nCORE SAB Meeting

Wednesday, March 7, 2018
4:00p Eastern / 3:00p Central / 2:00p Mountain / 1:00p Pacific

Attendees:
An Chen (NRI)
Dmitri Nikonov / Intel
Harsono Simka / Samsung
John Spargo / Northrop Grumman
Steve Kramer / Micron
Tod Newman / Raytheon
Wilfried Haensch / INM
Stefan Rusu / TSMC
Wilman Tsai / TSMC
Zoran Zvonar /ADI
Ravi Kanjoilia / EMD
Albert Davydov / NIST
Christina Hacker / NIST
Lisa Jones /Northrop Grumman
Scott Anderson / Lockheed Martin
Mansour Moinpour / EMD
William Rippard / NIST
Ralph Dammel / EMD
Ravi Pillarisetty / Intel

Please refer to charts shown in WebEx. They are on the nCORE website. From My SRC page, click on nCORE* Nanoelectronic Computing Research *from the block on the right hand side, then click on Science Advisory Board, then select SAB Meeting Results tab.

Agenda:

- Invention disclosure
  - "ME-spinFET (Magneto-electric spin FET) XOR device and circuit optimization" from E2CDA AMML center
- nCORE centers/projects
  - Revised SOW of Princeton University
  - Planned reviews in 2018
- Kick-off meetings
  - E2CDA kickoff meeting (Mar. 2, 2018)
  - NIST workshop for NEW-LIMITS (Apr. 9-10, 2018)
- DOE Lab Partnering Service

Invention disclosure

ME-spinFET (Magneto-electric spin FET) XOR device and circuit optimization" from E2CDA AMML center

Background: in the NRI program, we have PI's submit their invention disclosures to SRC and the Technical Program Group (TPG), which is equivalent to the SAB in nCORE, review the IP's and decide if we should support the filing of the IP. We invite the PI to join the meeting to explain the IP and answer any questions.

Presentation was given by Professor Peter Dowben and Professor Andrew Marshall from the AMML Center to explain the IP disclosure. The presentation is attached to the minutes.

Since the original disclosure was file, more information has come in and the ppt presentation was shared with the group. The issue at the core is AMML is working on magneoelectric field of tech transistors and want to implement them into CMOS plug in replacements and do so in an optimized way. This current disclosure will not be the only one you will see from AMML, there is another one coming from Prof. Azad Naeemi. Would like a decision as we are working on a paper based on the implementation of magneoelectric FET.

Feedback from the SAB is due on Friday, March 15th to An in an email. Do you support a filing of the IP based on the technical value, or do you think it's a derivative patent and not worth supporting?

Filing is done by the university through a law firm recommended by SRC. Filing cost is targeted at $18,000 per patent. Independent of our decision, the university can still file the patent on their own and per the agreement between SRC and the university, we still have those licensing rights on those patents.

There is a core patent on the magneoelectronic device in the NRI program, filed by UNL in the past. How you build a circuit is beyond this filed patent on magneoelectric device. It's the physical device implementation and is not extended into circuit implementation.

What is the difference between the universities filing the patent or SRC filing if the members still get the rights? Typically if SRC doesn't support the filing, the university won't either and it goes into public domain in the shape of a paper.

AI: An will find out the budget for patent filing.

nCORE centers/projects

See the US Map showing the 12 Centers. Blue shows the NEWLIMITS center co-funded with NIST and the others are the E2CDA Phase 2 projects.

We have 3 signed contracts and the other universities have received the contracts and are reviewing them, in the process of signing them or in negotiations with SRC. One project is an issue – Harvard/Stanford project (Nanophotonic Lithium Niobate platform for next generation energy efficient and ultrahigh bandwidth optical interconnect). The Harvard PI is unwilling to license BIP for SRC. Potential to lose the SRC funding but they will keep the NSF funding. We are in discussion with the PI and NSF and we will keep you apprised as we get additional information on this contract as well as the status of the other eight contracts.

Revised SOW of Princeton University

Nanophotonic Neuromorphic Computing: Professor Prucnal discovered BIP during the contract phase. Did not realize it until after the acceptance of the proposal. Needs to revise the SOW since the BIP has been licensed exclusively to a start-up company.

Revised SOW (slide 6) – the only change is within Thrust 1. The main change replaces microring based weight with Mach Zehnder switches. Other relatively small changes, mainly in the timing of the deliverable. Left side is before revision, right side is after the SOW revision.

We need approval from SAB before we can move forward with the contract signing phase.

There is still interest within the SAB among some members to continue this project with the revised SOW. However, questions were raised by some SAB members on the value of the revised SOW: microring implementation has advantages and revised SOW may not deliver the same level of performance. How are the specs and deliverables affected by the revised SOW? Summary from the PI is that this is relatively a minor change in the scope and the deliverables are not significantly affected but they take a different approach to avoid the BIP.

Clarified that there is overlap with the start-up company? They have an exclusive license. We would need licensing rights with this company to continue with the original SOW.

Determined that a teleconference with the PI to discuss the change in research and direction. Answers needed on the original deliverable, what is the deliverable now, what the specs were, how they plan to deliver and how these specs changed and how this work will overlap with the startup company. Need a little more information before deciding.

AI: An to contact the PI to have a teleconference with the SAB members to discuss the revised SOW (Tod Newman, Ralph Dammel, Mansour Moinpour, Scott Anderson, Stefan Rusu).

AI: Mary to schedule teleconference with PI and the SAB.

Planned Reviews

To reduce travel costs, we don't plan to do a review for each project. The NewLimits Center, led by Zhihong Chen is at Purdue and the topic is relevant to the JUMP ASCENT Center. The NewLimits Review will be held on August 14th, the day before the ASCENT Review at Notre Dame. This will be a three day event. The CAPSL Center, lead by Jorge Appenzeller does research in probabilistic logic and there is relevance to the C-BRIC Review. This will be a half day review the day before C-Bric and held on Oct 9 at Purdue.

The other E2CDA projects will have a mid-year review using WebEx.

There will be an nCORE Annual Review in the Washington area in mid-October to review: E2CDA Phase 1, E2CDA Phase 2, NewLimits Center.

Kick-off Meetings

E2CDA kickoff meeting was held March 2, 2018 at George Washington University.

- Attendance was effected by weather, all E2CDA projects presented and PI's interacted with the sponsors.

NIST workshop for NEW-LIMITS (Apr. 9-10, 2018) – Gaithersburg, MD

- April 9th Workshop – to engage with PI's with NEWLIMITS. Industry sponsors are encouraged to attend. Registration on the NIST website and will be distributed.

NIST funding for 2018 and beyond should be determined by the end of this month. If funding is fully approved we can select a second Center ad we will hold an SAB meeting to discuss that selection. If not approved, we look at other government funding options to increase the nCORE program.

DOE Lab Partnering Service

Website is being designed by DOE to facilitate collaboration with industry and academic users. DOE labs have a lot of facility and is interested in partnership with industry and academia to utilize these facilities. Website is being developed to establish these relationships.

Website is not complete, in development stage. Things to be added include: resources in terms of what type of equipment you can utilize and what type of capabilities the DOE labs can provide to users. The DOE person in charge of developing this website will send An some questions and they will be forwarded to the SAB to inquire what type of content you would like to see, what type of information you think is helpful for this type of collaboration. This will help develop the website to be more user friendly and more useful.

We plan to engage DOE closely in the program to try to find resources our sponsors could utilize through those DOE labs.

http://labpartnering.org/home

Meeting adjourned: 5:10pm