



Semiconductor  
Research  
Corporation

# JUMP 2.0 SAB F2F with Center Leadership (Year 2)

April 24-25, 2024

Samsung @ San Jose, CA



Roman Caudillo  
JUMP 2.0 Director

# JUMP 2.0 Leadership



**Dr. Roman Caudillo - JUMP 2.0 Director**



**Dr. Adam Knapp - JUMP 2.0 Program Manager**



**Tameka Bell - JUMP 2.0 Research Program Coordinator**

# List of Attendees – SAB

<u>Company/Sponsor</u>	<u>First Name</u>	<u>Last Name</u>
Arm Limited	Andrea	Kells
Boeing Company	Timothy	Lee
DARPA	Dev	Palmer
DARPA	Tsu-Hsi	Chang
GlobalFoundries Inc.	Ted	Letavic
HRL Laboratories	David H.	Chow
IBM Corporation	Manoj	Kumar
Intel Corporation	Aravind	Dasu
Intel Corporation	Ian A.	Young
Intermolecular, Inc. (EMD Electronics)	Cesar	Clavero
MediaTek, Inc.	Chih-Ming	Hung
Micron Technology, Inc.	Ameen	Akel
RTX Corporation	Mike	Burkland
RTX Corporation	Raymond	Zanoni
Samsung Electronics Co., Ltd.	Harsono	Simka
Samsung Electronics Co., Ltd.	HYUNMOG	PARK
Samsung Electronics Co., Ltd.	Muhammed	Ahosan Ul Karim
Samsung Electronics Co., Ltd.	Sujin	Ahn
Samsung Electronics Co., Ltd.	Wanki	Kim
Samsung Electronics Co., Ltd.	Woo-Bin	Song
Samsung Electronics Co., Ltd.	Yong Seok	Kim
SK hynix Inc.	Myoungseo	Kim
TSMC	Carlos H.	Diaz
TSMC	Gary	Chen
TSMC	Stefan	Rusu
TSMC	Meng-Fan	Chang

# List of Attendees – Center Leadership

<u>Center</u>	<u>University</u>	<u>First Name</u>	<u>Last Name</u>
ACE	Cornell University	Jose	Martinez
ACE	Harvard University	Minlan	Yu
ACE	University of Illinois at Urbana-Champaign	Josep	Torrellas
ACE	University of Michigan - Ann Arbor	Zhengya	Zhang
CHIMES	Georgia Institute of Technology	Muhannad	Bakir
CHIMES	Massachusetts Institute of Technology	Carl V.	Thompson
CHIMES	Pennsylvania State University	Madhavan	Swaminathan
CHIMES	University of California, Los Angeles	Puneet	Gupta
COCOSYS	Georgia Institute of Technology	Arijit	Raychowdhury
COCOSYS	Purdue University	Anand	Raghunathan
COCOSYS	University of Minnesota	Yu	Cao
COCOSYS/CUBIC	University of Illinois at Urbana-Champaign	Naresh	Shanbhag
COGNISENSE	Georgia Institute of Technology	Justin	Romberg
COGNISENSE	Georgia Institute of Technology	Saibal	Mukhopadhyay
COGNISENSE	University of California, Santa Barbara	James	Buckwalter
COGNISENSE	University of Illinois Chicago	Inna	Partin-Vaisband
CUBIC	Columbia University	Keren	Bergman
CUBIC	University of California, Berkeley	Ali M.	Niknejad
CUBIC	University of California, Santa Barbara	Mark	Rodwell
CUBIC/COCOSYS	University of Illinois at Urbana-Champaign	Naresh	Shanbhag
PRISM	Georgia Institute of Technology	Shimeng	Yu
PRISM	Georgia Institute of Technology	Suman	Datta
PRISM	University of California, San Diego	Tajana S.	Rosing
PRISM	University of Illinois at Urbana-Champaign	Nam Sung	Kim
PRISM	University of Texas at Austin	Emmett	Witchel
SUPREME	Boise State University	Elton	Graugnard
SUPREME	Cornell University	Grace Huili	Xing
SUPREME	Massachusetts Institute of Technology	Tomas	Palacios
SUPREME	University of Notre Dame	Christopher	Hinkle

# Review JUMP 2.0 Year 1 Accomplishments

- **DARPA Milestones:** Milestones #1-5 (Quarterly Reports) have been submitted to DARPA on schedule and accepted:
  - Milestone reports for each center can be found in Pillar in the data tab for each center, e.g. [PRISM M#1 Highlights, Metrics](#)
- **Center Spending** was very good for Y1 with overall spending at 91% spend rate
- **Center Renewals:** Year 2 funding amendments have been executed with the 7 centers
- **Liaison and Student Ramp Up**
  - **282 of 254 Liaisons + SAB/GC (100%)** signed up w/ good balance across Centers
  - **881 Students** signed up in Pillar (Bump Up of ~100 for Spring 2024)
- **Successful Y1 'Reviews' held for all 7 Centers**
- **95 Full-time Hires and Interns** for Year 1 of JUMP 2.0 (revised up from 71 reported at last GC)
- **254 Tech Transfers** (from revamped KPI collection process) – 147 are multi-company TTs
- **First JUMP 2.0 Patent Applications** are in process (9 IDFs approved for patent filings)
- **Prof. Mingu Kang (UCSD)** added to PRISM to bridge gap b/n devices and architecture

# Year 2 General Overview

- **Year 1** focus was standing up 7 really good (independent) Centers based on the awarded proposals, (SAB + SRC) feedback, and the incorporation of the PAPI faculty.
- **Year 2**, Centers have been operating for ~1.3 years and now want to see significant results and capitalize on opportunities for cross-center collaboration → Centers need to work together!
  - **Want Engagement and (organic) cross-collaboration that amplifies the Centers and delivers program level results!**
  - **Need clear and succinct communication of disruptive and revolutionary approaches and results from each center – Request that Quarterly Milestone reports from Center Director's include a succinct high-impact summary in the 'Overall Research Summary for the Quarter' section**

# Looking ahead to MPRA in Year 3

teaming

results

sharpened vision

finish strong!

today

Mid-program re-alignment

Year 1  
2022

Year 2  
2023

Year 3  
2024

Year 4  
2025

Year 5  
2026

①

②

③

④

⑤

KPIs

254 meaningful instances of tech transfer positively impacted all SRC members & 95 Hires and Interns for Y1

Use Annual Review Feedback Process for SAB to provides feedback to Center Directors ahead of MPRA (what's going well, what should/could be deemphasized/cut)

Research, Tech Transfer, Students, & New Ideas

## Key Output

- Emphasis on Technology Transfer into/out of the JUMP Centers in Years 2-5
- Students, particularly interns and full-time hires into members
- “Graduation” of ideas → e.g., DARPA OPTIMA Program



# Mid-Program Realignment Basics

- JUMP 2.0 follows a “3+2” model.
- At the beginning of year # 3 (2025), SRC will ask each Center Director to cut ~20% (\$\$) of their portfolio. All faculty, including the added “pick-a-PI faculty,” are equally eligible for removal from the Center.
- At the SAB F2F leadership meeting in Spring ‘25, Center leadership will put forward a “+ ~10% university driven addition” that will need to be clearly justified to the SAB.
- Following that, the SAB will prepare a gap analysis and **closed solicitation** that invited academics can respond to. The SAB will select final “+ ~10% project additions” (~Aug-Sept).
- Any terminated projects and faculty will run through the end of 2025. All new projects will be contracted in 2H’25 for a 1-Jan-2026 start and 2-year term.
- The goal is to double down on the promising ideas and vectors that will leave a lasting legacy for the Center.



# Agenda – Day 1:

Each Center has  
20 minutes to  
present +  
30 minutes of  
Q&A/Discussion!

Wednesday, April 24, 2024		
Time	Topic	Speaker(s)
7:30 - 8:00 am	On-site registration / check-in	
8:00 - 8:15 am	Welcome and Introductions	Roman Caudillo, SRC
8:15 - 8:30 am	DARPA Vision	Dev Palmer, DARPA
8:30 - 9:00 am	Samsung Welcome and Keynote	Su Jin Ahn EVP, Advanced Technology Development, Samsung Semiconductor R&D
9:00 - 9:30 am	SAB Goals for JUMP 2.0 in Year 2 and 10 min Q&A	
<b>9:30 - 9:50 AM</b>	<b>COFFEE BREAK AND INFORMAL DISCUSSIONS</b>	
9:50 - 10:10 am	COCOSYS Plan of Action from Director	Arijit Raychowdhury, GA Tech
10:10 - 10:40 am	COCOSYS Panel with Director(s) and Theme Leaders (try for at max 2 Theme Leaders chosen by directors) - open Q&A with SAB	Need to poll centers on who can attend
10:40 - 11:00 am	CUBIC Plan of Action from Director	Keren Bergman, Columbia U.
11:00 - 11:30 am	CUBIC Panel with Director(s) and Theme Leaders (try for at max 2 Theme Leaders chosen by directors) and with Q&A	Need to poll centers on who can attend
11:30 - 11:50 am	COGNISENSE Plan of Action from Director	Saibal Mukhopadhyay, GIT
11:50 - 12:20 pm	COGNISENSE Panel with Director(s) and Theme Leaders (try for at max 2 Theme Leaders chosen by directors) and with Q&A	Need to poll centers on who can attend
<b>12:20 - 1:20 PM</b>	<b>LUNCH</b>	
1:20-1:40 pm	ACE Plan of Action from Director	Josep Torrellas, UIUC
1:40 - 2:10 pm	ACE Panel with Director(s) and Theme Leaders (try for at max 2 Theme Leaders chosen by directors) and with Q&A	Need to poll centers on who can attend
2:10-2:30 pm	PRISM Plan of Action from Director	Tajana Rosing, UCSD
2:30 - 3:00 pm	PRISM Panel with Director(s) and Theme Leaders (try for at max 2 Theme Leaders chosen by directors) and with Q&A	Need to poll centers on who can attend
<b>3:00-3:20 PM</b>	<b>COFFEE BREAK AND INFORMAL DISCUSSIONS</b>	
3:20 - 3:40 pm	CHIMES Plan of Action from Director	Madhavan Swaminathan, PSU
3:40 - 4:10 pm	CHIMES Panel with Director(s) and Theme Leaders (try for at max 2 Theme Leaders chosen by directors) and with Q&A	Need to poll centers on who can attend
4:10 - 4:30 pm	SUPREME Plan of Action from Director	Grace Xing , Cornell
4:30 - 5:00 pm	SUPREME Panel with Director(s) and Theme Leaders (try for at max 2 Theme Leaders chosen by directors) and with Q&A	Need to poll centers on who can attend
<b>5:00 - 7:30 PM</b>	<b>HORS D'OEUVRES - SOCIAL HOUR UNTIL 7:30PM AT SAMSUNG</b>	



# Agenda – Day 2

80 mins for  
Systems Center  
Panel and  
Technology  
Centers Panel and  
Discussion!

Thursday, April 25, 2024		
8:45 - 9:00 am	Welcome Day 2	Adam Knapp, SRC
9:00 - 10:20 am	System Centers Panel w/ Q&A (ACE, COCOSYS, CUBIC and COGNISENSE)	Moderator: TBD (Center Director)
<b>10:30 - 10:50 AM</b>	<b>COFFEE BREAK AND INFORMAL DISCUSSIONS</b>	
11:00 am - 12:20 pm	Technology Centers Panel w/ Q&A (PRISM, CHIMES and SUPREME)	Moderator: TBD (Center Director)
<b>12:20 - 1:20 PM</b>	<b>LUNCH</b>	
1:30 - 2:30 pm	SAB meeting <i>Industry Only</i>	Moderator: Roman Caudillo
	Center Directors and Center Leadership meeting <i>Academics Only</i>	Moderator: Adam Knapp
2:30 - 3:30 pm	SAB and Centers Come Back Together and Report Out any items from their closed sessions	Moderators: Roman and Adam
Adjourn		

# Backup Slides

# TECHCON 2024 Career Connections Announcement

## GOLD Sponsors

GlobalFoundries Inc.

Intel Corporation

MICRON Technology, Inc.

## SILVER Sponsors

Advanced Micro Devices, Inc.

EMD Electronics (a Merck KGaA affiliate)

Samsung Electronics Co., Ltd.

## BRONZE Sponsors

Arm Limited

IBM Corporation

NXP Semiconductors

Texas Instruments

## Career Connections

**Real-time hiring!**  
**In-Person Event at**  
**TECHCON 2024**

September 10, 2024  
Austin, TX



**Registration Opens**  
April 1

**Registration Closes**  
May 13, 11:59p ET

**[LINK TO REGISTER](#)**

## 2024

**Sponsorship Levels**  
(Limited Booths Available)

Pricing

20 Sponsor Packages Available

**BONUS BENEFIT: Exclusive, Early Scholar Access**

Start recruiting before the event even starts! 

Private breakfast or lunch for 20 Scholars

Free recruiter "All Access" conference & meal pass  
(\$725 value)

2-hour Open House includes (1) interview room,  
food/beverages provided

Top spot on conference t-shirt

Recognition on conference t-shirt

Sponsor Spotlight on Social Media

Premier corner booth

Deluxe booth

Standard booth

	GOLD	SILVER	BRONZE
	\$9400	\$6800	\$4200
	4	4	12
	July	Aug	Sept
	✓		
	2	1	
	✓	✓	
	✓		
	✓	✓	✓
	✓	✓	
	✓		
		✓	
			✓

# Packaging Challenges in JUMP 2.0

- **Recommendation for a 3-pronged approach to packaging options/challenges needed/faced by PIs in the 7 centers:**

1. **Commercial:** Identify a commercial standard packaging solution that can be used to package the research chip/chiplet from the JUMP 2.0 center (this can include services such as wirebonding a die to substrate, attaching a heat sink etc.), [Volume and Cost often make this option difficult]
2. **Research (Aligned with CHIMES):** Explore collaborating with our packaging center CHIMES where the packaging that is needed fits within the scope of CHIMES research vectors and thus is beneficial to both centers, as in the attached example,
3. **Somewhere b/n 1 and 2:** Identify a research packaging foundry (where low-volume request is okay) that can be utilized to fit packaging needs that fall somewhere between (1) and (2) above; One suggestion is to explore using Georgia Tech PRC, which is something we have been discussing with PRC. Like option (1) the cost would come from the PIs JUMP 2.0 budget. Other options might include Penn State or UCLA. For this option an engineer is paid to do the work and the PI pays for the services as well as the M&S.

# JUMP 2.0 addresses 7 Themes spanning the full-system stack



**System Centers:**  
Drive Future Architectures and Platforms



**Technology Centers:**  
Benchmarking Novel Materials, Devices, and Interconnect

- Joint University Microelectronics Program
- 5-year program consisting of 7 Centers synergistically addressing the full-system stack for 2030 and beyond research needs
- SRC + DARPA (Research) + NSF REU (WFD)

New Research Budget	5 Year Total
JUMP 2.0 Research + REU Total*	\$331,886,470
DARPA Contribution	\$120,000,000
NSF REU Contribution	\$8,400,000

**Projected JUMP 2.0 + REU 5-Year Total: \$331M\***

Y1 Spending was on target with overall spending at 91%

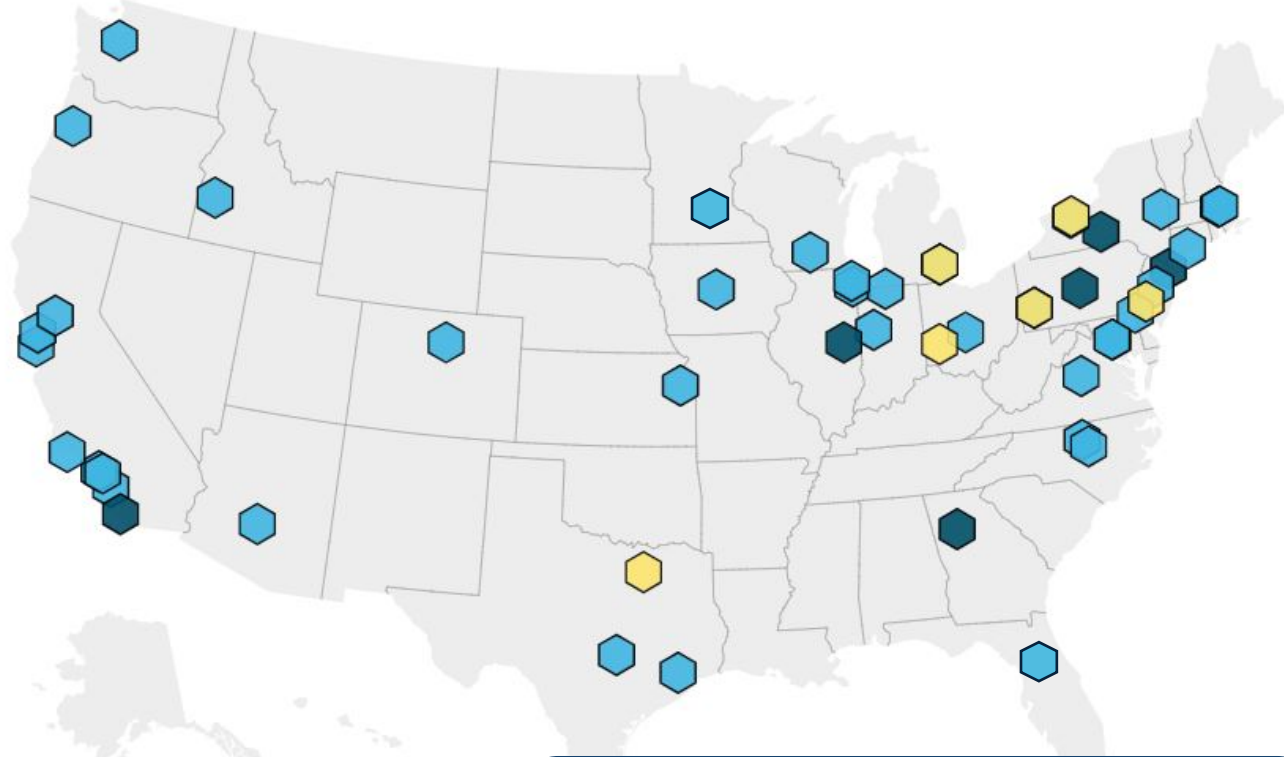


# JUMP 2.0 Center Network (\$331M over 5 years)



## SRCco Investments with DARPA and NSF

■ JUMP 2.0 
 ■ JUMP 2.0 - Lead 
 ■ REU



Get the data • Created with Datawrapper

**15 Member Companies/Sponsors**  
**142 Faculty (42 Universities)**  
**25 States**  
**Over 880 students**



## 42 Participating Universities

ASU	Stanford
Boise State	U Delaware
CMU	U Florida
Colorado Boulder	U Illinois at Chicago
Columbia	U Kansas
Cornell	U Maryland College Park
Duke	U Michigan Ann Arbor
Georgia Tech	U Minnesota
Harvard	U Washington Seattle
Iowa State	U Wisconsin Madison
MIT	UC Berkeley
North Carolina State	UC Davis
Northwestern	UC Irvine
Notre Dame	UC San Diego
Ohio State	UC Santa Barbara
Oregon State	UCLA
Penn State	UIUC
Princeton	USC
Purdue	UT Austin
Rice University	UVA
RPI	Yale



Prof. Mingu Kang (UCSD) added to PRISM to bridge gap b/n devices and architecture

# Mingu Kang Addition to PRISM

“PRISM needs a PI to help **bridge the gap between devices and architecture**”  
(Feedback from SAB following Y1 Annual Review)

PI Mingu Kang is an ideal candidate to address this gap

- 6 years of industry experience in analog and digital design, as well as architecture, on top of great research in academia.
- Prof. Kang developed industrial AI accelerators at IBM, and contributed to commercialization of PCM memory at Samsung, paving the way for PRAM applications in SSD and DRAM.
- He is an assistant professor with no SRC funding
- Winner of Intel’s Rising Star award in 2022.

Prof. Kang is being funded from PRISM UCSD cost share

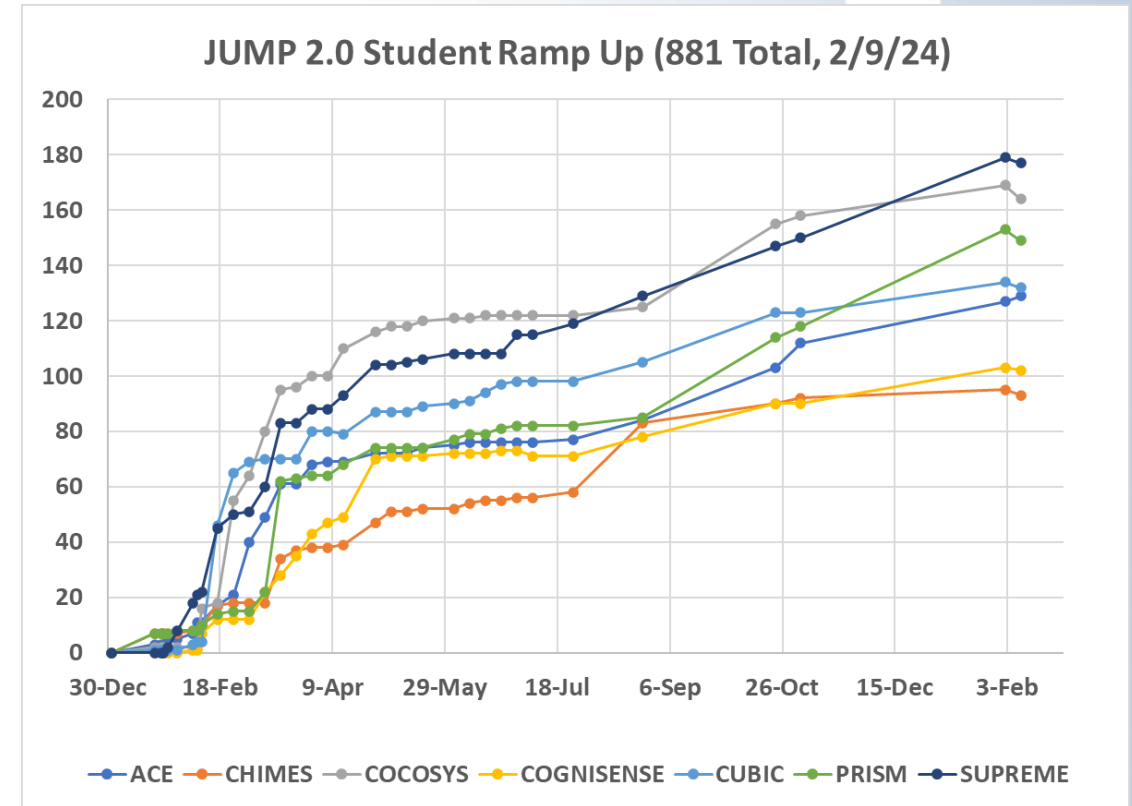
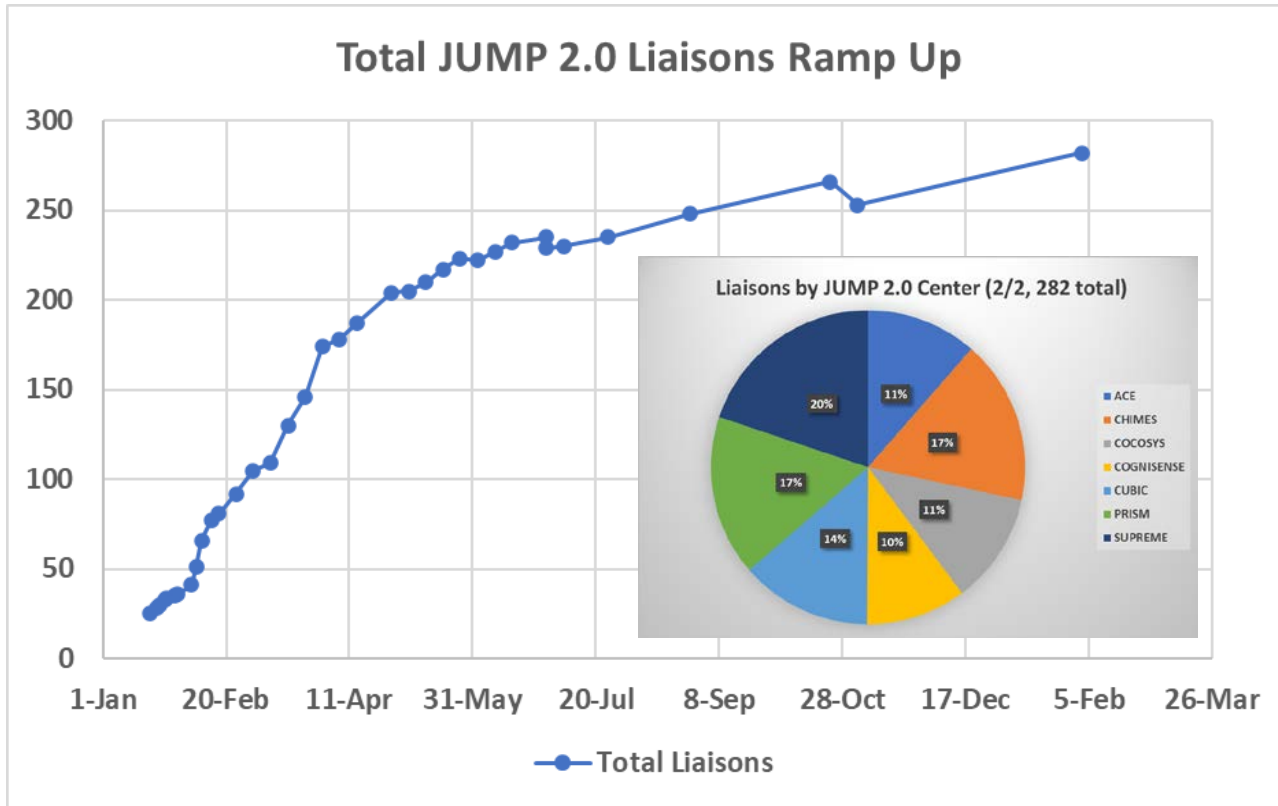
SAB unanimously approved Prof. Mingu Kang’s addition and SOW to PRISM and UCSD

Lead contract with UCSD has been amended to include his project, in process of being added to Pillar Science [[3135.021](#) Smart Integration of Emerging Memories with CMOS Interface toward Enhanced Error Resiliency and Efficiency]





# JUMP 2.0 – Liaison Engagement and Student Tracking



282 liaisons signed up (254 slots + SAB & GC) and liaison meetings revised for all centers

881 scholars signed up as of 2/9 Bump up of ~100 for Spring Semester



# JUMP 2.0 Center Leadership

(Director, Assistant Director)

Theme 1 – Cognition

**COCOSYS (GaTech)**



**Arijit Raychowdhury**  
GaTech



**Anand Raghunathan**  
Purdue



**Tajana Rosing**  
UC/San Diego



**Nam Sung Kim**  
UIUC

Theme 5 - Intelligent  
Memory & Storage

**PRISM (UCSD)**

Theme 2 –  
Communications &  
Connectivity

**CUBiC (Columbia)**



**Keren Bergman**  
Columbia



**Ali Niknejad**  
UC/Berkeley



**Madhavan Swaminathan**  
Penn State



**Muhannad Bakir**  
GaTech

Theme 6 – Advanced  
Monolithic & Heterogeneous  
Integration

**CHIMES (Penn State)**

Theme 3 – Intelligent  
Sensing to Action

**CogniSense (GaTech)**



**Saibal Mukhopadhyay**  
GaTech



**James Buckwalter**  
UC/Santa Barbara



**Huili (Grace) Xing**  
Cornell



**Tomas Palacios**  
MIT

Theme 7 – High-Performance  
Energy-Efficient Devices for  
Digital & Analog Applications

**SUPREME (Cornell)**

Theme 4 – Systems &  
Architectures for  
Distributed Compute

**ACE (UIUC)**



**Josep Torrellas**  
UIUC



**Minlan Yu**  
Harvard

Publicly announced January 2023  
142 Professors participating across 42 Universities!