Project Value
As pollinators, honeybees add >$15 billion/year in yield value to the agriculture industry. Increasing accessibility expands economic gain while having proven mental and emotional benefits for the beekeepers.

Key Product Outcomes
-Usable by 75% of targeted demographic
-Affordable home production cost
-Effectively reduces shaking motion (see inside flap)

Deliverables to User
The beekeeper will have access to a complete set of design drawings, parts list, and assembly manual via the AgrAbility database so product can be made at home with available materials.

2023
ABE/ASM Capstone
RJ1
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www.agrability.org

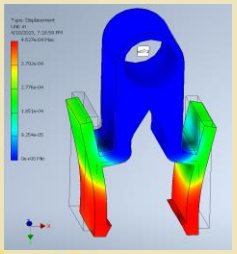
Stabilizing Apiculture Device

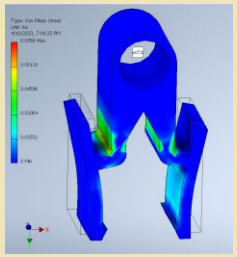
Beekeeping Accessibility:

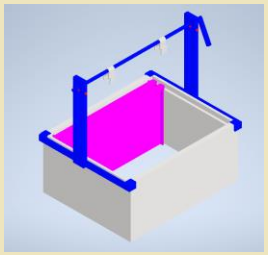
Know someone with Parkinson's?
Know a struggling veteran?
Know an elderly beekeeper?
Know physical disabled individuals?
Need a mentally relaxing hobby?

Why?

Beekeeping requires smooth handling of bee frames because bees can be easily irritated by irregular movements. Agitation can negatively affect hive productivity, which can lead to a decrease in yield and future performance. Lack of stabilization when handling beekeeping equipment has restricted certain demographics from keeping bees due to their agitative nature. A device to stabilize bee frames while being moved by beekeepers to provide apiary accessibility is the main project objective.







Product Development

Rigid Mechanical Solution

The chosen design is a simple approach that limits the degrees of the frame's freedom to horizontal, vertical, and rotational abilities. (picture above)

Parts for Construction

-3D printed corners (4)
-3D printed clamps (2)
-3D printed dowel supports (2)
- 4'x8' Plywood sheet
-½" Poplar dowel
-Linear rail kit (1 pack of 2)
-Wood clue
-Brass telescoping cylinders (2)
-5/8" Stainless steel strap U brackets

Simulation Results

Clamp: with a force of 1.5lbf on each ledge, a max Von Mises stress of 0.0766ksi and max displacement of 4.63e-4in was found.

Rod: A rod with 0.5" diameter pictured above with a bee frame force of 6lbf resulted in a max Von Mises stress of 9.37e-5ksi and max displacement of 4.85e-8in.

This unique product has no competitors. It is cost very effective and easy to use as well as produce at home. The 3D printed parts will be publicly accessible to beekeepers nationwide through the AgrAbility network database.