

I-School - 2020 Innovation (X) Proposal Application

COMPLETED

IP : 71.41.205.54

Completion time : Jan 22, 2020 13:41:47

Time taken : 6 hrs 51 mins

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Thanks for your interest in the School of Innovation's Innovation [X] Program.

Proposals are due by 11:59 PM on our extended deadline date, January 21, 2020 and must be submitted using this online form.

NOTE - Only one team leader/faculty member needs to submit a proposal for a given project.

Please contact Robert Shandley, Associate Dean of the School of Innovation, at innovationx@tamu.edu or (979) 862-6071 with questions.

1. Project Title

Ans: : A Start-Up Cycle: Patent to Product to Patent.

2. Primary Point of Contact for Project - Name

Ans: Lawrence Griffing

3. Primary Point of Contact for Project - Email Address

Ans: griffing@tamu.edu

PROJECT DESCRIPTION

4. Please provide brief background/context for the issue this project seeks to address. (1,200 character maximum)

Ans: This project builds on a discovery made in 2018, which is in the process of commercializing this discovery through a start-up, Griffing Biologics LLC. The discovery was the complete inhibition of germination of plant seeds when treated to an exogenous mix of sterols and encapsulating agent. Field-testing is an important component of the business model because the corporations interested in this intellectual property will require it. How much product development and testing is required as proof-of-concept for the business model to be viable? Furthermore, with discovery of different uses of the product, are there more opportunities to claim new, subsidiary patents based on the original claim? The opportunity to the undergraduate and graduate team provided by this context is that the team can see first-hand how such a start-up is initially developed and the linkage to the practical challenges of product development.

5. What are the goals for this project? (3,000 character maximum)

Ans: The goals of the project are three-fold: 1) to introduce the students to concepts in entrepreneurship, 2) to experience how lab results translate to field results in a variety of settings, and 3) to discover target and off-target effects of the treatment, which may lead to new patents.

1. Introduction to entrepreneurship.

The introduction to entrepreneurship will be based on background video and reading. These include The Startup Owner's Manual by Steve Blank and Bob Dorf and Business Model Generation by Alexander Osterwalder and Yves Pigneur. Although the students will not participate in customer discovery, we will explain the process to them and its importance for achieving a successful start-up.

2. Translating lab results to the field.

Most basic research uses model organisms, which have ideal characteristics such as simple genomes, short generation times, large reproductive potential in the lab, and a variety of highly-developed tools provided by the research community. Some of the discoveries immediately translate into practical products, such as medical treatments or improved food quality, but this is rare. Instead, model organisms may have peculiarities that make their response to the experimental treatment unique. It is for that reason that we plan to take our research out of the lab and apply it in the field.

We have several field test plots, routinely used by one of the team members, Dr. Muthu Bagavathiannan, in Soils and Crop Science. We plan to use the lab equipment of the lab of the other team leader, Dr. Lawrence Griffing, to formulate and mix the herbicide and initially test them in the lab. We will have four groups of 4-5 undergraduates under the team leaders, graduate students and post-doc to carry out different aspects of the field tests.

The importance of this goal is It is a necessary as proof-of-concept with our expected channel of distribution, the large agrochemical company.

3. Discovery of target and off-target effects.

In these trials, we expect the unexpected. The application of sterols to soils and field plants may have a variety of off-target effects, such as changes in the development and life cycle of some insect species. These on- and off-target effects will be monitored by the undergraduate groups, with special training from the post-doctoral student in the Griffing lab and a graduate student from the Bagvathianan lab.

6. What are anticipated outcomes from this project? (e.g., publications, website, app, data collection for further research/grant) (1,000 characters maximum)

Ans: The anticipated outcomes from this project are 1) data collection for another patent and an anticipated STTR grant, and 2) a publication from the field test data. (1) Data collection of the on- and off-target effects of the sterol application will provide insight into further possible effects of this herbicide, which may become the basis for future intellectual property claims (patents). From initial studies, it appears that there may be salutatory effects of this treatment in dealing with pests besides weeds. (2) The outcome from the field tests will be publishable in one or more journal articles, depending on the number of replicas that can be run within the time frame of this proposal and the success of the analysis of the plant and soil samples acquired.

7. Is this proposed project an extension of existing work or a new endeavor? (1,200 character maximum)

Ans: This is an extension of an existing I-Corps project to Dr. Griffing, A pre-emergent herbicide with a new mode of action. Over the past ten years, there have been no commercial herbicides discovered that work by a new mode of action (biochemical and signaling pathway specific to plants), despite extensive efforts by agribusiness. We are establishing a start-up business model and are looking for feedback on which sterol combinations and formulations would best meet their needs, which plant crops or weed species should be the focus of our research, whether it can or should be implemented in pest control strategies.

8. Is Institutional Review Board (IRB) approval required for this project?

Ans: No

Page 2 : FACULTY/STAFF LEADERS & CONTRIBUTORS

Identify the key faculty/staff team leader(s) and contributor(s).

- Team leaders are actively engaged in the project and attend all (or almost all) team meetings (most teams have 2-3 co-leaders). At least one team leader must be a faculty member. Projects with team leaders from different disciplines will receive preference.
 - Team contributors support the project as needed and occasionally attend team meetings (optional).
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TEAM LEADERS

9. Please list all team leaders below, including Name, Title, and Department/School.

Ans: Lawrence Griffing, Associate Professor, Biology/College of Science
Muthu Bagavathiannan, Assistant Professor, Soils and Crop Science/College of Agriculture

10. Do any of the team leaders listed above have plans for a sabbatical or other extended leave away from campus during the 2020-21 academic year?

Note: Selecting “yes” will not automatically disqualify a team, but rather will indicate that we need to have a discussion with your team about the nature of the planned leave in relation to the project.

Ans: No, none of the team leaders have plans to be on leave in 2020-21.

TEAM CONTRIBUTORS

11. Please list all team contributors below, including Name, Title, and Department/School.

Ans: Dr. Krishna Kumar, Research Associate, Biology/College of Science

PROJECT MANAGER

12. Do you plan to assign someone other than a faculty leader as a “project manager” for your team (i.e., a graduate student, postdoc, staff person)?

Ans: No

STUDENT PARTICIPATION

13. Ideally, how many graduate students would you select to participate on this team? (Numeric responses only, please)

Ans: 4

14. Ideally, how many undergraduate students would you select to participate on this team? (Numeric responses only, please)

Ans: 20

15. What would be the ideal composition of team members for this project? What majors, disciplines, skills, backgrounds, or perspectives would you like to have on the team? (1,200 characters maximum)

Ans: One graduate student leader per team, five undergraduates. Two teams would be under the direct supervision of Dr. Griffing and two teams under the direct supervision of Dr. Bagavathiannan. The undergraduates would be genetics, biology, or soils and crop science majors. The graduates would be from MEPS, Biology, or Soils and Crop Science. Dr. Kumar will supervise the instruction in entrepreneurship.

EXTERNAL PARTNERS

16. Will your team also include any external organizations or individuals as either partners, clients, study subjects, beneficiaries of the work, etc.?

Ans: Not sure yet

Page 3 : PROJECT DETAILS

The questions in this section are designed to help us better understand the details of your proposed project, and if selected, to help us better support your team.

17. Does your proposal include travel for students beyond Bryan/College Station?

Ans: No

18. Where would the team travel?

Ans: To field test sites of the Agriculture school

19. When do you anticipate that this travel would take place? (e.g., Fall 2020, Spring 2021, some other academic break, TBD)

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20. Do you expect that all students selected for the team would be able to travel, or just a select number?

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Page 4 : TEAM APPROACH

21. How will you facilitate collaborative inquiry on the team? How often and in what format will the team meet? How will you divide tasks? How you will ensure effective management of the project (e.g., appoint a student as a project manager, assign that role to a faculty leader, etc.)? (1,500 character maximum)

Ans: Each team will meet once per week with each other and once every other week (at least) with another team or teams with whom they are coordinating. Dr. Kumar will supervise the graduate students, who, in turn, will supervise the undergraduates. All of the team graduate students will also meet with the faculty leaders once per week.

STUDENT OPPORTUNITIES

22. What might students gain from their participation (e.g., conducting research directly with subjects, contributing to publications, using language skills)? What unique and differentiated learning opportunities would be available for graduate students? (1,500 character maximum)

Ans: The students learn about entrepreneurship, will learn to conduct publishable research, and will get experience in writing. The graduate students will benefit from the entrepreneurship lessons, since they probably won't have that in their standard training.

TIMELINE AND MILESTONES

23. Identify the timeline for the project, including start, completion and major project milestones. (You may use the text form or upload a table or file)

Ans: Sept. 2020: Develop the teams, collection of weed seeds.
October 2020: Plan formulations, first lessons in Entrepreneurship.
November 2020: Lab testing of formulations on weed seeds.
December 2020: Write up results from lab testing and explain how the proof-of-concept formulation relates to the anticipated supply chain by distributors.
January 2021: Develop second round of teams (hopefully with a high retention from 2020), make formulations for field testing
February 2021: Prepare field plots, learn more background on start-ups.
March 2021: Start treating different field plots with different formulations.
April 2021: Analyze short-term effect of formulations on field plots.
May 2021: Write up results from field tests.

24. Upload for above question

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Page 5 : BUDGET ESTIMATE

25. Total Budget Request (numeric response only, please).

Ans: 20,000

Detailed Budget Information

26. You may upload a budget table here encompassing the categories below, or you may complete the fields below through this form as applicable.

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If you uploaded a budget table, please move to the proposal submission step.

27. GRADUATE OR RESEARCH ASSISTANTSHIP (PHD)

(Suggested range: \$15-18/hour; note: RAships for students in graduate school should include costs for tuition remission and fees); Please enter dollar amount, and any relevant notes/justification.

Ans: Graduate research assistant for 6 months: \$12,900

28. RESEARCH ASSISTANTSHIP

(Suggested range: \$12-15/hour); Please enter dollar amount, and any relevant notes/justification.

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29. INSTRUCTION (Teaching) - PHD STUDENT

Please enter dollar amount, and any relevant notes/justification.

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30. POST-DOCTORAL OR STAFF EFFORT

Please enter dollar amount, and any relevant notes/justification.

Ans: Post-doctoral effort: \$7100.

31. UNDERGRADUATE STUDENT STIPEND OR WORK STUDY

(Suggested range: \$11-14/hour); Please enter dollar amount, and any relevant notes/justification.

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32. INSTRUCTIONAL, RESEARCH OR OFFICE SUPPLIES

Please enter dollar amount, and any relevant notes/justification.

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33. COMPUTERS AND MINOR EQUIPMENT

Please enter dollar amount, and any relevant notes/justification.

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34. TRAVEL - DOMESTIC

Please enter dollar amount, and any relevant notes/justification.

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35. TRAVEL - INTERNATIONAL

Please enter dollar amount, and any relevant notes/justification.

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36. CONTRACT WORK

Please enter dollar amount, and any relevant notes/justification.

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37. MEETINGS - BUSINESS

Please enter dollar amount, and any relevant notes/justification.

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38. OTHER - MISC.

Please enter dollar amount, and any relevant notes/justification.

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39. Please briefly note below any other sources of project funds. (Projects that match or leverage additional funds are strongly encouraged. Please note any such funds, awarded or proposed, here so that we understand the comprehensive outlay for the project.)

Ans: I-Corps funding for travel.

T3 funding to Griffing/Behmer/Yeh for examining off-target effects of sterols on insect development and behavior.

40. Please name a Unit/Business Manager who could administer funds for project, if requested:

Ans: Will Bailey, Biology Department

FINAL STEP

To officially complete the process and see a copy of your application submission, click "SUBMIT" below.

We encourage you to save this complete application as a PDF for your records. You will also receive an email in the next 48 hours confirming receipt of your application.

Thank you for your interest in Innovation [X]!
