

Presented by Fairchild Tropical Botanic Garden:

Growing Beyond Earth

Maker Contest Year 1: S.P.A.C.E.

Spatial Planning for Agricultural Chambers beyond Earth

Overview

We're calling on makers across America to submit their designs for growing plants in space. You'll have to design, prototype, and test your idea before submitting your entry to be judged by a panel of NASA botanists and engineers. Winning entries will be considered for implementation on the International Space Station and on future space craft.

The contest consists of two phases and is open to High School, College, and Pro level teams. Five winners from each category will be selected from Phase I to move on to Phase II, and a final team from each category will be chosen to join Fairchild at the Nation of Makers Conference in 2020 to showcase their designs during the launch of Year 2.

How to Participate

Your challenge in entering this contest is to create a growth chamber for edible plants, which fits within a **50 cm cube**, maintains sufficient **lighting, irrigation, and airflow**, and makes inventive and effective **use of 3D space in a microgravity environment**. Keep in mind that plants will grow towards a light source when not affected by gravity.

Phase I entries must be submitted to the Growing Beyond Earth Maker Contest at Instructables (QR code and URL below) by **February 3, 2020** to be considered.

Phase II entries will also need to successfully



grow 'Outredgeous' red romaine lettuce using their prototype, and produce a 90-second (minimum) video presenting their design.

www.instructables.com/contest/beyondEarth

In partnership with:



Get Involved

We want as many minds as possible tackling this challenge, and you can participate in a number of ways beyond just entering. Take it on yourself and spread the word to others!

Join our Webinars

Fairchild will host two introductory webinars on **July 10th** and **July 24th** during which NASA scientists will be available to answer questions and provide information about the goals of the challenge. An additional webinar will be held on **October 30th** as a final check-in with entering teams. Keep tabs on the website below for details.

Host a Make-a-Thon

Bring in other makers in your community and work together on this challenge by hosting a make-a-thon with your local makerspace partner. Be sure to have them register their event with Fairchild so you can represent NASA as you design for the future.

Keep the Conversation Going

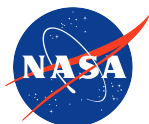
Follow us on Twitter @GrowBeyondEarth, and share your progress with #SPACEgarden on social media. Collaborate via the Nation of Makers Slack workspace in our channel #growingbeyondearth.

Visit Fairchild's Website

To learn all about the Growing Beyond Earth Maker Contest in detail, and for resources that may help inspire your design, visit our contest web page.



www.fairchildgarden.org/Education/Growing-Beyond-Earth-Maker-Contest



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Background

Beginning in 2015, Fairchild entered into a partnership with Kennedy Space Center (KSC) to help advance NASA plant research through classroom-based citizen science. Fairchild leveraged its network of more than 170 local middle and high schools, all participating in the Fairchild Challenge citizen science program, to address questions relevant to the work of the Exploration Research and Technology Programs organization at KSC. The Growing Beyond Earth Challenge was designed to expand food options and increase plant diversity for spaceflight by evaluating multiple edible plants that meet NASA's criteria for size and edibility. Using equipment that mimics the environmental conditions aboard the International Space Station, students are testing factors that may influence plant growth, flavor, and nutrition.

Now, we aim to harness the creativity and talent within our local community and throughout a national network of makerspaces to address the specific science, technology, engineering, and mathematics challenges related to food production in space. The first of these challenges is assessed by this year's contest: how to efficiently use plant growing space aboard spacecraft.

Meet the Judges



Dr. Gioia Massa

Gioia Massa is a plant scientist and a NASA project scientist at Kennedy Space Center. She works on food crop production for the International Space Station and future space exploration endeavors. She led the science team for the initial Veggie hardware validation on the space station. Currently she heads an interdisciplinary group to study fertilizer and light impacts on yield, nutrition, flavor, and food safety of Veggie-grown crops, and to assess crew behavioral health benefits from space crop growth. She also is involved with education and outreach programs related to plants in space and space food production. Gioia has a BS in Plant Science from Cornell University, a PhD in Plant Biology from Penn State University, and has conducted postdoctoral research at Purdue University and Kennedy Space Center.

Trent Smith

Trent Smith currently is the NASA Project Manager for NASA's on-orbit gardens on ISS, Veggie. Smith works for the ISS Program at Kennedy Space Center with the goal of maximizing ISS science in the orbiting laboratory. He transitioned from the Commercial Crew Program where he was working to get NASA astronauts back into space on U.S. led space systems. Smith has received several awards during his 15-year career at NASA, including a Spaceflight Awareness Award, a KSC Certificate of Commendation for Outstanding Leadership, two NASA Superior Accomplishment Awards for Leadership, R&D100 Award, Silver Achievement Medal, Exceptional Service Medal, and more than 18 Space Act Awards for Inventions and Innovations. Smith also has 10 patents granted or pending, and has authored two book chapters and more than 18 peer-reviewed scientific journal articles and government reports.



FAIRCHILD TROPICAL BOTANIC GARDEN®

Exploring, Explaining and Conserving the World of Tropical Plants

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