



## APPENDIX A

### Consortia Bylaws

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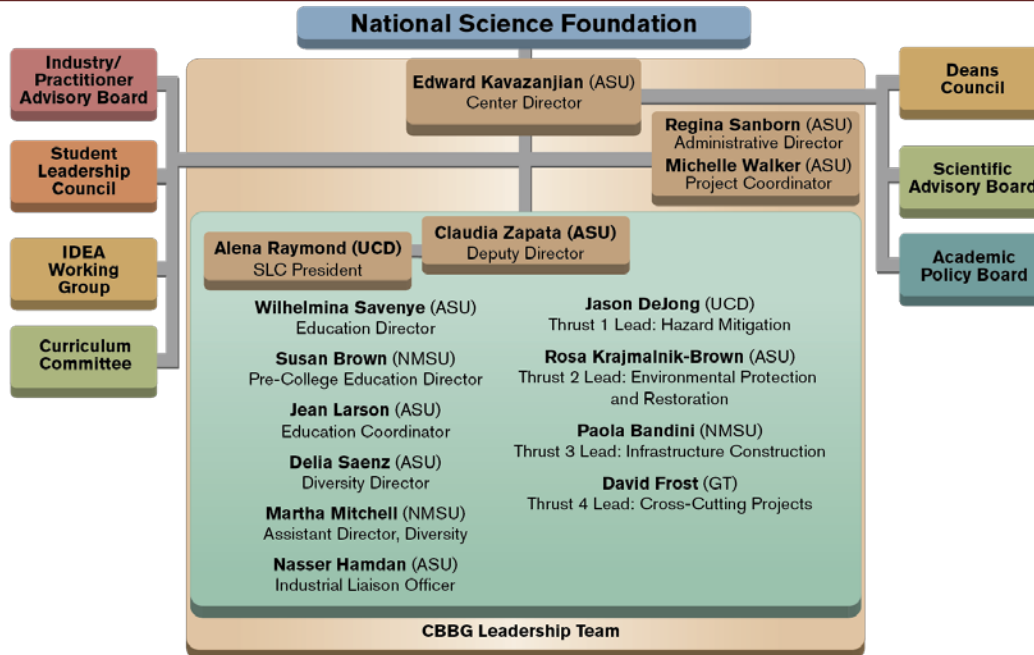
**Arizona Board of Regents for and on behalf of Arizona State University (ASU), the lead university for the National Science Foundation (NSF) Engineering Research Center (ERC) for Bio-mediated and Bio-inspired Geotechnics (hereinafter called "CBBG" or CENTER")**

#### Bylaws

##### ARTICLE I. General

- A. Purpose: These Bylaws (the "Bylaws"), in combination with the INDUSTRY/PRACTITIONER MEMBERSHIP AGREEMENT ("IPMA") and INTER-UNIVERSITY MEMBERSHIP AGREEMENT ("IUMA"), hereafter "AGREEMENTS", govern the operation of the CENTER. The Bylaws shall not be used to amend or change any part of the AGREEMENTS.
- B. Amendment: These Bylaws may be amended from time to time as deemed appropriate by CBBG in consultation with the LEAD UNIVERSITY and ERC PARTNER UNIVERSITIES, together known as "ACADEMIC MEMBERS", and the Industrial/Practitioner Advisory Board ("IPAB").
- C. Order of Precedence: These Bylaws are incorporated as part of the AGREEMENTS. If there are any inconsistencies between these Bylaws and the provisions of the AGREEMENTS, the applicable term or condition of the IUMA shall govern first and then the IPMA and these take precedence over any conflicting provision of the Bylaws.
- D. Infrastructure of the Center will be defined by the Center Director with Center Leadership Team, with the various committees, councils, groups and boards as described below.

## APPENDIX A Consortia Bylaws



### ARTICLE II. Responsibilities of Center Director

- A. Director: The Center Director will be appointed by the Dean of Engineering at Arizona State University (ASU), with approval of the NSF. The Center Director or Principal Investigator (“PI”) will commit at least 50% of their time to the administration of the Center through ERC funding, cost share funding, or through commitment by the PI’s home institution.
- B. In the case of the departure of the Center Director, the LEAD UNIVERSITY and the affected university, in consultation with NSF, will find a replacement suitable to NSF. Before a change is implemented within the LEAD UNIVERSITY, written approval from the NSF Program Officer must be secured. In the case of the departure of (a) the Center Director from the LEAD UNIVERSITY, or (b) one of the PIs from a core ERC PARTNER UNIVERSITY, and NSF does not find the person recommended by the Center to be suitable, NSF reserves the right to recommend termination of the ERC or the core ERC PARTNER UNIVERSITY’s affiliation with the ERC.
- C. The Successor Director will be selected from among the Faculty at ASU, in consultation with the Council of Deans and with approval of the NSF, and should have a record of a successfully funded research program.
- D. Faculty involved in inter-disciplinary research are specially sought for this position. The responsibilities of the Center Director include, but are not limited to:
  1. Organization of Consortium Meetings, including timely distribution of materials in advance of the meeting as required, and handouts at the CENTER Meetings,
  2. Developing research proposals, and engaging associated research personnel (e.g., by issuing RFP/RFPs), as necessary to meet the research objectives of CENTER,
  3. Ensuring that project proposals brought to the CENTER, will, if successfully completed,



## APPENDIX A

### Consortia Bylaws

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- accomplish the mission of the CENTER,
4. Preparing and delivering presentations on the CENTER (organization and accomplishments) to the Industry/Practitioner community and recruiting of new Industry/Practitioner Member (“IPM”) (as defined by the IPMA).
  5. Encouraging the Mentor program.
  6. Duties as required as a member of the IPAB Executive Committee (see Article III.H).
  7. Supporting the COUNCIL OF DEANS in selecting a succeeding Director as necessary.
  8. Selecting consultation resources outside of the IPMs and Academic Members, as necessary who may serve on the Scientific Steering Committee (SSC), Internal Academic Policy Board or Student Leadership Council (SLC).
  9. Making discretionary decisions, in accordance with NSF requirements, on accepting In-Kind Contributions in lieu of membership fees.
  10. Hosting the NSF site visit team.
  11. Reporting on the Project’s impact on workforce needs and other measures of the quality of the Project’s product, including the CENTER’s strengths, weaknesses, opportunities and threats to survival (SWOT) analysis, to NSF.

#### **ARTICLE III. Industrial/Practitioner Advisory Board**

- A. Purpose: The IPAB is primarily concerned with providing direction for the research and continuing education programs of the CENTER.
- B. IPAB Membership: The completion of an IPMA will give a member entity one seat on the Industrial Advisory Board of the CENTER. The IPAB will consist of a representative of each members of the Industrial Affiliates Program (IAP), as is defined in the IPMA. If a representative appointed to the IPAB is unable to attend a meeting of the IPAB, that member may send a substitute representative to the IPAB meeting. Also, the Director of the CENTER will serve as an ex-officio member of the IPAB.
- C. Voting Privileges: Only membership fee paying members of the IAP, shall have IPAB voting privileges. General members shall have one vote each, Leadership and fellowship members shall have 2.5 votes each. Associate Members of the IAP do not have voting privileges but may participate in IPAB deliberations.
- D. Officers. Officers of the IPAB shall be a Chair and a Vice-Chair who are selected from among the IPM of Fellowship and Leadership members and serve one-year terms. In the first year, both the Chair and Vice-chair will be selected by the Center Director. In subsequent years of the CENTER, the Vice-chair will be elected at the Annual Meeting and will serve for one year. After the first year, the Vice-chair of the previous year will succeed the Chair for the following year, with the transition occurring at the Annual Meeting. Therefore at the end of the first year the Vice-Chair becomes the Chair for the second year and a new Vice-Chair is elected for the second year.
- E. Meetings and SWOT: The IPAB will meet at least twice a year, carry out an annual analysis of the CENTER’s strengths, weaknesses, opportunities and threats to survival (a SWOT analysis), and participate in the annual NSF review of the CENTER’s performance and plans. During the meeting with the NSF site visit team, the Chair of the IPAB will present the IPAB’s SWOT



## APPENDIX A

### Consortia Bylaws

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analysis to the review team and discuss the findings. The SWOT will be updated annually and progress of the CENTER in addressing the SWOT will be discussed with the NSF site visit team as well. The Chair and the IPAB members also will discuss the annual SWOT analysis with the CENTER Director and the CENTER Leadership team to determine appropriate future strategies to deal with the weaknesses and threats.

- F. Expenditures: Industrial/Practitioner membership fees are treated as Program Income and must be allocated for use for Center purposes. Membership fees that are not expended in the year in which they are received must be placed in a Center account and reported to NSF and industry as ‘unexpended funds’ that are held in reserve for future use. Progress reports on the expenditure of these funds should be included in the Center's annual report and reported to IPAB during the IPAB meetings. Industrial/Practitioner members may provide additional support for activities such as sponsored research projects, equipment donations, intellectual property donations, or educational grants.
- G. Industrial Collaboration and Innovation Ecosystem Director (also known as, Industrial Ecosystem Director, or the Industry Liaison Officer or “ILO”). Under the supervision of the Center Director, the ILO will work collaboratively with the Center’s IPAB and other industry stakeholders to advance the mission and vision of the Center. Essential duties of the Industrial Collaboration and Innovation Ecosystem Director include:
- a. Serving as primary point of contact for Industry stakeholders.
  - b. Representing of the Center at Industry focused events and meetings nationally and internationally.
  - c. Facilitating and directing the coordination of IPAB activities to meet the Center’s objectives.
  - d. Working as a productive and constructive member of the Center’s leadership team.
  - e. Recruiting members to be part of the IPAB, including collecting membership fees.
  - f. Ensuring that all members (small, large companies, public agencies, state level and federal partners) become true partners to the Centers understating clearly what their roles are and how they contribute to the vision of the Center.
  - g. Ensuring that the IPAB has a clear role in the strategic planning structure of the Center.
  - h. Working closely with the workforce development aspects of the Center and ensuring that students have regular interactions with industry and are being given opportunities for internships at different industrial member sites.
  - i. Participating in weekly teleconferences with other ERC ILOs.
  - j. Attending an annual retreat.
  - k. Managing the annual IPAB SWOT analysis.
- H. Executive Committee. The Executive Committee shall consist of the Chair of the IPAB, the Vice-chair of the IPAB, and the Director of the CENTER. The ILO shall be an ex-officio member of the Executive Committee.
- The responsibilities of the Executive Committee of the IPAB are: Ensure the overall synergy of the research carried out in various thrust areas, recommend to the ERC Director any mid-course corrections in research and/or personnel, as necessary, Consideration of and ruling on requests for invitation of guests to the CENTER (see Article XVII), and



## APPENDIX A

### Consortia Bylaws

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Membership Development.

- Chair: The responsibilities of the Chair of the Executive Committee are: Preside over meetings of the IPAB, including closed sessions at the CENTER Review Meetings, and Other duties as required as a member of the Executive Committee.
- Vice-chair: The responsibilities of the Vice-Chair of the Executive Committee are: Act as recording secretary of meetings of the IPAB, including closed sessions at the CENTER Review Meetings, and Other duties as required as a member of the Executive Committee.

#### **ARTICLE IV. Scientific Steering Committee**

A. Purpose: The Scientific Steering Committee (SSC) is primarily concerned with the quality of research and the balance among funded research projects among the partner universities and the thrust areas of the Center.

B. SSC Membership: The SSC is an interdisciplinary group of senior researchers affiliated with the ACADEMIC MEMBERS and shall consist of eight subject matter experts, two each from ASU, Georgia Tech, New Mexico State University, and University of California at Davis, plus the Center Director, and one ethics expert from ASU.

C. Each ACADEMIC MEMBER shall select subject matter experts relevant to the thrust for which they are the lead and to the overall goals of the Center. They will provide guidance to the CENTER Leadership team on the direction and balance of our scientific and education programs.

D. The Center Director shall serve as chair of the SSC. The CENTER Thrust Leaders shall serve as ex-officio members of the SSC.

#### **ARTICLE V. Student Leadership Council**

- A. The Student Leadership Council (SLC) is responsible for organizing student activities to help achieve the CENTER's goals for research and education.
- B. The SLC will be comprised of the Center's undergraduate and graduate students and will have a President and a Vice President.
- C. Thrust Leaders will nominate students for the SLC President and Vice President positions and the Center Director will select from the nominees.
- D. The SLC Chair will serve as a member of the CENTER's Leadership Team.
- E. The SLC also is responsible for carrying out an annual SWOT analysis of the CENTER and communicating the results to the CENTER Director, the CENTER Leadership team, and the NSF site visit team.
- F. The SLC will collaborate with the Integrated Diversity, Education and Outreach Activities working group (IDEA WG) on improvements to education and diversity, and provide recommendations to the IDEA WG throughout the year, as appropriate.



## APPENDIX A

### Consortia Bylaws

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#### **ARTICLE VI. Science Advisory Board**

- A. The Scientific Advisory Board (SAB) is comprised of external discipline experts who are appointed by the Center Leadership Team in consultation with NSF.
- B. The SAB will meet collectively as a board at least once a year with the Center.
- C. The SAB will advise the Center Director on the direction and progress of the Center.
- D. The SAB will report to NSF on the direction and progress of the Center.

#### **ARTICLE VII. Integrated Diversity and Education Activities Working Group**

- A. The Integrated Diversity Education and Outreach Activities (IDEA) Working Group (WG) is formed from education and diversity representatives from each of the four partner Universities to provide additional depth and leadership in diversity and pre-college education, and further engage faculty in these programs. The IDEA WG serves as a collaborative body seeking continuous improvement of our diversity and education efforts.
- B. The IDEA WG will include the Diversity and Education Directors and the Diversity and Education Leads for each of the partner universities, the Diversity Coordinator, and a representative of the ASU Disability Resources Center.
- C. The IDEA WG will collaborate with the Leadership Team, the Student Leadership Council, and the Council of Deans to develop, guide, and improve education and diversity-focused strategies and activities and to update and maintain the CBBG Diversity and Education Plan.
- D. The IDEA WG will work with the independent assessment team to develop and conduct assessment and evaluation activities.

#### **ARTICLE VIII. Curriculum Committee**

- A. The Curriculum Committee has the specific charge of engaging CENTER staff (faculty, post-doctoral scholars, and student researchers) in curriculum development and creation of webinars, which will be overseen by the Education and Diversity leadership in collaboration with the IDEA WG and Center faculty members.
- B. The Curriculum Committee will include a CENTER faculty and student researcher from each partner university and will be co-chaired by the College and Pre-College Education Directors.
- C. The Curriculum Committee will provide an avenue to capture technical insight on education activities of the Engineering Workforce Development (EWD) program.

#### **ARTICLE IX. Council of Deans**

- A. The Council of Deans shall be led by the Dean of Engineering from ASU.
- B. The Council of Deans will be comprised of the Dean of Engineering from each University member.
- C. The Council of Deans will meet collectively as a board to provide administrative support for the ERC and to help facilitate the ERC's research, education, and innovation efforts across the lead and partner campuses.
- D. Council of Deans will collaborate with IDEA WG, SLC, and Leadership Team to develop, guide, and



## APPENDIX A

### Consortia Bylaws

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improve education and diversity-focused strategies and activities and to update and maintain the CBBG Diversity and Education Plan.

- E. The Council of Deans will make available opportunities for leadership development and diversity training to Center faculty across the related disciplines at each institution.

#### **ARTICLE X. Internal Academic Policy Board**

- A. The Internal Academic Policy Board (IAPB) is composed of the ASU Dean of Engineering and other ASU administrators.
- B. The IAPB will work with the CENTER Director to coordinate plans and policies with ASU departmental and university leaders.

#### **ARTICLE XI. Assessment Plan**

- A. The College Research and Evaluation Services Team (CREST) within the Mary Lou Fulton Teachers College at ASU will provide assessment of and collect data across all ERC educational activities.
- B. Implementation, or fidelity to the model, of the program components as outlined in the proposal will be examined through document review, attendance records, and observations of educational programming.
- C. For impact evaluation, pre-test and post-test data will be collected for courses and activities, and exam scores and projects will also be collected and analyzed.
- D. Surveys and focus groups will be employed to assess perceptions, values, and improvement recommendations of student participants at all levels, including college, post-college, professionals in continuing education, and K-12, as well as faculty members, K-12 staff and collaborators (i.e., partners on the project such as science center staff).

#### **ARTICLE XII. Diversity and Education Leadership**

- A. The Education and Diversity Leadership is comprised of the Education Director, Pre-College Education Director, Diversity Director, and the Deputy Director.
- B. The Education and Diversity Leadership will work with CREST to develop annual feedback reports, as well as shorter-term reports in order to provide substantial input into improving the programs over time.
- C. Reports will be reviewed by the IDEA WG and Curriculum Committee, and shared with CBBG faculty and staff.
- D. At least one session at the annual CBBG meeting will include a review of feedback and recommendations on the Education Programs of the Center.

#### **ARTICLE XIII. Diversity and Education Plan**

- A. The Diversity and Education Plan will include a collection of strategies and approaches that can be implemented at partnering schools, colleges, science centers, and in industry settings.
- B. At least one best practice for diversity and education will be identified by each partner institution annually and presented for approval to the Council of Deans.
- C. Approved best practices will be presented at the CENTER Annual Meeting and incorporated into the



## APPENDIX A

### Consortia Bylaws

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Diversity and Education Plan.

#### ARTICLE XIV. Selection of Research Projects

A. Core Projects. Research projects funded through use of NSF funds and/or MEMBER fees are “Core Projects”. Core Projects are subject to the terms and conditions of the IPMA and the NSF grant establishing the Center. The MEMBER fees portion of any funding of Core Projects shall be subject to ACADEMIC MEMBER’S applicable facilities and administration (F&A) rates based on total direct costs of the industry funded portion of the Core Project. Each ACADEMIC MEMBER shall use reasonable efforts to obtain approval for the use of a reduced F&A rate of ten percent (10%) on such industry funded portions of Core Projects.

1. Initial Core Projects: Initial Core Projects are projects identified for first year funding in the proposal approved by NSF.
2. Supplemental Core Projects: Supplemental Core Projects are projects funded through use of NSF and/or Member funds that were not identified for first year funding in the proposal.

B. Non-Core Projects: INDUSTRY MEMBERS may also propose (sponsor) research projects of their choice **related** to the mission of the CENTER. These projects, which are funded by a sponsoring INDUSTRY MEMBER, separate and apart from its membership fees, are called “Non-Core Projects” and carry indirect (F&A) costs at the rates determined by the ACADEMIC MEMBER performing the Non-Core Project. Non-Core Projects are governed by separately negotiated terms and conditions. The terms of these specific research contracts with an INDUSTRY MEMBER for the Non-Core Projects will govern the intellectual property ownership and licensing rights to the intellectual property arising from the performance of the Non-Core Project. The results of these Non-Core Projects will be available to the CENTER membership on the same basis as to any non-member, unless the sponsoring company and the ACADEMIC MEMBER agree otherwise.

C. Supplemental Core Project Proposal Generation. Supplemental Core Projects will be funded on the basis of proposals submitted by faculty and research staff from the ACADEMIC MEMBERS. The Current list of Research Areas will be issued annually as part of a Center-wide Request for Proposals by the CENTER Director. Research Proposals will typically be submitted to the Center Director no later than thirty (30) days before the Annual Meeting. However, Proposals may occasionally be submitted to the Center Director for consideration at other times as necessary to carry out the research needs of the CENTER. All proposals shall be held in strictest confidence by IPAB and SSC members and other Center personnel reviewing the proposal.

D. Supplemental Core Research Proposal Evaluation Process. The evaluation of research proposals by the IPAB and SSC (the BOARDS), and subsequent recommendations to the Center Leadership team on the specific research directions for the CENTER, shall involve the following steps:





## APPENDIX A

### Consortia Bylaws

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1. Evaluation in advance of the Annual Meeting by BOARD members of written proposals submitted according to Article XIV. C above.
2. An oral presentation of the proposals made by student or faculty investigators at the Annual Meeting, followed by discussion.
3. A closed session of each BOARD where strengths and weaknesses of each proposal, viewed in light of the research needs and objectives of the CENTER, are discussed.
4. A secret ballot rating of each proposal by BOARD Members or their substitutes in attendance at the review meeting, using a scale of 0,1, or 2 (0 = should not be funded, 1 = acceptable, and 2 = should definitely be funded). The results of the ratings will be immediately available to the BOARD by presentation of at least the mean rating, the standard deviation, and the number of zero (0) ratings for each proposal.
5. A subsequent discussion of the results of the ratings from Article XIV. D.4 above.
6. A consensus ranking of the proposals into no fewer than two priority groups (low and high priority), which will comprise the final recommendation to the Center Director on specific research projects to be pursued over the next year.

E. Supplemental Project Selection and Resource Allocation. Based on the IPAB and SSC recommendations from Article XIV. D.6 above, complemented by input from the CENTER Thrust Leaders and Education, Diversity, and IAP Directors and other information such as the availability and suitability of students to carry out the research, the total amount of funds available, the status of research equipment, the balance of funding among the ACADEMIC MEMBERS and Center thrusts, and possibly confidential information disclosed to the Director regarding imminent product releases that could compromise the originality of student work, the Director will allocate the resources of the CENTER to research projects.

F. Feedback to IPAB and SSC by Director. The final selection of research projects to be funded and the resource allocation to those projects will be communicated by the Director to the IPAB and SSC Members no later than thirty (30) days from the date of the Annual Meeting. Any substantial deviations from the IPAB and SSC recommendations in Article XIV. D.6 above will be explained in writing and will also be transmitted by the Director to the IPAB Members at that time.

G. Research Credit. All research credit for the funded projects is assigned to the individual PIs and Co-PIs performing the work in the project.

#### **ARTICLE XV. Other Funding Activities**

- A. An overarching goal for the center is to develop a culture of inclusivity and success for all members of the Center. The leadership, faculty, and students involved in an ERC shall be diverse in gender, race, ethnicity and persons with disabilities at levels that are benchmarked against the academic engineering-wide national averages.
- B. The CENTER will prepare and execute inclusion and diversity strategic plans in collaboration with



## APPENDIX A

### Consortia Bylaws

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the home departments of the CENTER-affiliated faculty.

- C. The Center Director will ensure that the Center's engineering workforce development and broadening participation programs and activities build on the philosophy and approaches of the NSF's Inclusion Across the Nation of Communities of Learners that have been Underrepresented for Diversity in Engineering and Science (INCLUDES) Program. EWD program outcomes and curriculum/outreach products will be disseminated to the participating partner and outreach institutions and as materials for workforce training. The EDW program will include assessment conducted by party external to the ERC to monitor progress and impacts over time and to improve the program as needed.
- D. In fulfilling its obligations under the agreement and in compliance with the requirements of federal law, no university receiving federal funds will employ quotas or set-asides based on race.
- E. Center activities in support of this goal include:
- Research Experiences for Undergraduates Program (REU), supported by using CENTER base budget funds (at least \$42,000 per year). The REU program will have a focus on increasing diversity. The CENTER also may augment base REU Program support through a combination of REU supplemental and/or site awards to individual CENTER faculty or institutions as long as those students have an interdisciplinary CENTER experience with exposure to industry.
  - Research Experiences for Teachers Program (RET), supported using the CENTER's base budget funds (at least \$84,000 per year). The RET program will have a focus on increasing diversity. The CENTER may augment base CENTER RET Program support through a combination of RET supplemental and/or site awards to individual CENTER faculty or institutions as long as those teachers work in CENTER laboratories and have an interdisciplinary CENTER experience. Materials developed in this program will be shared across the CBBG partners and nationally (via our web portal) after they are content-vetted and tested, integrating input from the CBBG assessment team, IDEA Working Group, and Curriculum Committee.
  - Stimulating member firms to support sponsored projects for the purposes of translating center-generated Intellectual Property (IP) to commercialization.
  - Building partnerships with federal, state, or local government programs designed to develop entrepreneurs, support start-up firms, and otherwise speed the translation of ERC-generated knowledge and technology into practice and products.
  - Collaboration with Small Business, including:
    - SBIR/STTR. Leveraging technology commercialization opportunities offered by the federal Small Business Innovation Research (SBIR)/Small Business Technology Transfer Research (STTR) programs. The CENTER will include analyses to determine the most effective methodologies to use to achieve these innovation goals through these types of partnerships.



## APPENDIX A

### Consortia Bylaws

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- Translational Research Fund. All ERCs will have member firms engaged in translational research through sponsored projects, and small firms carrying out translational research supported by funds from the ERC Program's Translational Research Fund or other non-ERC, non-member, non-university sources for ERC-generated Intellectual Property (IP) that member firms do not license.

Support for a translational research project to accelerate product development can be sought from NSF through the ERC Translational Research Fund; in that case, the small firm would be the submitting organization, with a subaward to the ERC faculty.

#### ARTICLE XVI. Conflict of Interest

- A. Each partner university will report on Conflicts of Interest (COI) of any CENTER faculty, Industrial Liaison Officers (ILO), and/or CENTER Executive Management personnel to the Administrative Director.
- B. When conflicts are disclosed for any of the above three categories of personnel, the university impacted must develop a COI management plan for each disclosure.
  - a. Compliance with the COI management plan and impacts on the project (if any) will be documented, reported to the Administrative Director, and included in the CENTER's annual report to NSF.
  - b. If NSF supports such a project as an associated project outside the center's core funds (e.g., a translation research project), any additional IP developed from that project would not revert to the university or member firms.

#### ARTICLE XVII - Guests at CENTER and IPAB Meetings

A. Guests defined. A guest of the CENTER is someone who is 1) not employed by a member company, and 2) not an active participant in one of the CENTER research projects. Guests might be researchers from non-member companies, government labs, or Institutes, or university faculty or students who are not currently members of the CENTER.

B. Purpose of Guests. It is expected that on occasion it might be advantageous to have guests attend CENTER review meetings. Acceptable reasons for allowing guests can include: recruitment of new members; and to have the guest make a technical presentation or provide technical information that is important to the success of the CENTER. Experts in the field of the research may also be invited as guests to support the evaluation of the proposals.

C. Approval of Guests. Members of the IPAB, the SSC, and the CENTER Director, Deputy Director, and Thrust Leaders may propose to the Executive Committee, via writing or EMAIL, that a guest be invited to a CENTER Meeting. This request shall be made no later than fourteen (14) days prior to the meeting. If there is unanimous approval by the Executive Committee, an invitation will be extended to the guest. If there is not unanimous approval, the member(s) of the Executive



## APPENDIX A

### Consortia Bylaws

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Committee opposing the invitation shall explain in writing to the party proposing the invitation why the invitation was not approved.

D. Confidentiality. Guests will be asked to agree that Subject Data, Data Supplied by Members, or any other information obtained from the CENTER shall not be used or disclosed to others, provided, however, that the foregoing obligation of non-use and non-disclosure shall not apply to any portion of the Data or Information received which: (i) is or shall have been known to the Guest before his receipt thereof; (ii) is disclosed to the Guest by a third party who did not have prior obligation of confidentiality with the Guest; or (iii) is or shall have become known to the public through no fault of the Guest. Guests shall be asked to sign a nondisclosure agreement.

#### **ARTICLE XVIII. Responsibility of Members and CENTER Researchers Regarding Disclosure of Subject Data and Data Supplied by Members**

In addition to “Item 5. Confidentiality” of the IPMA, the Bylaws include the following:

A. Definitions. The handling of subject and confidential data is defined in the AGREEMENTS.

B. Rationale. Some of the value of CENTER Membership to a company or other entity involves early exposure to ideas and results from the CENTER research. Because of the wide spectrum of industry sectors represented in the CENTER, there will be cases where subject data provides a competitive advantage for one Member company and not for another. Therefore, some constraints on disclosure of CENTER data are required.

C. Responsibilities of Personnel from Members. Personnel representing member companies or entities shall not distribute information, ideas, or subject data obtained from or through the CENTER to anyone outside of their immediate member company or entity other than affiliates and subsidiaries fifty percent (50%) or more of whose voting equity is owned by the member company until these have undergone public disclosure.

D. Responsibilities of Personnel from Consortia. When a Consortium is a member of this CENTER paying a single-membership fee, the Consortium representative appointed as a member of the IPAB shall routinely transmit to its own Member companies no more than the following: 1) a brief summary of CENTER projects, including objectives, tasks, and some research results (e.g., a few slides per project) that may represent data not yet available to the general public but that have been explicitly approved for disclosure by the IPAB, and 2) an Annual Report highlighting CENTER Activities. Benefits of membership do not accrue to individual firms that are members of a Consortium, unless they are also paying separate membership fees to the CENTER.

#### **ARTICLE XIX. Mentor Program**

A. Members will be encouraged to assign Mentor(s) to act as the primary technical contact(s)

Appendix A 11JAN2016

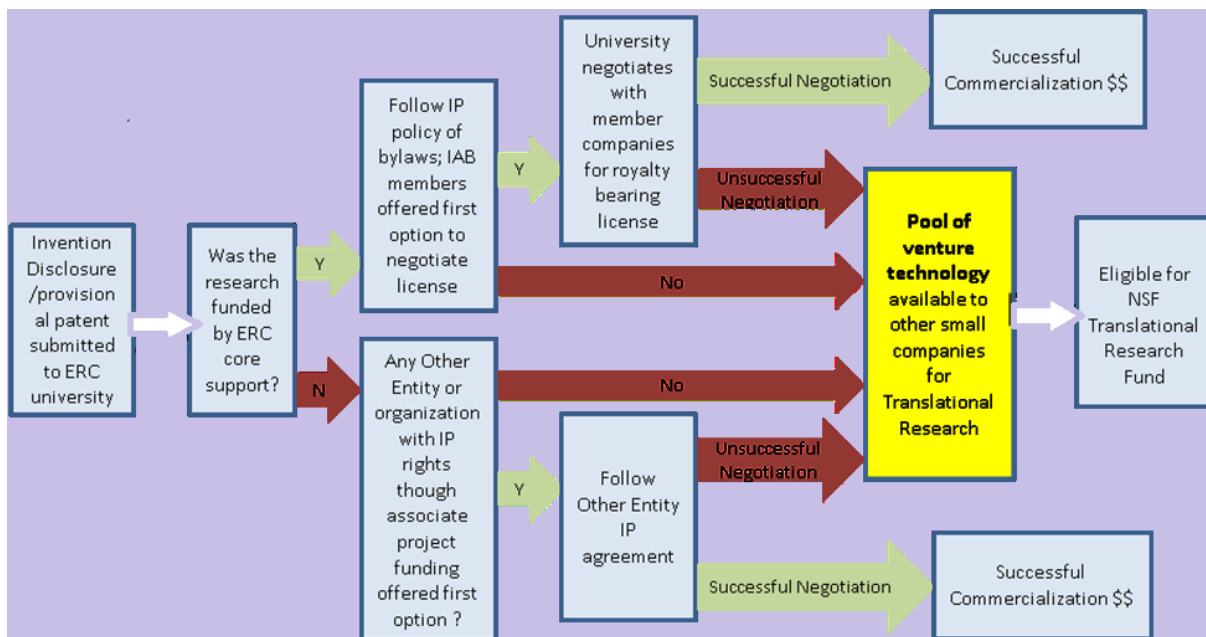
## APPENDIX A Consortia Bylaws

and advisor(s) for CENTER projects.

- B. The Mentor interactions, on the University side, will preferably involve the students.
- C. Industrial Mentors and University counterparts will be encouraged to have more regular contacts and visits than represented solely by the Semiannual CENTER reviews.
- D. Mentors of ongoing or proposed projects will be listed on proposals and progress reports.

### ARTICLE XX. Intellectual Property

- A. The ERC IP Process Flow is as defined by the NSF ERC Best Practices Manual (see figure below). It is anticipated that development leading to commercially viable products and processes will be primarily performed by industry members, rather than the ERC; but the ERC is truly a partnership to develop and translate research to market-impacting offerings. Additional definitions are found in the other AGREEMENTS.



### XXI. Public Access to Publications

NSF will require that either the version of record or the final accepted manuscript in peer-reviewed scholarly journals and papers in juried conference proceedings or transactions must:

- Be deposited in a public access compliant repository designated by NSF;
- Be available for download, reading and analysis free of charge no later than 12 months after initial publication;
- Possess a minimum set of machine-readable metadata elements in a metadata record to be made available free of charge upon initial publication;
- Be managed to ensure long-term preservation; and



## APPENDIX A

### Consortia Bylaws

- Be reported in annual and final reports during the period of the award with a persistent identifier that provides links to the full text of the publication as well as other metadata elements.

#### XXII. NSF Required Clauses

Definitions:

Awardee: LEAD UNIVERSITY

Subawardee: ERC Partner Universities

Participant Support: IPM fees

1. NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) dated December 26, 2014 apply.
2. Contractual arrangements should contain appropriate provisions consistent with Articles 8.a.4 and 9 of the CA-FATC.
  - a. Article 8.a.4: Consistent with the guidance in 2 CFR § 200.331, awardees must adhere to the requirements for pass-through entities in establishing and managing subawards and contracts issued under the award. In addition, awardees shall ensure that the following articles, if applicable, flow down to all subawardees, or are appropriately addressed in the subaward instrument: Articles 5, 7, 9, 10, 11, 12, 17, 18, 25, 26, 27, 28, 29, 30, 31, 34, 35, 36, 37, 38, 39, 40, 41, 42, 46, 47, 48, 49, 50 and 51. If the awardee issues contracts exceeding \$2,000 for construction, alteration or repair that are within the scope of the Acts found in 2 CFR § 200, Appendix II, "*Contract Provisions for Non-Federal Entity Contracts Under Federal Awards*," the appropriate clauses applicable to construction activities also will be included in applicable contracts.
  - b. Article 9: Procurement Standards - Whether or not approval of a procurement is required under Article 8a, where appropriate, the awardee (including commercial organizations) is responsible for compliance with the procurement standards identified in 2 CFR § 200.318. The awardee also is responsible for ensuring that the provisions contained in Appendix II of 2 CFR § 200 are made a part of any contract whose award amount exceeds the simplified acquisition threshold (currently \$150,000). See FAQ 200.110-6 of the *Frequently Asked Questions for The Office of Management and Budget's Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards at 2 CFR § 200* (dated November, 2014) regarding Effective Dates and Grace Period for Procurement. See also FAQ 200.320-2 regarding Methods of Procurement - Sole Source for Research.
3. Funds provided for participant support may not be diverted by the awardee to other categories of expense without the prior written approval of the cognizant NSF Program Officer.
4. Cost Share – No Federal funds may be used to meet the (sub)awardee's cost share obligation for this project. The amount of cost sharing must be documented on an annual and final basis, certified by the Authorized Organizational Representative, and reported to the managing NSF Program Officer via FastLane.
5. In accordance with sections 1869a and 1869b of title 42 of the United States Code, the awardee will do the following:



## APPENDIX A

### Consortia Bylaws

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- a. Obtain from the school board or comparable authority responsible for the schools considering participation in the project, written approval prior to involvement of pre-college students in pre-college education research and development, pilot-testing, evaluation, and revision of experimental and innovative pre-college curriculum.
  - b. Include in every publication, testing, or distribution agreement involving instructional materials developed under this grant (including, but not limited to, teachers' manuals, textbooks, films, tapes, or other supplementary material) a requirement that such material be made available within the school district using it for inspection by parents or guardians of children engaged in educational programs or projects using such material of that school district.
6. All materials produced as part of this project, including electronic components such as World Wide Web pages, must include a clear indication of source(s) of support (both NSF and any other contributors).
7. Costs of entertainment, amusement, diversion and social activities, and any costs directly associated with such costs (such as meals, lodging, rentals, transportation and gratuities) are unallowable. No NSF funds may be spent on meals or coffee breaks for intramural meetings of an organization or any of its components, including, but not limited to, laboratories, departments and center. When certain meals are an integral and necessary part of a conference or meeting (i.e., working meals where business is transacted), NSF funds may be used for such meals.
8. Foreign Collaborators:
  - a. The ERC will establish, over time, a set of collaborations between ERC faculty and faculty in foreign universities that include student involvement in research. These collaborations also may be with researchers in foreign institutes that function in a precompetitive research "space" as opposed to foreign institutes supported to advance new product development.
  - b. These partnerships may be formally established between the ERC and a foreign university through a Memorandum of Understanding (MOU), for example, or they may be less formal ERC faculty-to-foreign faculty collaborations. In either case, the Gen-3 ERC must ensure that the foreign collaboration adds value to the research and fully consider putting a protective Intellectual Property (IP) policy in place if necessary. When it is appropriate for satisfying the ERC mission, the ERC will also offer ERC students the opportunity to work for a sufficient period of time in a foreign laboratory to provide a meaningful research experience.
  - c. U.S. Student Involvement at Foreign Collaborators Laboratories: If there is a large number of U.S. ERC students who work in the laboratories of any foreign faculty collaborators resulting in a large accrual of materials costs, the ERC may provide a sub-award to that foreign university to cover those costs.
9. Reporting Requirements: Awardee will provide ad hoc and regular reports as designated by the NSF cognizant Program Official, with content, format, and submission time line established by the NSF cognizant Program Official. The Awardee will submit all required reports via FastLane using the appropriate reporting category; for any type of report not specifically mentioned in FastLane, the Awardee will use the "Interim Reporting" function to submit reports.



## APPENDIX A

### Consortia Bylaws

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- a. Annual Report. The Awardee shall submit an Annual Report which will contain specific information including, but not limited to, the following: the progress and plans of the ERC in all areas in achieving its vision with supporting data developed from the data submitted to the ERC Program's data base of indicators of progress and impact, information on revenues and expenditures, and proposed budgets. The annual report should also include plans, quantitative information on performance and the ERC's impact on diversity. The annual report is due at least five weeks prior to the annual site visit and at least 11 weeks prior to the anniversary date of the award. The annual report must be prepared according to the online document "Guidelines for Preparing ERC Annual Reports and Renewal Proposals," which is available at: <https://www.ERC-reports.org>
  - b. Data Tables: NSF maintains a database, ERC Web, to collect and report quantitative and qualitative data for all of the ERCs. Each center is required to enter data into the database annually as instructed the "Guidelines for Preparing ERC Annual Reports and Renewal Proposals" and the "Guidelines for ERC Web Data Entry." Both documents can be found at the website <https://www.ERC-reports.org>. Many of the data tables required in the Annual Report are produced from the data submitted to the ERC database. The Center will print these tables directly from the database website and use them in their respective Annual Reports. Details, data collection requirements and procedures for entering data are available in the "Guidelines for ERC Web Data Entry" document.
  - c. Renewal Proposal. In lieu of the third-year annual report, the Awardee may submit a renewal proposal that contains a cumulative progress report covering the period from the beginning of the ERC to the date of submission of the renewal proposal, a request for support for years four through eight, and plans for center activities during year four through eight of this Cooperative Agreement. The progress report/renewal proposal is due at NSF by a date agreed upon between NSF and the Awardee. If the Awardee chooses not to submit a renewal proposal, NSF support to the Center will be phased down over the two years remaining in the period of support provided by this Cooperative Agreement. The progress report/renewal proposal is due at NSF by a date agreed upon between NSF and the Awardee. If the Awardee chooses not to submit a renewal proposal, NSF support to the Center will be phased down over the two years remaining in the period of support provided by this Cooperative Agreement.
10. Specific Issues with this ERC:
- a. Alignment of Thrust 4 especially the research component dealing with enhancing oil and gas production to the vision of the Center;
  - b. Continuing to hone the Center's engineered system vision especially explaining the vision to a non-civil engineering audience;
  - c. Ensuring that the Center adheres to a dynamic and interactive LCSA methodology for selecting projects and ensuring that all stakeholders (industry, public agencies) are full partners to the Center.

**END OF BYLAWS**