SUBMISSION FORM
University System/Employee Intellectual Property Joint Participation
MUSP 407

This form is to be submitted with any Board of Regents item whereby a campus seeks the approval of an agreement with or arrangement regarding an employee pursuant to 20-25-109 MCA and Regents Policy 407.

When the submission concerns matters of trade secrets or confidential business information, or any other matter entitled to privacy under state or federal law (e.g., the federal statute known as Bayh/Dole) the submitting campus may request consideration of the submission, in whole or in part, in executive session.

The submitting campus should also provide the Commissioner a copy of the contract(s) that form the basis for the cooperative arrangement for which approval is sought. Submission of the contract does not indicate a conclusion that all or part of the contract is a public document and the question of whether it is in whole or in part protected from public disclosure will be evaluated on a case by case basis.

1. **Summarize the nature of the intellectual property that was developed by the employee seeking approval. Indicate the sources of funding for the research that resulted in this invention.**

   The technology is a process called Freeze Tape Casting (FTC). FTC is the process by which a ceramic slurry (ceramic particulate in water) is mixed and poured as a film on a polymer carrier and pulled over a large cooled bed from which small ice crystals grow from the bottom through the thickness of the film. When all the water in the film is completely frozen and the film rigidized from the ice, the sheet is place in a vacuum freeze dryer to remove the water by sublimation. The ice crystals are removed and in their place are graded and aligned pores surrounded by ceramic particulate that can be rigidized with heat treatment leaving novel pore structures for a multiple of materials engineering applications. The result is a membrane that can facilitate the fabrication of functionally graded composites (battery electrodes and aerospace composites) by filling the pores or be utilized in its porous state to control chemical reactions by evenly distributing gasses (catalysts and fuel cells). The technology is not specific to ceramic materials and slurries can be fabricated with polymers and metals to duplicate the process in vastly different materials classes. The resultant membranes can have many different applications for commercialization, for example, in lithium batteries, solid oxidized fuel cells, and for high temperature metal joints in functional grading.

   Current and past funding for the commercialization and advancement of Freeze Tape Casting has come from SBIR and STTR's from NASA, The Department of Energy, the National Science Foundation, and the U.S. Navy.

   Name(s) of the university employee(s) involved.

   - Dr. Stephen Sofie
     - Inventor of Freeze Tape Casting.
     - Professor in the Department of Mechanical and Industrial Engineering at Montana State University
     - Requesting approval to join executive advisory board and have equity in start-up company Glacigen Materials, Inc.

a. Name(s) of business entity(ies) involved.

Glacigen Materials, Inc., is a start-up based in Four Corners, MT. Glacigen Materials was co-founded by Dr. David Driscoll and his business partner, Dr. John Bognar. Dr. Driscoll received his PhD from Montana State University where he studied under Dr. Sofie. Glacigen is currently working in conjunction with Dr. Sofie's MSU laboratory, utilizing SBIR's and STTR's to advance freeze casting technology for commercialization. For one specific grant, Glacigen and MSU are working to create structurally engineered foams which can improve battery charge and discharge rates. The foams can be fabricated from different materials, making the batteries usable in different technologies.

The university and employee(s) are seeking approval for (check as many as appropriate):

b. ☒ The employee to be awarded equity interest in the business entity
c. ☒ The employee to serve as a member of the board of directors or other governing board of the business entity
d. ☒ The employee to accept employment from the business entity
e. ☐ Other. Please explain.

2.

a. Summarize the nature of the relationship between the university and the business entity (e.g., the entity is licensing the intellectual property from the university, the entity is co-owning the intellectual property with the university).

Glacigen Materials, Inc., is a business entity formed by former MSU student, Dr. David Driscoll. Dr. Driscoll is a former student of Dr. Sofie. Glacigen Materials has been working with advancing and commercializing freeze casting technology originally created by Dr. Sofie through Small Business Innovation Research (SBIR) and Small Business Technology Transfer (SBTT) grants. The grants are being done in partnership with Dr. Sofie's MSU laboratory. The SBIR's and SRRT's contain an option for Glacigen to license any technology that comes out of the MSU side of the grants. The goal of the grants is to commercialize and advancement of the freeze casting technology.

b. The proposed duration of the agreement or arrangement.

The Option to License Agreement is contained in three (3) current SBIR and STTR grants. Glacigen Materials will have the opportunity to seek an exclusive license from MSU upon successful commercialization of any of the products that are subjects of the grants. Additionally, there are several completed grants where Glacigen can still exercise an option to lease intellectual property.

The conditions under which the agreement may be terminated or dissolved.
The Agreements have different end dates based on the specific SBIR/STTR projects, but generally an Agreement terminates at the end of the Evaluation Period unless the option is exercised or declined by company, in which event the agreement will terminate at the end of the stipulated negotiation period or upon execution of a license agreement, whichever occurs first.

MSU shall have the right to terminate the agreement immediately, without the obligation to provide notice, if company files a claim, including in any way the assertion that any portion of the patent rights is invalid or unenforceable where the filing is by the company, a third party on behalf of the company, or a third party at the written urging of the company.

3. Explain specifically how the University System or the State of Montana will likely benefit from the agreement or arrangement.

a. The IP that is created at MSU through the grants is wholly owned by MSU. The grants given an option to Glacigen that could lead to a fully negotiated license with annual fees and royalties that could generate significant revenue upon successful commercial development of the technology.
b. The technology could create more efficient batteries for cars, phones, and other everyday items.
c. The company, Glacigen, is based in Four Corners. Successful advancement of the company could create more Montana jobs particularly with the implementation of the multi-campus MatSci PhD program that provides important graduate training in the field related to materials processing and tailoring of engineering materials.
d. This technology could continue to result in more SBIR and STTR grants, and potentially sponsored research projects.
e. The SBIR and STTR grants have provided funding to graduate students, and future grants and sponsored research could provide the same benefit.

4. Summarize the financial terms of the agreement or arrangement. Include:

a. The value, nature and source of the University's contribution.

Currently, the University contribution of time is compensated by grant funding.

b. The value and nature of the employee's contribution.

Dr. Sofie has been instrumental in the continued capturing of the grant funds working with Glacigen on exploring freeze tape casting in numerous applications with an emphasis on larger scale implementation and commercialization. Dr. Sofie also has additional academic research grants, independent of Glacigen, from the DOE related to freeze tape casting of functional ceramic materials. At this time, Dr. Sofie has not invested any of his personal funds into Glacigen.

c. The anticipated revenue to be generated by the project and the time line for generating such revenue.

A license agreement is yet to be negotiated so projected revenue is difficult to anticipate at this time. Nonetheless, given the number of SBIR and STTR grants with this company there is a potential for different intellectual property that could result in several licenses.

d. The manner in which revenue and expenses will be shared by the parties.

The current Option Agreement will allow the company to negotiate a license which would include royalties, among other terms. Any future royalty revenues will be shared by MSU and the inventors after payment of a development fee to MSU and collection of any unreimbursed costs.

e. The nature of each party's equity interest in the project. If none, so indicate.

Dr. Sofie currently holds 0% equity in Glacigen Materials. He is requesting this 407 so that he may be offered equity interest and sit on the Executive Advisory Board of the company.