



GRADUATE STUDENT RESEARCH FELLOWSHIP

This research fellowship seeks to demonstrate (through a real-world case study) how historically appropriate renovations and deep energy retrofits are critical to curbing carbon emissions associated with New England's vast stock of architecturally significant "brutalist" buildings.



■ Motivation - Sustainability is Preservation:

- "There is no pathway to a zero-emissions building sector without zeroing out emissions from America's 325 billion square feet of existing buildings." - Carl Elefante, FAIA, AIA former president.
- "As the construction process can amount to half of a building's lifetime carbon emissions, the adaptive reuse and retrofit of existing buildings are critical strategies in reducing embodied carbon... especially important in the case of...carbon-intensive concrete structures" - ArchDaily - The Refurbishment and Adaptive Reuse of Brutalist Architecture.

■ When, Who and How Much?

- The research cost is \$13,200 for 14 weeks of research (Summer 2023).
- The research will be completed by a graduate student in preservation-related field at the University of Massachusetts, Amherst. Student will be selected by APTI members and university faculty.
- Methodology guided by Lori Ferriss, Chair of APTI Sustainable Preservation Committee.
- In partnership with UMass BRUT and Docomomo, ensuring existing building is accurately modelled, and research justifies responsible stewardship of brutalist building stock.

■ Research Scope and Schedule:

- Develop comparative LCA of preservation vs replacement approaches for case study brutalist building (Tobin, Campus Center, Fine Arts Center). This is anticipated to include:
 - ·Weeks #1-2: Review existing building physical conditions and energy performance data.
 - ·Weeks #3-4: Develop retrofit approach with professional guidance to create bill of materials.
 - ·Weeks #5-6: Use LCA tools to calculate embodied carbon and approximate operational carbon.
 - ·Weeks #7-8: Define replacement building and approximate embodied carbon of replacement.
 - ·Weeks #9-10: Estimate impacts of demolishing building and approximate operational emissions.
 - ·Weeks #11-12: Compare total embodied + operational carbon emissions of retrofit vs replacement within the timeframe of campus decarbonization
 - ·Weeks #13-14: Draft article summarizing evaluation framework and findings, incorporating professional feedback.

■ Deliverables:

- Article suitable for publishing in APTI Technical Bulletin.
- Student Presentation at 2024 APTNE/APTI Annual Symposium.

