

## **Minutes (Spring '16)**

### **NATIONAL SCIENCE FOUNDATION**

**National Science Foundation, Arlington, VA**

### **Engineering Directorate Division of Industrial Innovation and Partnerships**

Report of the Advisory Subcommittee for Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs

June 6-7, 2016

#### **1.0 INTRODUCTION**

The National Science Foundation (NSF) Advisory Subcommittee (AdCom) for the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs met June 6-7, 2016, at the Phase II Grantees Conference, in Atlanta, Georgia.

#### **Advisory Committee members in attendance included:**

William Lockwood Benet (by phone)

Susan Butts

Annette Finsterbusch

Arlene Garrison

Karen Kerr

Tom Knight (Chair)

Eugene Krentsel

Richard Paul

Susan Preston (in person on June 6 and on the phone on June 7)

Skip Rung

Ann Savoca

David Spencer

#### **Advisory Committee members absent:**

Karthik Ramani

#### **NSF IIP representatives attending all or part of the meeting included:**

Pramod Khargonekar, Assistant Director, Engineering Directorate, via teleconference

Grace Wang, Deputy Assistant Director, Engineering Directorate, via teleconference

Barry Johnson, Division Director, IIP

Graciela Narcho, Deputy Division Director, IIP

Ben Schrag, Senior Program Manager, IIP

Prakash Balan, SBIR/STTR Program Director, IIP

Glenn Larsen, SBIR/STTR Program Director, IIP  
Rajesh Mehta, SBIR/STTR Program Director, IIP  
Jesus Soriano, SBIR/STTR Program Director, IIP  
Ruth Shuman, SBIR/STTR Program Director, IIP  
Murali Nair, SBIR/STTR Program Director, IIP  
Kelly Monterroso, Communications Specialist, IIP  
Eric Keys, AAAS Fellow  
Apolinary Orgeta, Intern

## **2.0 AGENDA**

### **Wednesday, June 8, 2016**

12:00 p.m. Breakout Lunch for Working Group on Assessment and the Working Group on Deal Flow/Broadening Participation

2:00 p.m. Welcome and Introductions – Tom Knight (Chair), Barry Johnson (IIP Division Director)

2:15 p.m. Review Agenda and Confirm Prior Email Approval of Minutes – Tom Knight

2:30 p.m. Review National Academies Assessments of SBIR/STTR – Barry Johnson

3:00 p.m. Presentation on NSF SBIR/STTR Assessment and Working Group Report Out – Eric Keys

4:30 p.m. Discussion of Communications Strategy – Kelly Monterroso

5:00 p.m. Review SBIR/STTR Solicitations and Technical Topics – Ben Schrag

5:45 p.m. Update on Phase 0 Pilot Program – Barry Johnson

6:00 p.m. Adjourn for Dinner

### **Thursday, June 9, 2016**

7:30 a.m. Continental Breakfast

8:30 a.m. Introduction and Overview of the Day – Tom Knight

8:45 a.m. Report Out – Working Group on Deal Flow/Broadening Participation – Annette Finsterbusch

9:00 a.m. IIP Update (Staffing, COV, Programs, Office Move, Other) – Barry Johnson, Gracie Narcho

10:00 a.m. SBIR/STTR Subcommittee Deliberations

11:00 a.m. SBIR/STTR Subcommittee Recommendations to NSF (Note: Grace Wang calls in 11-11:30am)

12:00 p.m. Discussion of Potential New Subcommittee Members – Tom Knight, Barry Johnson

12:30 p.m. Grab and Go Luncheon Available, Meeting Adjourns

### **3.0 Approval of Minutes from Last Meeting**

The AdCom confirmed that the minutes from the prior meeting were approved via email prior to this meeting.

### **4.0 COMMENTS and FEEDBACK**

#### **Organizational Changes & Comments**

The AdCom congratulates Joseph Hennessey on his upcoming retirement and thanks him for his myriad contributions to SBIR and IIP. We will miss him.

The AdCom welcomes Kelly Monterroso as the new Communications Specialist. This full-time, permanent position will improve Outreach (which will improve Deal Flow and Broaden Participation), and we look forward to assisting Kelly as needed.

The AdCom congratulates the following IIP members on their new roles:

- Ben Schrag on his promotion to Senior Program Manager
- Prakash Balan on his transition to the Partnerships For Innovation programs
- Steven Konsek on his transition to the iCorps program.
- Jesus Soriano as IIP's representative to NSF's Broadening Participation activities, such as NSF Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES).

The AdCom is encouraged to hear of the 200+ applications received from job applicants interested in replacing these three Program Directors (PD).

The AdCom recommends IIP Leadership seek permission from the Engineering Directorate for adding one additional Program Director (PD) ASAP because:

- SBIR set-aside has grown to its highest percentage in history, approaching 3.2%
- SBIR PDs are processing more proposals and grants than nearly any other Division within the Foundation
- Many (200+) candidates have applied for our current 3 openings, indicating strong interest from qualified candidates and an available applicant pool, and
- Adding a fourth PD now will help with transition for future reassignments or retirements.

AdCom recommends outreach to fill this fourth PD position should be designed to attract a person who is female or a member of an unrepresented group.

## **Discussion of National Academies Assessments of SBIR/STTR**

AdCom agrees with the major findings & recommendations from the National Academies for SBIR at NSF:

- NSF SBIR is meeting 3 of its 4 legislative objectives:
  - Stimulating technological innovation,
  - Using small business to meet Federal R/R&D needs
  - Increasing private sector commercialization of innovations derived from Federal R/R&D
- NSF SBIR needs to do more to achieve its fourth legislative objective: “foster and encourage participation by socially and economically disadvantaged small businesses (SDBs, and by women-owned small businesses (WOSBs), in technological innovation.” This is the focus of one of our Working Groups, and specific recommendations are discussed below in the section “Joint Report from the Deal Flow/Broadening Participation Working Groups”.
- NSF SBIR needs to improve monitoring, Evaluation, and Assessment. This is the focus of one of our Working Groups, and specific recommendations are discussed below in the section “Report from the Assessment Working Group”.

AdCom notes that the major recommendations from the National Academies were consistent with those from two other outside groups: this SBIR/STTR AdCom, and the last two IIP Committee of Visitors (CoVs).

AdCom notes that some of the recommendations were based on 2011 information, and much progress has been made since then, e.g., use of crowdfunding.

AdCom asks IIP Leadership to send us a copy of your response to the National Academies findings and recommendations.

## **Discussion of SBIR/STTR Solicitation & Technical Topics**

AdCom finds the topic list to be a good list of examples, but please make it more clear that all topics are welcome. This message, that all topics are welcome, needs to be communicated across multiple marketing channels:

- The SBIR & STTR Solicitation(s)
- The Topics List
- Our website
- Plus all other communications, outreach, and marketing materials.

AdCom recommends listing NAE Grand Challenges as welcome topic areas, or at least characterizing some existing topics as supporting these Grand Challenges.

AdCom recommends expanded emphasis on high-risk, “swing for the fences” SBIR/STTR awards, to build a portfolio of high-risk/high-potential return grantees.

AdCom would ask IIP leadership: When creating these topic lists, are we missing needed outside technical talent in areas where PDs are not familiar? How might IIP

leverage new ways to expand the topic list? For example, would convening specialized/virtualized panels with technical skills beyond those of the PDs for specific topic areas be helpful? Would Entrepreneurs in Residence, other “in residence” technical experts, or expertise from other divisions/directorates within NSF, be helpful?

### **Discussion of IIP Update (Staffing, Programs, Budget, Office Move)**

AdCom is very encouraged and supportive of IIP plans presented by Barry & Gracie, particularly:

- Fresh roles and leadership for PDs in areas such as GOALI, BIC, iCorps, etc.
- The planned pilot to change the financial review process for SBIR grantees, so that the criteria used to evaluate SBIR grantees is tailored to Small Business and different from the financial review process used to evaluate NSF’s traditional academic institutions.
- Plans for piloting a Phase 0 pilot program like iCorps at Historically Black Colleges and Universities (HBCU)
- Plans for the move to the new NSF headquarters.

### **Potential New AdCom Subcommittee Members**

AdCom recommends adding additional new members to fill open vacancies. Potential additional new members could be added from the following groups:

- NSF SBIR/STTR grantees who are recent “graduates” from the program and who have demonstrated strong commercialization success, particularly women entrepreneurs.
- Representatives from underrepresented groups, such as someone from one of the HBCU Phase 0 iCorps nodes as a way to help our broadening participation efforts.
- People with connections/expertise in the investment data analytics and/or Customer Data Management (CRM) worlds.

AdCom volunteers to assist IIP leadership with recruiting new members if that would be helpful. Any new member should share our enthusiasm and passionate support for this program.

### **Report from the Assessment Working Group**

Appendix One shows the members of this working group.

The Assessment Working Group notes progress and senses significant immediate opportunity based on several recent developments:

1. New IIP leadership team solidly in place and developing strong strategic plans
2. Assessment AAAS Fellow Dr. Eric Keys has come up to speed and is making progress understanding and displaying the large amount of SBIR/STTR data (grantee database, DIMS) already available.

3. There is a strong consensus regarding SBIR/STTR Assessment needs and opportunities among AdCom members, recent NSF/Engineering Directorate Committees of Visitors and the April 2016 National Academies' reports on the NSF SBIR/STTR program.

AdCom was pleased to see Eric Keys' charts on assessment data, organized as they should be under the 4 goals for the SBIR/STTR program set forth by Congress. In most cases related to broadening participation, there does not appear to be progress (as appears to be the case across agencies and in the venture industry itself) but in the case of women proposers, there may be an upward trend. This, and other findings, should be tested for statistical significance.

AdCom feels strongly that even though NSF is not a "mission agency", its SBIR/STTR program does (as the National Academies also found) in fact contribute to meeting federal R&D needs. For example, there are agencies without large R&D budgets (DoT, DoEd, etc.) whose missions and needs are clearly addressed by NSF SBIR/STTR grantees.

AdCom's "bottom line" recommendation is that IIP staff draft an Assessment Plan/Strategy (possibly along the lines of the Communications Strategy reviewed at this AdCom meeting) for advance distribution and discussion at the November 29-30 AdCom meeting. Working Group members will be pleased to serve as resources to IIP staff, especially Eric, as this proceeds.

Detailed comments/recommendations regarding NSF SBIR/STTR assessment needs and opportunities that we hope can usefully inform preparation of the plan:

1. Because there will be significant costs in both money and precious staff time, there should be advance knowledge/plans of how assessment data will be used, i.e. what decisions it will inform.
2. Assessment needs can be thought of as belonging to two groups: internal/operational (e.g. related to participation demographics), and external/outcome/longitudinal (commercial, economic and societal outcomes).
  - a. The internal assessment needs are easier to meet, largely via use of internal NSF databases and proposal cover sheet data. These could be expanded/enhanced by investment in a CRM system.
  - b. The outcome/commercialization metrics are much more difficult, given the need for "external" data (including valuable information grantees are not currently required to provide over time), high current costs for collecting that kind of data (phone calls, consultants) and long lag times between surveyed outcomes and study publication. There is hope that this situation can be improved with the use of electronic survey techniques (perhaps with incentives for grantees to respond) and public or subscription databases on startup companies receiving investment (e.g. CrunchBase, PitchBook).
  - c. Given the range of possible grantee outcomes (failure, organic growth, pivot, out-licensing, asset sale, acquisition, IPO) it will be challenging to track all investment, jobs and revenue over time, but an

organized/sophisticated approach should uncover the best outcomes and many good success stories (economic, technical, social).

3. Success at the above would be greatly aided by having “hooks” into grantees (PIs, CEOs) over time, i.e. beyond the performance period. Although some companies can be in the program as long as 5 years (Phase I through IIB, other supplements), even 5 years isn’t long enough to capture success (or other denouement) for most startups.
4. I-Corps teaches that startups are “temporary organizations” whose main job is discovering successful business models for technical innovations. This strongly suggests that ways to track the success of these innovations and business models post-startup (licensing, acquisition) are highly desirable.

### **Report from the Entrepreneurial Education Working Group**

Appendix One shows the members of this working group.

The AdCom appreciates all the hard work by Staff, in particular Ruth Shuman and Gracie Narcho, and others to create and execute on another successful educational program for the Phase 2 Grantees. Several AdCom members attended or spoke at various sessions and we thank them for their participation as well. Anecdotal comments have been quite positive and the AdCom looks forward to receiving results from the attendee survey. One comment heard more than once was the wish of Grantees to have had some of the content even as a Phase 1 Grantee, which amplifies the need for such training. Congratulations for another program well done.

From our previous meetings, we know Staff has also been conducting periodic bootcamps for the Phase I Grantees. Phase I Grantees are not required to attend, but Program Directors have strongly encouraged many of the Grantees to attend. As a result, 95% of the Grantees attended the program in September 2015. I-Corp has led the training. Feedback has been very positive. Many thanks to Staff for this excellent early-stage educational program as well - vital for our young grantees.

The AdCom continues to recommend the following future activities to further strengthen entrepreneurial education:

1. Knowledge manager: We have discussed on occasion over the past few years having someone focused on coalescing and making available a wealth of educational materials on multiple topics from entrepreneurial basics to sector specific tools to regional support programs such as accelerators, incubators, mentoring programs, business competitions, etc. The content can be derived from our own programs (e.g., videotaping our Phase II grant training program), outside resources that are considered gold standard quality, YouTube videos, etc. We recommend an internal hire or a contractor be retained to create an extensive database of materials and then maintain and expand over time.
2. Sector-specific programs: The interest in providing sector-specific discussions continues, but how to execute is challenging. With nine discrete program areas, this would necessitate nine separate programs, which is a logistical nightmare.



What may be possible is to have webinars or a conference related single session for each sector that deals with some unique issues such as go-to-market strategy or strategic partners.

### **Joint Report from the Deal Flow/Broadening Participation Working Groups**

Appendix One shows the members of these two working groups.

The combined Working Groups on Deal Flow and Broadening Participation have continued to work together with Gracie Narcho since the October 2015 AdCom meeting. The group welcomed Kelly Monterroso to the team at a lunch meeting that preceded the June AdCom discussions. At that time, the following recommendations were made:

- Identify and secure a Marketing company with web-design talent to drive the website rework of the website in both its user interface and its content.
- In parallel to the website rework, revise the content of the one-page hand-out to be used at events. Ensure that the messaging parallels the experience that a user will find on the revised website.
  - If possible allow this collateral be used as both a hand-out and in attractive, free standing cardboard units that can be distributed at tech transfer offices, legal offices, VCs, etc.
  - Continue to simplify the message by using more graphics and less verbiage on both the collateral and the website.
- Continue to edit and utilize video clips from NSF success stories on the website. Kelly has begun gathering these videos and will make them available to those searching for info via the website and YouTube.
- The next priority after the collateral and website is a set of YouTube videos that support entrepreneurs in learning about and applying for NSF SBIR/STTR grants.
- The committee has offered its support in on-going review of proposed content and each member offered to utilize their networks for resources to support these efforts
- The committee is very supportive of the Phase 0 Pilot Program focused on institutions with a high representation of minorities and look forward to hearing the results from this pilot at an upcoming meeting.

AdCom recommends outreach efforts to include existing leading hispanic, black, asian and women networks following an initial screening of groups such as:

- <http://www.shpe.org/>
- <http://latinostartupalliance.org/>
- <http://www.womenchemists.sites.acs.org/>
- <http://www.awis.org/>
- <http://societyofwomenengineers.swe.org/>
- <http://www.nsbe.org/home.aspx>

The AdCom recommends IIP influence and leverage NSF-wide initiatives coming from EVALUATION AND ASSESSMENT CAPABILITY in FY16 particularly (1) the **portfolio analysis tools system** and (2) the cross-cutting evaluation for NSF investments in **broadening participation** on the following populations:

- underrepresented undergraduate and graduate students,
- underrepresented faculty in STEM departments,
- underrepresented principal investigators submitting proposals worthy of support, and
- underrepresented institutions.

These initiatives should feed and be aligned with SBIR/STTR management changes regarding performance assessment of PDs, their inreach into the academic grant making area, as well as the assessment currently being undertaken by Eric Keys. Influencing and feeding from these EAC initiatives could be another input to support to specific IIP program innovation and outreach strategies.<sup>1</sup>

The AdCom recommends establishing a baseline of the current size of each of the under-represented groups in the SBIR/STTR portfolio.

The AdCom recommends that Barry Johnson adjoin the SBIR to the other NSF groups that are implementing programs to broaden participation in accordance with the recent mandate from the new Director, and to have a member of IIP appointed to CEOSE to ensure alignment.

The AdCom recommends using budget to contract a marketing professional to build a marketing organization to support SBIR/STTR and its staff with the following:

- In cooperation with the Program Directors, create / complete an overarching, clear, and concise branding message that “introduces” or, in some case, may “re-introduce” SBIR/STTR’s programs and processes to prospective entrepreneurs and PIs.
- Identify both new and existing prospects (groups and/or individuals) to whom to present the message and track these contacts and interactions (metrics).
- Continuous improvement of this message as feedback and results are available.

The AdCom recommends that the grant application and submission process be reviewed again and streamlined in conjunction with the new branding effort in order to

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<sup>1</sup> The [EAC evaluation design](https://www.nsf.gov/about/budget/fy2016/pdf/47_fy2016.pdf) will “use a mixed methods approach (qualitative and quantitative) to do a formative assessment of what mechanisms work best and a summative evaluation of the impact of NSF’s historic investments in broadening participation. The EAC will develop a study to explore the cumulative longitudinal impact of NSF funding on individuals, (their career paths, creative ability, mentoring of students, networks, and other spillover effects such as single investigators, Research Experiences for Undergraduates (REUs), fellows, etc.)” Source: [https://www.nsf.gov/about/budget/fy2016/pdf/47\\_fy2016.pdf](https://www.nsf.gov/about/budget/fy2016/pdf/47_fy2016.pdf)

reduce obstacles and pain points that have been identified previously as reasons that prospective applicants chose not to apply.

- Consider embedding “how-to” video links into the online instructions to facilitate applicants with the process.

The AdCom recommends structuring and implementing a set of appropriate metrics to drive the strategy and direction of the combined effort for deal flow and broadening participation, monitor performance, and produce good data for both internal and external use.

- Define a short set of metrics that are specific, measurable, achievable, relevant and time-based.
- Get buy-in from all (Director, Deputy Director, Program Directors and AdCom members)
- Establish a method to collect and share the data (and analysis) on a regular basis.

Appendix One shows the members of this working group.

## **5.0 FUTURE MEETING AGENDA**

The next two AdCom meetings will occur

1. November 29-30, 2016 at NSF.
2. Spring 2017 dates are TBD.

The AdCom appreciated how IIP shared the meeting agenda and the reading materials prior to this meeting, and the interim report on our recommendations from our prior meeting.

AdCom’s Proposed Agenda for the next meeting:

1. Update on IIP mission, vision, and strategic goals, including an update on key strategic metrics/assessment, including:
  - matching funds
  - percentage of SBIR phase 1 awards to new PIs
  - current size of each of the underrepresented groups in the SBIR/STTR portfolio, with measures of statistical significance of recent trends in Phase 1 submissions from underrepresented groups
  - plus the other assessment metrics presented by Eric Keys at our June 2016 meeting
2. Update on our Top Four Priorities/Working Groups
3. Discussions with Program Directors on topic(s) preselected to be of particular interest to the Program Directors.

4. Deliberations

5. Report Out

AdCom requests at least 75 minutes for our Deliberations, item #4, above.

**Appendix One:**

**AdCom Working Groups, with Members and Key Contacts from IIP Staff**

<b>Working Group</b>	<b>Key Contact (from IIP Staff)</b>	<b>Chairperson (from AdCom)</b>	<b>Members (from AdCom)</b>
<b>Assessment</b>	Barry Johnson	Robert “Skip” Rung	Susan Butts Dick Paul Susan Preston Karthik Ramani David Spencer
<b>Broadening Participation*</b>	Gracie Narcho	Ann Savoca	Karen Kerr Tom Knight Arlene Garrison William Lockwood-Benet
<b>Deal Flow*</b>	Gracie Narcho	Annette Finsterbusch	Karen Kerr Eugene Krentsel Ann Savoca Susan Preston
<b>Entre- preneurial Education</b>	Barry Johnson	Susan Preston	Susan Butts William Lockwood-Benet Karthik Ramani Skip Rung

\*Broadening Participation and Deal Flow have significant overlapping activities and will often meet together.