Design Of A Double Pane Transparent Wood Window
Team Fabricating Transparent Wood
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Motivation
- Reduce the amount of planned energy consumption to meet energy performance requirements set by U.S. DoE
- Residential and commercial buildings consume 40% of the country’s primary energy from heating, cooling, and lighting
- From this usage, buildings account for 30% of global CO₂ emissions

Previous Work
- Previous methods for improving the energy efficiency of glass windows include: multiple panes, films, and glazes
- Li et al. (2016) were the first to fabricate high haze transparent wood (R-wood and L-wood)
- High haze wood is anisotropic thermally, optically, and mechanically
- Different polymers have been tested for infiltration to create the composite

Technical Approach
Generalized Fabrication of Transparent Wood (Li et al., 2016):
- Cut sample
- Delignification
- Solvent Exchange
- Epoxy infiltration

Next Steps
- Continued Research
  - Diagonal (D)-wood
  - Processing focus for scale-up size and quantity; consistency
  - Epoxy alternatives in regards to sustainability and non-yellowing properties
  - Sourcing and recyclability

Product Launch
- Target market: younger couples in the Northeast region
- Pricing: $300
- Government incentives
- Economies of scale

Conclusions
- Low haze grain orientation and thickness trends agreed with those of high haze grain orientation and thickness
- Estimated properties of overall window prototype based on properties of individual components for comparison with glass windows
- Transparent wood technology is young with limitations, but understanding of weaknesses will focus research for improvement
- Feasibility will rely on scalability of processing and sourcing

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“We pledge on our honor that we have not given nor received any unauthorized assistance on this assignment.”

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