**Design Goal**
- Create a 1 kg ski (170 cm length, 90 mm waist).

**Motivation**
- A lighter ski allows for more efficient travel in the backcountry.
- 1 kg off the foot is equivalent to 4.7-6.4 kg off the back.[1]
- Average backcountry ski weighs 1.91 kg.[2]

  [1] Study from Fjaderlatt.se
  [2] Data compiled from Evo.com

**Binding Retention**
- Lightweight core materials are inherently weak and alone cannot adequately hold binding screws.
- Custom fixtures for a straight pullout test were manufactured.
- The design specification was to exceed the ISO standard of 292 lb (6004:1991).

**Composite Layers**
- Three point bending tests were used to find the stiffness of market skis.
- Finite element analysis was used to determine the correct composite layup.
- Our final pair consists of one biaxial and two uniaxial sheets of carbon fiber between the base and core with randomly oriented fiberglass mat and biaxial fiberglass below the topsheet.

**Ski Press**
- MDF was CNC cut for the mold.
- Fire hose was used to make air bags to pressurize the mold.
- Heat mats were used to generate camber by creating a temperature differential.

**Takeaways**
- Ski manufacturing is inconsistent and difficult at low volume.
- While making 1 kg skis is possible, performance sacrifices have to be made.
- Composites as a science is still developing, therefore prototyping is essential to the ski design process.

**Graphics**
- Graphics were custom designed by the team and printed on the lightest available industry standard topsheet material.