Title: Ski jump launch trainer (ski jump)

Date: 11/14/2025 - 11/20/2025

Client: Prof. Walter Block and Dr Azam Ahmed

Advisor: Prof. Randy Bartels

Team:

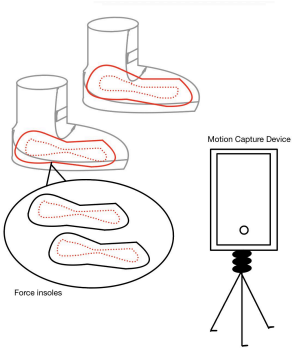
- Team Leader: Kenneth Sun
- BSAC: Caleb White
- Team Communicator: Presley Stellflue
- BPAG: Sarah Kong
- BWIG: Matthew Niemuth

Problem statement: Develop and prototype a comprehensive training system that will allow young skiers learning to jump direct comparison of their technique to professionals utilizing force plates and motion capture.

Brief status update: Now that the ski hill has closed, the group must work on fabricating two sets of force insoles that will be given to the client's daughters at the end of the project. This fabrication involved designing and fabricating an attachment method of the proto board as well as replication of the system already built, two to three times over.

Difficulties / advice requests: Determining a method for collecting data without the ski hill.

Current design:



Summary of Weekly Individual Accomplishments:

- Kenneth Sun: Worked with Caleb on getting the web interface set up. Specifically accelerometer and force output data to show up consistently on the phone. We then tested new force plate configurations and went to the teaching lab to test the calibration curve procedure for Friday plan.
- Caleb White: Set up a plan for the calibration of the force plates via a linear curve of applied weight vs associating ADC / Voltage change. Discussed a roadmap for the rest of the semester with specifically a final product given to the client in mind.
- Presley Stellflue: Investigated various methods for attaching the microcontroller holder to the boot using the Velcro strap, ensuring it stays in place without slipping off and without the arms of the controller holder breaking. Also brainstormed ways that we can make usage easier for skiers.
- Sarah Kong: Researched and purchased a velcro power strap to attach the housing/storage unit to the boot. Additionally, researched the benefits and efficiency of utilizing Velostat as a pressure sensor in preparation for the final deliverables.
- Matthew Niemuth: After the team decided to update a few dimensions on the CAD model, I updated those dimensions and reprinted our microcontroller storage unit + lid. I also typed up fabrication steps for making it on CAD.

Upcoming Team Goals: Calibration curve testing and electronics finalization. Begin working on the final prototype, including the closure for the electronics. Finalize the Kinovea data and begin working on final deliverables.

Upcoming Individual Goals:

- Kenneth Sun: Get the calibration curve finished and the equation set up with the correct code. Begin working on the kinovea videos getting the correct graphs and data.
- Caleb White: Calibrate the pressure sensor insoles via a linear calibration curve in the laboratory. Once completed, if the relationship satisfies sensitivity and accuracy desired, will move onto further fabrication of the proto boards that will be needed for the final product. Continue to work on Wifi interface.
- Presley Stellflue: Will get familiar with CAD, how we are going to fabricate the microcontroller holder. I will also look for Velcro straps for attaching to the ski boot.
- Sarah Kong: Test the current force insole prototype and see what needs to be improved on. Test new velcro straps as an attachment method for the housing unit.
- Matthew Niemuth: Calibrate force insole in force plate lab and being fully assembling our final prototype.

Materials and expenses:

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	QT	Cost Each	Total	Link

							Y			
Motion Capture System										
Tripod with Bag	60 inch lightweight tripod with adjustable-height legs and rubber feet, compatible with smartphone adapters.	Amazon Basics	WT3540	Amazon	B005KP473Q	10/1/2025	2	$25.99	$51.98	AmazonBasicsTripod
Tripod Mount Adapter	Smartphone holder, vertical and horizontal mount adapters for smart phones. Pack of 2	Sharing Moment Co.	H-200112	Amazon	B07S8TTH34	10/1/2025	1	$6.99	$6.99	AmazonTripodMount
Force Plate Insoles + Accelerometers										
Right Force Insole Template	TPU 3D-printed template for force plate insole made of, 18.3 cm long	N/A	N/A	Wendt	N/A	10/10/2025	1	$0.72	$0.72	N/A
Right Force Insole Template	PLA 3D-printed template for force plate insole made of, 18.3 cm long	N/A	N/A	Wendt	N/A	10/13/2025	1	$0.56	$0.56	N/A
Right Force Insole Template	PLA 3D-printed template for force plate insole made of, 20.8 cm long	N/A	N/A	Wendt	N/A	10/15/2025	1	$0.59	$0.59	N/A
Right Force Insole Template	PLA 3D-printed template for force plate insole, dimensions 24.2 cm long	N/A	N/A	Wendt	N/A	10/16/2025	1	$0.80	$0.80	N/A
Left Force Insole	PLA 3D-printed template for force plate insole, dimensions 24.2 cm long	N/A	N/A	Wendt	N/A	10/22/2025	1	$0.80	$0.80	N/A
Electrical Tape	SWRT 6 Pack Black Electrical Tape 0.75in x 66ft 600V	SWRT		Adafruit	B0DLNGHJZH	10/20/2025	1	$7.99	$7.99	AmazonElectricalTape

Microcontroller storage unit + lid V1.	PLA 3D-printed box + lid	N/A	N/A	Wendt	N/A	11/18/2025	1	$0.99	$0.99	N/A
Microcontroller storage unit + lid V2.	PLA 3D-printed box + lid	N/A	N/A	Wendt	N/A	11/20/2025	1	$1.19	$1.19	N/A

Timeline:

Task	Sep			Oct					Nov				Dec	
	12	19	26	3	8	17	24	31	7	14	21	28	5	10
Project R&D														
Research	X	X	X	X	X	X	X	X	X	X	X			
Design			X	X	X	X	X	X	X					
Prototyping				X	X	X	X	X	X	X	X			
Testings								X	X	X	X			
Deliverables														
Progress Reports	X	X	X	X	X	X	X	X	X	X	X			
PDS		X												
Design Matrix			X											
Prelim Presentation				X										
Prelim Report					X									
Final Poster														
Final Report														
Meetings														
Client		X							X		X			
Advisor	X	X	X	X	X	X	X	X	X	X	X			
Website														
Update	X	X	X	X	X	X	X	X	X	X	X			

Filled boxes = projected timeline

X = task was worked on or completed