



NSF Convergence Accelerator's 2022 Cohort Phase 1 Award

Project Title

Designing for Circular Economies:
Creating Impact from Local Plastic Waste Using
Off-Grid Containerized 3D Printers & Practice
Based Learning

Awardee

re3D Inc.

Award/Contract

49100423C0002

Award Contract Type

R&D

Award Date

December 15, 2022

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NSF Funded Program

NSF's Convergence Accelerator

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Track I: Sustainable Materials for Global Challenges

Convergence Accelerator

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PROJECT ABSTRACT

Plastic waste pollution is an increasingly prevalent environmental issue, with a recycle rate of only 9% for all the worldwide plastic ever produced. The Designing for Circular Economies: Creating Impact from Local Plastic Waste Using Off-Grid Containerized 3D Printers & Practice Based Learning project convenes academia, educators, nonprofits and industry experts to develop a deployable, net-zero-footprint manufacturing system that enables lay users to design and manufacture goods from plastic waste, resulting in sustainable infrastructure with significant socio-economic impact. The system includes an interactive design tool and sustainability dashboard to help users better quantify the environmental impacts and economic opportunities of redirecting waste streams, originally designated for a landfill, into feedstock for 3D printing goods in a circular model.

This project will stimulate job creation for historically underserved people through plastic preparation, 3D design and 3D printing. The workforce serving priority includes zero-waste and technology education with the goal of creating jobs and services for underserved communities.

This solution leverages re:3D's expertise in 3D printing directly from plastic waste, Habitat for Humanity's desire for customized 3D printed home goods made from plastic trash, The University of Texas at Austin's expertise in engineering design and Life Cycle Value Analysis (LCA), The University of Wollongong's expertise in the built environment, and Western Sydney University's experience in the materials science of 3D printing with recyclables.

The collaborative effort will work with Habitat for Humanity to better understand waste generated from their operations, product needs of low-income homeowners and users who will customize/buy/use the goods, the metrics needed for the LCA, and comprehensive requirements for the hardware, software & training solutions.

As the National Science Foundation's Convergence Accelerator is providing an opportunity to collaborate and make an impact beyond the scope of one entity alone, this project unites research towards a multi-tiered impactful solution.