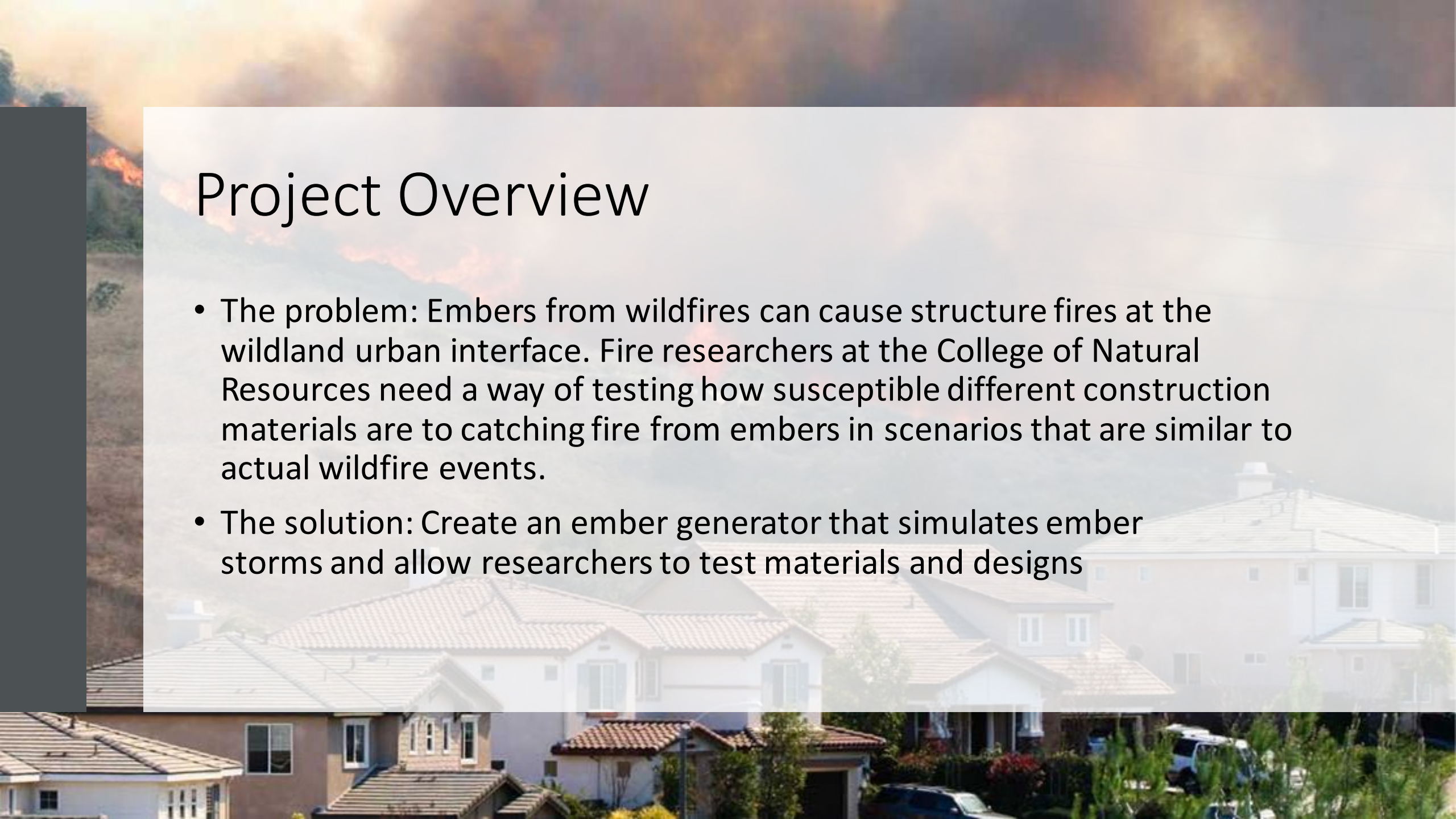


Easy Ember Team

Addie White, Jacob Roy, Kaitlyn Lindholm, Zachary Schirado, Garrett Borth

The background of the slide is a composite image. The top portion shows a wildfire with bright orange and yellow flames rising from a hillside, with thick, dark smoke billowing into the sky. The bottom portion shows a residential neighborhood with several houses, some with tiled roofs, and greenery. A semi-transparent white box is overlaid on the image, containing the title and bullet points.

Project Overview

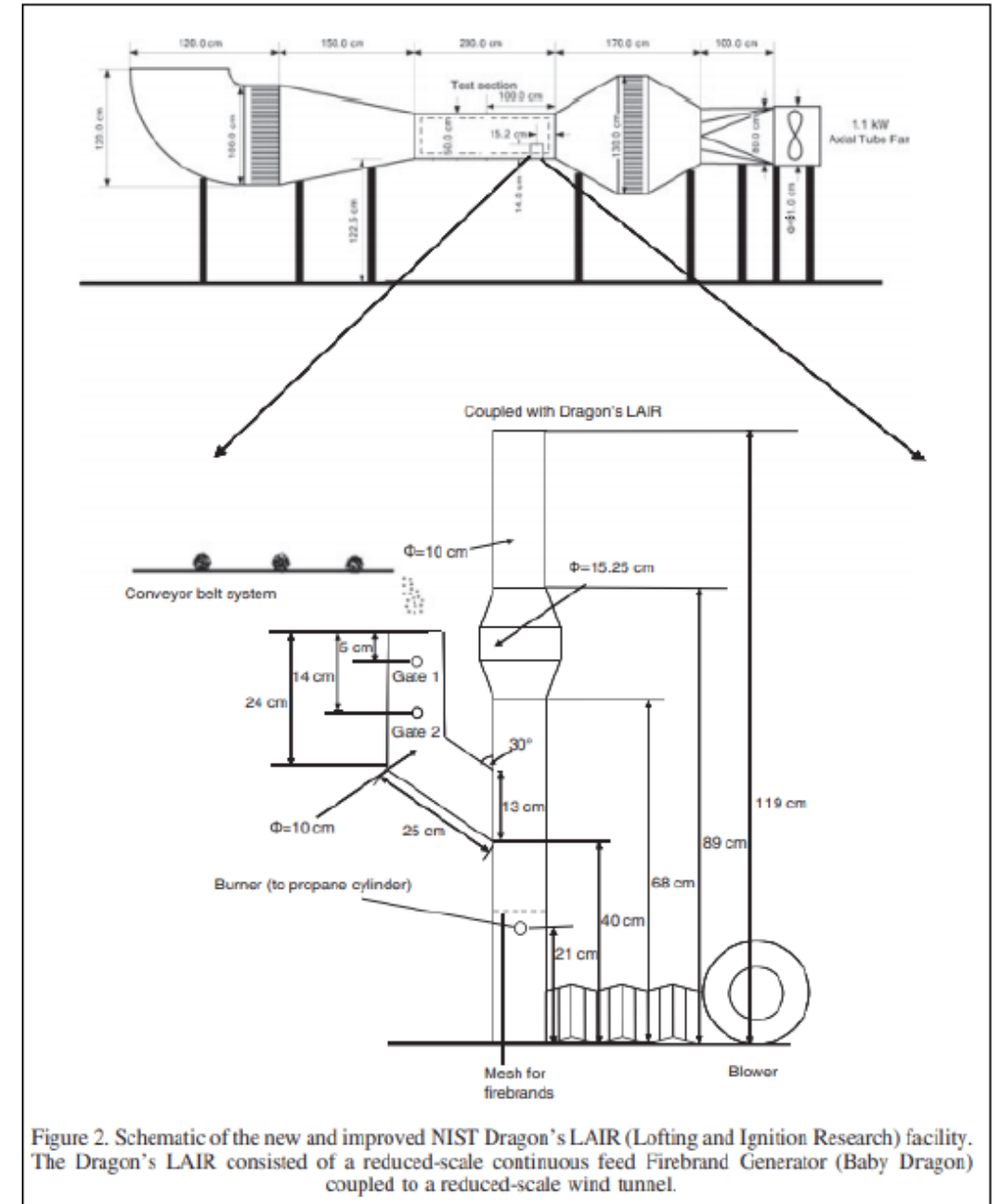
- The problem: Embers from wildfires can cause structure fires at the wildland urban interface. Fire researchers at the College of Natural Resources need a way of testing how susceptible different construction materials are to catching fire from embers in scenarios that are similar to actual wildfire events.
- The solution: Create an ember generator that simulates ember storms and allow researchers to test materials and designs

Criteria

Size	Able to transport on cart(s)
Electric	120 VAC, 15amps
Ember Stream Duration	15 minutes without reloading fuel source
Airflow output speed	0-5.0m/s , able to change
Fuel source	Woodchips, bark, branches, etc.
Flame source	Propane or other gas
Ember flow output thickness	Open to design, enough to catch things on fire
Frame material type	No HVAC thin metal, steel thickness that can withstand heat
Safety features	Fuel line, shut down, emergency shut down, fire suppression (dampers to shut down oxygen supply) (something to stop fuel source)
Durability	Vibration resistance, able to transport in bed of truck, fire resistant (temperature?) 600-1200K (repeated heating and cool-> material design)
Useful Life	~200 cycles / 3-4 years
Budget	\$3,100

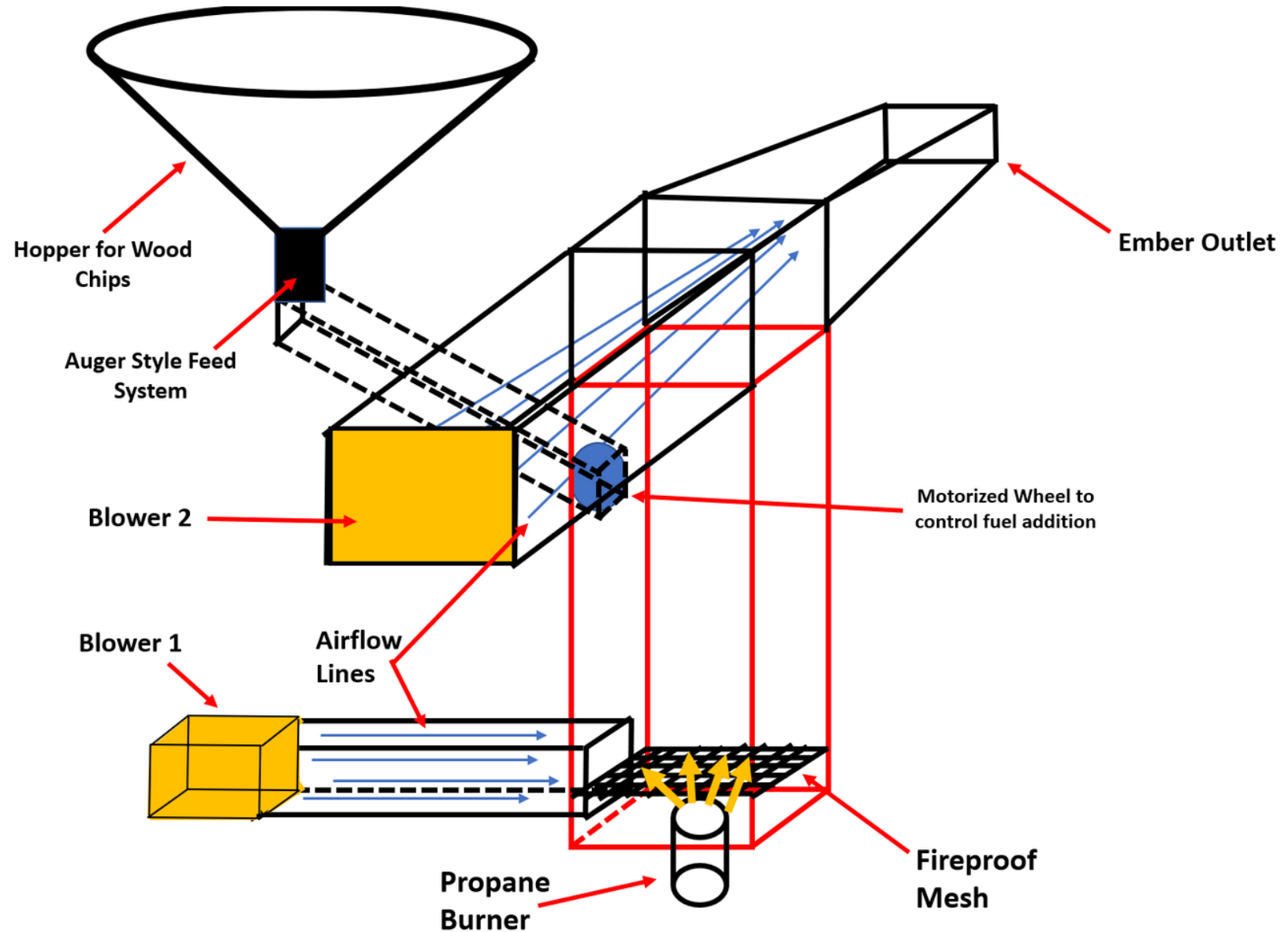
Background Research

- NIST reduced-scale continuous feed Firebrand Generator (NIST Baby Dragon)
- Performance already characterized (Suzuki & Manzello, 2011)
 - Flux and mass flux measured as functions of feeding rate to create optimal conditions to create steady firebrand showers
- Used Baby Dragon design as starting point



Initial Design

- Similar to Baby Dragon Design
- Differences:
 - Hopper fed (with motorized wheel/auger) instead of conveyor belt
 - Two blowers instead of one
 - Dimensions to fit size criteria of Idaho Fire Lab



Preliminary Testing

- <https://www.youtube.com/watch?v=wDtj-zY6BNU&feature=youtu.be>
- Proof of concept
 - Embers can be blown upward with fan



More Testing



Moving Forward

- Further testing using bottom fan
- Incorporate top blower to for horizontal movement
- Heat fatigue analysis of materials
- Purchase larger propane torch
- Further design of fuel feed system
- Begin looking into finalizing prototype material choices

