

## **ReCreateIt: Transforming Plastic Waste through Community-Led Manufacturing**

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### **Abstract**

ReCreateIt, led by re:3D, Inc. and partnering with Austin Habitat for Humanity (AHFH) ReStore, Georgia Tech, University of Texas at Austin, Western Sydney University (Australia) and the University of Wollongong (Australia), is developing a local circular economy by deploying a Gigalab, a sustainable manufacturing lab capable of repurposing plastic waste through fused granular fabrication 3D printing.

ReCreateIt has set a goal to divert at least 10,000 lbs of plastic waste from entering landfills, train at least 20 workers in advanced manufacturing and engage and educate more than 500 community members. To create high value items from recycled plastic, re:3D built a Gigalab from a modified shipping container, which houses a GigabotX 3D printer, a granulator, and a material dryer. Georgia Tech is leading the implementation of an interactive design tool customers can use to select and customize home goods. UT Austin and the University of Wollongong are developing a sustainability dashboard which collects and communicates the environmental impacts of the project. Western Sydney University and the previously mentioned collaborators are conducting polymer research to characterize bulk recycled materials, enhance the printability of recycled materials, and ensure the structural integrity of printed parts. All research, metrics and data will be made accessible via a project-built public-facing website.

The ReCreateIt Gigalab installed at a ReStore site in Austin, TX enables customers to design sustainable home goods 3D printed directly from recycled plastic waste collected on-site during normal ReStore operations. The project is increasing access to plastic recycling solutions while stimulating new job creation and education for historically underserved communities. The team is also researching solutions for 3D printing with hard-to-reuse commodity plastics. To date, over 4000 lbs of plastics has been collected, and over 650 lbs has been processed and granulated for 3D printing. Ten employees have been trained or are being trained on the collection, processing and manufacturing processes, and the resulting products created in the Gigalab are creating revenue that supports the AHFH mission.

A part of the National Science Foundation's Convergence Accelerator in Track I: Sustainable Materials for Global Challenges, this project is also funded by CSIRO, Australia's national science agency. The international collaboration is providing the research and development foundations for community-led sustainable manufacturing and a template for transferring the approach to broader community stakeholders.