
  - https://ibis.org/editorial_wip/
  - Produce IBIS specification documents

- Interconnect Task Group
  - Chair: Michael Mirmak, Intel
  - https://ibis.org/interconn_wip/
  - Develop on-die/package/module/connector interconnect modeling BIRDs

- Quality Task Group
  - Chair: Mike LaBonte, MathWorks
  - https://ibis.org/quality_wip/
  - Oversee IBISCHK parser testing and development

BIRD = Buffer Issue Resolution Document

IBIS Milestones

I/O Buffer Information Specification

- 1993-1994 **IBIS 1.0-2.1**:
  - Behavioral buffer model (fast simulation)
  - Component pin map (easy EDA import)
- 1997-1999 **IBIS 3.0-3.2**:
  - Package models
  - Electrical Board Description (EBD)
- 2002-2006 **IBIS 4.0-4.2**:
  - Receiver models
  - AMS languages
- 2007-2012 **IBIS 5.0-5.1**:
  - IBIS-AMI SerDes models
  - Power-aware model

I/O Buffer Information Specification

- 2013-2015 **IBIS 6.0-6.1**:
  - PAM4 multi-level signaling
  - Power delivery package models
- 2019 **IBIS 7.0**:
  - Back-channel time-domain support
  - Interconnect modeling using IBIS-ISS and Touchstone
- 2021 **IBIS 7.1:**
  - DDRx IBIS-AMI support
  - Electrical Module Description (EMD)
  - IBIS-AMI back-channel statistical optimization

Other Work

- 1995: **ANSI/EIA-656 (IBIS 2.1 International standard)**
- 1999: **ANSI/EIA-656-A (IBIS 3.2 International standard)**
- 2001: **IEC 62014-1 (IBIS 3.2 International standard)**
- 2003: **Interconnect Model Specification (ICM 1.0)**
- 2006: **ANSI/EIA-656-B (IBIS 4.2 International standard)**
- 2009: **Touchstone 2.0**
  - Official Touchstone donated from Agilent/Keysight
- 2011: **IBIS-ISS 1.0 (Interconnect SPICE Subcircuit)**
  - Subset of HSPICE
- **IBISCHK**: IBIS file syntax parser
  - Current version 7.1.0
  - Source code available for purchase
  - Compiled executables available free of charge
- **TSCHK2**: Touchstone 2.0 file syntax parser
  - Current version 2.0.1
  - Source code available for purchase
  - Compiled executables available free of charge

Planning for IBIS Version 7.2

Current unofficial BIRD content for IBIS 7.2

BIRD ID	BIRD Title	Approval Date	Notes
211.4	IBIS AMI Reference Flow Improvements	April 1, 2022	IBIS-AMI
213.x	Extending IBIS-AMI for PAMn Analysis	Not approved	IBIS-AMI
216	Alphanumeric Pin Names	March 11, 2022	[Pin] clarification
217	Require Clocked Rx Models to Return Clock Times	March 11, 2022	IBIS-AMI
218	Designator Pin List Relaxation	April 22, 2022	EMD
219.1	AMI Parameter Root Name Clarifications	Not approved	IBIS-AMI

- Major technical changes are IBIS-AMI focused:
  - PAMn
  - Redriver simulation flow fixes
- Will fix many editorial issues in IBIS 7.1

What's Next for IBIS?

- IBIS Open Forum's highly collaborative task groups are up for the challenge of addressing the SI and PI demands of new signaling technologies:
  - Expanded system-level perspective
    - Clock/data relationships, timing information, equalization training
  - Power Integrity focused modeling
    - Improved Power Supply Induced Jitter modeling
    - Diode and inductor models
    - Voltage regulator models
    - Chip-level Standard Power Integrity Model (SPIM)
  - 112Gbps SerDes and beyond
  - Interconnect Modeling
    - Touchstone 3.0
    - Pole/Residue support
    - Port naming
    - IBIS-ISS expansions

Participation in IBIS

- The success of IBIS depends on active participation and volunteering

- Bringing your ideas and talents to IBIS
  - Task groups for technical discussions and document editing
  - IBIS email reflectors
  - Open Forum teleconferences 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 to the IBIS specification
    - Many developed collaboratively in task groups
    - Discussed and voted on in Open Forum meetings

IBIS Website Resources

IBIS Summits

Task Group Info

Spec documents

BIRDs List

Email support

Syntax Parser
Downloads

[Thank You]

IBIS Open Forum:
Web: https://ibis.org
Email: info@ibis.org

We welcome participation
by all IBIS model makers,
EDA tool vendors, IBIS model
users, and interested parties.