

Bylaws and Articles of Collaboration of Trustees of Boston University Center for Semiconductor Modeling Consortium

Article 1: Name and Purpose

These *Bylaws and Articles of Collaboration* (the “Agreement” or “*Articles of Collaboration*”), effective the last date executed by the parties, hereby establish the Boston University Center for Semiconductor Modeling (CSM) Consortium (“Consortium”). These *Articles of Collaboration* are entered into between the academic and industrial entities that make up the Consortium, as delineated in Article 2.

The Consortium Members have each agreed to form this multidisciplinary consortium in order to foster in-depth collaboration among the participants, with emphasis on developing robust and predictive semiconductor materials and device models to minimize risk in developing new technology. The CSM will focus on the theory, simulation and experimental validation of the models. The Consortium Members will team to formulate joint proposals to target and capture external funding to support research needs and accelerate the transition of new concept/ideas to working technologies.

Objective of Consortium. It is the overriding objective of the Consortium to:

- Bring together government, academia, and industry in a collaborative fashion to address research opportunities through its Open Campus initiative.
- Collaborate with diverse group of scientists to accelerate the development of a novel design approach to improve the ability of the science and technology community to develop novel semiconductor devices and transition into specific system applications.
- Develop robust and predictive models to minimize risk in developing new technology. The Consortium will focus on the theory, simulation and the experimental validation of the models.
- Exchange researchers between Consortium Members to facilitate the execution of joint research projects.
- Provide educational programs to foster scientific interchange and facilitate transition of new technologies within the technology community.
- Provide access to unique infrastructure at Member organizations.

Articles of Collaboration. The Consortium Members agree to execute these *Articles of Collaboration* to address the various operational aspects of the Consortium.

Article 2: Identity and Roles of the Consortium Industry Members and University Members

Academic Lead Member. Trustees of Boston University (BU) shall be the Academic Lead Member (ALM) of the Consortium. The role of BU is to lead the Research and Transition Component of the Consortium and manage the overall Consortium Program. In its role as Academic Lead Member, BU is an accredited advanced degree (PhD)-granting U.S. educational institution well known for world- class research in interdisciplinary science, engineering, and software development.

The Academic Lead Member shall:

- Provide leadership in fulfilling the Consortium vision of identifying and accelerating the infusion of new technologies.

- Manage the Consortium research projects as determined by the Steering Committee. Actively solicit opportunities for collaboration between and the Consortium and the extended research community.
- Comply with all Consortium reporting requirements including joint papers and presentations, journal articles, and workshop proceedings.
- Promote and utilize “blended” research teams (multi-institution) across the Consortium’s research portfolio.
- Administer and manage the funds collected through the Consortium.
- Be responsible for the management and integration of all the Consortium’s efforts under the Cooperative Agreement or other legal mechanisms.

Industry Member (FULL Consortium Member) - \$25,000 annual membership

Intended for major companies in need of CSM solutions and access to expertise and pre-competitive research results. This Membership tier is for all companies having more than \$5M in annual revenue.

Benefits:

- Identified as Industry Leader in CSM website and promotional materials
- Admission to semi-annual CSM Member meetings for those employees asked to be added to the guest list.
- Access to CSM facilities in accordance with applicable policies
- Opportunity to participate in CSM collaborations
- Notification and opportunity to participate in grant proposals to federal agencies
- Early access (before publication) to Consortium-funded research results and generated IP
- Non-Exclusive Royalty Free (NERF) license for internal, non-commercial purposes and potential for commercial license
- One seat on the Consortium Steering Committee to set direction and select projects for funding.

Industry Members can buy up to ONE additional Membership for an additional \$25,000 which would allow for another seat on the Consortium Steering Committee. Representation on the Consortium Steering Committee will be capped at two (2) seats per Member.

Industrial organizations with more than \$5M annual revenue, which are not in the business of making and selling products (e.g. material growth foundries, R&D organizations, etc.), have the option of making membership contribution with in-kind resources.

Industry Member (AFFILIATE Consortium Member) - \$5,000 annually or equivalent in-kind resources.

Intended for small innovative businesses in need of CSM solutions or engaged in the development of that technology and its applications. These companies must have less than \$5M in annual revenue.

Benefits:

- Identified as Industry Affiliate Consortium Member on CSM web site and promotional materials
- Free admission to the annual Consortium Member meeting
- Access to CSM facilities at a discounted rate in accordance with applicable policies
- Opportunity to participate in CSM collaborations
- Notification and opportunity to participate in grant proposals to federal agencies
- Input into direction of Consortium-sponsored research – through written white papers to the Steering Committee.

University Members —In-kind resources

Intended for other Universities to participate in the CSM research activities and serve as partnering sites for some CSM research. Notification and opportunity to participate in grant proposals to industry and federal agencies as allowed. University Members are non-voting Members of the Consortium and will be subject to a separate University Membership Agreement.

Article 3: Recruiting Members/Removing Members of the Consortium

Full and Affiliate Membership enrollment will occur during an open enrollment period each year from January 1 - January 31. **Note: The first year membership will be a 16 month membership for the period of September 1, 2018- December 31, 2019. Membership in subsequent years will be on a calendar year basis.**

Membership starts on the date the Consortium agreement is signed by the member and the membership fee is received, and continues until the end of the calendar year of enrollment. The Membership continues by default in subsequent years, unless the member decides to terminate Membership by giving BU 180-day written notice prior to the termination date.

Membership fees are payable annually, and are used to support Consortium research.

Consortium Membership is open to US corporations and foundations or US affiliates or subsidiaries of international corporations. Exceptions may be considered only via approval by the CSM Steering Committee; and will require a unanimous vote for membership. Government agencies, federally funded research & development corporations (FFRDC) and government owned contractor-operated laboratories, must participate via MOUs within the Center for Semiconductor Modeling.

Article 4: Organizational and Management Structure of the Consortium

Consortium Advisory Board: The Consortium Advisory Board will consist of the Consortium Director (Academic Lead PI/PD), the ARL Director or a designated representative, the CERDEC NVESD Director or a designated representative, an AFRL representative, an NRL representative, and any other scientific advisors that the Advisory Board or Consortium Director require. The Advisory Board's task is to set up operational processes and to guide the operation and research priorities of the Consortium. The Advisory Board will meet via conference call at least quarterly.

Consortium Steering Committee: The Consortium Steering Committee will consist of 1 (one) voting member from each Full Membership, the Consortium Director, members of the Consortium Advisory Board as needed, and representatives from any participating federal agencies. All Consortium Steering Committee members have an equal voice in setting the Consortium research agenda. The Consortium Steering Committee will be chaired by the CSM Program Director (an ARL lead). Additional scientific advisors maybe invited to join the Consortium Steering Committee as required by the Committee.

The Consortium Steering Committee will determine what research topics will be addressed with Consortium funds. It will also be responsible for selecting pilot projects and ensuring that those projects funded are meeting their milestones. A simple majority of the voting members will be required for project selection. In the event that a simple majority does not approve any pilot projects, projects may be selected by the CSM Program Director. Employees of other Federal government agencies who have MOU's with the CSM will not be voting members of the Steering Committee, but will play an advisory role.

Consortium Director: The Consortium Director will be appointed by the Academic Lead Member at BU. The Consortium Director shall provide leadership and be responsible for management of the overall Consortium Program. The Consortium Director has day-to-day responsibilities for the organization, including carrying out the Consortium's goals and objectives. The Consortium Director will attend all meetings, report on the progress of the organization, answer questions of the CSM, and carry out the duties of the Consortium.

The Consortium Director carries out multiple responsibilities, including serving as a tenured-faculty member at the Academic Lead University, working as a Consortium research PI, and leading the Consortium Program with the overall responsibility to the program. The Consortium believes it is very advantageous to the Consortium program that the Director continue to be a teacher, active researcher, and R&D manager because all three of these responsibilities represent the major Consortium program goals.

Committee Formation: The Steering Committee may create subcommittees on an as- needed basis to serve specific needs of the Consortium. Membership to these subcommittees will be determined as needed. The Consortium Director will appoint all subcommittee chairs.

Article 5: Strategies for Effective Collaborative Research

The Consortium will address collaborative research issues through various strategies, including:

- Providing seed funding to research topics selected by the Consortium Steering Committee.
- Utilizing “blended” research-PI teams that feature PIs and researchers working together on research projects across our entire research portfolio.
- Forming joint proposals to target and capture external funding to support research needs and accelerate the transition of new concepts/ideas to working technologies.
- Enhancing the interaction between the Consortium Members and CSM to evaluate and use the simulation tools and develop ideas/methodologies for model validation. Researchers and scientists from Member organizations are encouraged to spend time at BU and other Consortium entities. Students and postdoctoral fellows supported by CSM will be available to collaborate with Member organizations based on the specific project requirements and approval by Consortium Steering Committee.
- Holding biannual (2 per year) Consortium meetings.
- Distributing quarterly updates via a webinar or newsletter and annual reports via website or publication.
- Holding regular presentations of research and technology developed within CSM at technical conferences.
- Assisting researchers in the implementation of new technologies and techniques developed or identified by CSM to improve the speed and quality of research.

Types of Collaborative Opportunities:

Self-funded:

This includes unfunded collaborations with in-kind exchanges between individuals associated with Consortium Members institutions, fostered by Consortium meetings and open resources. No- or low-cost general activities that may fall in this category include:

1. Experts database: Researchers can fill in a page for a web-based data base available to all other Members. This will enhance collaborations among Members both on unfunded basis and when applying for grants.
2. CSM External Web Site: This site will disseminate news and highlights, giving CSM a higher profile and increasing the opportunities for PI level and centrally funded grants. It will also list points of contact and Consortium Members.

3. **Workshops:** Talks and posters at bi-annual Consortium meetings will showcase CSM results and will provide opportunities for connections with federal agency program managers, Member organizations (who may sponsor follow-on research) and prospective collaborators will be invited to participate. Invited talks and posters, and the number of contributed posters, will be determined by the Steering Committee on a case by case basis for each meeting.

Funded:

Consortium Members have many advantages, listed below, that will help when they write individual PI grant proposals. Results from Consortium-affiliated grants can be listed as Consortium accomplishments.

1. **Consortium Funded:** Funds generated through Membership fees will be available for research topics decided by the CSM Steering Committee.
2. **Individual Grant Sponsored:** Individual Members or groups of Consortium Members can write grant proposals to typical funding agencies highlighting the research advantages of Consortium Membership, and will list the outcomes under these grants as Consortium accomplishments.
3. **Sponsored Research:** Larger grants may fund Consortium opportunities for targeted research areas.

Meetings and Workshops:

Consortium Members, potential Members, and invited guests can collaborate via the research and innovation conferences, described as follows:

1. **Annual Consortium General Meeting:** This annual meeting will highlight the status of the Consortium and its programs. All recipients of Consortium funds are required to present the results of their programs at this meeting. The location and date will be decided by the Consortium Steering Committee
2. **Annual Focused Symposium:** An annual symposium will be held focused on a specific Consortium research topic where needs, status and technology gaps will be discussed. The topic, location and date will be decided by the Consortium Steering Committee. The goal is to have discussions on how any technology gaps may be addressed and to identify collaborative opportunities to address those gaps. These topics may relate to future Consortium funding opportunities.

Article 6: Financial and Administrative Responsibilities of the Academic Lead Member

Administrative Management: The Academic Lead Member, will be responsible for the oversight and management of all administrative functions for the Consortium, including ensuring timely completion of milestones and tracking budgets (see finance), internal and external reporting, coordinating meetings and conferences, maintaining the Consortium website, and ensuring compliance with university, local and federal requirements.

Managing Consortium Finances: The financial matters of the Consortium will be managed by the Academic Lead Member, which will be responsible for ensuring that the monies budgeted for the activities of the Consortium will be committed in a timely and expeditious manner. In this capacity, the Academic Lead Member shall also be responsible for:

- Disbursing funds on a timely basis to ensure the success of Consortium-sponsored research projects and overall management and administration of the Consortium Program.
- Publishing a monthly internal “funds tracking report” for the Advisory Board to track disbursement of program funds.
- Ensuring that within three months of completion of the Focused Projects, all invoices are submitted in

connection with that project.

- Developing and reviewing financial procedures, contracting with the Consortium Members and supporting the annual budget plan and seed funding projects.
- Presenting the budget and planned expenditures to the Advisory Board and Steering Committee for approval. Federal representatives will serve in an advisory capacity only.
- Ensuring that annual financial reporting requirements are met and submitted to the Steering Committee, showing income, expenditures and committed funds.

Article 7: Intellectual Property

Success of the Consortium is dependent on the establishment and maintenance of a collaborative research environment that encourages and facilitates the sharing of intellectual property while providing adequate protection of ownership rights. Per the Cooperative Agreement, the United States Government (USG) shall obtain "Government Purpose Rights" to Intellectual Property developed in the course of performing under the Cooperative Agreement. (See 37 CFR Part 401, 32 CFR 32.36, and 34 CFR 34.25 included by reference in the Cooperative Agreement).

7.1 Definitions:

- (i) Participants – “Participants” shall include the Academic Lead Member, Consortium Industry Full and Affiliate Members, University Members, and Subawardees
- (ii) Intellectual Property - "Intellectual Property" refers to intangible personal property including, but not limited to, copyright, patents and patent applications, trademarks, technical data and software rights.
- (iii) Consortium Intellectual Property - "Consortium Intellectual Property" means that Intellectual Property made or created by a Participant in the course of performing tasks under the Consortium with Consortium funding, which includes Center funding or Consortium Membership fees.
- (iv) Subject Invention – “Subject Invention” shall mean any invention made on the basis of Consortium Intellectual Property.
- (v) Excluded Intellectual Property - "Excluded Intellectual Property" means Intellectual Property that is made or created by a Participant outside of the course of performing tasks under the CSM Consortium without Consortium funding.

7.2 Ownership - Each Participant has the option to retain sole title and ownership to Consortium Intellectual Property created solely by its employees. Consortium Intellectual Property made or created jointly among Participants shall be jointly owned by such Participants.

7.3 Non-Exclusive License to Members for Consortium Purposes - Each Participant hereby grants to all other Participants a nonexclusive, royalty-free, non-sublicenseable, non-assignable license (NERF) to Consortium Intellectual Property, for the limited purpose of performing tasks under the Consortium.

7.4 Patents

7.4.1. Patent Filing- Solely Owned Inventions- Each Participant electing to retain sole title to any Subject Inventions made solely by its employees shall be subject to the obligations and conditions set forth in 37 CFR Part 401, Section 401.14.

7.4.2 Patent Filing- Jointly Owned Inventions- In the event that a Subject Invention is jointly made by employees of more than one Participant ("Inventing Participant") during the performance of the Cooperative Agreement:

- Each Inventing Participant electing to retain title to its ownership interest received through its employees

shall be subject to the obligations and conditions set forth in 37 CFR Part 401, Section 401.14;

- Said Inventing Participant(s) shall jointly determine whether an application for patent shall be filed on such joint invention, the identity of the Participants who will prepare and file such application, and the countries in which such application will be filed;
- Unless otherwise agreed by the Inventing Participants, the actual out-of-pocket expenses of patenting such joint invention shall be divided equally between the Inventing Participants, provided that, when one Inventing Participant elects not to share equally in the expenses, the other Inventing Participant(s) shall have the right to seek or maintain such protection for such joint invention at its (their) own expense and shall be granted by the non-paying Inventing Participant full control over the preparation, prosecution and maintenance of the patent application and issuing patent, even though title to any issuing patent will be jointly owned.

7.4.3 Disclosure and Prosecution of Participant Inventions- An Inventing Participant will report in writing to the Academic Lead Member (ALM), or its designee, each Subject Invention within three (3) months after the Inventing Participant inventor discloses it in writing to the Inventing Participant's personnel office or office responsible for patent matters, or within six (6) months after the Inventing Participant becomes aware of the Subject Invention, whichever is earlier. At the time of such reporting, the Inventing Participant will provide the ALM with a copy of such invention disclosure along with an abstract of the Subject Invention. The ALM, or its designee, will report the invention to the CSM Program Director. Any Participant may obtain a copy of the above disclosure from the ALM, or ALM designee, and will respect the invention's confidentiality. An Inventing Participant will also notify the ALM, or its designee, of any publication, sale, offer for sale or public use of the Subject Invention, and whether a manuscript has been submitted for publication at the time of the disclosure, or anytime thereafter until the filing of a patent application. An Inventing Participant will also notify the ALM, or its designee, promptly of any filing of a patent application, decision not to file, pay maintenance fees, continue prosecution or defend in reexamination or opposition proceeding any patent or patent application or a Subject Invention.

7.5 Obligation to Negotiate - All Inventing Participants agree, to the extent rights are available, to negotiate with other Participants licenses to Consortium Intellectual Property which they own, solely or jointly, on reasonable terms and conditions, for the purposes other than performance of tasks under the Consortium.

7.6 No Accounting- Subject to the licenses granted pursuant to this Agreement, or any separate written agreement to the contrary, each Inventing Participant shall have the right to license its solely owned or jointly owned Consortium Intellectual Property to any third party, independently and at such royalty rates and upon such terms and conditions as it may determine. All royalties resulting from such licensing may be retained solely by the licensing Participant without a requirement for accounting to any other Participant or to the Consortium.

7.7 Pre-Existing Rights. Except to the limited extent required to perform a party's obligations under this Agreement, no Participant receives any right, title, or interest in or to any research materials provided to it by any other Participant, to any Consortium Intellectual Property created by any other Participant, or to any Excluded Intellectual Property.

7.8 Rights Subject to Federal Patent Policy. The assignment of title or the granting of any license above is subject to the rights of the Federal Government and Federal law set forth in 35 U.S.C. §§ 200 *et. seq.*, as amended, and the regulations promulgated thereunder, as amended, or any successor statutes or regulations (the "Federal Patent Policy"). Any right granted in this Agreement greater than that permitted under the Federal Patent Policy will be modified as may be required to conform to the provisions of the Federal Patent Policy.

Article 8: Internal Dispute Resolution.

The Consortium Members recognize that disputes between them arising under this Agreement are best resolved by all the parties directly involved and pledge their good faith and best efforts in order to reach an equitable resolution should a dispute arise.

The Consortium Members also agree that any dispute arising under these *Articles of Collaboration* that cannot be resolved directly, shall be submitted by the disputing parties to the Consortium Advisory Board. If a resolution still cannot be reached, a full report summarizing the nature of the dispute and the Consortium Advisory Board's previous efforts to resolve the dispute shall be provided to the Academic Lead Member by the Consortium Advisory Board, and the Academic Lead Member shall determine the appropriateness of employing Alternative Dispute Resolution to settle the dispute.

Article 9: Handling of Proprietary, Classified and Sensitive Information

The Consortium Members favor an open-publication policy to promote the commercial acceptance of the technology developed by Consortium under this Agreement. However, the Consortium Members also simultaneously recognize the necessity to protect confidential or proprietary information or data ("Proprietary Information"). **Note as to classified information: the Academic Lead Member (Boston University) does not maintain facilities to support handling of classified information and will not accept information of classified nature into the facility environment.**

The Consortium Members agree to utilize any Proprietary Information received from another Member under the terms of this Agreement for the sole and express purpose of performance under this Agreement. In order to be deemed Proprietary Information under this Article 9, said information must be marked or designated in writing as proprietary or confidential by the disclosing Member. The Consortium Members retain the right to refuse to accept any such information which they do not consider to be essential to the completion of the Project or which they believe to be improperly designated as Proprietary Information. The Consortium Members shall be bound to protect Proprietary Information from disclosure in accordance with this provision unless it has already been published or publicly disclosed by the disclosing Member or is required to be disclosed by a court of law. In order to be deemed Proprietary Information, confidential oral disclosures must be specified and designated as proprietary in writing within thirty (30) days of oral disclosure. Each Consortium Member further agrees to observe at least the same standard of safeguarding such Proprietary Information as it does for its own similar information and data. The Consortium Members agree to return to the disclosing Member, or destroy, all Proprietary Information related to this Agreement that it has in its possession upon completion or termination of this Agreement.

For any work that is not deemed fundamental research, Boston University must approve a Technology Control Plan for any work that is subject to export control laws and regulations, including those implemented by the Department of State through its International Traffic in Arms Regulations (ITAR), the Department of Commerce through its Export Administration Regulations (EAR), and the Treasury Department through its Office of Foreign Assets Control (OFAC). Members who plan to disclose export-controlled information shall coordinate on developing the Technology Control Plan. No export-controlled information shall be shared with BU until the Member is cleared to do so by BU's Export Compliance Officer.

Article 10: Publications and Press Releases

The basic objective of research activities by the Consortium is the generation of new knowledge and its expeditious dissemination for the public's benefit.

Each PI and Consortium Member shall grant the Consortium Director or designee the opportunity to review proposed publications or abstracts of presentations funded by the Consortium or resulting from Consortium funding, not less than 14 days prior to submission, for the purpose of verifying that no Proprietary Information is released to the public, and to ensure compliance with this Cooperative Agreement. The Consortium Members

and the Government agree to confer and consult with each other prior to publication or other disclosure of the results of work under this Agreement to ensure that no proprietary information is released. Prior to submitting a manuscript for publication or before any other public disclosure, each PI, Consortium Member, or Staff Scientist will offer the Advisory Board ample opportunity (not to exceed 30 days) to review such proposed publication or disclosure, to submit objections, and to file application letters for patents in a timely manner.

BU and the University Members (collectively referred to in this paragraph as “University Participants”) reserve the right to publish in scientific or engineering journals and/or present in professional meetings the results of any research they perform. University Participants will submit any proposed publication or presentation to each Industry Member in writing, containing results of the research program of the University Participant. The Industry Member shall have the right to request a delay in publication for a period not exceeding ninety (90) days from the date of submission to the Industry Member, in order to identify patentable subject matter and to identify any inadvertent disclosure of Company’s Proprietary Information included in the proposed publication, provided that the Company makes a written request and justification for such delay within forty five (45) days from the date the Member Company is notified of the proposed publication or presentation. Information subjected to ITAR regulation will be covered by the appropriate technology control plan as governed by the *Articles of Collaboration* in Article 9.

Article 11: Amending this Agreement

These *Articles of Collaboration* may be amended when necessary by the CSM Steering Committee. Proposed amendments must be submitted to the Consortium Director and BU and will be decided upon by majority vote of the CSM Steering Committee. Updates will be sent out with regular board announcements.

Article 12: Entire Agreement

This Agreement, along with all attachments, constitutes the entire agreement between the parties concerning the subject matter hereof and supersedes any prior understandings or written or oral agreement relative to said matter. In the event of a conflict between the terms of the Agreement and its attachments, the terms of the Agreement shall govern. In the event any provision of this Agreement is found to be legally unenforceable, such unenforceability shall not prevent enforcement of any other provision of this Agreement.

Article 13: Liability

In no event shall any Member be liable to any other Member for incidental, consequential, special or indirect damages or lost business profits, regardless of the form of action, whether in contract, tort (including negligence), breach of warranty or otherwise, even if a party has been advised as to the possibility of same, arising out of or relating to this Agreement.

Article 14: Non-Assignment

This Agreement may not be assigned by any Member to any other party except by operation of law resulting from the merger of a party into or with another corporate entity.

Article 15: Governing Law

This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts, without giving effect to its principles of laws, and shall be enforced in accordance with applicable Federal law and regulations, directives, circulars or other guidance. Except as otherwise required by applicable Federal law, the exclusive jurisdiction for resolution of any disputes relating to, arising from or otherwise connected to this Agreement shall be in the state and federal courts located in Suffolk County, Massachusetts, and each of the Members hereby submits to the jurisdiction of such courts.

Article 16: Order of Precedence

In the event a conflict exists between the provisions of the *Articles of Collaboration* and (a) the ARL Cooperative Agreement between the Government and Boston University or (b) any contract between Members, resolution will be determined as follows:

- (a) For conflicts between the *Articles of Collaboration* and the Cooperative Agreement, the Cooperative Agreement will take precedence and govern; (b) for conflicts between the *Articles of Collaboration* and other contracts between Consortium Members, the *Articles of Collaboration* will take precedence and govern.

Article 17: Survival

The provisions of this Agreement which, by their explicit terms or their manifest intent are to survive, including, without limitation, those which relate to confidentiality and liability, shall survive expiration or termination of this Agreement.

CERTIFICATION

These *Articles of Collaboration* were adopted by the following Consortium Members on the latest date executed below. When signed, this Agreement shall become binding on the Parties.