



Semiconductor
Research
Corporation

Industry Panel: A SAB Perspective for JUMP 2.0

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Introductions

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Topic Areas

- I. SAB Perspective
- II. Research Operations & Strategy

I. SAB Perspective

1. In Year 2, each center have now been stood up and are operating well within their own center
2. Expectations: JUMP 2.0 centers need to
 - Ramp up quickly to work on fundamental, **DISRUPTIVE** research, and enable **REVOLUTIONARY** innovations that is worth the cost and time by member companies to further develop
 - Focus on “breaking the wall” to enable major breakthroughs (with time horizon of 5-10 years) that can solve the hard problems outlined in the Needs document and Decadal Plan
 - Be able to articulate how these radically different solutions / disruptive innovations can “break the wall”, or at least show a path. Be able to show **meaningful** impacts of the disruptive innovations, and show that the impacts are **broad**
 - Understand the State of the Art (SotA), and work to **significantly beat** the SotA → Benchmarking is needed
 - Work with industry (SAB or liaisons) to map out how these solutions can be meaningful. Work with SAB to further define your center’s Grand Challenge goals
 - Should push towards “**research that are further out**”, and fight the pull towards “**research that are near term**” that arises due to the need for prototyping using today’s tech
 - Look for and ramp up your cross-center collaborations, and work together towards **something greater than the sum of the individual parts**

I. SAB Perspective

3. Additional points:

- We're looking for revolutionary solutions that can “move the needle”
- Current prototyping work in JUMP2.0 does not push the envelope
- During the F2F event, focus on the main breakthroughs, *e.g.* innovations that DARPA and SRC members can use in internal reviews to justify continuing funding. Help us help you prepare for the JUMP2.0 realignment
- On benchmarking disruptive research: Can JUMP2.0 show the theoretical maximum of an innovation, and show how close we get?

II. Research Operations & Strategy (from 2023)

1. Know:
 - a. How your research relates to Center and Theme goals,
 - b. Research strategy for achieving goals,
 - c. Criteria for declaring “done”, “reached success”, or “quit”
2. Benchmarking: **Know State-of-the-Art in your field and where JUMP2.0 research stands in comparison.**
 - a. Know what has been developed, tested & evaluated in the past. Remember your sponsors likely have a (much) longer technical memory than the scholars!
 - b. Work with sponsors on defining metrics and FOM as needed.
 - c. Goal is not 10-30% improvements, but >100% (or even 200%), to be enough to meet the threshold of being a “revolutionary innovation”
 - d. PI’s need to be outward looking in their projects – reference non-SRC related research work as appropriate for benchmarking and claiming new records.
3. Don’t be afraid to fail but know why & the plan forward.
 - “Fail-fast” approach: Aim to fail-fast and make necessary recommendations for research direction changes. There is value in uncovering fundamental roadblocks as much as on finding pathways forward.
4. Align holistic technical metrics for the project at hand, establish the starting point (e.g., state-of-the-art), and report progress on these metrics on e-workshops and reviews

II. Research Operations & Strategy (from 2023)

5. Keep in mind, this is “Applied Engineering”, not “Blue Sky” research – think of viability for commercialization.
 - a. Know operating environments for ME (i.e. no milli-Kelvin or GPa scenarios)
 - b. Constraints of industrial fabrication, CMOS compatibility
6. Prototyping:
 - a. Be clear on what the research goal is for a prototype artifact - What are we trying to learn?
 - b. What are the criteria for test and evaluation results?
 - c. Make sure test results and/or hardware is available to sponsors
 - d. Reach out and engage sponsors early in considering design and fabrication of hardware prototypes to maximize the relevancy and impact of that hardware, e.g. for chiplets plan to use relevant interface standards for interfacing with relevant FPGAs/CPU/GPU and with SOA packaging solutions
7. Maintain multiple hypotheses so you don’t “fall in love” with your pet theory.
8. Change, Adjust, Adapt: The world won’t stand still. React to changes in the state of the art.
9. Focus on end-to-end metrics: Measure the impact of your work at the application level.
 - a. Ensure that the problem you’re solving has system-level relevance
 - b. Solve problems that matter to the member companies

Appendix

SRC Mechanics

1. Know how to claim IP.
2. Be able to answer when relevant, “What research products from JUMP 1.0 are being utilized and expanded upon?”
3. Directors, make sure students know:
 - a. How center fits in to overall JUMP2.0 program,
 - b. How their work depends, and relies on, across centers results
4. Have admins deconflict scheduling of events with major JUMP2.0 events (i.e., annual reviews)

Interactions with & Presentations to JUMP 2.0 Sponsors

1. Be ready to answer the question, “Why should I care?”
2. Each ppt slide should be able to stand alone, what is the takeaway? Bumper stickers are useful.
(need examples of the good and the bad)
3. Citations are important. A listing at the end of a presentation is always helpful.
4. Make sure your sponsors can access you during your poster session.
5. Don’t assume sponsors know all the acronyms, models, and jargon used within your academic subfield. Briefly define or explain them.
6. Avoid spending *unnecessary* amounts of time on background and/or already presented results during e-workshops to avoid net updates that are incremental deltas as opposed significant steps forward. This of course is a balancing act since we do want to provide background and context for new audience members.
7. For e-Workshops, PI’s/presenters should always include one page on plans for the next update which - hopefully- is consistent with what they had presented in their previous update! If they need to do course correction and re-visit/change research plans, it should be clearly communicated.