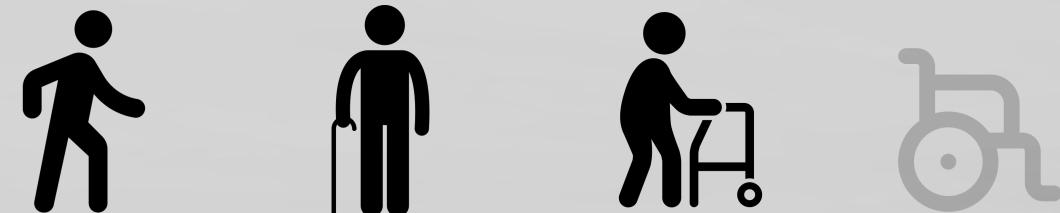


# Sit-Stand Electric Scooter

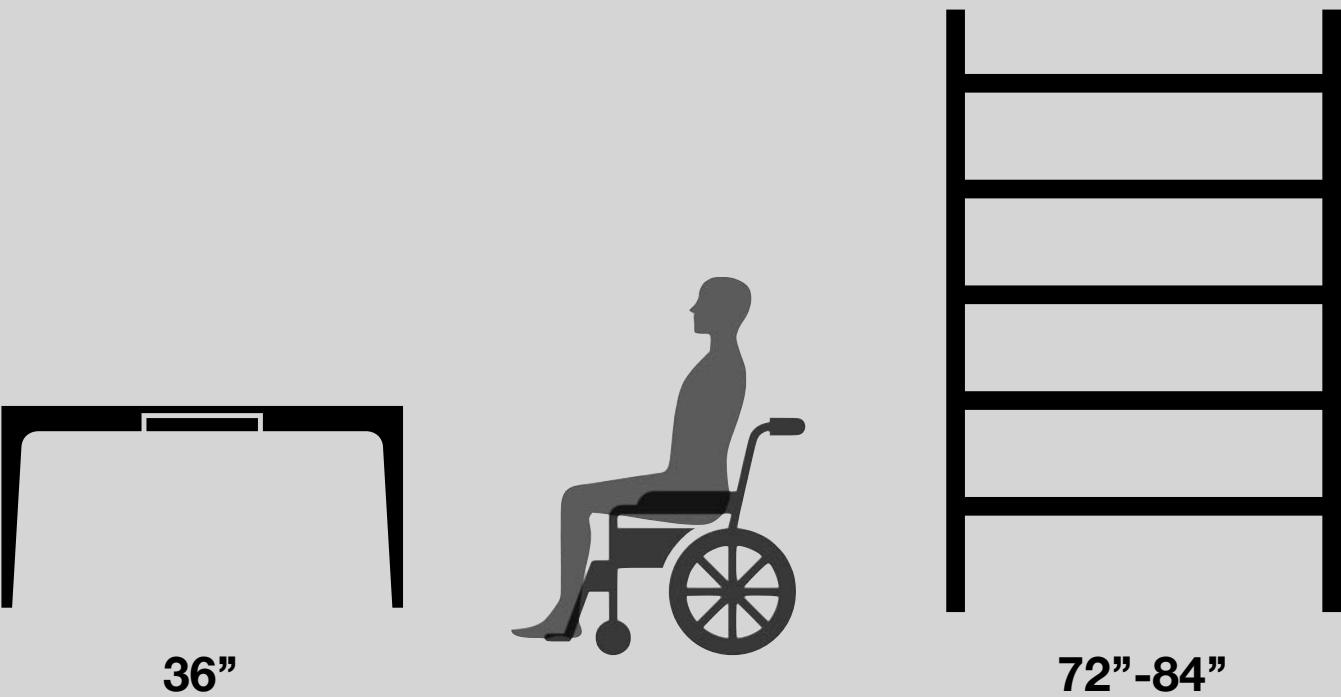
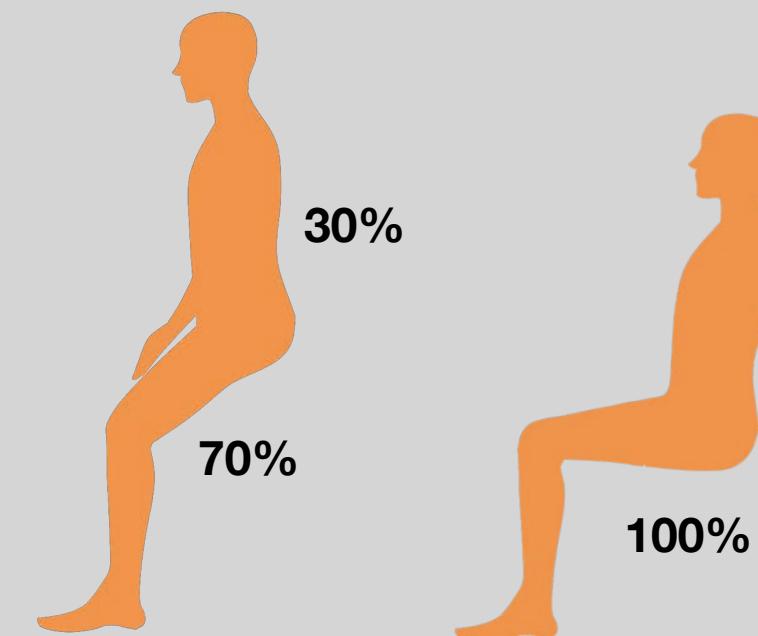
Designed for those with lower  
limb functionality but who require  
external support for daily  
commutes.



# Higher posture

## Better accessibility

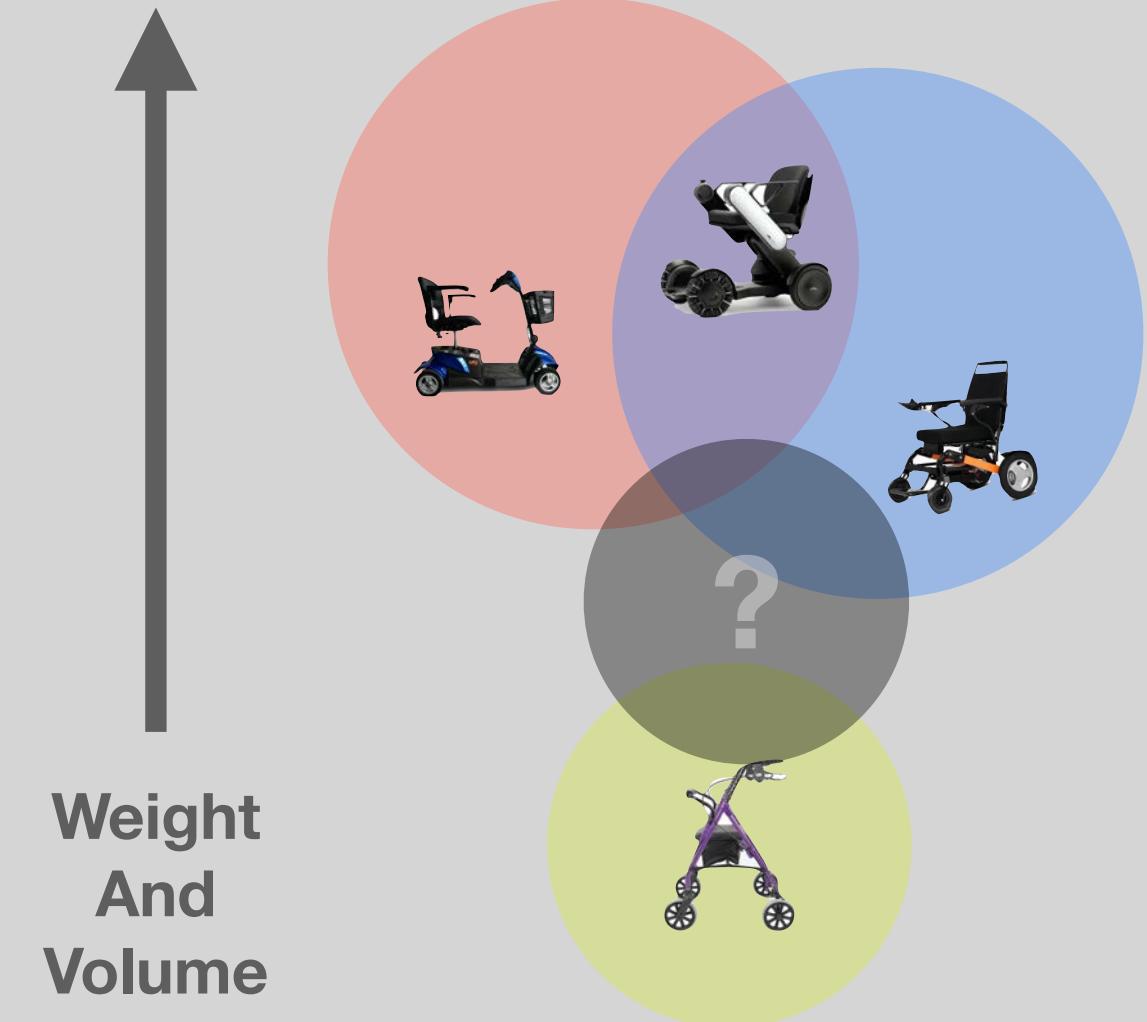
### Ultra-Portability



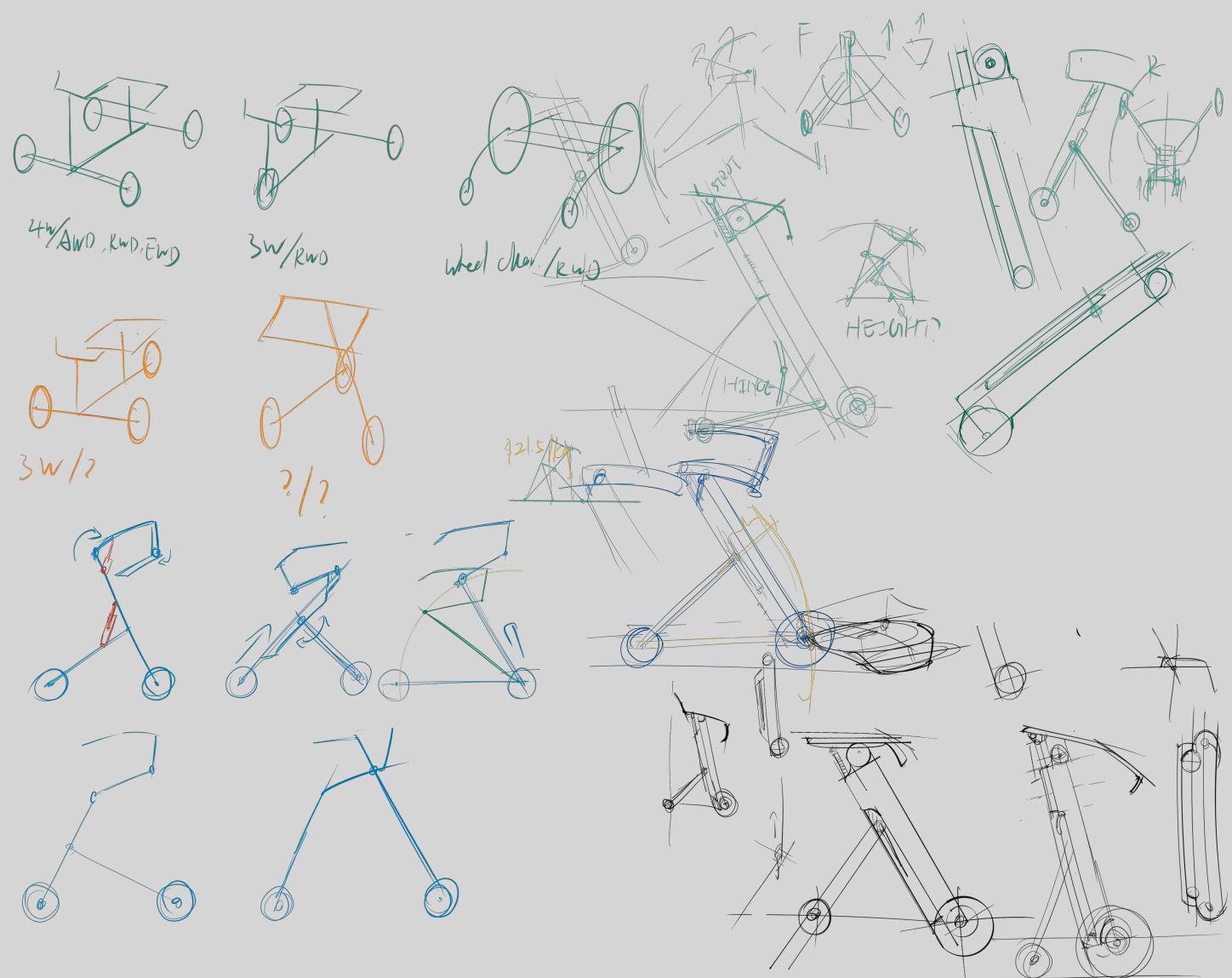
The sit-standing posture offers a more balanced weight distribution than the traditional sitting position. While sitting typically places 100% of the user's weight on the buttocks, the sit-standing stance distributes approximately 70% of the weight to the buttocks and 30% to the back, promoting better vascular circulation and muscle exercise.

Traditional sitting-style mobility aids often present challenges for users when navigating various heights, such as reaching items on higher shelves while shopping or adjusting to a lower position at the cashier counter during checkout.

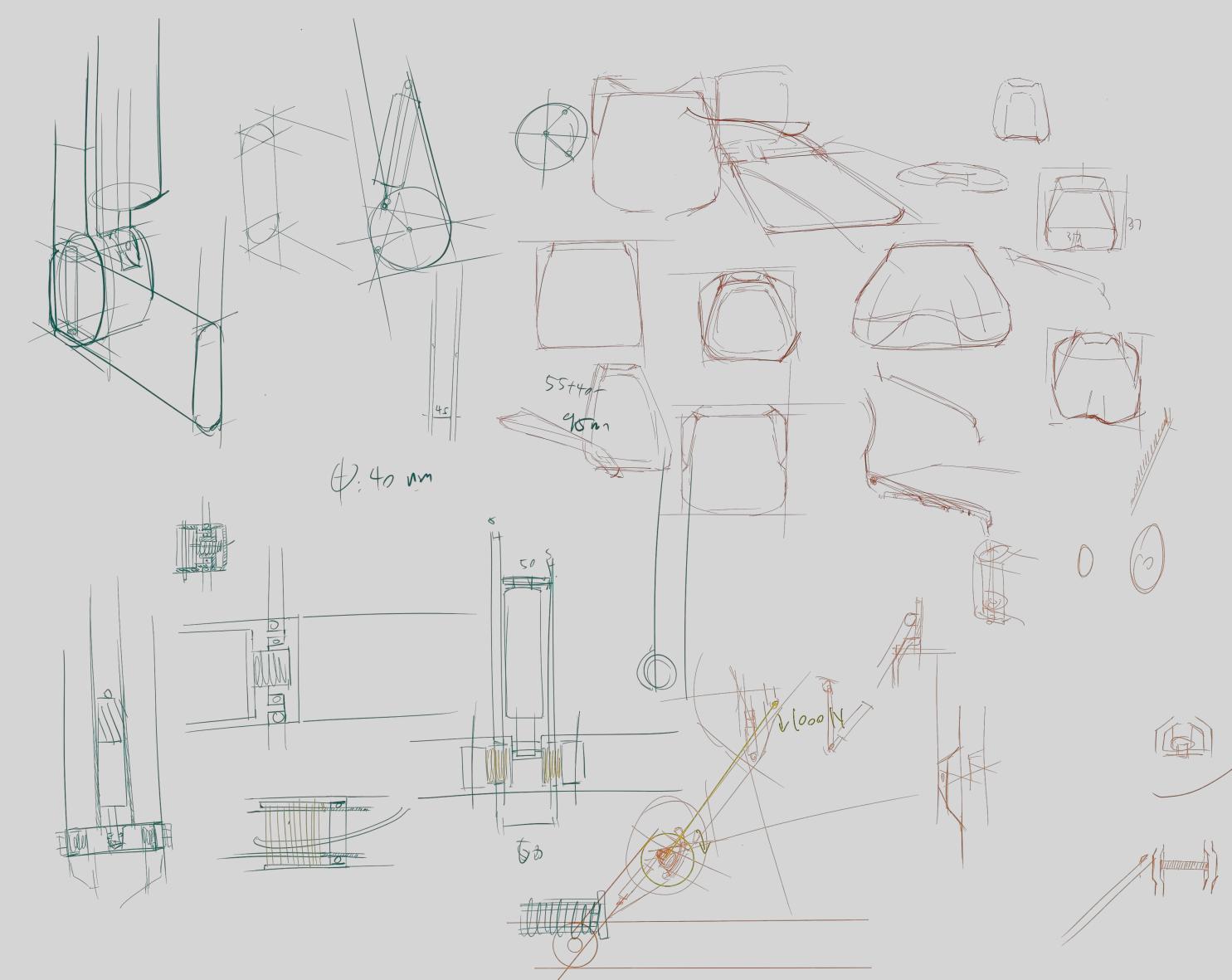
*“Results showed that residents, experts and carers all prefer chairs which are above the recommended height for older people so that they will be able to get out of them more easily.”*  
*“Variable height chairs, a range of chairs of different heights in each space and footrests could all address the height problem.”*  
— Seating in aged care: Physical fit, independence and comfort, 2018, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5758957/>



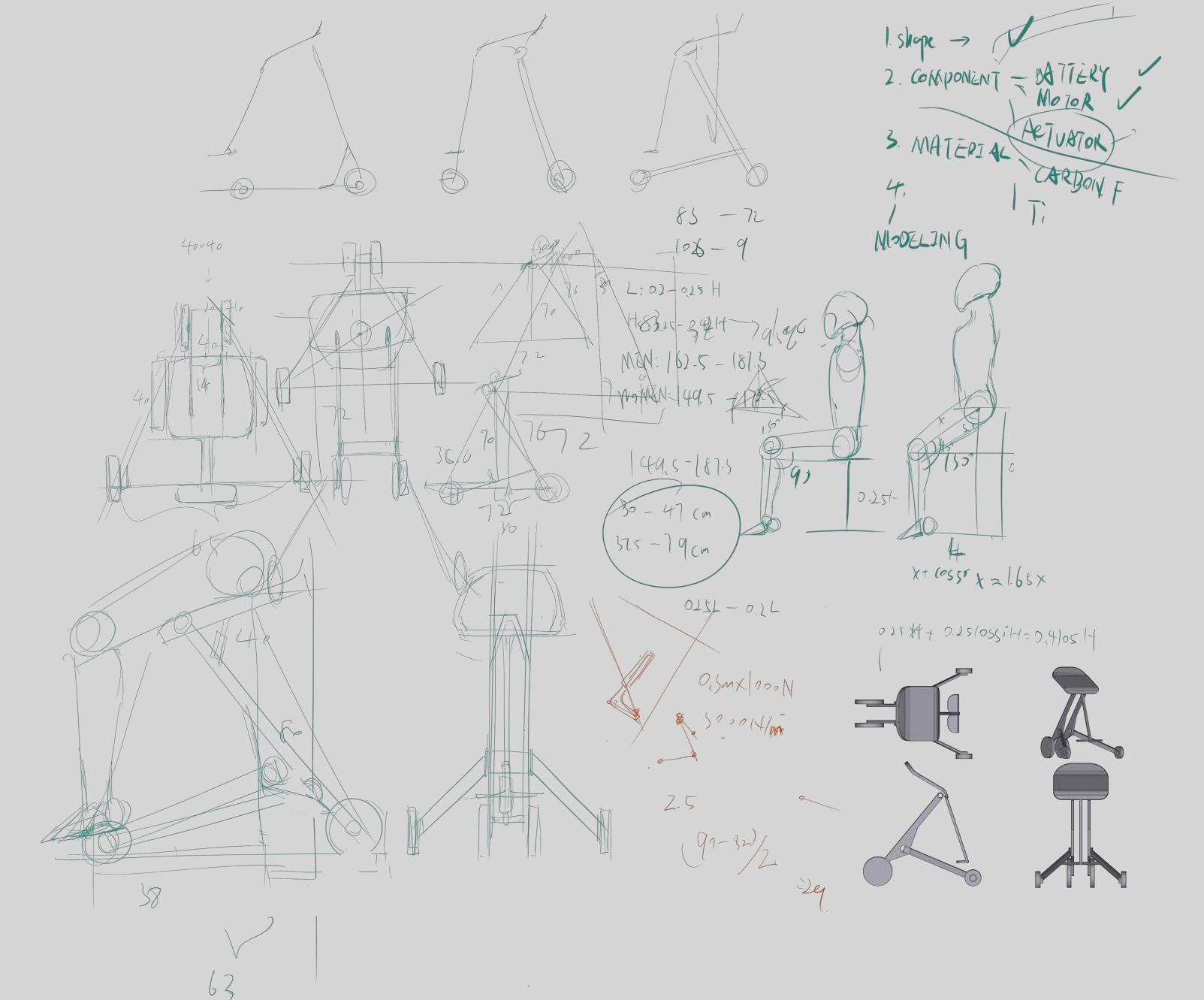
### 1. Concept design for form generation and drivetrain research.



### 3. Industrial Design



### 2. Detailed Investigative of dimension, material, and structure



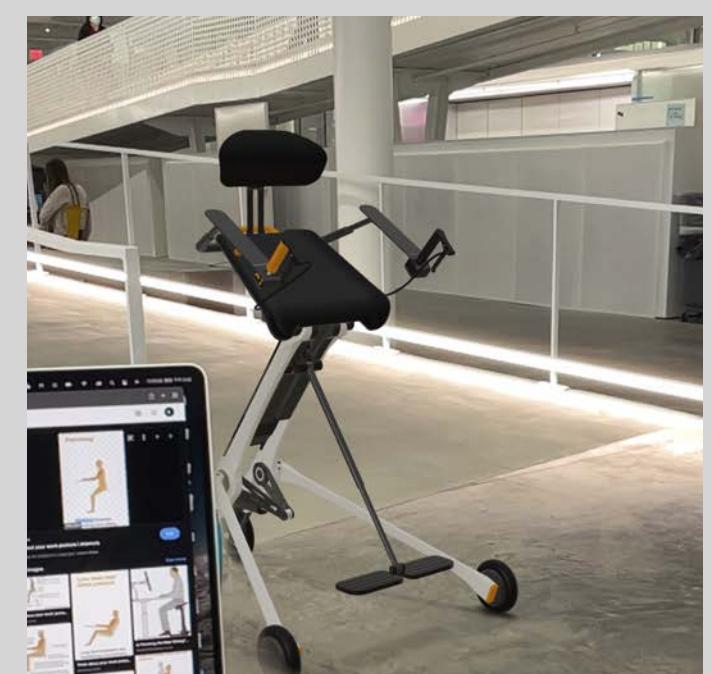
### 4. Prototyping



3D Printing



Augmented Reality



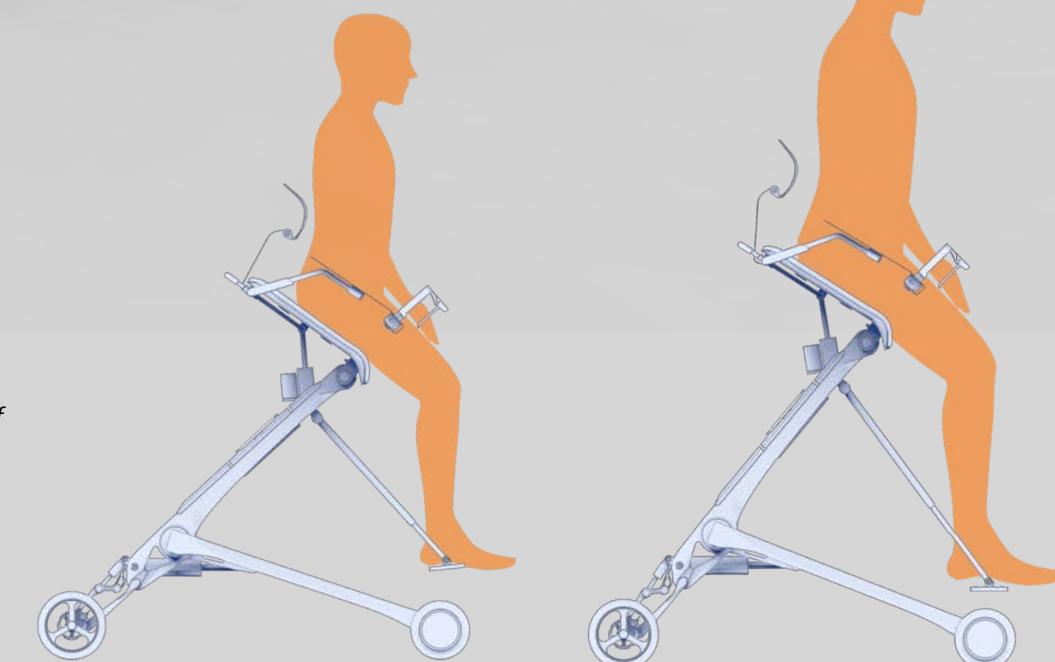
## Designed for variety dimension

Two electric actuators and two dampers guarantee comfort and compatibility.

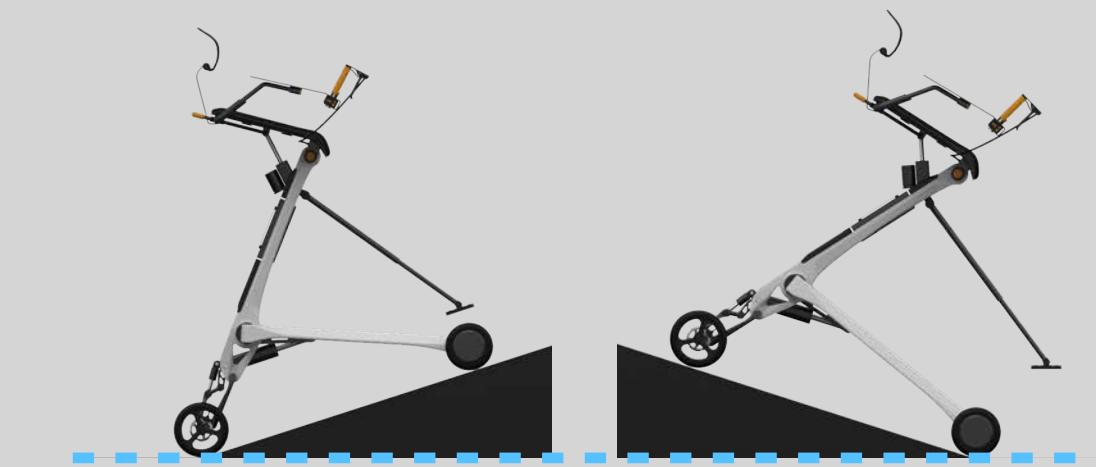


The sit-standing e-scooter is designed to accommodate 90% of the height and weight of people in the United States. It has a height range of 14.5 to 31.5 inches and a depth (seat center point to foot) of 11.9 to 18.5 inches.

According to the CDC's 2015-16 NHANES survey, 90% (5 to 95 percentile) of the population's height is 5'4" to 6'2" (male) and 4'11" to 5'8" (male). The ratio between the length of the caput femur to the foot and the height is approximately 1:2. The Ratio between the length of the calf bone to the feet and the size of the femur is 1:1.

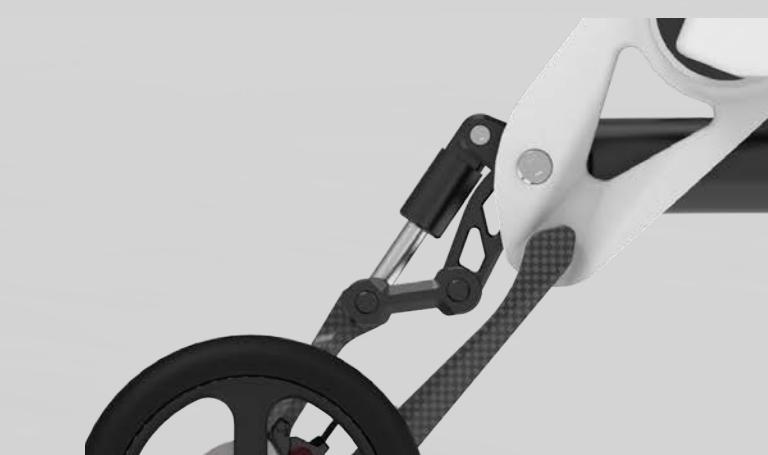


## Easily overcome bumps & ramps

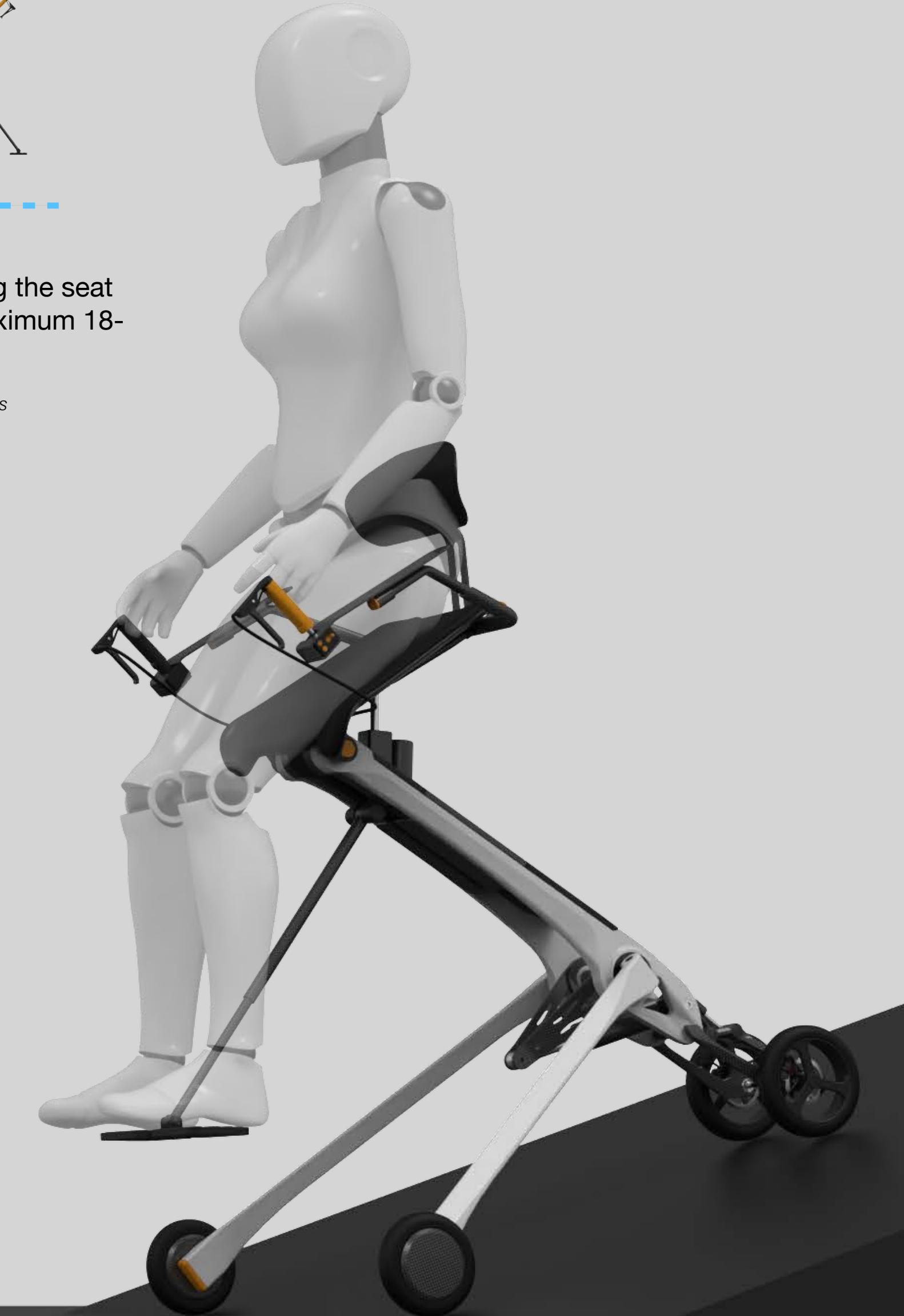


An electric strut drives the seat angle, making the seat capable of actively staying balanced at a maximum 18-degree ramp.

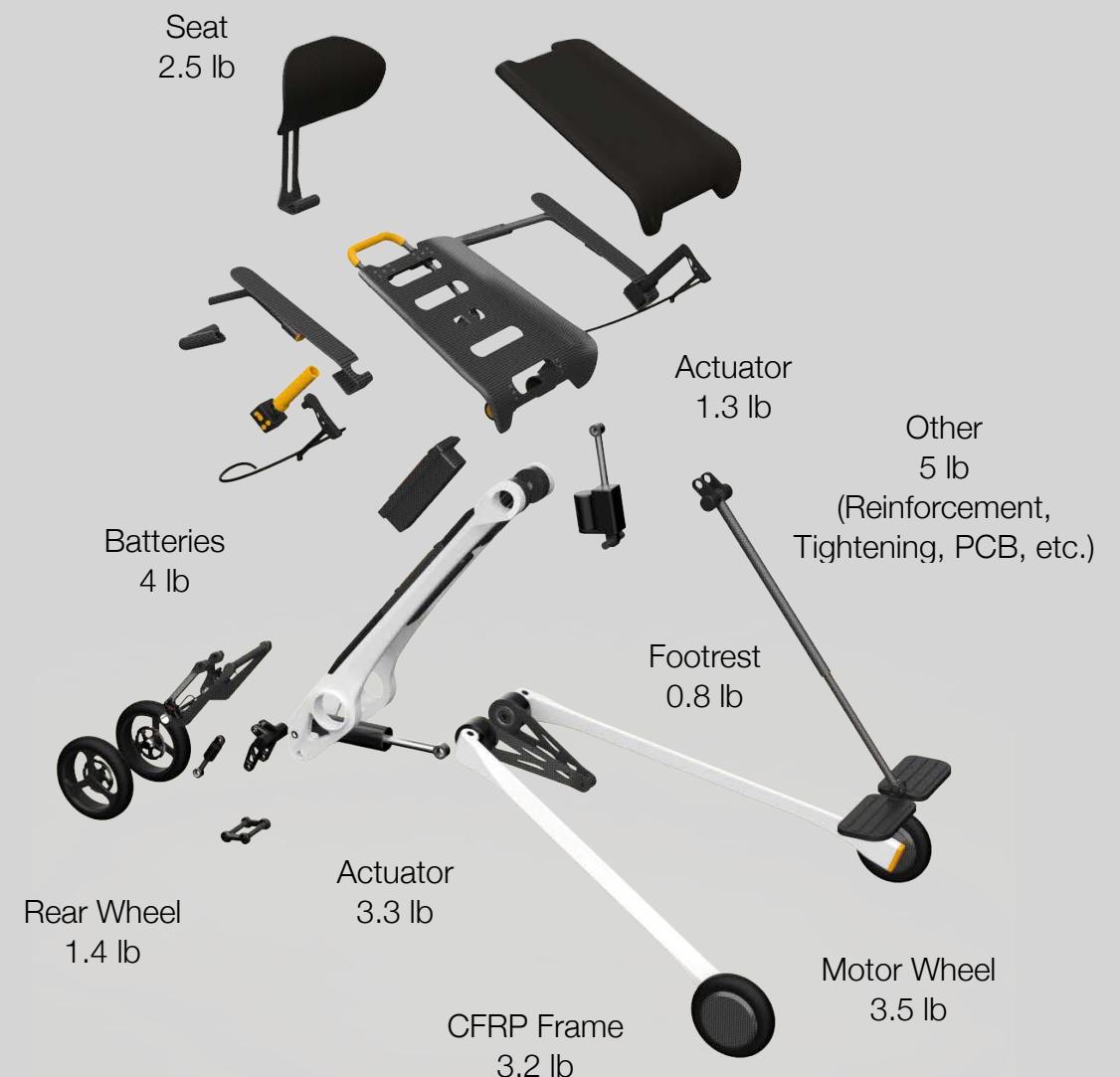
*According to ADA, the max egress ramp for wheelchair is 4.76 degrees*



Inspired by the mountain bike, the Sit-standing E-scooter features a shock-absorption system on the rear. With pre-tensioned front wheel arms, it rides smoothly on uneven, bumpy pavements.



# Lightweight and easy-carry, yet strong



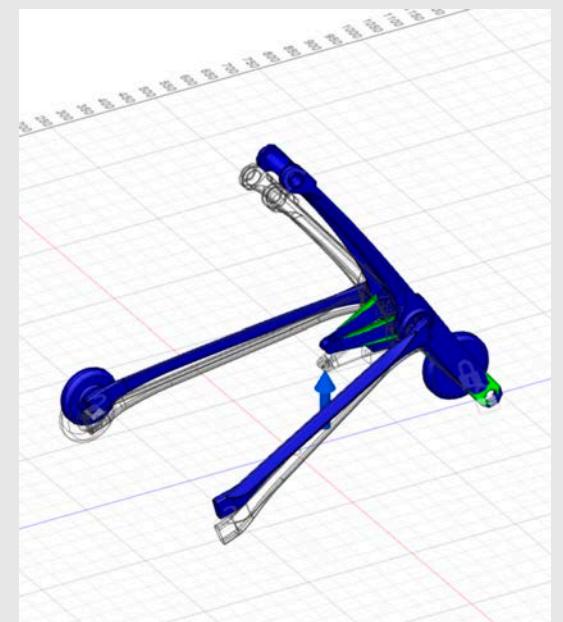
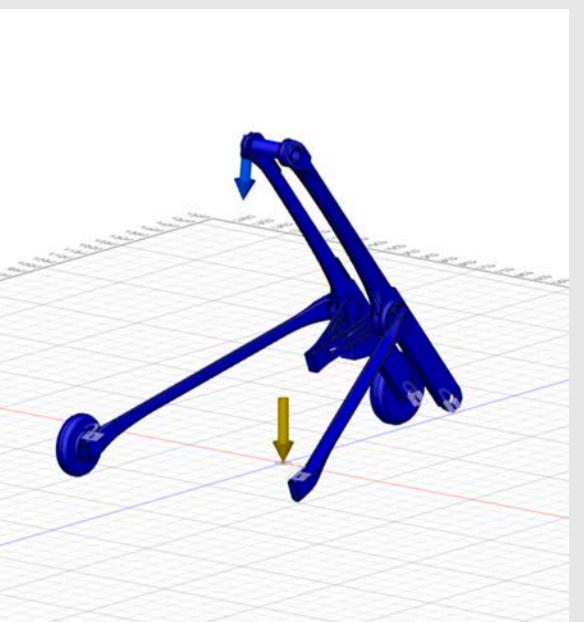
The weight is calculated in CAD based on the assigned materials, along with the spec sheets from the manufacturer for the components meeting the designed performance (battery, motor wheel, and actuator).

The sit-standing e-scooter weighs 25 pounds, significantly lighter than other powered options. This is achieved using lightweight materials such as carbon fiber-reinforced plastic (CFRP), aluminum, and polypropylene, as well as updated parts, including motorized wheels, a high-density battery, and electric actuators.

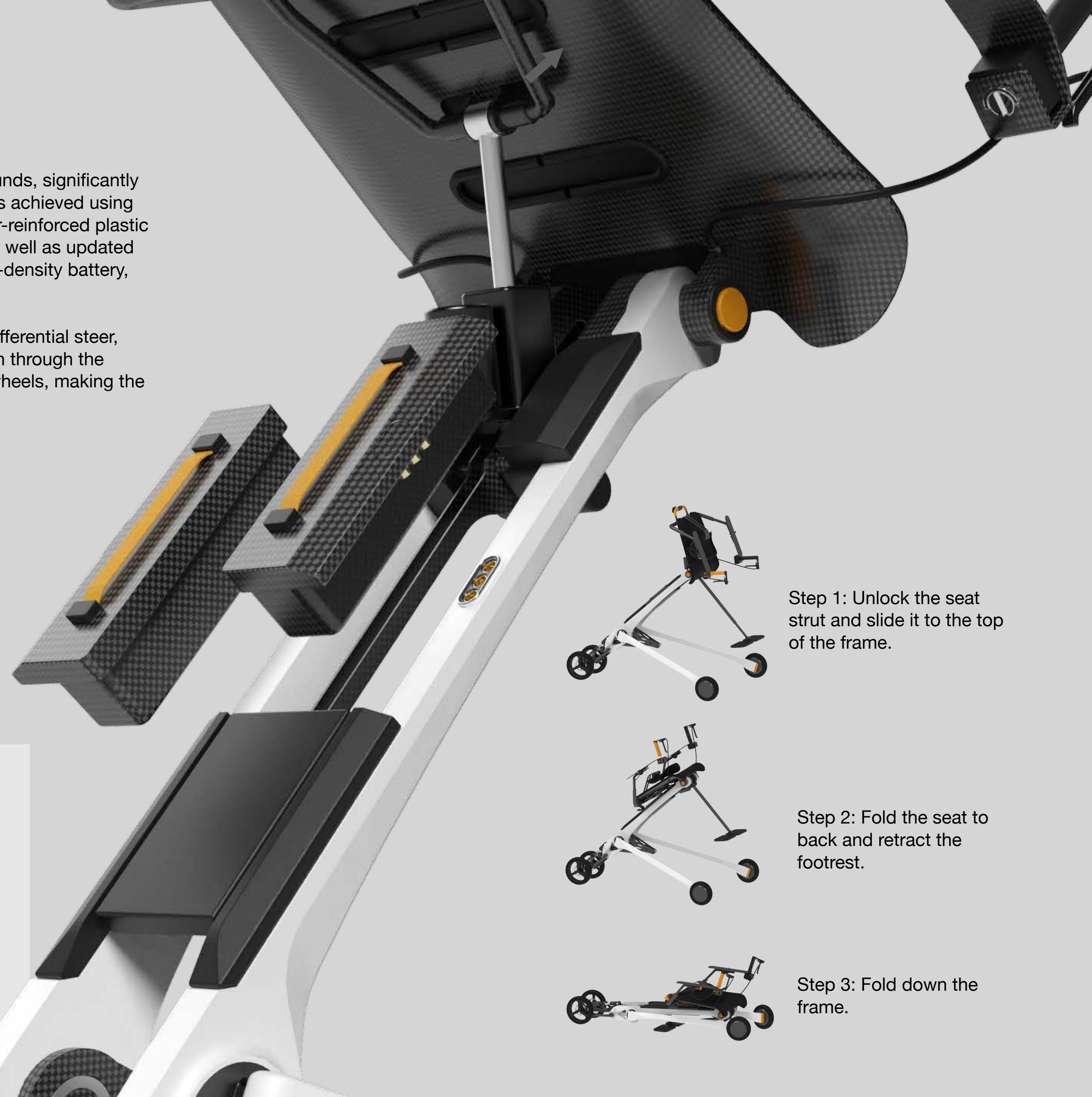
The steering system, known as electric differential steer, operates by driving the scooter's direction through the speed difference between the two front wheels, making the structure simpler and lighter.



It features a foldable design, measuring 42 inches long, and easily fits in a standard sedan's trunk.



Thanks to CFRP, the strength simulation shows that the entire frame (with a 3mm wall thickness) has a minimum safety factor of 2.3, which means the material strength is 2.3 times the actual stress, under the maximum designed load of 220 lbs (which is above the 95th percentile of the population weight in the United States) with a maximum deformation less than 30mm.



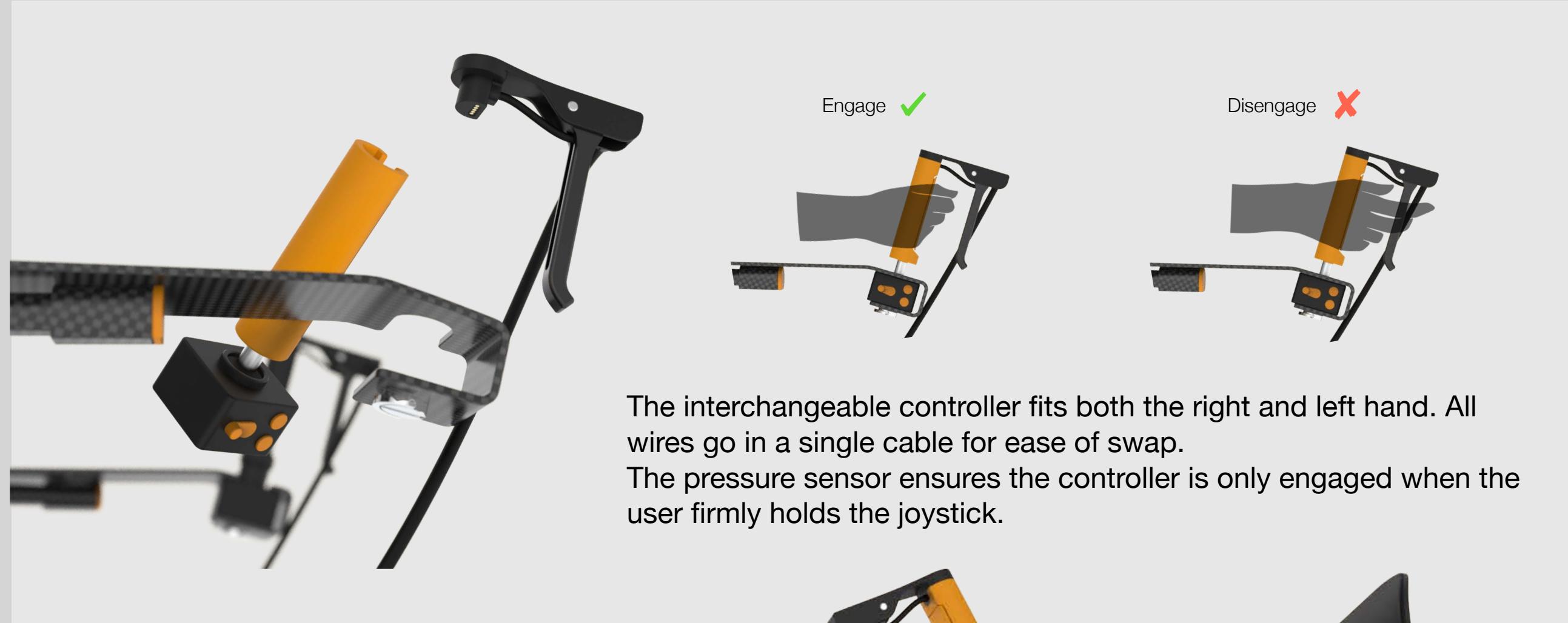
Step 1: Unlock the seat strut and slide it to the top of the frame.

Step 2: Fold the seat to back and retract the footrest.



Step 3: Fold down the frame.

## Ride safely, right and left-handed



## Accessories making the ride easier



**Rear Hooks:**  
It is mounted on the seat's rear handle, suitable for holding large backpacks.



**Side Hooks:**  
The hook mounted beneath the armrest is excellent for lightweight loading, such as handbags or shopping bags.



**Cup Holder:**  
A self-balanced cup holder under the armrest that stays perpendicular to the ground regardless of the slope.