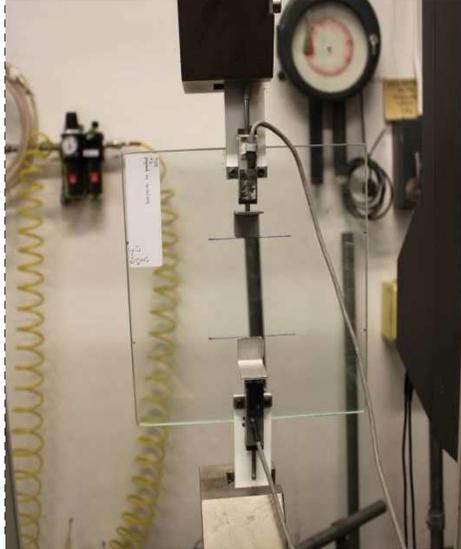
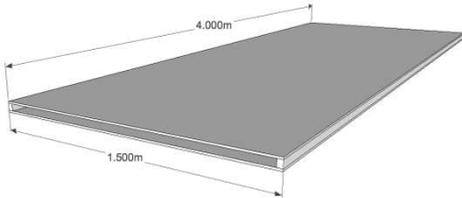


## Towards a frame-integrated glazing unit

MEng Student | *Hao Li*  
Supervisor | *Dr. Mauro Overend*



**Overview** | *The broader research aims to develop a novel frame-integrated glazed unitised curtain wall system that will reduce thermal transmission at joints, reduce structural depth significantly and allow an inside flush finish. This novel system comprises a Glass Fibre Reinforced Polymer (GFRP) frame adhesively bonded along the perimeter of an insulated Glass Unit (IGU). The specific objective of this project was to develop the design of the glass-to-frame bonded connection by selecting suitable GFRP frames and adhesives. Four-point bending tests were performed on two types of GFRP profiles to select the GFRP frames. The Glass Fibre Reinforced Polyester Resin was selected over the Glass Fibre Reinforced Phenolic Resin due to its similar performance and lower cost. An analytical model was created to optimise the thickness of the adhesive and calculate its shear strength requirements. Four candidate adhesives were pre-selected on the basis of their shear strength: Dow Corning TSSA Silicone, Araldite 2047 Acrylate, 3M DP490 Epoxy and 3M 2216 B/A Epoxy. Single lap joint specimens with toughened glass plated and GFRP profile were prepared and tested.*

**Main Outcomes** | *The results showed that DP 490 adhesive exhibits the most desirable mechanical characteristics under short-duration and ambient testing conditions. Araldite 2047, did not achieve the shear strength requirements, but could potentially do so with some modifications. 3M 2216 B/A and TSSA are discarded due to their low shear strength.*

**Future Work** | *In order to further verify the performance of the two recommended adhesives (3M Scotch-Weld DP 490 Epoxy and Araldite 2047 Acrylate), further single lap shear tests should be performed for each adhesive. Further, in order to verify the performance of the adhesive at the upper bound of the design temperature range, single lap shear tests at 80 ° C should also be performed.*