



Tufts University

GREEN FUND

Green Fund Application Revised Proposal

Project Name and Submitters:

Tufts Hydroponics Collaboration

Kevin Cody, New Entry Sustainable Farming Project

The committee has asked for information about your project before, but this revised proposal offers you a chance to synthesize all of the changes you have made to your project based on the committee's feedback into a revised proposal.

Please comprehensively answer the questions in this document. Once complete, please send to GreenFund@tufts.edu.

1. What is your role at Tufts? (student/faculty/staff/other (please describe))

As the Farmer Training Program Manager with New Entry Sustainable Farming Project, a program of the Friedman School, I teach courses on business planning and organic horticulture, develop curriculum and programs for new and beginning farmers, build relationships with partner organizations across the region, and manage grants and special projects related to farmer training. This is a staff position.

I am also a faculty member with a dual appointment in Environmental Studies and the Friedman School through my position as Professor of Practice in Food Systems. In this position I teach courses on applied food systems and work to build partnerships and programs that span campuses, colleges, and academic departments.

2. What school are you involved with at Tufts?

The Friedman School of Nutrition Science and Policy in the Agriculture, Food, and Environment Program, and The School of Arts and Sciences in the Department of Environmental Studies.

3. Please provide a 300-350-word description of project.

Commercial hydroponics operations are being deployed in urban environments and institutional settings to improve food security and accomplish a variety of learning objectives. New Entry Sustainable Farming Project was recently gifted commercial hydroponics equipment and this project is designed to fund the initial operation and implementation of this equipment in conjunction with new project partners. This collaboration will create research and experiential learning opportunities for Tufts students, as well as community engagement opportunities with an innovative agricultural technical school and grassroots non-profit organization.

For this project, Tufts/New Entry will establish a collaboration with two other entities—Building Audacity of Lynn and Essex North Shore Agricultural & Technical School—to design, build, and operate commercial hydroponics equipment to achieve three primary objectives. The first objective is to develop a hydroponics farm-to-school pipeline. This will be done with Essex Tech where they will build and operate a portion of the hydroponics equipment in an already existing greenhouse on their campus in Danvers, MA with the produce going primarily to the school cafeteria. The second objective is to support food access efforts already underway with Building Audacity, who will build and operate a portion of the hydroponics equipment at a facility in Lynn to serve low-income communities of color. The third objective is to integrate the Tufts community in ways that will 1) support the development of an online training course in hydroponic farming, 2) create opportunities for workshops in adult education that serve Tufts/New Entry participants, 3) integrate students and courses from Environmental Engineering, The Friedman School, Urban Environmental Planning, Environmental Studies/Biology, and the Department of Education. Through course projects, internships, work-study arrangements, and independent and collaborative research students and faculty across campuses in Medford and Boston will participate and benefit from this collaboration.

4. What is the timeline of your project and how will you measure success?

New Entry is already in possession of the equipment at our farm in Beverly, MA. Essex Tech has a greenhouse space currently available to install the equipment, and Building Audacity is in the final stages of securing a space in Lynn to operate this equipment. The shared-use agreements will be for a period of two years with program evaluations after year one and the option to renew contracts after year two.

January/February 2021—New Entry begins the process of creating shared-use agreements with project partners that are vetted through the Tufts legal department. Work study students are screened and hired by New Entry and Building Audacity to support work of organizations related to this hydroponics project. Tufts academic program directors and faculty are convened to discuss various learning objectives that could be integrated into spring courses.

February/March 2021—Project partners finalize share-use agreements and each take possession of a portion of the hydroponic equipment which is composed of 8 stacked racks capable of producing over 2,500 plants total. Each partner will utilize 4 racks. Partners and students develop plans for building and design of respective systems, as well as plans for training and record keeping. Assembly begins on systems in Lynn and Danvers. New Entry staff play a supporting role in construction and initial set up. Work study students develop initial outline for

curriculum on how to build and operate hydroponics utilizing the nutrient film technique, and how to track and capture data related to costs of production. Students from partner organizations participate in system construction and contribute to program planning.

April/May 2021—Systems are operational and initial runs of produce are seeded and transplanted by teams of students from Essex Tech and Building Audacity with support from New Entry staff and Tufts students. Produce is harvested and distributed to the school cafeteria and community of Lynn. Project partners are convened to reflect on initial process and production. Curriculum for online training course is finalized and built into Canvas shell by New Entry staff and Tufts students. Student in Spring courses involved with hydroponics collaboration submit assessments associated with course learning objectives.

June/July/August 2021—Tufts student interns are hired by New Entry and Building Audacity to support the hydroponics projects. Systems remain in production throughout the summer. New Entry supports distribution of produce grown in both sites as part of food access program. New online course is launched in collaboration with Essex Tech’s adult education programming that also serves New Entry participants. Food insecure individuals access reliable supply of fresh leafy greens. Project partners are convened by New Entry to assess production, distribution, and training objectives and to set goals for coming fall and winter. Faculty across programs at Tufts are convened to discuss experiential learning and community engagement opportunities associated with this project for Fall courses. Produce grown is featured at a farm stand at Essex Tech, providing an anchor to this new market that will also feature farmers from New Entry.

September/October/November 2021—Fall courses across multiple programs will feature the hydroponics project, promoting opportunities for conducting research and engaging with communities. Work study students are hired by New Entry and Building Audacity to support work on this project and promote integration with Tufts community. Produce grown is distributed in low income communities of color with support from New Entry, and is integrated into the dining and culinary programs at Essex Tech.

December 2021—Internal program evaluation conducted by project partners to assess production, evaluate costs, and revise learning objectives. Training modules, products, and markets are revised for year two of the project.

Year 2—In year two of this project, production will continue in systems operated by Building Audacity and Essex Tech with support from New Entry and Tufts’ students and faculty. Essex Tech continues to offer hybrid course on hydroponics (2-3 per year), cross-promoted with New Entry.

Measuring Success—Outcomes for measuring success include units of produce grown and distributed, number of households served, number of individuals enrolled in courses, number of students involved in being trained and operating systems with Essex Tech and Building Audacity, and number of Tufts classes and students involved with this project. Tufts courses will include assessments related to specific learning objectives and community partner goals. Qualitative survey’s will be conducted with student trainees and households who receive produce to evaluate program impact.

5. How many people in each of these categories will your project impact? Please provide an estimate of the number of impacted individuals. Categories: students, faculty, staff, other (please specify)

Students: 200

Through course-based projects, internships, and work-study opportunities across a variety of programs including the Friedman School of Nutrition Science and Policy, Environmental Studies, Biology, Civil and Environmental Engineering, and the Department of Public Health.

Faculty: 10

Faculty across the above-mentioned programs have expressed support for this project and willingness to extend experiential learning opportunities to students. This project also has the potential to build collaborative relationships across academic programs.

Staff: 10

New Entry staff (5 individuals) will work with staff across the university to support students' research and internship opportunities, as well as community engagement strategies.

Other: 50

This category represents the collaboration partners students, staff, and faculty that will also be stakeholders and participants in this project. At Building Audacity and Essex Tech, students, faculty and staff will support the construction and maintenance of the systems, and benefit from the learning opportunities and produces grown.

6. How much funding are you requesting from the Green Fund and are you seeking funding from other places? Please attach an itemized budget (use template provided).

Funding requested from Green Fund: \$21, 319.65

Additional funding is being supplied by Building Audacity and Essex Tech to cover labor and materials costs, and to heat and cools spaces that are being used to house these systems. Partners may apply for additional support from external grant funders such as Natural Resources Conservation Service (NRCS), and the Massachusetts Department of Agricultural Resources (MDAR) to maintain and expand the hydroponics project offerings.

7. Who will be actively working on this project with you? If you are collaborating with others, list their information in the table below (add rows if necessary). You must provide letters of support from each person involved in the project - please attach them (optional template provided):

Name	Affiliation: (student/faculty/staff/other and school)	Contact email	Letter of support attached?*
Nakia Navarro	Building Audacity	nakia@buildingaudacity.org	YES
Heidi Riccio	Essex Northshore Agricultural & Technical School	hriccio@essextech.net ; bhanson@essextech.net	YES
René LaPointe Jameson	Tufts student— Environmental Engineering	Rene.LaPointe_Jameson@tufts.edu	YES
Colin Orians	Faculty-Environmental Studies, Biology	Colin.orians@tufts.edu	YES
Timothy Griffin	Faculty-Friedman, Agriculture, Food, Environ.	Timothy.griffin@tufts.edu	YES
Ndidiamaka Amutah- Onukagha	Faculty-Department of Public Health and Community Medicine	Ndidiamaka.Amutah_Onukagha@tufts.edu	YES
Robert Viesca	Faculty-Civil and Environmental Engineering	obert.Viesca@tufts.edu	YES
John Durant	Faculty-Civil and Environmental Engineering	John.durant@tufts.edu	YES
Chris Swan	Faculty-Civil and Environmental Engineering; Dean of Undergraduate Education	Chris.Swan@tufts.edu	YES

*Their letter of support should clearly state how they will be involved in the project and include their signature (can be digital).

8. Who are your project stakeholders? According to the Project Management Institute (PMI), the term project stakeholder refers to "an individual, group, or organization, who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project." Say a project seeks to install more air dryers in bathrooms on campus. A project stakeholder in this example would be facilities, who would have to install the air dryers in the different locations.

- Building Audacity, Lynn, MA
- Essex North Shore Agricultural and Technical School, Danvers, MA
- New Entry Sustainable Farming Project, Beverly, MA

9. If you received additional questions from the committee, please include the questions and answers below:

Responses to reviewer inquiries:

- What is the long-term plan for this project? Who will ultimately be responsible for the growing, care, maintenance of the area, building etc.? How do you plan on hiring the consultant? Who will be involved in that process and overseeing time actually spent on the design and planning?

The long-term plan for this project is to build an effective collaboration to accomplish the objectives outlined above. Ultimately, this collaboration may also inform future efforts to build and operate a hydroponic farming system in conjunction with Tufts Dining who has already expressed interest in such a project. Term-limited arrangements will be made with both partners outlining terms and conditions for shared use of the hydroponic equipment.

Essex Tech has an experienced staff person who will play the lead role in building and operating their portion of the equipment inside a heated greenhouse. Building Audacity also has a staff person with experience operating this equipment who will lead their side of the project. New Entry has identified three individuals who may play consulting roles—two operate existing commercial hydroponic farms and the third is a Tufts PhD graduate in Conservation Biology with experience in aquaponics. New Entry staff will play vital roles in connecting the Tufts community and overseeing operations in Danvers and Lynn.

- Are you pursuing extra funding for expenses not outlined in the proposal? Or is the proposal estimated budget the total cost of the project?

Project collaborators are expected to contribute time, expertise, and space to operate the equipment. A portion of the start-up material costs will also be provided by these collaborators. A revised budget estimate will include New Entry staff and consulting time, in addition to supplies and materials. Once the equipment is operational, we will evaluate needs and costs for future budgeting and grant proposals that relate to the overall project objectives. Funding for urban agriculture projects by federal and state agencies are on the rise.

- Do you have a plan of where the farming plants would go and could help people?

Produce will be grown in two sites. In Lynn, most of the produce will be distributed at no charge, with the support of New Entry's refrigerated trucks, to low-income communities of color in Lynn and Dorchester. Another portion of produce grown in Lynn will be sold to low-income residents who utilize the Supplemental Nutrition Assistance Program (SNAP). Produce grown by Essex Tech will supply their dining services, in addition to augmenting New Entry's supply and distribution to Salem school districts.

- How would this be sustained long term? Where are you hoping to locate the item? How big is it? What kind of supporting infrastructure (water, sewer, electrical) is needed at the site?

Revenue generated through course fees and produce sales will offset some of the operational costs. Building Audacity and Essex Tech have access to resources that will cover additional costs. New Entry will support Building Audacity with grant writing expertise to secure additional

funding from sources such as Massachusetts Department of Agricultural Resources and the Natural Resource Conservation Service.

The greenhouse facility operated by Essex Tech is fully equipped for year-round production and is operating below capacity. Building Audacity is currently pursuing a space in downtown Lynn with backup options to pursue if necessary.

All together the equipment would require between 2,000 and 2,500 square feet of space. In this proposal, the equipment is split into two spaces each requiring about 1,000 square feet. (See attached floor plan and schematic for system as a whole.)

- Please update us on any changes to your application if collaborating with René and the other hydroponics group.

At this stage, we determined that siting this equipment on campus in Medford or Boston was unlikely due to space limitations and requirements. Discussions with project partners began shortly after we submitted our Green Fund application and were put into contact with René and Nakia from Building Audacity. We recognized overlapping interests and the ability to support one another with our respective resources on hand. Similarly, with Essex Tech, New Entry has been developing a partnership with this institution to better serve their students and our beginning farmer pipeline. We have also participated in their adult education programming. With space on hand and staff with expertise, we decided an additional partnership would promote educational exchange across organizations and locations, as well as demonstrate feasibility of two similar operations with distinct missions.