Female Specific Alpinist Gear: An In-Depth Analysis of the Effects of Under-Representation in Alpinist Gear

Makena A Klatt

M.S Sports Product Design, University of Oregon

SPD 610 Thesis Capstone Research

Dr Susan Sokolowski

Vanessa Preisler

Carly Mick

Introduction:

Throughout the ages, women have continually tested their abilities in the mountains. For just as long, their contributions have unfolded behind the scenes, with recognition seldom accorded to them, being cataloged simply as someone's “wife" or simply left without a name. The prevailing narrative often downplayed their capabilities, attributing their summit successes to the assumed assistance of their male counterparts. Yet, despite the persistent challenges and biased narratives, women have persevered. From the late eighteenth century, when the exploits of women in mountaineering were first documented, to the groundbreaking achievement of Caroline North and Christina Huber with their first all-female ascent of Cerro Torre in 2015 (*First All-Female Ascent of Cerro Torre via the Ragni Route - Alpinist.Com*, n.d.), the magnetic allure of the mountains has resonated for women just as powerfully as it has for men.

Project Overview:

My thesis project is focused on creating an integrated layering system specifically for female alpinists that takes into account women's specific needs such as bathroom breaks, menstruation, odor control, hygiene, mobility, fit, and thermoregulation. The goal is to make something that allows women to move quickly and efficiently through the mountains in variable conditions.

History of the Sport:

Most histories of mountaineering give marked preference to male endeavors, leaving out the stories of women’s contributions to the sport. The few accounts that do include women highlight the ascents of Western European climbers. To look at the history of the sport and women's place in it, it is important to acknowledge women worldwide who have contributed to mountaineering. The first accounts of women ascending mountains can be dated back to prehistoric times in the Andes. These ascents were not in sport by today's standards but “were high mountain ascents nonetheless, at heights modern climbers would not attain until the mid-19th century” (Evelio Echevarria, 2004). Yet these prehistoric climbs are often left out of the history books. Instead, most historians credit the origin of mountaineering to male colonial explorers. These men were “equipped with thermometers, artificial horizons,

compasses, ice axes, and a primary goal of claiming and appropriating land" (Froderberg, 2018).

It wasn't until the 1800s that mountaineering underwent a significant transformation, shifting from a utilitarian pursuit to a sporting activity largely due to the introduction of Alpine clubs and professional guides. This evolution started in the alpine regions of Switzerland, Italy, and France. The sport at this time was mostly dominated by white men, but women began to immediately leave their mark. The first documentation of a modern female ascent worldwide can be traced back to Elizabeth Parminter, Jane Parminter, and Mary Parminter, two sisters and a cousin who, "in 1786, recorded to have climbed on Mount Buet in France" ("Lady Legends of the Alps," 2019).

In 1907, the Ladies' Alpine Club in London was established which "created a meeting place and support for a growing body of female climbers, whose achievements were already beginning to rival those of their male counterparts but who continued to encounter prejudice and exclusion on account of their sex" ("Lizzie Le Blond And The Establishment Of The Ladies Alpine Club," 2015). The Alpine club came into existence because the Alpine club "would not permit women to join until 1975" ("Ladies' Alpine Club," 2023).

Most histories focus on women climbing in Europe but major first ascents were happening at the same time in South America. In 1903, "Nadinevon Meyendorff became the first woman with a known name to have climbed in the Andes" and accomplished the first ascents of Cerro Tolosa, and Los Geme in the Aconcagua area in Argentina (Evelio Echevarria, 2004).

Back in Europe, Miriam O'Brien Underhill coined the term "manless climbing" (Walsh, 2022) and in 1929 she made the first ascent of the Grépon with Alice Damesme. In response to such a feat, the French male mountaineer Étienne Bruhl stated "The Grépon has disappeared. Now that it has been done by two women alone, no self-respecting man can undertake it. A pity, too, because it used to be a very good climb" (Walsh, 2022). Miriam went on to accomplish the "first manless climb of the Matterhorn" ("Lady Legends of the Alps," 2019) Her resistance to criticism and sexism demonstrated not only her exceptional mountaineering prowess but also her unwavering determination to challenge gender norms in the alpine world, paving the

way for a new era of inclusivity and recognition for women in the realm of mountain exploration.

Women's climbing started to become more popular around the early 1930s. Llsevon Rentzell, a German-Argentinian, ascended the “icy Volcan Osorno in southern Chile in 1929” and in “January 1932, with two companions, made the first ascent of Cerro Gemelos del Turbio in northern Patagonia” (Evelio Echevarria, 2004). In the 1930s, a German woman with the last name of Kuhn who was raised in Valparaiso Chile climbed the “crater of Volcano Tupungatito and in March of the same year made the third ascent of Tinguiririca” (Evelio Echevarria, 2004). She is widely considered the first Chilean woman mountaineer.

In the late 1930s through the mid-1950s, Dorly Marmillod, a Swiss climber ascended countless peaks all over southern Chile and Argentina (Evelio Echevarria, 2004) showing that women could climb at the same level as men. In 1988, the first Female Ascent of Cerro Torre was accomplished by Rosanna Manfrini (AAC Publications - South America, Argentine-Chilean Patagonia, Cerro Torre, First Female Ascent, n.d.).

In 2006, Crystal Davis-Robbins was the “first female to ascend the North Pillar of Fitz Roy” (CRYSTAL DAVIS-ROBBINS, RYAN NELSON SEND IN PATAGONIA - Alpinist.Com, n.d.). Her accomplishment proves again that women are not only as strong, resilient, and determined as men but brave and resourceful as well. Her accomplishment proves once again that women are not only as strong, resilient, and determined as men but also brave and resourceful. It stands as a testament to the indomitable spirit of women in the face of challenges, breaking through societal stereotypes and showcasing the equal prowess and courage that women bring to the forefront of exploration and achievement.

Product Classification:

This project will focus on sustainable apparel design, specifically apparel design for female alpinism and climbing. It will revolve around an integrated layering system for advanced and experienced female alpinists. The layering system will incorporate base layers, mid layers, and an outer layer. The target user is a female alpinist 25-40 years of

age, has 10+ years of technical climbing experience and has also worked in a professional capacity in the industry. To be able to climb at this level, the athlete has spent an immense amount of time in nature and therefore harbors a deep respect for it and would like that to be reflected in the gear they choose to wear. She is passionate about leave-no-trace practices and cares deeply about sustainability. She is a seasoned and dedicated climber, someone whose life has been deeply intertwined with the intricate world of climbing for over a decade. Her proficiency in technical climbing isn't just about mastering the sport; it's a testament to her unwavering commitment, discipline, and continuous pursuit of excellence in her craft. Her passion extends far beyond conquering peaks. She is an advocate for ethical climbing practices, passionately promoting leave-no-trace principles because she knows the importance of respecting the sanctity of these natural wonders she ascends. She champions sustainability, recognizing the delicate balance between human pursuit and environmental preservation. Her commitment to minimizing her ecological footprint shapes her climbing expeditions and daily life choices. Her dedication to the sport and the environment intertwines to form a powerful narrative that transcends mere climbing; it's a holistic philosophy of responsible exploration and reverence for the natural world.

Golden Circle:

Sustainability plays a pivotal role in my design philosophy for the thesis project, emphasizing adherence to circular design principles geared towards the creation of products that prioritize durability, reusability, repairability, and recyclability, ultimately leading to a zero-waste approach. This commitment is rooted in the belief that minimizing environmental impact is of paramount importance, achieved through deliberate and mindful choices in product creation, the promotion of longevity, and the integration of circular practices. Not only is this of paramount importance for the design but also for the athletes using it.

Key Performance Job:

Designing specifically for women recognizes the importance of acknowledging and addressing the unique needs, preferences, and experiences of women. This

perspective encompasses several key "jobs to be done" and challenges to be addressed.

Firstly, the design should cater to the practical needs of climbers. Athletes often face extended periods of climbing, requiring gear that can be worn for up to 7 days at a time for all of their activities such as sleeping, eating, and climbing. Furthermore, they need equipment that is lightweight and compact, as they must carry it for the entirety of their endeavor. The design should also account for variable weather and extreme conditions, ensuring that athletes are well-equipped to handle any situation.

Beyond these practical considerations, the design should take into account specific female needs. This includes making the gear adjustable to accommodate various body types such as chest size, thigh size, and hip size. Moreover, addressing issues related to going to the bathroom and managing menstruation while wearing a climbing harness is crucial. Climbers relieve themselves while still wearing the harness and while staying tied into the rope on the route. Currently, female climbers must loosen their harnesses to remove their layers in order to go to the bathroom. This is unsafe and puts the athlete at extreme risk. This is an issue I would like to address in the design. Additionally, the design should tackle common concerns such as odor and chafing, ensuring that the gear remains comfortable and functional throughout the duration of the trip. Ultimately, how could I design an integrated layering system for female alpinists that provides thermoregulation, makes going to the bathroom more efficient, allows athletes to move quickly through the mountains in variable conditions, and is also kind to the Earth?

User Athlete/Global Market:

According to the International Federation of Sport Climbing (IFSC) 2019 annual report, “the average percentage of climbers per country with the total world population—and after excluding populations in extreme poverty — 44.5 million climbers worldwide.” According to the same survey, it is estimated that women make up “30 percent of the market or approximately 13.35 million climbers”. According to the 2019 American Alpine Club report, 65% of climbers are 18-35 years old which is

approximately 8.67 million. Of these, the elite few who will be climbing at such difficult levels is approximately 7% or 606,900.

Athlete role/ position/skill:

The athlete's overall objective is to quickly, efficiently, and safely, move through the mountains, navigate variable weather conditions, and climb through mixed conditions such as rock, ice, and snow to reach the summit, and then descend. Depending on the objective, this could take several hours to several days. Typically, athletes hike up to the base of the mountains, where they establish a base camp. This is typically a snow cave and used as a home base while they wait for an optimal weather window. During this time, the athletes are eating, sleeping, and working out to stay in peak physical fitness, all in the same set of clothing. They might also use this period to establish a high camp further up along their climbing route. When a suitable weather window opens up, the athletes will try to accomplish their objectives.

To excel in this pursuit, individuals must maintain peak physical fitness, encompassing qualities such as endurance, strength, and cardiovascular health. They must also possess an array of technical climbing skills, including proficiency in rock climbing, ice climbing, and mixed climbing, alongside mountaineering skills such as navigation, avalanche awareness, and crevasse rescue. Technical gear proficiency is paramount, involving expertise in rope work and gear handling.

In addition to physical and technical skills, mental toughness is a prerequisite, encompassing the ability to make sound decisions, manage risks effectively, and exhibit resilience. Endurance in extreme conditions, specifically in the realms of cold weather survival, altitude acclimatization, and a deep understanding of weather patterns is crucial. Effective teamwork and communication skills are essential for successful summit attempts. A dedication to safety, without compromising the adventurous spirit, remains a foundational principle, emphasizing the importance of prioritizing safety in all aspects of outdoor exploration.

Environment:

Alpine climbing involves small unsupported teams tackling large multi-pitch routes that can involve various combinations of rock climbing, ice climbing, and mixed climbing, in alpine type mountain environments. Alpine routes are long and require a full day or even several days of climbing. Alpine style of climbing is often considered the purist form of climbing, it is climbing fast, light and unsupported through the mountains carrying minimal gear which allows climbers to take advantage of weather windows to reach objective.

Although there are several hallmark alpine climbing areas around the world, this paper focuses specifically on climbing in the Patagonia region in southern Argentina. In El Chalten, one of the main hubs for alpine objectives, the climbing season typically runs “from November through February, depending on the season” (Climbing in Patagonia & Multi-Pitch Rock Climbing | Swoop Patagonia | Swoop Patagonia, n.d.). Temperatures in November through February range from 30.4°F to 49.5°F, with humidity ranging from 76-77%, with 13-17 rainy days per month, or 8-10 inches of rain per month, and 5.2-5.4 sun hours per month. (El Chaltén Climate: Temperature El Chaltén & Weather By Month, n.d.)

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	4.9 °C (40.7) °F	6 °C (42.8) °F	4.1 °C (39.4) °F	1.5 °C (34.8) °F	-0.8 °C (30.5) °F	-3 °C (26.5) °F	-3.5 °C (25.7) °F	-2.9 °C (26.8) °F	-1.2 °C (29.9) °F	0.5 °C (32.8) °F	1.9 °C (35.4) °F	3.4 °C (38.1) °F
Min. Temperature °C (°F)	1.7 °C (35.1) °F	2.6 °C (36.8) °F	1.2 °C (34.2) °F	-1 °C (30.3) °F	-2.9 °C (26.7) °F	-5 °C (23) °F	-5.6 °C (21.9) °F	-5.2 °C (22.6) °F	-3.8 °C (25.2) °F	-2.2 °C (28) °F	-0.9 °C (30.4) °F	0.5 °C (32.9) °F
Max. Temperature °C (°F)	8.1 °C (46.7) °F	9.7 °C (49.5) °F	7.4 °C (45.4) °F	4.4 °C (40) °F	1.4 °C (34.6) °F	-1 °C (30.2) °F	-1.2 °C (29.9) °F	-0.1 °C (31.8) °F	1.8 °C (35.2) °F	3.4 °C (38.1) °F	4.7 °C (40.5) °F	6.3 °C (43.3) °F
Precipitation / Rainfall mm (in)	256 (10)	210 (8)	255 (10)	275 (10)	261 (10)	218 (8)	229 (9)	232 (9)	188 (7)	241 (9)	238 (9)	266 (10)
Humidity(%)	77%	76%	80%	82%	84%	85%	83%	82%	82%	79%	77%	77%
Rainy days (d)	17	13	16	15	15	15	15	15	15	15	16	17
avg. Sun hours (hours)	5.4	5.4	4.5	3.8	3.3	2.8	3.1	3.8	4.3	5.1	5.3	5.2

Figure 1: Data 1991 - 2021 Min. Temperature °C (°F), Max. Temperature °C (°F), Precipitation / Rainfall mm (in), Humidity, Rainy days. Data: 1999 - 2019: avg. Sun hours (El Chaltén Climate: Temperature El Chaltén & Weather By Month, n.d.)

While climbing, the dangers are numerous. Athletes must be aware of potential rock falls, avalanches, and incoming weather, all of which could leave the alpinist stranded on the wall. The terrain in Patagonia varies depending on the region and the climbing objective. Three of the most common climbing terrains include rock, ice and snow. Most of the rock in this area is “granite or granodiorite” (Fitzroy : Climbing, Hiking & Mountaineering : SummitPost, n.d.) and is extremely grippy and surprisingly slippery when wet. The crystals are sharp and can be painful and cold to climb on. Ice climbing involves ascending frozen water formations. The quality of ice can vary widely, from thick solid ice to more fragile brittle formations. The section of the route consisting of snow is usually at the very bottom and the top of the summits. Often athletes have to navigate through snow plains and glaciers at the base of the mountains in order to reach the bottom of the climbing route. At the summit, it is common to encounter rime mushrooms which are “large bulbous mushroom-shaped accretions of hard rime that build up on the upwind side for mountain summits and ridges or on windward rock faces” (Rime Mushrooms on Mountains: Description, Formation, and Impacts on Mountaineering in: Bulletin of the American Meteorological Society Volume 94 Issue 9 (2013), n.d.).

Proposed Product:

The climbing environment and weather conditions can change drastically, and therefore the products the athlete wears must be adaptable. I propose an integrated layering system that is compatible with a harness and allows female athletes to use the bathroom efficiently. My proposed solution to this problem is to make a base layer for the top and bottom, as well as a mid-layer top and an outerwear top and bottom for a total of 5 final pieces. The end of these products must also be taken into account. Sustainability is of the utmost importance in order to maintain these wild places that climbers go to explore. Therefore, sustainability will be at the core of this design

Competitor Products:

Some of the most commonly used base layers for climbing include the Arc’teryx Rho lightweight hoody which retails at $140.00. It is made from a polyester and elastane

fabric that is brushed with a Torrent interior, which helps to speed up the drying time while remaining comfortable next to the skin. The snug fit reduces drafts and bulk while enhancing the garment's layering ability. It also has a hood and a full-face balaclava to add warmth and versatility. Another common base layer option is the Black Diamond Solution 150 Merino quarter zip retailing at $145. Its warmth-to-weight ratio is the highest of the three base layers. It offers exceptional thermoregulation and breathability due to the merino wool. The hood and quarter zip provide more versatility for thermoregulation. The final option is the Patagonia Capilene Air Hoody retailing at $145. It is manufactured using a 3D knit weave design with lofted wool innovation. It has a slim fit and hood to trap heat. The permeable fabric allows excess moisture to be released.

Fig 2: Arc’teryx Rho lightweight hoody

Fig 3: Black Diamond Solution 150 Merino quarter zip

Fig 4: Patagonia Capilene Air Hoody

For the Mid-layers, the most commonly used are the Rab Neutrino Pro, The Feathered Friends Eos, and the Arcteryx Cerium Hoody. The Rab Neutrino Pro retails at $400 and offers lofty warmth for relatively minimal weight and bulk. It's constructed of durable materials and has great coverage, with a longer-than-average torso and an exaggerated drop hem, velcro-adjustable cuffs, and an adjustable-volume hood. The Feathered Friends Eos retails at $415 and features 900+ fill down is remarkably lightweight, and there's quite a bit of loft, making it one of the warmest jackets without feeling too bulky it still compresses small enough to compete with the smaller jackets. Finally, the Arc'teryx Cerium Hoody retails at $400 and features a host of adjustability features that make it comfortable in most situations. It's more weather-resistant than most, and it swaps out down-filling for water-resistant synthetic insulation in key moisture-prone areas. It's easy to layer in colder weather and packs down into a small, lightweight package.

Fig 5: Rab Neutrino Pro

Fig 6: The Feathered Friends Eos

Fig 7: Arcteryx Cerium Hoody

For the outer layer for bottoms, the most commonly worn solutions include the Patagonia Alpine Suit, the Patagonia Dual Aspect Bibs, and the Flylow Siren Bib Pant. The Patagonia Alpine Suit retails at $999 and features Gore-Tex newest material innovations to keep the athlete protected from head to toe while also providing unrestricted movement. Built of 100% recycled, PFC-free, waterproof/breathable 3-layer GORE-TEX fabric with alpine-specific design solutions, it offers complete storm protection using more responsible materials without compromising quality. Next, the Patagonia Dual Aspect Bibs which retail at $400 and feature a fully PFC-free waterproof/breathable hard shell built for alpine climbing in the harshest conditions. This combination of full storm protection for the worst possible weather, a construction designed specifically for freedom of movement in the mountains, and a materials package free of perfluorinated chemicals, lower product impacts on the environment. Finally, the Flylow Siren Bib pant which retails at $475 and features air-permeable, stretchy, and waterproof face fabric that is able to eliminate sweat by preventing overheating, while still keeping the weather out. The Siren also features a half-height bib, adjustable suspenders, and large outer leg vents that let you dump excess heat during extremely rigorous periods of time.

Fig 8: Patagonia Alpine Suit

Fig 9:Patagonia Dual Aspect Bibs

Fig 10: Flylow Siren Bib Pant

Product Anatomy:

Typically, in an average technical base layer, we can see several key factors. These include specialized fabric, ergonomic seams, tailored fit, strategic paneling or zones to cater to moisture-prone areas, enhancing ventilation and comfort during physical activities, zippered collars that allow for adaptable temperature control, while elastic cuffs and hems ensure a secure fit.

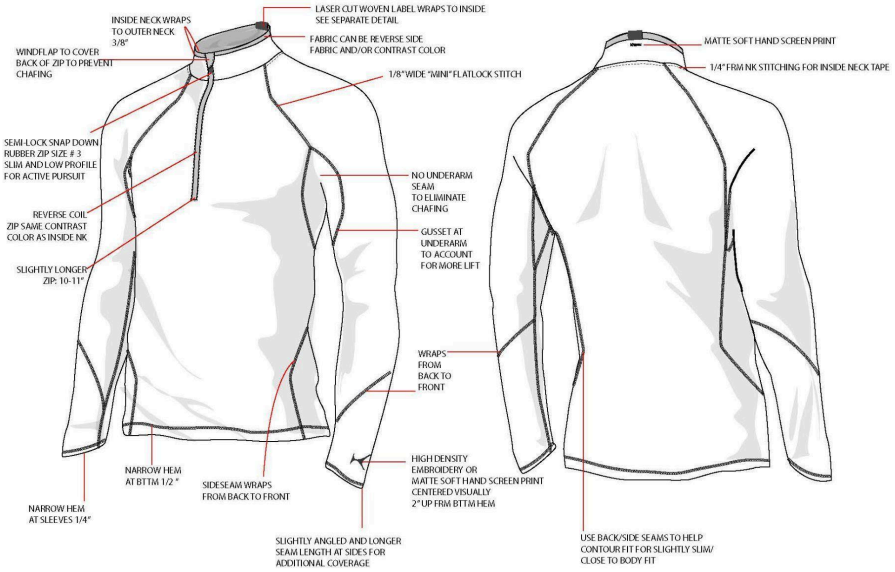

Fig 11: Base Layer Product Anatomy Diagram

A Typical mid-layer puffy jacket has similar features. It usually will include insulating properties, typically featuring a shell fabric with a durable water-repellent (DWR) finish to repel moisture. The jacket is filled with either down or synthetic insulation. Its construction includes a baffle that prevents insulation from shifting in order to maximize heat retention in conjunction with elastic cuffs and adjustable hems which also help to seal in warmth. Puffy jackets commonly include zippered pockets for storage and may feature a helmet-compatible hood for added protection against the elements, presenting a versatile, insulating layer for cold-weather adventures. It remains as lightweight as possible.

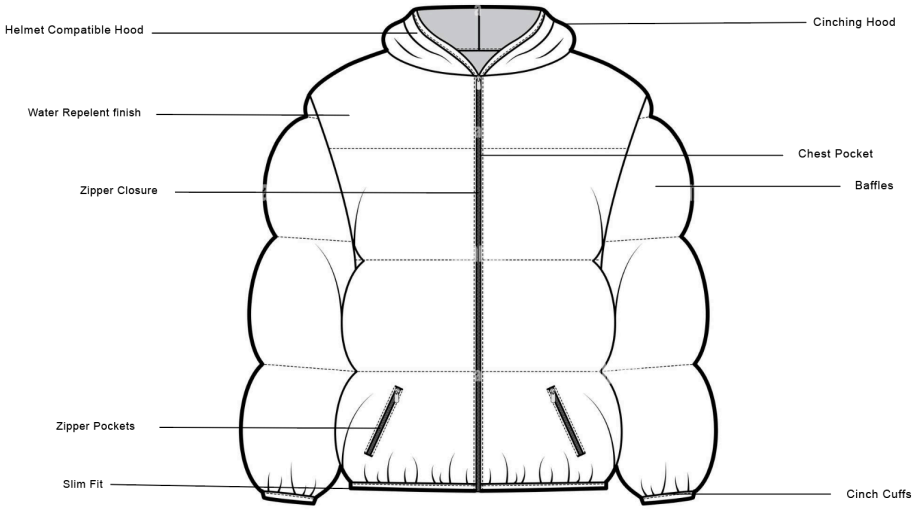

Fig 12: Mid-Layer Product Anatomy Diagram

Alpine climbing outer layer pants typically have durable yet flexible construction, utilizing waterproof and breathable fabrics with reinforced panels in high-wear areas for durability. These pants often feature articulated knees and gusseted crotches to increase the range of motion. Zippered vents are very important for thermoregulation. Integrated gaiters and reinforced cuffs prevent snow or debris entry, and the presence of zippered pockets or gear loops provides convenient storage for climbing essentials.

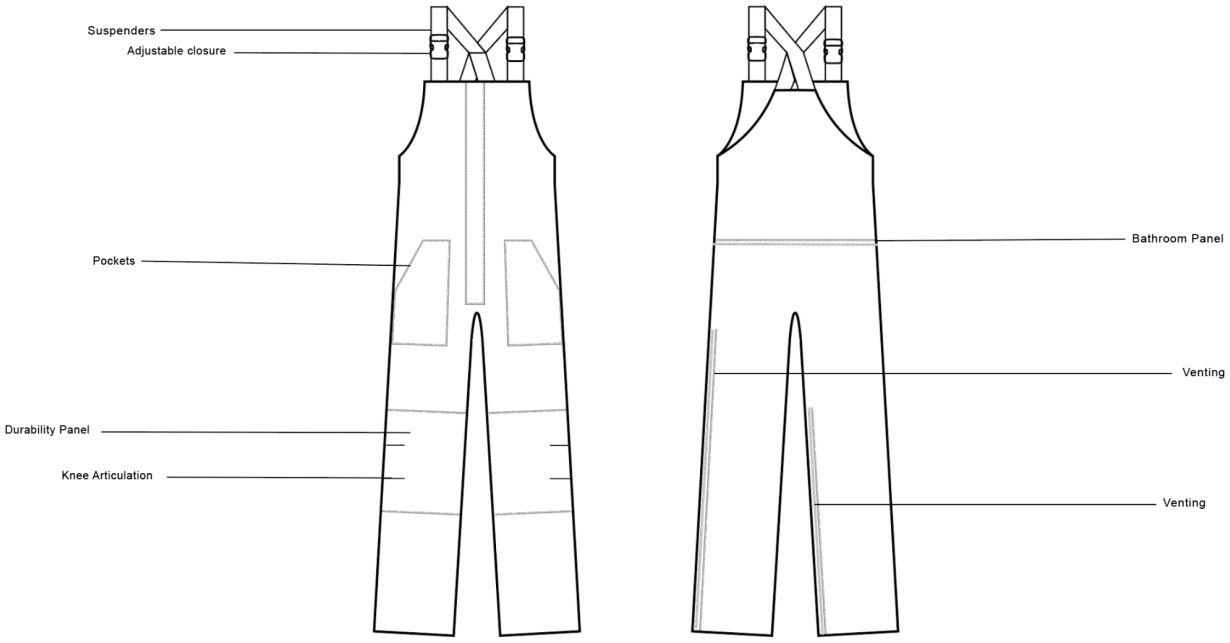

Fig 13: Outer Layer Product Anatomy Diagram

Current Materials:

The evolution of base layers, entwined with the history of natural and synthetic fibers, reflects a journey marked by innovation, functionality, and the pursuit of optimal performance in outdoor apparel. Initially, natural fibers such as wool and cotton dominated the realm of base layers. Wool, particularly merino wool, held a revered position owing to its inherent breathability, warmth retention even when wet, and natural odor resistance (Siler, 2023). Its popularity endured through centuries, proving its efficacy in regulating body temperature during various outdoor activities.

However, the emergence of synthetic fibers in the mid-20th century, notably polyester and nylon, revolutionized the landscape of base layers. These materials offered unparalleled moisture-wicking capabilities, rapid drying times, and increased durability compared to their natural counterparts (Nylon, n.d.). Polyester, in particular, became a staple due to its “lightweight nature and exceptional moisture management, making it ideal for high-performance activities” (“Why Are Raincoats Made of Polyester?,” 2023).

Despite the advantages of synthetic fibers, concerns about environmental impact and sustainability have led to a resurgence of interest in natural fibers. Merino wool, bamboo, and even some blends of hemp and organic cotton have “regained popularity due to their biodegradability and reduced reliance on petrochemicals” (Blomsma & Brennan, 2017). Their natural breathability and moisture-wicking properties, “coupled with advancements in textile technology, have positioned them as competitive alternatives to synthetics” (“Why Buy Natural Fibers Instead of Synthetics?,” 2010).

Both natural and synthetic fibers come with their distinct pros and cons. Natural fibers excel in their breathability, odor resistance, and environmental sustainability. They often provide superior insulation, especially when wet, and are biodegradable, aligning with environmentally conscious practices. However, they might lack the “rapid drying capabilities and durability of synthetic fibers” (Team, 2023). Additionally, natural fibers like “wool can be more expensive and may require specialized care” (Natural vs. Synthetic Fibers, n.d.).

On the other hand, synthetic fibers offer exceptional moisture management, quick-drying properties, and durability. They are often more affordable, easy to care for, and maintain their shape and functionality even after repeated use and washes. However, “their production involves petrochemicals, contributing to environmental concerns, and they might retain odors more than natural fibers” (Natural vs. Synthetic Fibers, n.d.).

In recent years, the industry has witnessed a trend towards hybrid solutions, blending natural and synthetic fibers to capitalize on the strengths of both. These blends aim to offer the best of both worlds, combining the performance attributes of synthetics with the natural benefits of fibers like merino wool, catering to the diverse needs and preferences of outdoor enthusiasts. While blends aim to combine the strengths of both materials, they can pose challenges in recycling and disposal. “Separating natural and synthetic fibers for recycling purposes can be complex due to their different structures and properties, potentially impacting their biodegradability and environmental impact” (Dorigato, 2021).

As for mid-layers, most people choose between a fleece or an insulated jacket. The “development of synthetic insulation in the mid-20th century brought about a

significant shift in the industry" (Bozsaky, 2010). Materials like polyester and other synthetic fibers became prominent for mid-layer insulation "due to their ability to mimic the insulating properties of natural materials while offering advantages such as quick-drying, moisture-wicking, and sometimes a more compressible and lightweight profile compared to their natural counterparts" (Bozsaky, 2010).

Selecting between a fleece and an insulated mid-layer involves a delicate balance of assessing the intended use, weather conditions, and personal preferences. Fleece, with its excellent "moisture-wicking properties and quick-drying capabilities, is a versatile choice for high-energy pursuits where managing sweat is crucial" (The Layering Equation | Backcountry.Com, n.d.). Its flexibility in various weights and styles caters to a range of temperatures, making it suitable for dynamic outdoor adventures. However, it's essential to bear in mind that fleece can be bulkier compared to insulated jackets, impacting packability. On the other hand, insulated mid-layers, whether featuring synthetic or down insulation, excel in providing superior warmth, making them ideal for cold and static conditions. Synthetic insulation maintains some insulating properties when wet, offering an advantage in damp environments, while down insulation, with its exceptional warmth-to-weight ratio, is unmatched in extreme cold (Down vs. Synthetic Insulation, 2022). However, the potential drawback lies in the "loss of insulation when traditional down gets wet", which might pose challenges in wet or unpredictable weather conditions (Synthetic vs. Down - Active Endeavors, n.d.).

Current outwear materials include a spectrum of waterproof technologies, each with environmental implications. Traditional waterproof materials, like polyvinyl chloride (PVC) and perfluorinated chemicals (PFCs), have been widely used for their water-resistant properties. However, "they pose significant environmental concerns due to their persistence, toxicity, and potential bioaccumulation" (Liu et al., 2014).

The emergence of high-performance waterproof fabrics like GORE-TEX introduced a new era in outdoor apparel. While GORE-TEX provides exceptional waterproofing and breathability, its production involves the use of per- and polyfluoroalkyl substances (PFAS), including PFCs, "which are persistent and have been linked to environmental and health hazards" (Segedie, 2021). The environmental impact of these chemicals includes "bioaccumulation in ecosystems, potentially

affecting wildlife and human health, as well as long-term persistence in the environment" (Liu et al., 2014).

In response to growing environmental concerns, there's a shift towards exploring more sustainable alternatives in waterproof materials. Some manufacturers are "innovating with bio-based or recycled materials to reduce reliance on petroleum-based substances and limit the environmental impact of production" (Mujtaba et al., 2022). Bio-based membranes derived from plants or biodegradable polymers "aim to offer waterproofing without the ecological repercussions associated with traditional synthetic materials" (Andrew & Dhakal, 2022). Additionally, eco-friendly coatings and laminates are being developed, "aiming to achieve water resistance without the use of harmful chemicals" (Holmquist et al., 2021). Some companies are actively "researching and implementing alternative water-repellent treatments that do not contain PFAS or other hazardous substances, seeking to maintain performance while reducing environmental harm" (Holmquist et al., 2021).

As the industry progresses, the pursuit of environmentally friendly waterproof materials remains a focal point. "Striking a balance between high-performance functionality and environmental responsibility is a crucial challenge" (Systems | Free Full-Text | Understanding Corporate Green Competitive Advantage through Green Technology Adoption and Green Dynamic Capabilities: Does Green Product Innovation Matter?, n.d.) which is driving ongoing research, innovation, and collaboration among manufacturers, environmental organizations, and consumers to "foster a more sustainable future for outdoor apparel" (Gossen & Kropfeld, 2022).

Current Manufacturing:

The current manufacturing process for base layers starts with the selection of material. Common base layer materials include wool, synthetic materials, and blends, each offering benefits. Wool is a natural fiber that has great insulation, moisture-wicking, and odor-resistant properties. Synthetic materials such as polyester, nylon, and spandex are moisture-wicking, breathable, and lightweight but retain odors. Blends of the two materials have a balance of warmth, moisture management, and durability but

sacrifice recyclability. The next step in the process is either knitting or weaving the selected material. Next, the fabric may undergo various treatments to enhance the performance characteristics such as machine washable, anti-odor, or anti-microbial. Next, the fabric is cut into pattern pieces according to the design of the garment. These pieces are then sewn together at a factory. An elastic waistband and cuffs are added to ensure fit and prevent the base layer from moving during wear. Finally, the garment is checked for quality control, defects, and proper sizing.

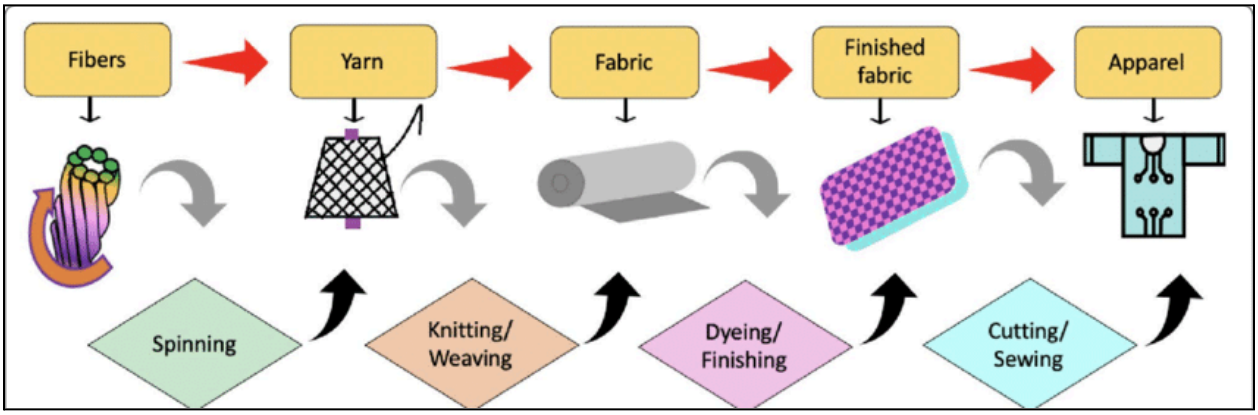

Fig 14:(*Fiber Attributes and Mapping the Cultivar Influence of Different Industrial Cellulosic Crops (Cotton, Hemp, Flax, and Canola) on Textile Properties*, n.d.)

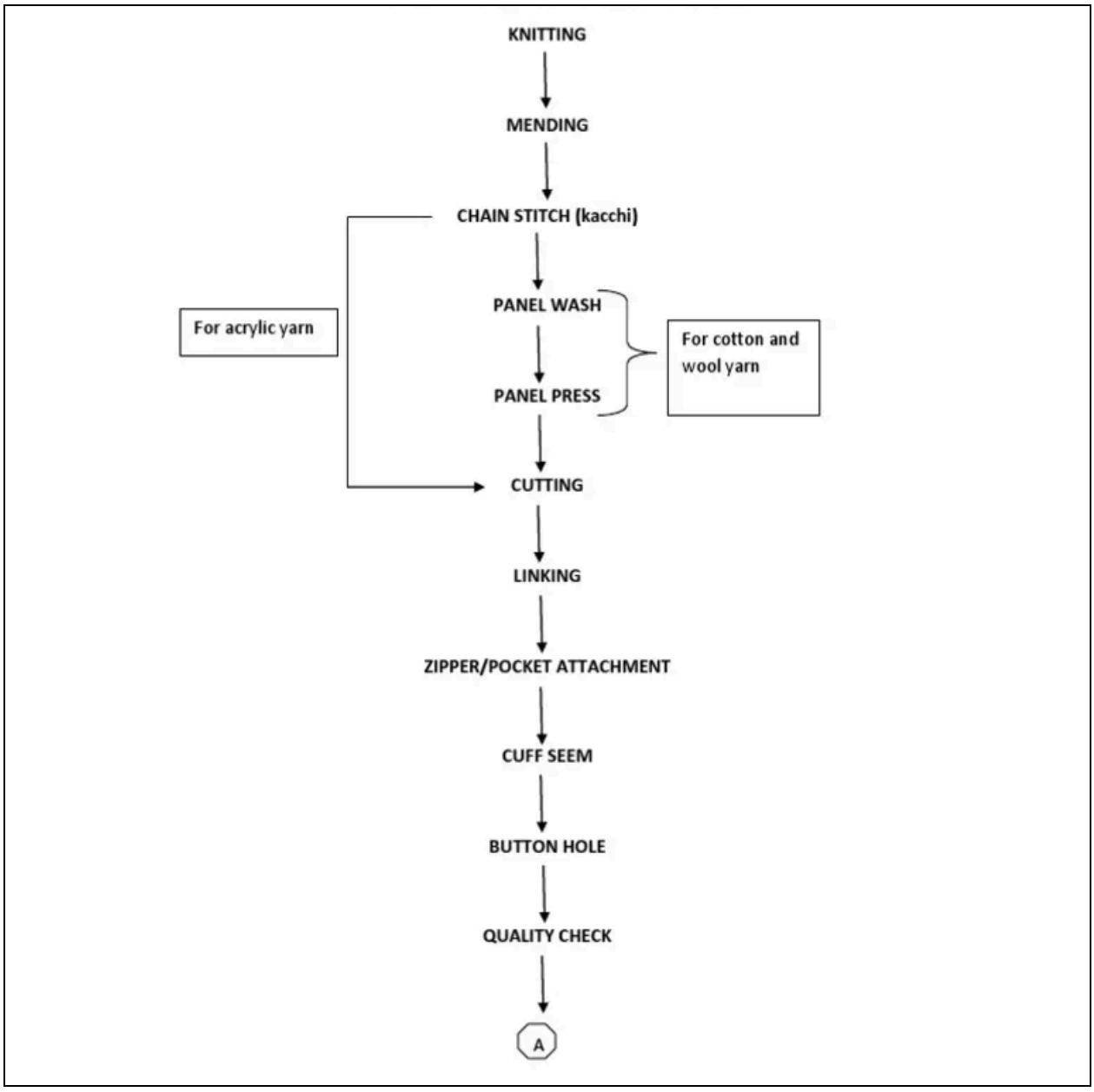

Fig 15: (*Flowchart and Manufacturing Process For Sweater Manufacturing | PDF | Yarn | Gauge (Knitting)*, n.d.)

The manufacturing process for mid-layer jackets is similar to the base layer. Insulated mid-layer jackets are often made with a combination of outer shell fabric and an insulating material, such as synthetic insulation, polyester fibers, or natural down. The choice of materials affects the jacket's warmth, weight, and other properties. Next, the materials are cut into patterns and then sewn together. The outer shell, insulation,

and lining are sewed together. Channels or quilted sections are created to hold the insulation in place. Baffles or stitch lines are sewn through the layers to prevent the insulation from shifting and to maintain consistent warmth. Finally, zippers, pockets, and trims are sewn on to finish the jacket off. The garment is then checked for quality control.

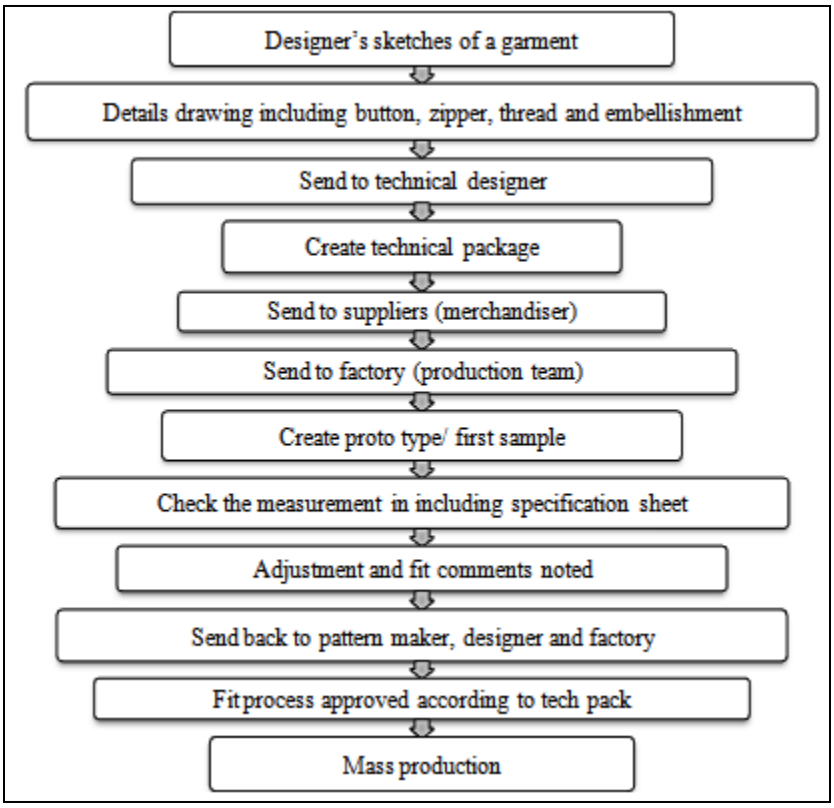

Fig 16: (*Effectiveness of Technical Packages for the Apparel Production Process in the Global Apparel Industry*, n.d.)

The manufacturing process for technical outerwear is again similar. First, suitable materials are chosen. Technical outerwear is typically constructed from waterproof and breathable materials such as Gore-Tex and other specialized laminates. These materials provide protection against rain, snow, and wind while allowing moisture to escape. Once the fabric is finalized, the pattern is created and cut to shape. Next, the garment is sewn together, the seams are taped and sealed at a factory and then checked for quality control such as waterproofness, durability, and breathability.

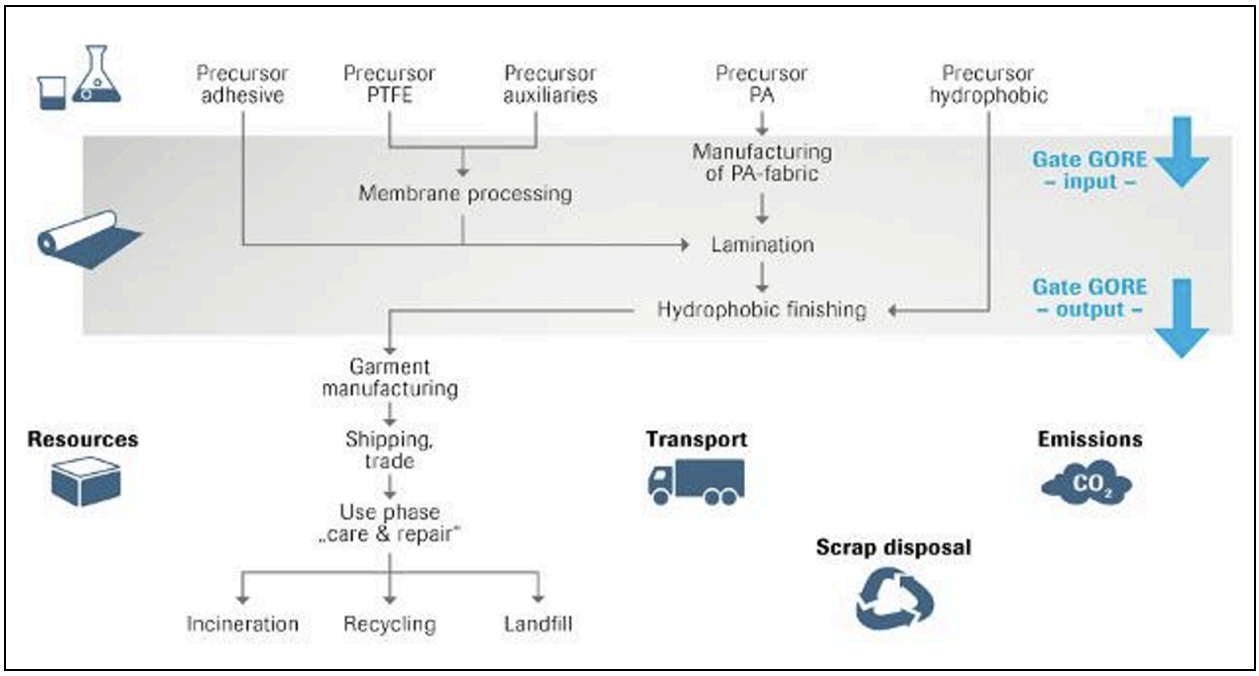

Fig 17: (W. L. Gore & Associates GmbH, 2013)

Intellectual Property:

Patents play a vital role in research when designing new garments, serving as a crucial mechanism for protecting innovative ideas and creations within the apparel industry. Garment design often involves the development of unique and original concepts, ranging from novel fabrics, cutting-edge technologies, or innovative design aesthetics. Patents provide designers and clothing manufacturers with legal protection, preventing others from replicating or profiting from their innovations for a specified period. Therefore, it is essential to know what patents are already in the space that the potential designs fall under. I looked at patents for mid-layer construction, climbing pants, bathroom, and privacy panels in clothing.

The first patent explored for mid-layer construction is CA2853056C held by Helly Hansen. The garment is designed with at least two layers: a protective shell as the first layer and an insulating layer as the second. The insulating layer's thickness is adequate to create predefined holes, each capable of retaining air, essentially functioning as air cells. This garment offers the unique ability to regulate temperature, airflow, and humidity, featuring a first layer that serves as a water-repellent, vapor-permeable

exterior shell. The insulating second layer, with its appropriately thick configuration, provides air cells with varying sizes and spacing relative to the torso, ensuring efficient temperature control. A third layer in the form of a mesh liner enhances comfort and breathability, while the first layer is equipped with airflow ports for enhanced ventilation and adaptability.

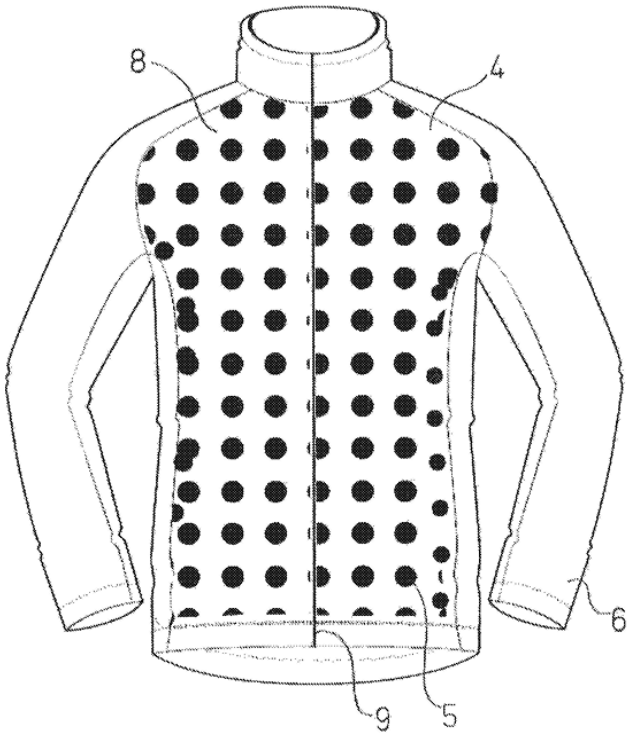

Figure 18: (ULRIKSEN et al., 2017)

The next mid-layer technology I looked at is patent KR102034745B1. The described techniques pertain to innovative breathable and insulating apparel. Specifically, this technology is centered around a garment (referred to as "garment 100") designed with specialized chambers (designated as "insulation chambers 130") to house insulating filler material (labeled as "filler 330"). An opening (termed "opening

110") positioned along the seam (referred to as "seam 120") between these insulation chambers facilitates the efficient transfer of evaporative moisture or air from the interior of the garment (in close proximity to the wearer's body, often denoted as "body 2002") to the external environment. Notably, in a distinct aspect of this design, the opening 110 is strategically offset from the inner opening 342, with the inner opening 342 being connected to the outer opening 110 via a passage that traverses through the layers of the garment.

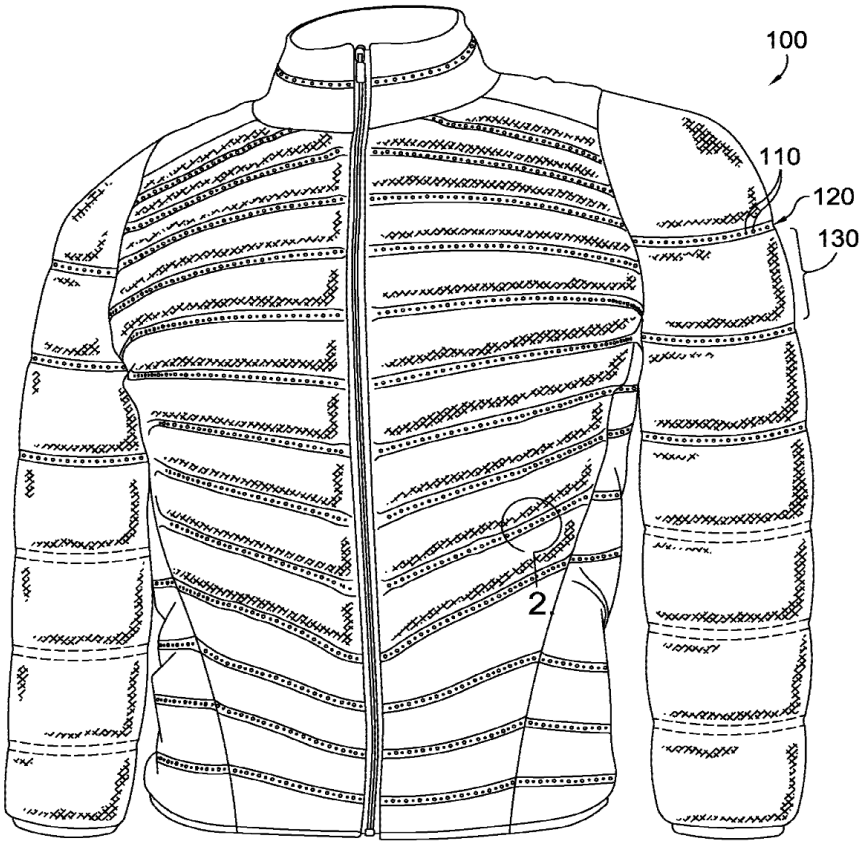

Figure 19: (페지멘티, 2019)

Next, I looked at climbing pants technology. I looked at patent KR20050121180A. The current innovation involves a novel design implemented at the upper end of a belt in a pair of pants. This design features a side connection line that connects the front and back plates, accompanied by a sewing line to secure this connection. Additionally, the

upper part of the pants is equipped with a pocket inlet, and at the end of this pocket inlet, there is a pocket seam. Notably, a female snap button is integrated into the bottom rear surface of the pocket inlet, and a corresponding male snap button is affixed to the lower portion of the female snap button, maintaining a predetermined separation distance between them. When the female and male snap buttons are fastened on the rear surface of the pocket inlet, the pocket ends fold at the specified separation distance, creating a spacious, unobstructed area at the upper part of the pants. This innovative approach ensures that the pants offer exceptional mobility and comfort, especially when the knee portion is elevated beyond a certain angle.

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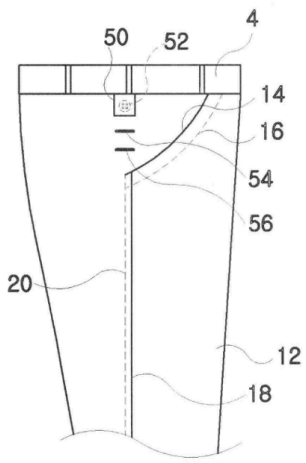

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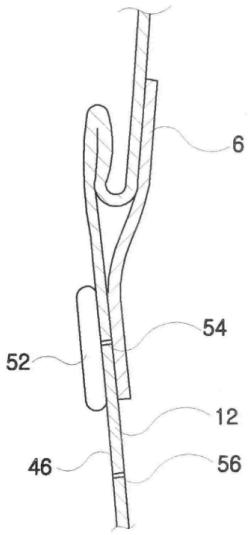


Figure 20: (문근술, 2005)

Next, I looked at patents relating to efficient bathroom breaks for women. The first patent I looked at is US20200196688A1 held by Simms Fishing Products LLC. The patents protect the design that a fishing wader having a chest piece, a back piece, and a waterproof zipper installed on a side of the wader between the chest piece and the back piece, the zipper extending substantially vertically from an armpit area of the wader to a horizontal seam between the chest and back pieces and one or more torso pieces, and the zipper opening in a downward direction from the armpit area.

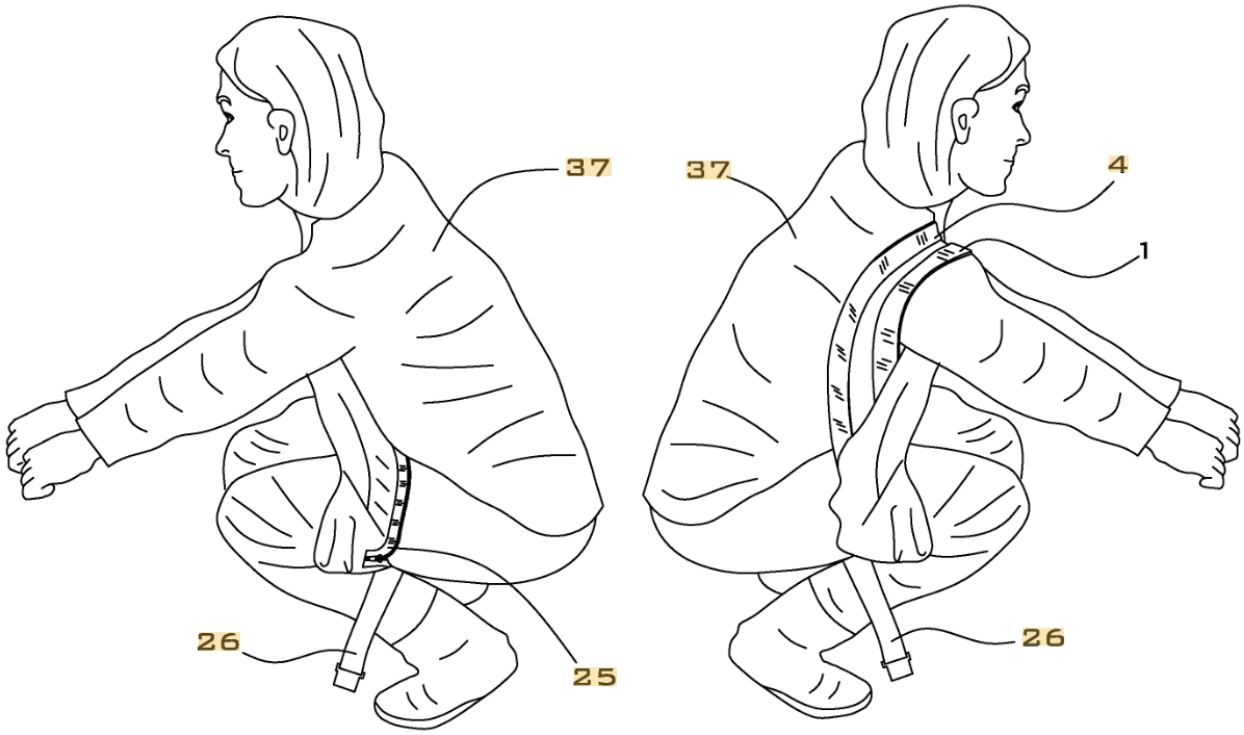


Figure 21: (Beernink & Krull, 2020)

Finally, I looked at patent US8898813B2, “an easy access individual needs one-piece garment” (Davis, 2014). A one-piece garment with a drop-seat panel design, facilitating convenient restroom breaks and addressing personal needs without necessitating the complete removal of the attire. This garment incorporates a distinctive feature, creating a horizontal division at the back waistband, spanning from one side

seam to the other. Furthermore, it features a vertical division that separates the front and back sections of the attire, originating at the waistband and extending down both side seams to the desired length. The garment is equipped with secure closures to seal the vertical separation along each side seam, ensuring discretion and ease of use. Additionally, there are closures that effectively connect the lower back part of the one-piece garment to the upper back part, precisely where the garment's separation runs horizontally between the side seams.

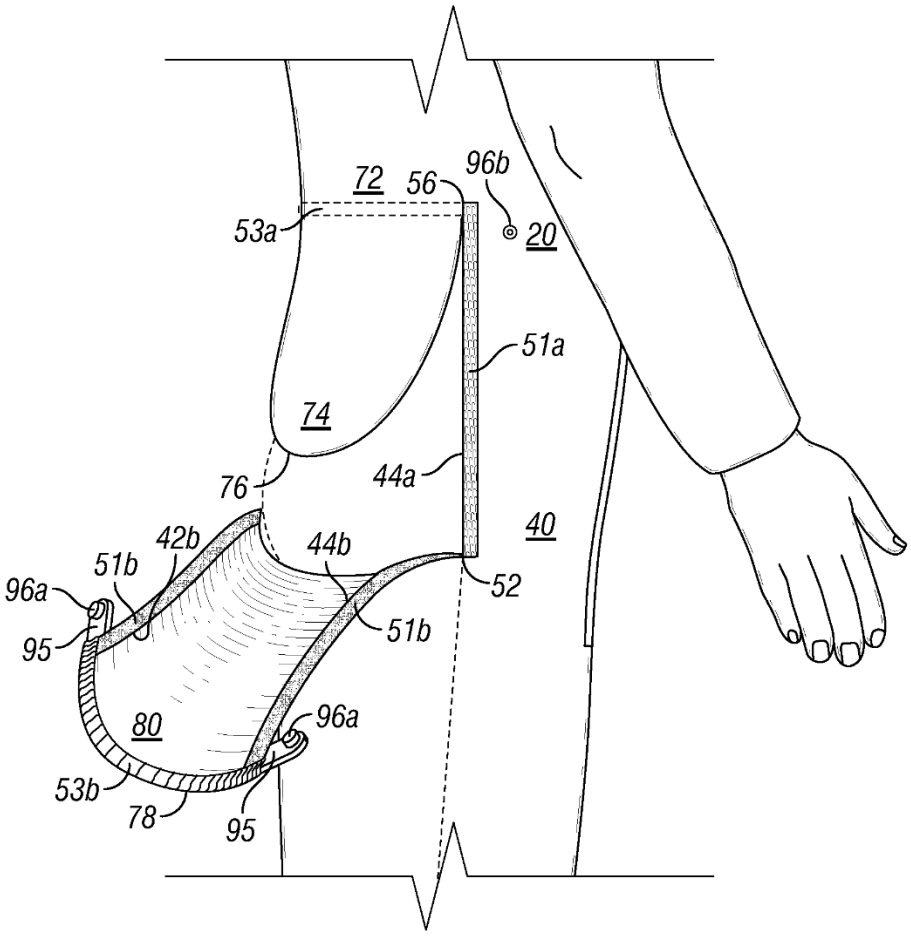


Figure 22: (Davis, 2014)

Current Color, Graphic, and Logo Trends:

The history of pink in women's clothing has seen a transformation from a color once embraced across genders to one predominantly associated with femininity. In the

“mid-20th century, cultural norms solidified the notion of pink as a color specifically designated for girls and women, while blue became associated with boys and men”(*The Color Pink — History, Meaning and Facts*, n.d.). This cultural shift reinforced the “gendered perception of colors, shaping fashion trends and marketing strategies, and emphasizing pink as a symbol of femininity, softness, and delicacy in women's clothing” (*The Color Pink — History, Meaning and Facts*, n.d.).

However, contemporary movements in fashion have been challenging these traditional gender norms. There's a growing resurgence of women reclaiming the color pink, “not as a symbol of prescribed femininity, but as a symbol of empowerment, confidence, and self-expression” (*Is Pink Still a “Girl Color”?*, 2023). This reclamation involves a shift in the narrative around pink, embracing it as “a color choice that signifies strength, individuality, and freedom rather than solely representing gender”(*Is Pink Still a “Girl Color”?*, 2023).

Women are subverting traditional expectations by “incorporating pink into their wardrobes in diverse and empowering ways” (SuryaCreatX, 2023). Fashion designers and influencers are showcasing pink in a broader spectrum, exploring different shades and tones to break away from stereotypes. Pink is being featured in bold and empowering silhouettes, challenging the notion that it is exclusively delicate or passive. Moreover, “there's a trend of blending pink with other colors, textures, and styles, creating multifaceted and inclusive expressions of femininity and personal identity” (SuryaCreatX, 2023).

Social movements advocating for gender equality and inclusivity have played a role in reshaping the perception of pink in women's clothing. This shift “highlights the importance of choice and autonomy in fashion, emphasizing that colors, including pink, can represent individuality, strength, and diversity, irrespective of gender norms or stereotypes” (*Busting Gender Stereotypes: The Pink Versus Blue Phenomenon*, n.d.). As a result, “women are reclaiming pink as a color that embodies confidence, empowerment, and freedom of expression in modern fashion” (*We’re In The Hot Pink Renaissance — Here’s Why It’s Feminist*, n.d.).

In the outdoor industry, current graphic and logo trends are leaning towards “minimalist and versatile designs that embody a sense of adventure, sustainability, and

inclusivity” (*The Most Updated Logo Design Trends in 2024*, n.d.). Logos and graphics often feature clean and simplified geometric shapes, emphasizing versatility across various products and platforms. Nature-inspired elements like “mountains, trees, and waves are prevalent, often portrayed in abstract or stylized forms to evoke a sense of exploration and connection to the outdoors” (*The Most Updated Logo Design Trends in 2024*, n.d.). Additionally, there's a growing emphasis on “eco-consciousness, reflected in logos through subtle nods to sustainability, such as the use of earthy tones, organic shapes, and symbols highlighting environmental stewardship” (*The Most Updated Logo Design Trends in 2024*, n.d.).

Color Trends:

According to the WGSN, current color trends in the space include colors that bring a sense of reassurance, energy, and optimism to a more cautious market. Colors focus on well-being, the outdoors, and long-term purchases. The turbulence of 2020 will be felt in the years to come and is seen by consumers seeking nourishing, meaningful, reassuring, and healing colors. Grounding colors associated with nature are prevalent. Green, khaki, brown, and rich earthy tones help consumers feel rooted both figuratively and literally, with time spent outdoors or with plants.

Future color trends in the space are derived from WGSN's A/W 25/26 Global Colour Forecast, and “feature palettes and color stories specifically tailored to the active industry. It reflects the acceleration of climate change and its impact on everything from winter sports and outdoor pursuits to personal anxiety” (Active Colour Forecast A/W 25/26 - WGSN Fashion, n.d.).It is predicted that the A/W 25/26 colors will include deep meditative tones which will return and connect to the consumer's need for restoration. Future Dusk and Cherry Lacquer encapsulate a sense of mystery and self-empowerment, which resonates in a world full of contrast. Intense brights play a powerful role, connecting directly to urgency and activism, but also to a sense of self-belief and stamina. Neon Flare ignites energy and has a powerful kinetic and synthetic quality that resonates physically and digitally. Light and luminous pastels such as Celestial Yellow and Moonstone Blue align with multi-sensorial experiences, spirituality, and the need for soft tones that calm the mind.

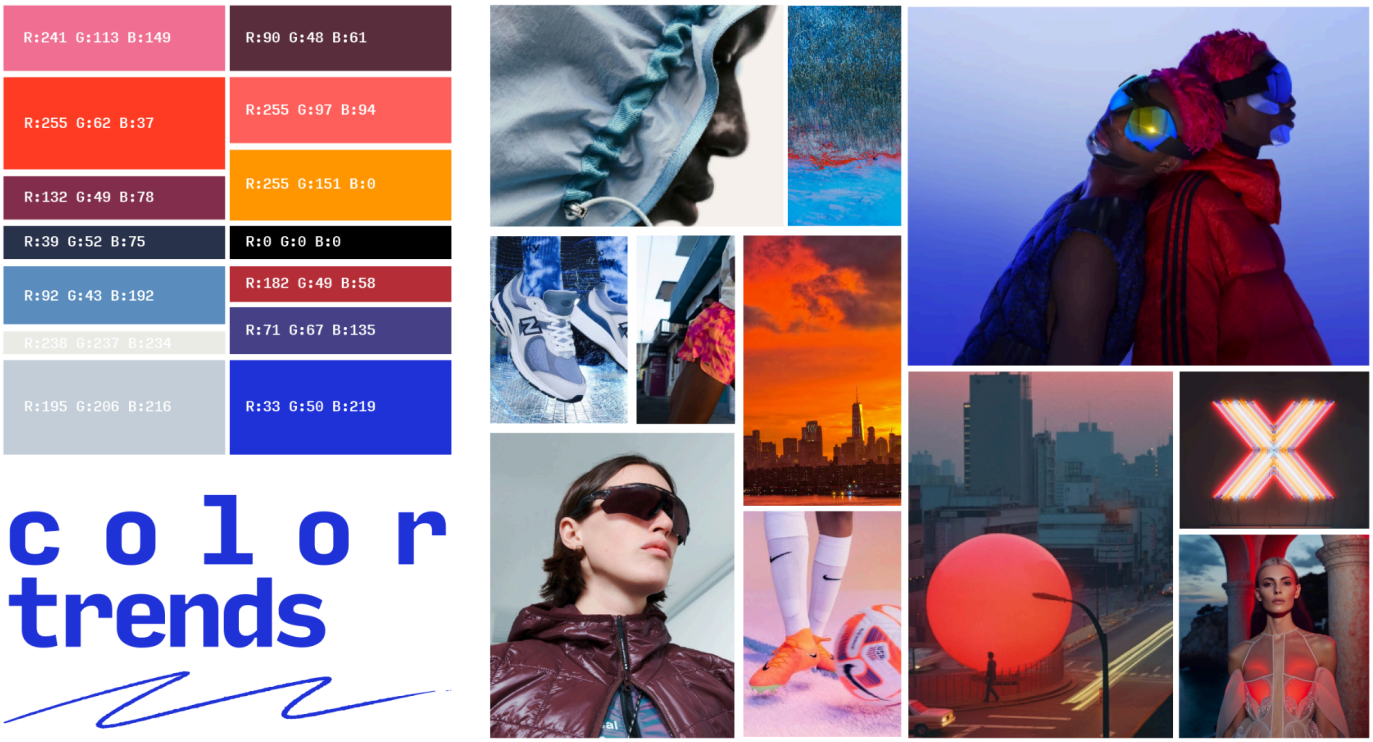


Figure 23: Future Color Trends

Graphic Trends:

According to the WGSN, current trends in the outdoor apparel industry include Sustainability and Eco-conscious Designs. Graphics focusing on environmental and sustainable themes are in demand as environmental awareness grows. Retro and Vintage Styles are also popular. Nostalgic designs, including elements from the '80s and '90s, appeal to a sense of nostalgia and authenticity currently felt by society.

Future graphic trends include amplified craft, super nature, and plant power. According to the WGSN, the circular design will evolve the #Craftcore trend, with purposeful mending and patchwork at the core. It is expected to see a sense of pride in displaying reused and repurposed garments.

Figure 24: Future Graphic Trends

Logo Trends:

As with any design, logo design trends can change rapidly, influenced by shifts in design aesthetics, technology, and cultural preferences. Current logo trends seen on the market today include minimalism, geometric shapes and sustainability, and eco-conscious designs. According to Bill Gardner, who writes the annual logo trend report for Logo Lounge “Minimalist logos with simple shapes, clean lines, and limited colors are popular, as well as geometric designs, which include abstract geometric patterns, and eco-friendly themes which becoming more prominent as companies prioritize environmental concerns” (2023 Logo Trend Report | Articles | LogoLounge Logo Design Inspiration and Logo Design Competition, n.d.).

Potential future logo trends include 3D and holographic designs as well as transparent and ethical designs. Transparency in branding and ethical values which are on the rise, could influence logo design, with logos reflecting corporate responsibility and values.

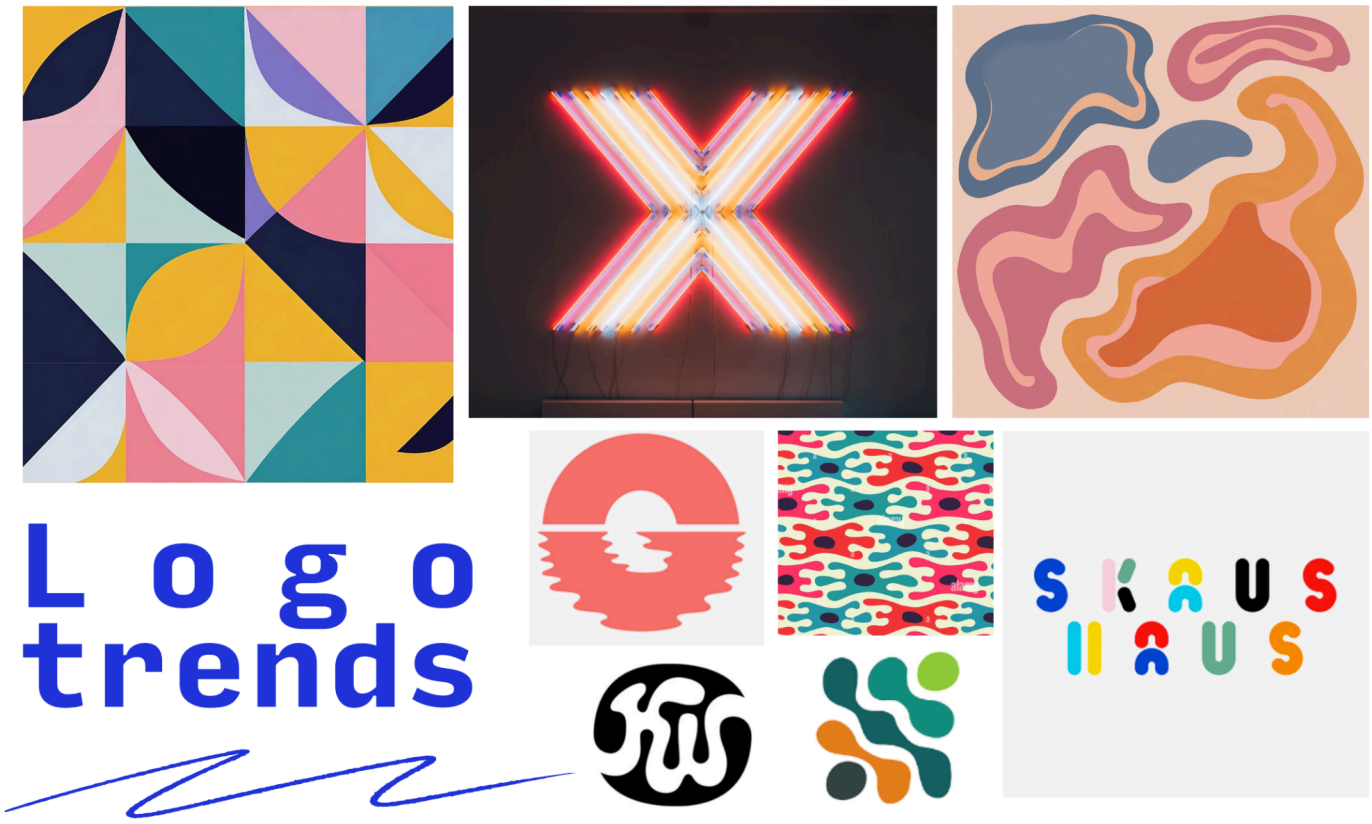


Figure 25: Future Logo Trends

Physiological Research:

Physiological criteria for climbing are difficult to differentiate from biomechanical parameters because both of them are closely intertwined. Physiological research in climbing includes energy systems and metabolic demands. According to a 2022 study in Exercise Physiology, “Climbers utilize both aerobic and anaerobic pathways, with the former being predominate during sustained efforts, such as ascending a long pitch, and the latter during brief bursts of intense actively, such as overcoming a challenging crux on the route” (Maciejczyk et al., 2022). Cardiovascular efficiency and altitude effects must also be taken into account. Because climbing takes place at varying altitudes, athletes' cardiovascular systems must adapt to the challenges of reduced oxygen

availability at higher altitudes. An athlete's “heart rate, stroke volume, and overall cardiac output during ascents must also be efficient for coping with the unique challenges posed by high-altitude climbing” (Grover et al., 1986). Muscular strength and endurance are other important physiological factors that are paramount in climbing, particularly “grip strength and finger strength” (Saul et al., 2019). Specifically, “the maximum finger and (concentric) wrist flexor contraction, strength-to-weight-ratio, and overall hand strength” (Saul et al., 2019) are all significant physiological factors in climbers. Finally, Recovery and injury prevention should not be overlooked. Overuse injuries are common injuries in the climbing community due to “repetitive stressors specific muscle groups and joints” (Morrison & Schöffl, 2007). Physiological research explores the recovery mechanisms in climbers, examining factors like muscle protein synthesis, inflammation, and markets of fatigue. This knowledge contributes to the “development of effective recovery protocols, including rest intervals between climbing sessions, and strategies to minimize the risk of overuse injuries” (McCallum, 2017). Understanding the intricate interplay of physiological factors is “crucial for climbers to enhance overall climbing performance” and stay healthy (Giles et al., 2006)

Biomechanical Research:

Rock climbing demands both strength and the strategic utilization of that strength through efficient technique at all skill levels. Effective performance, however, hinges on the understanding and implementation of proper biomechanics. This involves harnessing interconnected muscle systems to exert force precisely when and where needed, aiming for minimal energy expenditure. A climber's body positioning, joint angles, limb movements, grip strength, and finger movements, are all important biomechanical factors to consider.

Psychological Research:

The psychology of rock climbing delves into the mental resilience required to navigate the challenges of this demanding sport. Climbers face exposure, heights, and the constant risk of falls, inclement weather, and severe conditions. Having a level head is of the utmost importance. Rock climbing often involves making split-second decisions

in dynamic and challenging environments. The psychological aspect of decision-making and risk perception in climbing are integral to climbers' success and safety. Climbers must also possess confidence and self-efficacy, as well as a positive mindset in the face of unpredictable environments. (Wheatley, 2023)

Research Methods:

Two research methods will be utilized to collect data from athletes and on products. According to Research Methods for Product Design by Paul Anthony Rodgers and Alex Milton, “a comprehensive understanding of research methods…generate problems to solutions” (Rodgers & Milton, 2013). The first method will be the use of surveys which will be conducted to systematically collect data from athletes. A set of standardized questions will be sent out on an online platform and results will be automatically collected. Second, athlete interviews will be conducted to collect in-depth, context-rich, qualitative information. The interviews will provide a platform for open-ended dialogue, allowing insight into nuanced aspects of the sport, the product, and the problems to be solved.

Research Questions:

The following questions were used as a guide when conducting interviews with athletes, but overall the interviews were informal, and conversations and questions flowed naturally. Adopting this style allowed me to uncover problems I had not previously known about and allowed the athletes to relax and tell me what they thought was important.

Athlete Interview Questions:

SYSTEMS OF DRESS

1. What is your system of dress?
    a. Base layer top and bottom (brand and model)
    b. Mid-layer top and bottom (brand and model)
    c. Outer layer top and bottom (brand and model)
    d. Any fiber preference?
2. What are your clothes interacting with?
    a. Rock shoes, ice climbing boots?
    b. Helmets?
    c. Harness?
    d. Hoods?
    e. Gloves?
3. How do you change layers on a route? Put more on or take some off
    a. What point (ledge, anchor, top)
    b. When? (morning, lunch, night, after climbing, while belaying)
    c. How? (with harness, helmet, gloves, ice climbing boots, rocks shoes)
4. Do you bring extra layers?
    a. What extra layers (tops, bottoms, base, mid, outer)
    b. How do you carry them?
5. What does the day-to-day look like for alpine climbing?
    a. Climate
    b. Weather
    c. Surfaces (rock, snow, ice)

WOMEN'S POINT OF VIEW

1. How do you go to the bathroom while alpine climbing?
    a. Where on a route?
    b. What clothing layers move?
    c. Modesty in front of climbing partners?
    d. Do you have to pack everything out?
    e. How do you wipe/clean?
    f. Hand sanitization?
2. How long are you wearing the same base layers and intimate layers?
3. How do you deal with your menstrual cycle while climbing?
4. Clothes having chaffing, odor control, hygiene issues?
5. Is your mobility and range of motion affected by any clothes you wear while climbing?

SUSTAINABILITY

1. What does sustainability mean to you?
2. Is it important to you to have sustainable clothing options?

EXTRA

1. Are there any issues with your current kit you would fix?
2. How long does your kit last?
3. What wears out first?
4. What do you have to replace the most often?
5. Are there any fit issues?
6. What do you do with items in your kit once they no longer serve you?

Figure 26: Athlete Interview Question

I conducted several interviews with five athletes: Sarah Leanne Hart, Kristie Kayl, Luchi Marun and Ceci Lavenccia and Shea McCrary all of which are experienced in alpine climbing, both professionally and personally. The total interview hours was eleven hours, spread across 1-2 hour sessions with each of the athletes. My interview with Sarah Leanne Hart, who is not only an experienced alpine climber, but has also done work chronicling the achievements of women in climbing, which historically has been a sport dominated by men, was especially inspiring. Her work is an important step in correcting a gender bias prevalent in the sport.

Of all of the questions I asked the athletes, there were several key themes that continued throughout each conversation I had. One of the most important issues that was continually raised was that in order to go to the bathroom while climbing, a female athlete must either unclip her harness leg straps or loosen or remove her main waist belt on her harness, thus removing or tampering with her safety equipment in order to relieve herself. This is so commonplace within the sport that it is second nature. One of the athletes reiterated that although this is a huge safety concern, and an issue she would like to be fixed, she doesn't want the solution to hold her back in other ways, for example in weight or in cost.

All five women mentioned in their interviews that in their experiences and their female friends' experiences, it was very common to develop yeast and other bacterial infections during and immediately after a climbing trip. Kristie Kayl told me that for her, personal hygiene becomes less important while on the wall, partially because it is so difficult to maintain and because it is time consuming to maintain. Layers need to be tampered with, gear needs to be tampered with, and there is also exposure from the elements, not to mention external pressure to keep going while the weather is good.

Another common theme echoed across each of the interviews was that weight and durability are of the utmost importance when it comes to picking out their alpine climbing kit. They want a kit that is going to last and be able to withstand the extreme environments they are subjected to. I asked each woman about the fibers they choose for each layer and the results were mixed. Some preferred natural fibers for their base layers while one swore by synthetic, and one by a blend. For the midlayers, results were also mixed, varying from a thin down vest, a polyester fleece, a wool overshirt to a

synthetic insulated jacket. The outer layers were a bit more conclusive, with two of the women preferring synthetic pants while the other two women prefered synthetic preferred bibs. We talked about the delicate balance between lightweight/high performance and durability in relation to fiber choices.

We also talked about representation in climbing for women, not just in the sport itself but in the products used to help them achieve their climbing goals. The idea that products could be designed specifically for women to work for women's bodies is something they were all very excited about. See appendix for interview transcrip with Sarah Hart.

SWOT Analysis:

After interviewing athletes, It made me realize that I wanted to move away from looking at each potential garment I am as a base layer, mid-layer, or outer layer and look more closely at the jobs to be done for each piece. I did this to help me better understand the garments as a layering system and how to relate to each other rather than thinking of them as set and established garments. I decided to break up the SWOT analysis for the base layers by warmth, breathability, comfort & fit, durability, layerability, and material. This allowed me to hone in on each garment where the strengths, weaknesses, opportunities, and threats were in the context of a greater layering system. For the Mid-layer category, I choose to break up the unique jobs to be done, again to break away from preconceived notions of what a mid-layer is. I used the following categories to dive deeper into each of the competitor mid-layers: warmth, comfort & fit, portability, weather resistance, breathability, and material choice. Finally, when looking at the outer layers, I choose to break it up and look at weather resistance, comfort & fit, ventilation, warmth, features, and material choice. The following figures show the results of the SWOT analysis on each of the categories.

swot: baselayers

		strengths	weaknesses	opportunities	threats
Arc'teryx Rho Lightweight Hoody		Versatile balaclava/ hood quick drying breathable moisture wicking flatlock seams stretch fleece	price polyester/elastine blend no pockets	Sustainability mono-material recyclable	dependence on plastics
Black Diamond Solution 150 Merino 1/4 Zip		highly adaptable with hood and 1/4 zip drop tail hem breathable	expensive very slim fit fiber blend durability	durability not warm enough mono-material sustianability pockets	non-inclusive fit
Patagonia Capilene Air Hoody		breathable loose fitting hood	durability difficult to layer expensive	mono-material	3-d printing

Figure 27: Base Layer Overview

swot: Arc'teryx Rho Lightweight Hoody

	strengths	weaknesses	opportunities	threats
warmth	Very warm versatile with hood thin polyester	thin polyester	zoning areas	reliance on plastic
breathability	versatile with hood moisture wicking	odor retention retains some mositure	ventilation areas zoning areas	reliance on plastic
comfort & fit	flatlock and merrow stitch seams lay flat	too form fitting for some users	seamless	seamless knitting
durability	durable fabric and seams	odor retention	ventilation areas	reliance on plastic
layerabilty	less bulk overall due to close fit design	too thin for stand alone	access to pockets when layering	reliance on plastic
material	warm, lighteight, durable	odor retention not sustainable	more sustainable	reliance on plastic

Figure 28: Base Layer SWOT 1

swot: Black Diamond Solution 150 Merino 1/4 Zip

	strengths	weaknesses	opportunities	threats
warmth	versatile with hood and 1/4 zip	very thin	zoning areas for more warmth or less	chafing from zipper
breathability	fabric is very breathable	odor retention retains some mositure	ventilation areas zoning areas	sustainability
comfort & fit	material is very soft	too form fitting for some users	seamless	seamless knitting
durability	durable fabric and seams	odor retention	ventilation areas	reliance on plastic
layerabilty	less bulk overall due to close fit design	too thin for extreme temps	access to pockets when layering	reliance on plastic
material	warm, lightweight	Merino wool and polyester blend	mono material	reliance on plastic

Figure 29: Base Layer SWOT 2

swot: Patagonia Capilene Air Hoody

	strengths	weaknesses	opportunities	threats
warmth	seamless anatomical hood	a bit bulky	zoning areas	patents
breathability	fabric is very breathable and moisture wicking	lofted wool design allows wind to permeate	zoning areas for wind	3d printing
comfort & fit	material is very soft	too form fitting for some users	larger size range	material access
durability	can be quickly made and repaired	fabric is susceptible to rips and snags	more durable construction	construction of garment and material choice
layerabilty	great base layer by itself	a bit thick for mid layer but too slim fit to layer underneath	access to pockets when layering	patents
material	warm, lightweight	not durable	mono material	innovation needed

Figure 30: Base Layer SWOT 3

swot: midlayers

		strengths	weaknesses	opportunities	threats
Rab Neutrino Pro		warm 800FP down lightweight comfortable 100% recycled fabric helmet compatible	durability only 3 pockets	durable fabric more pockets	down industry
Feathered Friends Eos		warm 900FP down lightweight Compact-able	no hood adjustment	helmet compatibility	down industry
Arc'teryx Cerium Hoody		lightweight very warm 850FP down	expensive low durability low water resistance	more warmth more durable	down industry

Figure 31: Mid- Layer Overview

swot: Rab Neutrino Pro

	strengths	weaknesses	opportunities	threats
warmth	800 fill hydrophobic down	large baffles cause down to shift	zoning for areas where you want down to stay in place	down industry
comfort & fit	longer than most jackets, directional seams on arms	not helmet compatible	helmet compatibility	patents
portability	highly compressible	heavy	bag sewn into jacket	losing warmth to drop weight and add portability
weather resistance	extra torso panel to protect from wind	limited DWR coating	waterproof	PFC coatings
breathability	Fabric is breathable	wind gets in at baffle seams on arms and back	add wind proof panels	patents
material	20D recycled Pertex Quantum Pro ripstop nylon	not weather resistant enough	mono material	reliance on plastic

Figure 32: Mid-Layer SWOT 1

swot: Feathered Friends Eos

	strengths	weaknesses	opportunities	threats
warmth	900 fill down	too warm for high energy output activities	zoning for areas where you want down to be less warm	down industry
comfort & fit	slightly longer than other jackets	not helmet compatible or built for mobility	helmet compatibility directional seams raglan sleeves	patents
portability	highly compressible	heavy	bag sewn into jacket	losing warmth to drop weight and add portability
weather resistance	good cinching points,	sewn through baffles hood toggles require two hands	waterproof	long term use
breathability	Fabric is somewhat breathable	lacks vents, uninsu-lated portions, or two-way zippers	vents, uninsulated portions, or two-way zippers	patents
material	Pertex Quantum brushed ripstop nylon with a DWR finish	not durable long term, too thin	mono material, move away from down	reliance on down

Figure 33: Mid-Layer SWOT 2

swot: Arc'teryx Cerium Hoody

	strengths	weaknesses	opportunities	threats
warmth	RDS certified 850 down and synthetic Coreloft	sacrifices some warmth for light-weight		down industry
comfort & fit	slightly longer than other jackets	not helmet compatible, slim fit	helmet compatibility directional seams raglan sleeves	patents
portability	highly compressible and lightweight	sacrifices some warmth for light-weight	bag sewn into jacket	too lightweight, not specialized. other companies
weather resistance	areas of synthetic coreloft	not wind proof	waterproof	long term use
breathability	underarm gussets are thin	lacks vents, uninsu-lated portions, or two-way zippers	vents, uninsulated portions, or two-way zippers	patents
material	15D ripstop nylon treated with DWR	not durable long term, too thin	mono material, move away from down	reliance on down

Figure 34: Mid-Layer SWOT 3

swot: outerlayers

		strengths	weaknesses	opportunities	threats
Patagonia & GORE-TEX®: ePE Shells Alpine		full coverage not female specific expandable hood articulated construction	not female specific no pee flap or bathroom access mobility	Female specific bathroom accessibil-ity	competitor companies
Patagonia Dual Aspect Bibs		pee flap for bathroom access mobility boot compatible harness compatible	not full coverage	durability	competitor products
Flylow Siren Bib Pant		pee flap for bathroom access mobility	not full coverage not boot compatible	durability more coverage	Competitor products

Figure 35: Outer-Layer Overview

swot: Patagonia & GORE-TEX: ePE Shells Alpine

	strengths	weaknesses	opportunities	threats
weather resistance	full body coverage	long term durability	zoning areas for more warmth or less	chafing from zipper
comfort & fit	gusset in knees and elbow	restricts mobility, built as non gender, hard to pee in	female specific	industry moving away from gendered designs
ventilation	two way zipper	not enough venting	more vents and zoning for breath-able sections	patents
warmth	full body coverage	not enough adjust-ability for thermoregulation	adjustable thermoregualtion	patents
features	innovative hood, RECCO, lined pockets	many zippers, too many features, too heavy	access to under layers	patents
material	Three-layer GORE-TEX fabric PFC-free and 100% recycled,	odor retention	mono material	reliance on plastic

Figure 36: Outer-Layer SWOT 1

swot: Patagonia Dual Aspect Bibs

	strengths	weaknesses	opportunities	threats
weather resistance	lower body coverage	long term durability	zoning areas for more warmth or less	chafing from zipper
comfort & fit	womens mobility is prioritized for high-steps and and hips	difficult to get on, slim fitting	female specific	industry moving away from gendered designs
ventilation	not full body coverage	not enough venting	more vents and zoning for breath-able sections	patents
warmth	lower body coverage	not enough adjust-ability for thermoregulation	adjustable thermoregualtion	patents
features	RECCO, harness com-patible, cuffs for boots,	not enough exter-nal pockets, durable knees	access to under layers	patents
material	100% polyester ripstop	odor retention	durability	reliance on plastic

Figure 37: Outer-Layer SWOT 2

swot: Flylow Siren Bib Pant

	strengths	weaknesses	opportunities	threats
weather resistance	full lower body coverage	heavy duty for climbing	zoned areas for heavy duty such as knee	zippers give out and let moisture in
comfort & fit	relaxed fit	baggy in certain areas, create cold air pockets	female specific design, articulated and gussets	industry moving away from gendered designs
ventilation	side zippers for venting	not enough vents	more vents and zoning for breath-able sections	patents
warmth	lower body coverage	baggy in certain areas, create cold air pockets	adjustable thermoregualtion	patents
features	RECCO, reinforced cuffs, lined pockets	not enough exter-nal pockets, durable knees	access to under layers	patents
material	Intuitive Perm (3-layer)	odor retention	durability	reliance on plastic

Figure 38: Outer-Layer SWOT 3

Top 5 “Strengths Finder” strengths

My top five strengths and strengths include Strategic, Adaptable, Empathetic, Activator, and Futuristic. My strategic strength helps me to see patterns and make connections, while my adaptable nature allows me to flexibly navigate various situations. Empathy is a powerful tool for understanding others, and being an Activator means I am great at initiating action. My futuristic strength helps me to excel at envisioning possibilities and setting long-term goals.

Golden Circle:

Sustainability plays a pivotal role in my design philosophy, emphasizing adherence to circular design principles geared towards the creation of products that prioritize durability, reusability, repairability, and recyclability, ultimately leading to a zero-waste approach. This commitment is rooted in the belief that minimizing environmental impact is of paramount importance, achieved through deliberate and mindful choices in product creation, the promotion of longevity, and the integration of circular practices. Not only is this of paramount importance for the design but also for the athletes using it. I think it is important to look at the choice landscape athletes and consumers are given and to reimagine what it could look like in terms of choosing sustainable options.

Thesis Project Alignment

Much like the Master of Science Sports Product Design program where I have been able to marry my passions for technical gear, design, and sustainability, so too does my thesis project. The project has allowed me to challenge notions around sustainability, and use my technical outerwear and layering system as test cases for my proposed sustainable model. I think my strengths as a futurist allow me to look forward and imagine the endless possibilities of how the system could be better. It is through my activator strength that I will be able to make this possibility a reality in my project.

I look forward to having my thesis project at the center of my portfolio to showcase how I am able to meld my passions for technical product design and

sustainability and show that it is possible to do both. Currently, my portfolio lacks any projects focusing on technical outerwear. Because this is something I would like to do after graduation, this project will demonstrate my competency as well as experience working on extremely technical pieces of clothing. I am equally passionate about sustainability and am excited to have a project where sustainability is at the core.

Performance Testing Plans:

My Performance testing plans are as follows. The plan incorporates several questions which will be asked in the initial stages of the testing plans, in the interviews and in the surveys. Based on these results and answers, the following research will be guided.

Step 1: Competitor Products:

Base layers:

Bottom: Women's Capilene® Thermal Weight Bottoms Patagonia

Why: One of the most commonly used thermal bottoms for alpine adventures.

https://www.patagonia.com/product/womens-capilene-thermal-weight-baselayer-bottoms/43692.html?dwvar_43692_color=LMBE

Top: Women's Merino 200 Oasis Long Sleeve Crewe Thermal Top Ski Tracks

Why: I want to test a natural fiber vs the recycled poly blend of the bottoms.

https://www.icebreaker.com/en-us/womens-baselayers/merino-200-oasis-long-sleeve-crewe-thermal-top-ski-tracks/0A56HX.html

Mid layer:

Jacket: Black Diamond Coefficient Hoody

Why: Standard mid layer for alpine ascents

https://www.blackdiamondequipment.com/en_US/product/w-coefficient-fleece-hoody/

Outer layer:

Top: Arcteryx Alpha Jacket Women

Why: The best light weight, breathable, and women's mobility-focused.

:https://arcteryx.com/us/en/shop/womens/alpha-jacket

Bottom: Women's Dual Aspect Bibs

Why: Best alpine climbing pants on the market

https://www.patagonia.com/product/womens-dual-aspect-bibs-for-alpine-climbing/194187482909.html?s_kwcid=17928&utm_source=google&utm_medium=cpc&utm_campaign=Performance+Max+-+Evergreen&gad_source=1&gclid=CjwKCAiAvJarBhA1EiwAGgZl0HcB6-spXtCZN-9k2F3AsArL7ghaR7hBAvU5mUu01Dtsoczb8RAsqxoCqYMQAvD_BwE

Step 2: Metrics

How Can We Statement:

Design an integrated layering system for female alpinists that provides thermoregulation, makes going to the bathroom more efficient, allows athletes to move quickly through the mountains in variable conditions, and is also kind to the Earth.

Metrics:

How easy is it to pee? (timed test in current and new gear? How many layers need to be removed?)

How unsafe is it to go to the bathroom (does the harness need to be tampered with or loosened ? What about the rope and belay system?)

What is the hygiene standard (talk to a gynecologist)?

Is mobility hindered? (reach test, stress test)

How much does kit weigh?

How durable is the kit? (the Martindale test)

Step 3: Research

Initial Testing:

- Athlete surveys: collect data
- Athlete Interviews: collect information about athlete struggles

Portland Testing:

- Field test 10 Female climbers attempting to pee while wearing harnesses while hanging on the wall.

Black Diamond Testing

1. How do these garments handle being worn for extended periods of time?
    a. Odor?
    b. Hygiene?
2. How does the layering system perform in cool temperatures?
3. Can you pee while wearing the whole kit?
4. How do you go to the bathroom while alpine climbing?
    a. Where on a route?
    b. What clothing layers move?
    c. Modesty in front of climbing partners?
    d. Interaction with gear (ie harness, rope management?)
    e. How do you wipe/clean?
    f. Hand sanitization?
5. How long are you wearing the same base layers and intimate layers?
6. How do you deal with your menstrual cycle while climbing?
7. Clothes having chafing, odor control, hygiene issues?
8. Is your mobility and range of motion affected by any clothes you wear while climbing?

Step 4: Analyze Data

Quantitative data will be analyzed with Excel, and other like programs. Qualitative data will be analyzed by looking at the results and looking for any repeating words or patterns. Observation will be used and documented by photos and videos. The survey results will be analyzed in Excel. Ideally, most of the data will be quantitative numerical data.

Performance Testing:

The first test I performed was looking for the optimal zipper position and length for the pee opening on the pants. I had an athlete wear five different pant prototypes and timed how long it took the athlete to “get into pee position” which is squatting down low to the ground with all layers removed in order to allow athlete to relieve themselves. I timed each donning and each ‘use’ of the prototype (athlete unzipping and moving

layers to pee). I had the athlete wear each garment and perform the test twice and recorded her results for both opening and closing the garment. From this test I was able to distinguish which zipper configuration would be the most optimal. Through this test I learned the placement of the zipper is second to the total length of the zipper when it comes to optimal performance.

The next test I conducted was with three female climbers who each tried on my kit as well as the competitor kit. I timed each of them donning and then “using” the kit. First, I had the athletes try on my kit. I didn’t tell them how to put it on, and initially observed if they found the design to be intuitive. All three were able to put on the kit correctly without any guidance. Next, I had each individual put on their harness over the kit and move around. I had them preform a series of set movements, similar to movements you would do while climbing. First I had them reach both hands above their head. Second, I asked them to spread their legs as wide as possible. Next I had them stand on one leg and hold their knee up as high as they could. And finally I had them reach down and touch heir toes. After each movement, I asked them to rate how much the clothing hindered them from performing those motions on a scale of 1-10. They unanimously agreed that the kit was comfortable for movement but found the waist to be too snug and the pants to be “hot and sweaty.” Next I told them to “get in position to use the bathroom” and timed them. Each athlete was able to use the zipper and flap system to get into a position they could relieve themselves without having to loosen or tamper with their harness waist belt. They were then instructed to ‘get into a position to climb again” and were timed. Each athlete was able to tuck flaps and zip kit back without having to loosen their harness.

Next, I had each athlete try on my competitor products and timed each of the athletes as the donned the kit. They were all able to don the competitor kit without instruction. Next, I had each individual put on their harness over the kit and move around. I asked them to perform the same movements and recorded their responses. They reported that it was comfortable, but since the overall straps were not adjustable, they did not fit any of the three women well despite all being a size small. They also reported not liking how baggy the rear area was and described it as having a “diaper butt” which was not desirable. Next I told them to “get in position to use the bathroom”

and timed them. Each athlete was able to get into the position without further instruction but each athlete had to loosen or take off the waist belt of the harness. The time recorded it took to get into the position was longer than when in my kit. Next I had them get “into a position to climb again” and were timed. Again, the time it took them to get into position was much longer. Athletes reported struggling with retucking their shirts and mid layers back into their pants and harness and layering everything to “fit smoothly as prior to going to the bathroom.” Athletes complained of poor fit overall and bunching of layers under the harness hip belt area that lead to chafing and pressure points.

From these tests, I have concluded that being able to go to the bathroom without tempering with the harness hip belt is of the utmost importance. I also learned that the area under the hip belt is often a place where athletes experience pressure points and chaffing due to the seams often found in those areas.

	Donning		Doffing	
	Crux Kit	Competitor	Crux Kit	Competitor
Athlete 1	0:18	0:52	0:26	2:01
Athlete 2	0:14	1:00	0:28	2:36
Athlete 3	0:13	0:59	0:30	2:35
Average time	0:15	0:57	0:28	2:24

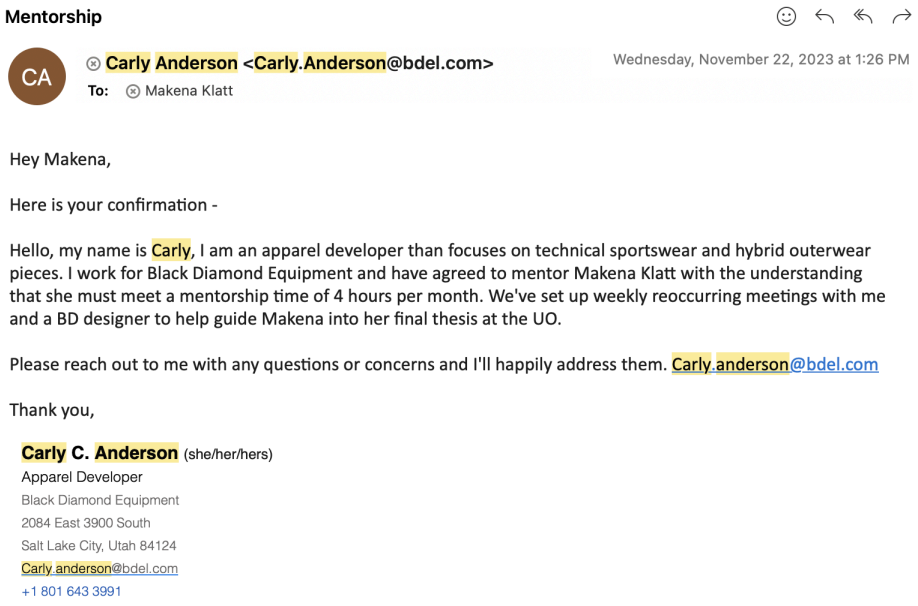
Figure 39: Donning and Doffing test results

Final Output:

In conclusion, the under-representation of female-specific gear in the alpinist industry has significant implications for both the performance and safety of female climbers. This analysis has highlighted the persistent gaps in apparel design and availability, emphasizing the need for greater inclusivity and specific solutions that address the unique physiological needs of women. By fostering innovation and prioritizing female-focused research and development, the industry can not only enhance the climbing experience for women but also contribute to the overall advancement of alpinism. Addressing these disparities is crucial for promoting gender equity and ensuring that all climbers have access to the gear they need to succeed and stay safe in their endeavors.

Project Mentor:

I have four thesis project mentors. The first is Carly Anderson, a Product Developer at Black Diamond. I also have Maggie Elder, a senior designer for technical alpine and snow at Patagonia, Charity Fox, a senior designer/developer for technical outerwear at Outdoor Research and Michelle Rose, podcast host.



Mentorship

CA **Carly Anderson** <Carly.Anderson@bdel.com> Wednesday, November 22, 2023 at 1:26 PM
To: Makena Klatt

Hey Makena,

Here is your confirmation -

Hello, my name is Carly, I am an apparel developer than focuses on technical sportswear and hybrid outerwear pieces. I work for Black Diamond Equipment and have agreed to mentor Makena Klatt with the understanding that she must meet a mentorship time of 4 hours per month. We've set up weekly reoccurring meetings with me and a BD designer to help guide Makena into her final thesis at the UO.

Please reach out to me with any questions or concerns and I'll happily address them. Carly.anderson@bdel.com

Thank you,

Carly C. Anderson (she/her/hers)
Apparel Developer
Black Diamond Equipment
2084 East 3900 South
Salt Lake City, Utah 84124
Carly.anderson@bdel.com
+1 801 643 3991

ME Maggie Elder Dec 13
To You

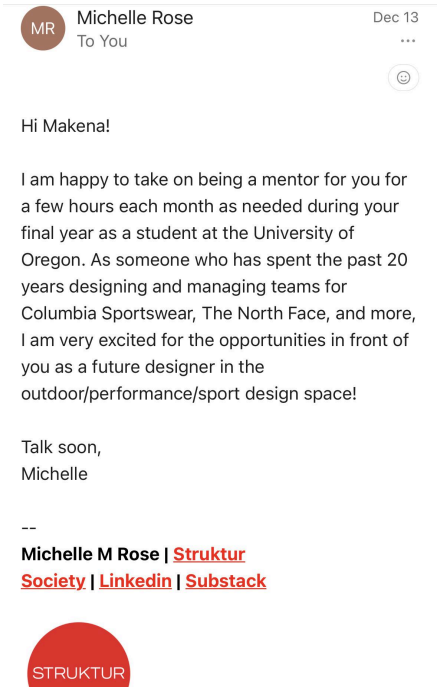
Hi Makena,

Of course!

I am Maggie Elder I work at Patagonia as a senior designer for technical alpine and snow product and I am happy and excited to mentor Makena Klatt once a month. I am looking forward to watching your project come to life!

Lets get our January chat set up soon! Have a wonderful holiday :)

Best,
Maggie



MR Michelle Rose Dec 13
To You

Hi Makena!

I am happy to take on being a mentor for you for a few hours each month as needed during your final year as a student at the University of Oregon. As someone who has spent the past 20 years designing and managing teams for Columbia Sportswear, The North Face, and more, I am very excited for the opportunities in front of you as a future designer in the outdoor/performance/sport design space!

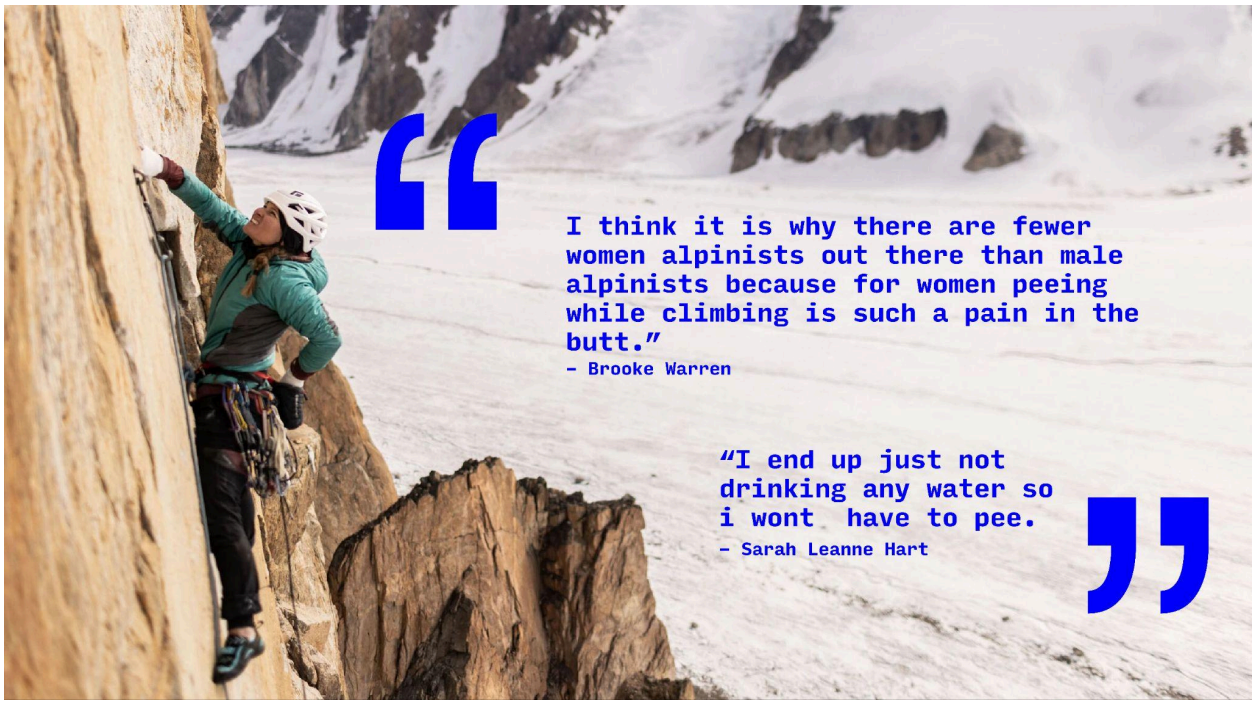
Talk soon,
Michelle

--
Michelle M Rose | Struktur Society | Linkedin | Substack

STRUKTUR

Appendix:

Final slides:



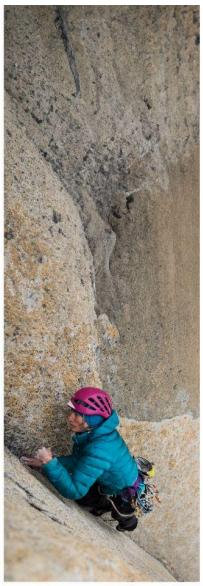
how could we ...

design a integrated layering system for female alpinists that makes going to the bathroom more efficient and allows athletes to move quickly through the mountains in variable conditions and is also is kind to the Earth?

alpine climbing

alpine climbing:
alpine climbing involves small unsupported teams tackling large multi-pitch routes that can involve various combinations of rock climbing, ice climbing, and mixed climbing, in alpine type mountain environments. Alpine routes are long and require a full day or even several days of climbing.

alpine style:
often considered the purist form of climbing, it is climbing fast, light and unsupported through the mountains carrying minimal gear which allows climbers to take advantage of weather windows to reach objective.



rock

ice

mixed

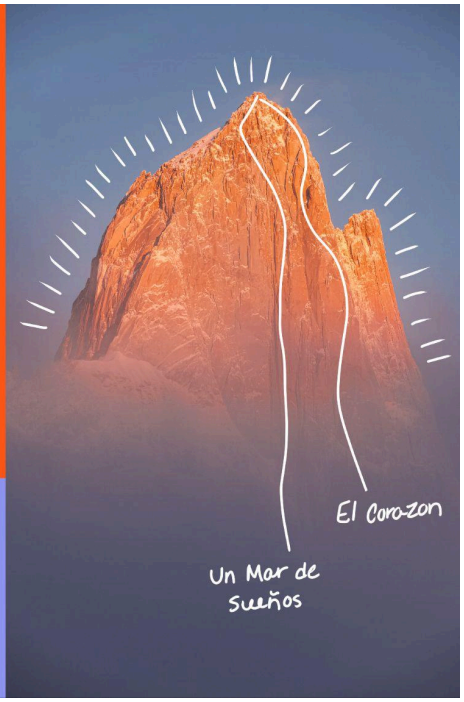
the athlete

User:25-45 year old female

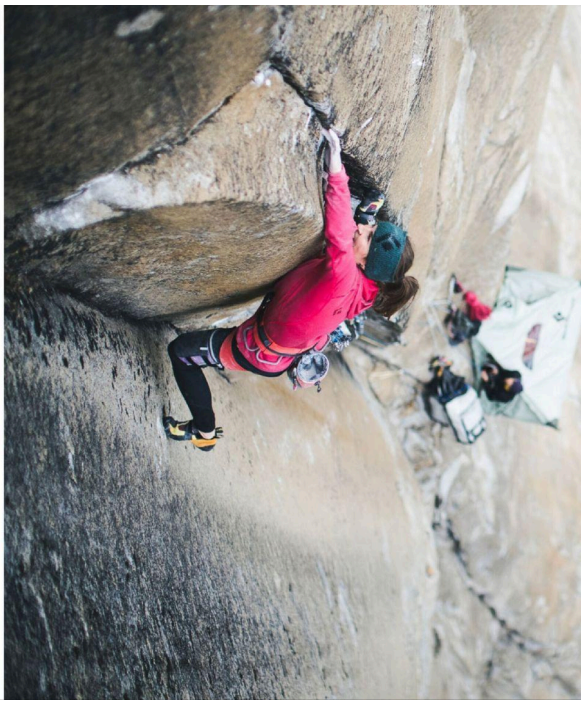
Ability: expert, professional guide

Product area: apparel

Performance goals: kit allows female alpinists to easily and efficiently (50% quicker) go to the bathroom while climbing without tampering with their harness



whats wrong with current female alpine climbing kits?



#1 Female athletes must loosen hip belt on harness in order to pee.

#2 9/10 athletes interviewed report developing a UTI or yeast infection while on or after climbing trip.

#3 It is extreemly difficult to re-tuck layers into harness after going to the bathroom.

integrated layering

– the solution integrates through each layer, starting from the underwear, base layer, and soft shell pant.


CRUX.
CRUX.
CRUX.
INNOVATION FOR FEMALE FIRST ASSENTS
Climbing without limits requires performance climbing apparel. A new female alpine climbing collection designed for women to be women.

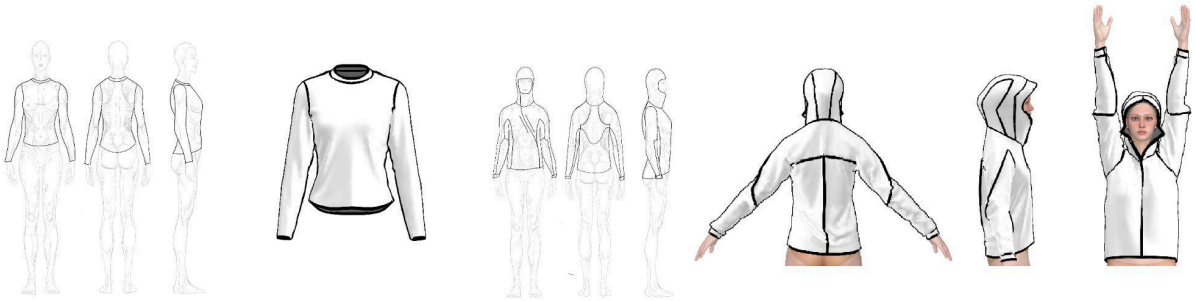
CRUX.
CRUX.
CRUX.

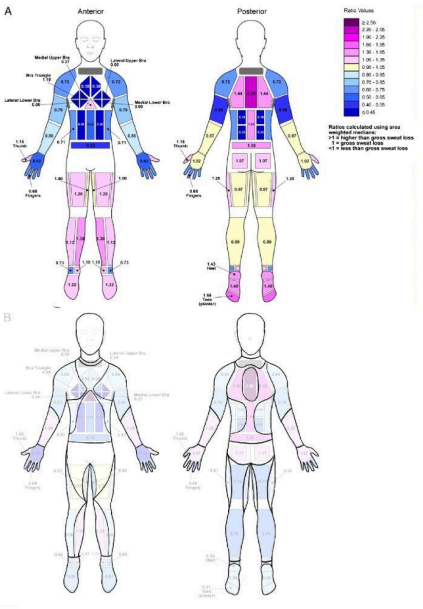
CRUX represents a brand that celebrates women alpine climbers.

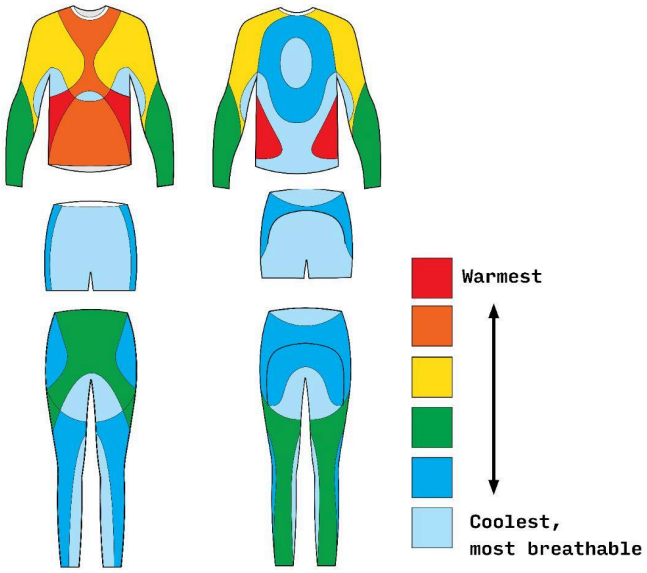
It focuses on the new wave of female athletes that are disrupting the traditionally male dominated climbing industry.

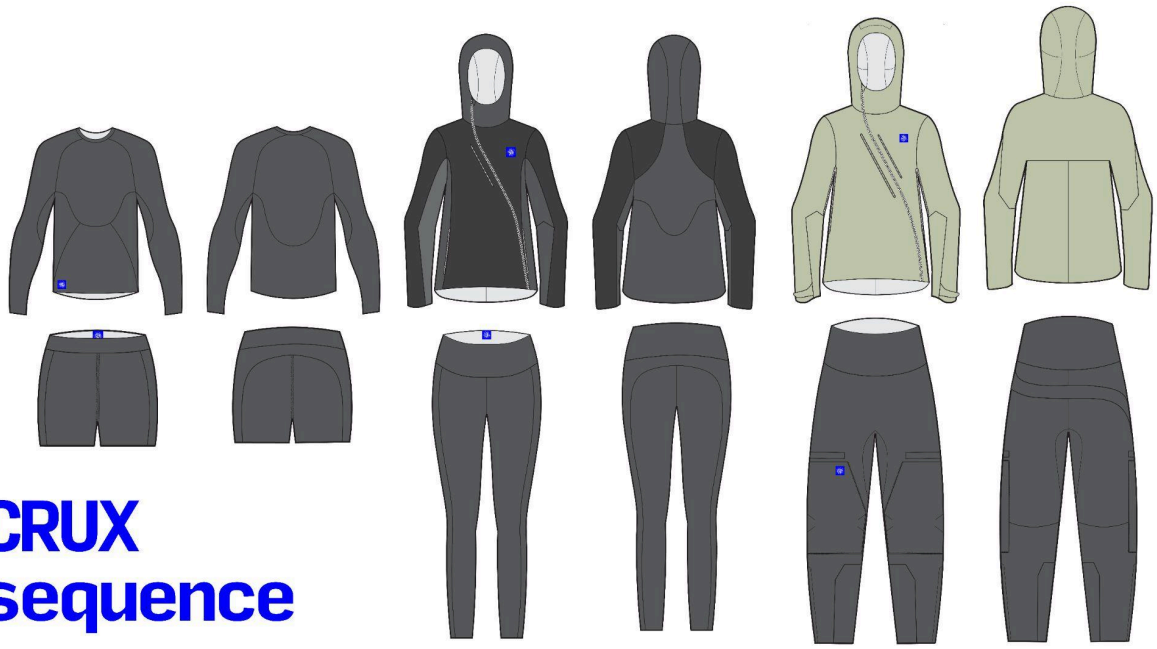
crux (/kreks/) noun

- The most difficult portion of a climb; often the grade is defined by the difficulty of the crux. grade of the climb is defined by the difficulty of the crux




A
Anterior
Posterior
B


Warmest
Coolest,
most breathable



CRUX sequence

efficient bathroom break testing...

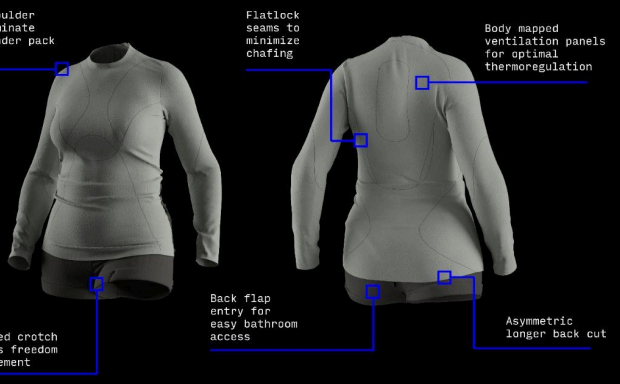
Competitor Kit:

Does the athlete need to tamper with waist belt? YES
how long does it take get into “pee” position? 57 seconds
How long does it take to climb again? 2 minute 24 seconds

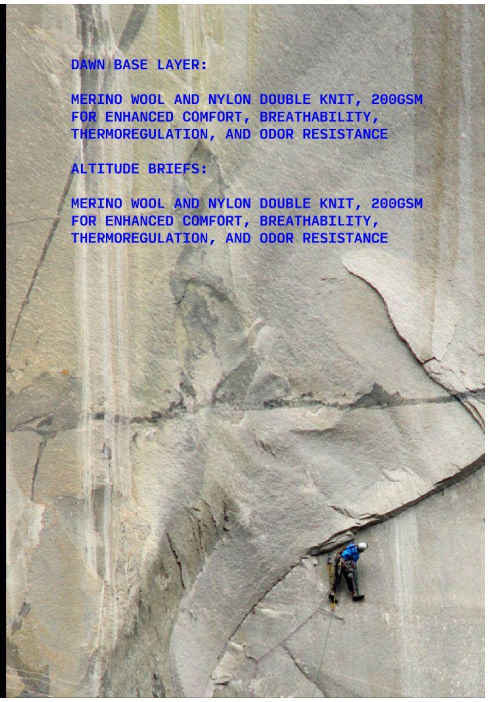
CRUX Sequence:

Does the athlete need to tamper with waist belt? NO
how long does it take get into “pee” position? 15 seconds
How long does it take to climb again? 28 seconds

dawn base layer



dusk briefs



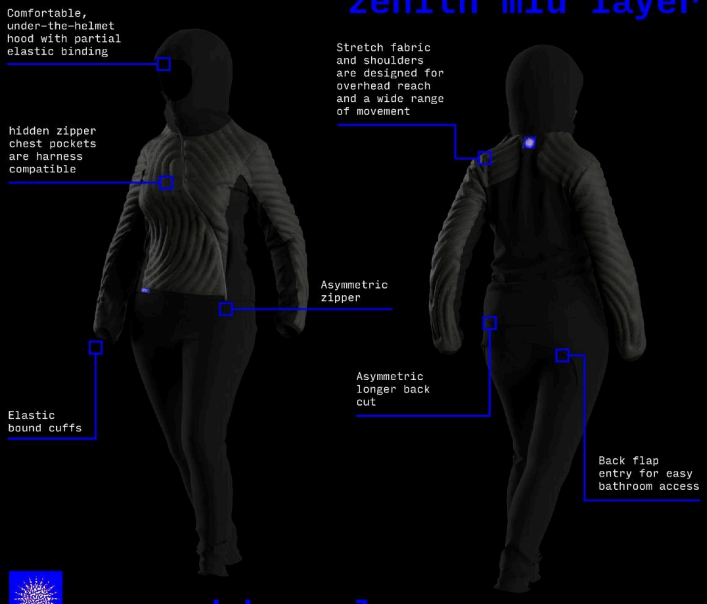
DAWN BASE LAYER:

MERINO WOOL AND NYLON DOUBLE KNIT, 200GSM FOR ENHANCED COMFORT, BREATHABILITY, THERMOREGULATION, AND ODOR RESISTANCE

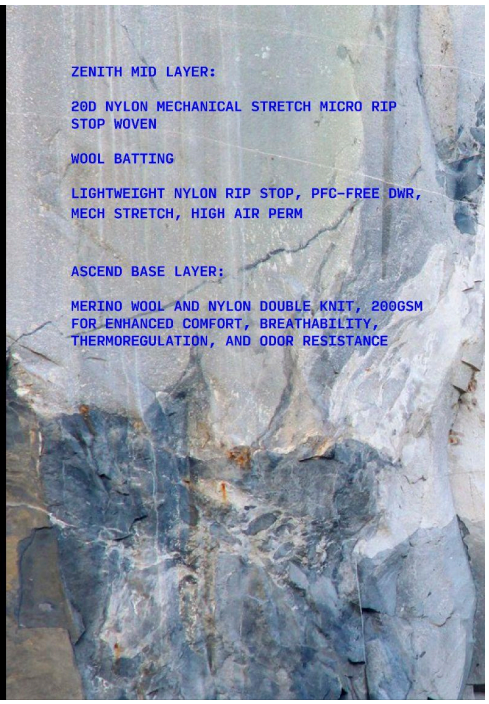
ALTITUDE BRIEFS:

MERINO WOOL AND NYLON DOUBLE KNIT, 200GSM FOR ENHANCED COMFORT, BREATHABILITY, THERMOREGULATION, AND ODOR RESISTANCE

zenith mid layer



ascend base layer



ZENITH MID LAYER:

20D NYLON MECHANICAL STRETCH MICRO RIP STOP WOVEN

WOOL BATTING

LIGHTWEIGHT NYLON RIP STOP, PFC-FREE DWR, MECH STRETCH, HIGH AIR PERM

ASCEND BASE LAYER:

MERINO WOOL AND NYLON DOUBLE KNIT, 200GSM FOR ENHANCED COMFORT, BREATHABILITY, THERMOREGULATION, AND ODOR RESISTANCE


solstice shell
Storm hood fitted for climbing helmet with one hand adjustment
Articulated elbows provide room for range of motion
Chest pocket for feminine products
Zippered back panel for easy bathroom access
Cuffs with velcro adjustments
Asymmetric longer back cut
Side gusset entry with adjustable g-hook closure
Reinforced knee panels for abrasion resistance
altitude pants

SOLSTICE SHELL:
3L, 40D STRETCH NYLON FACE, 15D JERSEY BACK, 20K/20K, HYDROPHILIC LAMINATION
ALTITUDE PANTS:
FOUR-WAY STRETCH WOVEN (188 GSM, 85% NYLON, 15% ELASTANE)
HIGH DURABILITY NYLON BLEND STRETCH WOVEN (48% NYLON, 49% POLYESTER, 3% ELASTANE, 220GSM)

Interview with Sarah Hart

Speaker 1 [00:00:00] As much ground it as possible the shortest amount of time. And then like maybe more classical mountaineering would be like expedition style. Maybe there's porters involved. Maybe you're like extending fixed ropes in the mountains. And there it's like you can carry as much as you want because you're actually probably not carrying at all. Well I would say to me that seems like the major differentiate is in what you wear. Maybe albinism is a confusing word because I think sometimes people confuse albinism with mountaineering. And I think they are different. Mountaineering is. Yeah. Like an expedition style approach. Albinism is like a fast and life leave no trace style. Yes.

Speaker 2 [00:00:45] Mountain climbing. Okay. So based on those definitions I think I'm definitely focusing on alpine climbing. Within that like umbrella of alpine climbing is there's still there's still like some like variability though, right. Like it could be fast and light like a day push. But then also you could still do something that's like multi-day potentially. Or is that. Incorrect.

Speaker 1 [00:01:10] I would say you would wear the same things for that though. Okay. Because I think whatever you're going to wear in the mountains, if you're like lens is to go as. Quickly as possible, whether it's I'm going to do this in a day real fast, or if you're still going with the ethos of like. Alpine climbing. Maybe it's a big enough objective that you have to sleep en route, but I think your your systems would be the same other than maybe you're carrying a bivvy sack.

Speaker 2 [00:01:39] Okay.

Speaker 1 [00:01:40] Or you're going to carry in fact, okay, maybe you're going to carry an extra puffy because you're going to sleep with just a puffy.

Speaker 2 [00:01:46] Okay.

Speaker 1 [00:01:47] But I think the the spirit is the same. So the clothing system to me would be kind of the same.

Speaker 2 [00:01:52] Okay. Okay. So based off of that, thank you for clarifying. I'm just going to like kind of go through the questions I had written out. So for your base layers, when you are, doing an alpine climb, what what base layers do you wear? Do you wear base layers? And if you do, do you know, like the Brandon model or like name?

Speaker 1 [00:02:16] Yeah. You know, I previously I was I worked with a company here in Canada called Mountain Equipment Co-op. I don't know if you've encountered them at all in your research, but MSE. Is it sort of like what Aria used to be? It was a co-operative they made in in-house apparel. It was kind of like legendary, I would say, within the community of albinism, especially in Canada and into the US. They, like me, very functional in highly, I would say like highly designed product. And so I wore mostly M.A.C apparel. And mostly I would wear their silk weight layer, a base layer so it's the thinnest layer that they make. And yet it still has enough warmth in it because it's like a full length layer long sleeve, a full length long chain. And so today MSE actually has garnered business. They're now of their own to their A company. So I don't do anything with NBC anymore. I'm a bit bitter about the loss of the co-op.

Speaker 2 [00:03:28] But.

Speaker 1 [00:03:29] Now I've actually been wearing a lot of gear from a company called neuroma. Neuroma if Neuromorphic Corona is from, Norway. So it's a Scandinavian brand, and I have their I wear their base layers now, and I actually would have to say the base layers I have right now are too heavy. They're a heavier weight and they're too heavy for. I wouldn't feel comfortable wearing them on like.

Speaker 2 [00:03:58] A.

Speaker 1 [00:03:59] Big alpine push.

Speaker 2 [00:04:00] Okay.

Speaker 1 [00:04:01] I think the silk weight is for me is maybe where it's at.

Speaker 2 [00:04:05] Okay. Okay. Awesome. And then for your mid layers, top and bottom.

Speaker 1 [00:04:17] Yeah. Mid layer I. So you'll probably know more about this than I do, but there's this new, fabrication. It's like a variation on Polar tech and it's like super. You can see through the material. So it's highly breathable, but also when paired with, like, a wind shell or Gore-Tex or whatever, it's very warm, like its heat qualities are really impressive. So I wear a layer by an arowana that has that textile, that fabrication. But I can actually I'm in I'm at the office so I don't have my gear with me, but I, I can't remember the name of it. But I know that, like, a lot of outdoor brands are dabbling with this textile right now because it is so breathable. And yet when it's locked down, it's really warm.

Speaker 2 [00:05:12] Okay, I will look into that and see if I can find what layer that is.

Speaker 1 [00:05:17] I know that I think I've seen, I think Mountain Hardware. If I build hardware, I think Mountain Hardware has a piece right now that is just like purely that fabrication, just in like a, a mid weight layer or, I don't think it'd be a base layer, but it's just like a your typical long sleeve shirt. Okay. And I saw it recently. I was like, that's that, that's the material I really love.

Speaker 2 [00:05:45] Okay, okay. I'll see if I can find that. And then for your outer layers, what does that look like for you?

Speaker 1 [00:05:55] I, I really. I'm not like I because you're like, albinism is like a high output cardio activity. I shy away from heavy like three layer Gore-Tex. Right now I have a neuron to show and I think it's either Gore-Tex Pro Light or Gore-Tex Pack Light.

Speaker 2 [00:06:23] Okay.

Speaker 1 [00:06:24] It kind of is. Maybe more on the side of, like, a very lightweight plastic bag. So maybe not totally ideal for Ohio, but albinism. But the weight of it and the pared down ness of it, it just has like a chest pocket and it has hand pockets and I believe that's it. And I really like that the simplified shell nature of it. And I also just really shy away from the super heavy weight. Gore-Tex is there too, you know, that's for skiing. It's not really the best fabrication for albinism. There is another jacket and Patagonia jacket called the storm ten. I don't know if they make the storm ten anymore, but that is that's the type of shell that I. I rely on the most. In the mountains. It's very light. It has quite a lot of like. Breathable qualities, so it's not the most waterproof. But I think when it comes actually ideally to albinism, you're you're not like going out in the most inclement weather like you don't in theory. You need to have the most locked down the most waterproof.

Speaker 2 [00:07:42] Apparel. That makes sense. do you bring any sort of like puffy layer.

Speaker 1 [00:07:48] Yeah, I, so I do two things. It depends on where and what the activity is, but I'll either use, this massive, you see puffy, it's called the hot cocoa. It's like 850 filled down. It's just like a giant pillow. But the outer fabrication is super light, like it doesn't. It would withstand nothing. I mean, it isn't a very weak fabrication or weak like outer layer, but it's such a high concept of down the jacket. Just like I can tuck it into a stuffed sack and put it on my harness if I want. And then just pull that out at a ballet or for a bivvy.

Speaker 2 [00:08:37] Okay.

Speaker 1 [00:08:37] So I'll do that in places like the Rockies or Patagonia.

Speaker 2 [00:08:43] Where.

Speaker 1 [00:08:45] You're more likely to encounter like a drier, a drier climate. Here on the coast, I never wear down. I always wear a synthetic, puffy, because it's just so much moisture in everything that we do here. So then here on the coast, I use the DOS parka to Patagonia jacket. I really like the DOS parka, and I also have an Corona layer that isn't it's not a belay parka, it's much lighter and much more packable, but it's still synthetic and and actually like on the coast, our winters and our like just generally our climate's kind of warm and forgiving. So I can actually get away with just wearing that pretty light insulated layer and not going all the way to a belay parka.

Speaker 2 [00:09:42] Okay. Okay. That's interesting. And then as far as your, outer layer for your bottoms. Do you wear like base layer and outer layer or like, how does that work for you?

Speaker 1 [00:09:58] Yeah, I wear the I'll wear the silk layer, the base layer. Okay. And then again like depending on the location, I, you know, in a place like Patagonia or climbing ice in the Rockies, I'll wear soft shell because you're not likely to encounter as much liquid. And any time I ice climb or go winter alpine climbing here on the coast, I always wear a Gore-Tex layer.

Speaker 2 [00:10:29] Okay.

Speaker 1 [00:10:30] And you know, I have a heavy Gore-Tex layer, which is counterintuitive to what I'm saying about what I wear on the top. But or. Anything to do with like alpine climbing. Often your bottom is just getting totally abraded on everything. So. I carry a bit of a heavier bottom, I guess.

Speaker 2 [00:10:51] Okay. Do you know what, like, brand or model those bottom pants are?

Speaker 1 [00:10:58] Right now I have a Noronha. I have two pairs of neuron A bottoms. I have, like, a bib. Super heavy weight, three layer Gore-Tex, which I actually just use for skiing. It would be too much for alpine climbing.

Speaker 2 [00:11:15] Okay.

Speaker 1 [00:11:16] But then I have a sort of super lightweight. Again, I think it's Gore-Tex pack later. Gore-Tex Pro Lite as a bottom.

Speaker 2 [00:11:27] Okay.

Speaker 1 [00:11:27] And that's what I use for ice climbing. I would wear that if I was going winter alpine climbing. And then for like I said, for maybe Patagonia or maybe the Rockies, I wore a Patagonia bottom for many years that I just loved. It was a soft shell kind of hybrid, so it was highly breathable, but it also had quite a lot of water repellent properties to it, and that was perfect for that type of application.

Speaker 2 [00:12:01] Okay. Awesome. Okay. And then I guess so. Moving forward, maybe I should clarify some more. I think I am looking because I, you know, there's so many, so much variability as, you know, like depending on where you're climbing, you want different gear. So, I think for this project I'm focusing on, like Patagonia and climbing down there in like January, December, January. So just to give you.

Speaker 1 [00:12:34] Something that I said about the non specific. Yeah I reply.

Speaker 2 [00:12:38] Yes. Just so you know. Okay. so next I have a few questions about what your clothes are interacting with as far as like gear and tools. Such as like rock shoes, ice shoes, helmets, gloves, what up? Like, all sorts of that stuff.

Speaker 1 [00:13:00] Yeah, well, I guess so. With, the lens of Patagonia. Most often it's just like a light. Approach boot.

Speaker 2 [00:13:12] Okay.

Speaker 1 [00:13:13] I wouldn't it wouldn't be in the context of, like, a full rigid ice climbing boot that's like, got bales for a friend, you know, for bales for crampons front and back. It would just be a shoe that you could put a strap on crampons on, or maybe, a bale on the front, but then just strap on or, sorry, a strap on in the front and a bale in the back just for a bit more rigidity, if maybe you're doing a small amount of front pointing. I never a little bit of ice, so mostly it's like rock shoes. Okay. For me, I mean, I if I was climbing for folks who climb on the tour like there you you'd probably actually be wearing a full shank mountain boot because you would be doing a lot more ice and mixed climbing. And yeah, definitely a helmet. Definitely a harness, definitely hoods I have to have on the top. I need to have one outer layer that has a hood, because I think if you bivvy or at blaze, the hood is what helps to keep all that hot air in. So I really I need to have a hood on my layer.

Speaker 2 [00:14:28] Okay. And you would prefer that hood on your outer layer.

Speaker 1 [00:14:32] Yeah.

Speaker 2 [00:14:33] Okay. Yeah.

Speaker 1 [00:14:33] Rather than what I do is I actually in Patagonia I always carry balaclava. And so when I'm Vivienne or if times or, you know, just if it's cold, you're on the north side of the mountain or something. I'll wear a balaclava and a helmet and then have a hood on my, like, puffy, my belly puffy and maybe my shell layer.

Speaker 2 [00:14:58] Okay. And then just for clarification, are you having, you.

Speaker 1 [00:15:03] Know.

Speaker 2 [00:15:03] I'm sorry, my dog wants my intention. When you are. Oh, okay. I'm going to let her out really fast. Sorry. One second. Okay, I know, I know, you want to go. Sorry about that.

Speaker 1 [00:15:27] Anyway.

Speaker 2 [00:15:29] So as far as the, ballet park is concerned, is that something you're throwing over your outerwear, your outer layer? Yeah. Okay. Yeah.

Speaker 1 [00:15:39] And so again, if I'm thinking about Patagonia specifically, like usually I would climb in so great layered that like super insulated mid layer that I was telling you about. And then probably a shell, a shell like the storm ten would be something that I would wear. And then I would have a belay layer that would go on top of everything.

Speaker 2 [00:16:07] Okay.

Speaker 1 [00:16:08] Maybe I would have a vest. I actually am kind of I think this or like a sleeper hit. I actually think vests are amazing. And so it is. It also not uncommon for me, even when I'm ice climbing here on the coast, I'll have my silk layer, my midway super warm layer, that breathable one, a shell, a vest, and then ablaze, I can throw on my biggest puffy.

Speaker 2 [00:16:39] Okay. Okay. Awesome. Okay. And then let's see what else. So, the hood back to that. You would prefer that on your outerwear rather than on your base layer. Okay. And then on the base layer, do you. Do you have any preference of like I know some people are big fans of the quarter zip or pockets even for.

Speaker 1 [00:17:12] You know, the base layer. I always go real simple.

Speaker 2 [00:17:15] Okay. Simple.

Speaker 1 [00:17:16] Because my, my hope is, is that. That I've like layered enough for my system is efficient enough that I actually never have to touch that base layer like that just is there. And then everything else is kind of like added or removed. So pockets in the outer pieces. Okay, hopefully nothing has to be touched against my skin. That's against my skin.

Speaker 2 [00:17:42] Okay. That makes sense. Okay. And then so as far you talked a little bit about this, but as far as like when you're climbing, could you talk a little bit about how you change layers and like what point and when do you change layers?

Speaker 1 [00:17:59] Yeah, yeah, I've had some awkward moments for sure. Yeah. Ideally never when you're mid pitch.

Speaker 2 [00:18:09] Okay.

Speaker 1 [00:18:10] So I think yeah I do delete everything good that stuff. But then you should never aspire to that. So whatever pulley system one wears I would hope it would let you get to the top of the pitch where you have to make any changes. But yeah I believe it's game on Apple is is when everything happens like I know I see you had noticed it said something in here about going to the bathroom. I mean, yeah, you got to be able to go to the bathroom at a shared blade, potentially partly hanging. So is a it's a waste of time. It's a waste of energy. It's a waste of everything to have to like divert yourself off the route in order to do a clothing change or to go to the bathroom. You really need to have an efficient enough system that everything that needs to happen can happen at a okay.

Speaker 2 [00:19:05] Okay. I guess we'll kind of pivot into the going to the bathroom part, because that's something I'm very fascinated in, and something I think I really want to consider in this design. Yeah. I'm curious. You said it best to go, like, at a ballet so often that's hanging, I'm sure. And that's with even if you were, like, on a ledge or something at a ballet, you still would have your harness on. So I'm curious, are you do you agree with that, or is that not true?

Speaker 1 [00:19:44] Yeah. Yeah. Okay.

Speaker 2 [00:19:44] Totally. Okay. So I'm curious, like, I've, I've talked to some of my friends and, like, I feel like everyone has their kind of, like, tips and tricks, but I'm curious to know, like how, if you're comfortable, how do you how do you do that process? And.

Speaker 1 [00:19:59] Yeah. So annoying. I mean, I think the one of the clincher is, is having a harness that has like, buckle to undo the bungees behind your butt. I think that's totally clutch. And if that's the case, then you're in a reasonably okay position to just try and like actually undo your pants, pull them down. But if that is not the case then it's kind of gets really dodgy because you're like having to actually undo the belt of your harness. In order to like maneuver all the different harness parts. So first of all yeah. Is an actual buckle to release the bungees on the leg loops. And then just a lot of fiddling and trying to like pull the harness though. you also have to like make sure you collect all the gear that's hanging off of your harness. And so the rope is out of the way like there's been a I've had tons of mistakes. Yeah. I can't even count the number of times that I've been alpine climbing and like had some kind of bathroom accident.

Speaker 2 [00:21:13] Yeah.

Speaker 1 [00:21:14] But Yeah.

Speaker 2 [00:21:16] Yeah. It's very I'm sure frustrating to like, not what you want to be.

Speaker 1 [00:21:21] And actually, I mean, this is funny that you bring this up because now I remember I actually had an incident in I've had an incident twice, once in the Karakoram on, big Wall and once in Patagonia, where I actually had to go to the bathroom number two, because, you know, you're like. Eating different food. Your stomach isn't okay. A lot, it's a lot of the time. And having a total bathroom emergency and actually not being able to do anything about it. Actually going to the bathroom in your pants. Yeah. Because you can actually like get off the robe. You can't go anywhere. You're mid pitch and then having to turn around because it's like I can't keep climbing in this current state. And that's happened to be twice.

Speaker 2 [00:22:13] So that's it. Yeah. Here is not efficiently made for either for dealing with that right now.

Speaker 1 [00:22:21] Oh yeah. It's not. But that is a very interesting challenge though because I think when you start to like create product that. Serves the purpose for women climbers. You have to add a lot more potentially guac to that layer, like zippers and flaps and so like that to me is the crux is like, how do you create something that is slightly more usable for women climbers, but doesn't make it like a heavier product? That's tricky I don't know.

Speaker 2 [00:22:59] That's what I'm going to hopefully try to figure out. Yeah. That is the, the goal of this. so as far as like when you're actually like going to the bathroom say like a pitcher hanging, are there any, I don't know, like issues with, like, modesty or is that just something like you don't even care about at that point.

Speaker 1 [00:23:20] And you don't even care?

Speaker 2 [00:23:21] Yeah. Okay.

Speaker 1 [00:23:23] Yeah. I think all modesty just goes out the window.

Speaker 2 [00:23:25] Yeah.

Speaker 1 [00:23:26] Maybe that is an issue for some people. But I think when you're actually like when you're when you're in a place like Patagonia where the hazards are high, where speed and efficiency is what keeps you safe, it becomes not an issue because it's just like we're both here trying to survive and do the best we can to be successful. So I've never encountered an experience where either person or a team of people is uncomfortable in any way.

Speaker 2 [00:23:57] Okay.

Speaker 1 [00:23:58] Yeah.

Speaker 2 [00:23:59] Okay. And then, so in Patagonia, do you have to pack everything out? Yes you do.

Speaker 1 [00:24:08] Oh, no, sorry, I should. Let me know. What am I saying? So people will cash gear. They're like depending on what side of the range you're climbing. People will start the season by going and maybe cashing some gear at some of the divisions. But I preface that by saying like the last time I climbed in Patagonia was in 2018. And I climbed for like the ten years leading up to that. But I think since 2018 like the busyness of Patagonia is significant and I don't know, I mean I have some folks who I can inquire with but I don't know if it's maybe. Accepted to cash gear or safe to cash gear anymore? I'm not sure. But in theory, that's how I would do it.

Speaker 2 [00:24:54] Okay. Okay. So then would that be like, just to give me, like, a timeline of what that looks like? You would, like, arrived, ultra ten or wherever you are. Get your gear together. When a weather like window opens up, you'd go cash gear at, like, a high point. Probably return back to town, potentially. And then, like, when the weather is, like, ideal, then that's when you would do your full push. Or. I don't know, maybe.

Speaker 1 [00:25:31] It depends on, like, the difficulty if you're going with an objective to like climb at your limit. Maybe you know, you want to go climb, fix or climb something difficult in the trees. Then a lot of people will do that specific mission to go in cash gear. They won't necessarily do it on a good weather window. It'll be maybe when the wind isn't like an a blow you to the floor to the ground. But then the other approaches is here that you just arrive to town. You're just kind of like shaking off the travel. Maybe a small window appears. You go in to climb a warm up route, and then on your way out from climbing that warm up group, you just stash everything that you can leave that you brought in. So those are the probably the two ways to do it.

Speaker 2 [00:26:22] Is that also like a like that where you would stash gear. Is that also somewhere you would potentially establish like a bivvy or like a camp for the night.

Speaker 1 [00:26:30] Yeah. Yeah. Exactly. Like the where you catch the years, the same place where you would say you're going to go climb something that needs a really early start. You would walk in the night before. Bivvy in this spot where everybody caches their gear and then climb your route the next day and maybe come out and sleep again.

Speaker 2 [00:26:48] Okay. And so because you're leaving gear down there you could you know bring more layers and like a sleeping bag or whatever potentially.

Speaker 1 [00:26:57] Yeah probably a lot of the time people will take that approach of like we'll go to a warm up route. We're going to be in there, will bring all of our baby gear. We'll bring some food that we can leave up there. Okay. And then at the end of our climb, we'll leave the rack and our harnesses and everything.

Speaker 2 [00:27:13] So in that, in that, scenario, would you be sleeping in what you're going to climb in? Most likely like the next day in, like your in your gear question?

Speaker 1 [00:27:27] I think. What have I most often do? I feel like. In scenario one, where you're bringing in a cash to leave before you're ever climbing anything, then you're bringing in stuff that is specifically for climbing. But in this scenario where you're going in, it's not super heavy because your intention is to go climb and then just leave. Whatever is, is you don't need to bring that with you. Then there's probably some crossover, like you're probably hiking in, in the same stuff that you're going to wear when you're climbing. You'll probably wear it out. It's less likely for it was less likely for me that I would ever leave actual. Clothing systems. Mostly because when you are in the range, you can access from different points. And so depending on the weather window, depending on your goals, it's the coding system that follows you to these different places, these different entry points. But it might be things like their bivvy gear, food. Maybe you bring two sets of harnesses, so you're leaving a harness there and then you've got one in town. But for me, I feel like most of the coding systems were following me. I wasn't leaving open it.

Speaker 2 [00:28:44] So you had been then potentially in this situation, be sleeping in whatever you were going to climb in the next day? Yeah. Okay. Okay. Interesting.

Speaker 1 [00:28:54] The only thing that I was all I'm always particular about is like. Mostly clean underwear and clean socks. Yeah, socks especially cause your feet get so trashed. The clean socks are nice.

Speaker 2 [00:29:06] Okay. And then also, I have a question about. Yeah, there's, like, more intimate layers. How often would you like? Ideally. And then maybe realistically change those.

Speaker 1 [00:29:18] Ideally, you start the climbing day with a fresh pair of underwear. In reality, I would go three days without changing underwear. Yeah, those kinds of things like those types of luxuries are. Like, I think they become real points of consideration, especially especially maybe as a woman, where your ability to like, carry these massive loads everywhere. It's it really impacts your ability to climb hard when you're actually physically exhausted from approaching and doing all these like, gear, cash trips and stuff. And I. I mean, that's actually advice I would give to other women who are pursuing albinism is like, you actually have to sacrifice a lot of. What we as women might see as being essential. Because if the goal is to be successful in the mountains, you have to like, yeah, maybe it is. You're going to wear the same clothes for four days and not bring a toothbrush and not bring a second pair of socks, but that might be a bit of that might be what differentiates you for being successful or not. So.

Speaker 2 [00:30:36] Yeah, a lot of those. Yeah. Yeah. Comforts are not as important as. Yeah. Surviving. Okay. Let's see. If you're comfortable, I'm just curious about how, you know, if you're down there for a month or two, female athletes won't have a menstrual cycle. I'm curious how that affects or if you have any, or no stories or insights on Halloween, how that has affected your climbing or like how you deal with that while climbing.

Speaker 1 [00:31:12] Though annoying. Like the most annoying part of health and glamor, I, I a lot of of my girlfriends use the Diva Cup. I've never been able to successfully use it, so I don't. And I also had an IUD for like many years of my climbing career. So I didn't have a I didn't have a period, which was amazing. For me it's like, yeah, you got to carry little tiny OB tampons and so annoying. And. It's not. It's totally. Yeah. Like, maybe what you could design actually, is some, like, ultra light way to discard used tampons in the mountains.

Speaker 2 [00:32:02] Yeah. So. So does, like, all of that has to be carried out then.

Speaker 1 [00:32:06] Like fear. The truth is, is it doesn't. Because again, you're, like, going as efficiently and as quickly and in like if you're on a wall, you're probably not carrying it down. I can't I'm sure there are times when I did in times when I did not. Because also it's like that would mean pre-planning what you want to carry you down in how you're going to carry it down. Maybe if there's actually like a product that's made to, like, just like a poop tube. Look out.

Speaker 2 [00:32:43] Yeah.

Speaker 1 [00:32:44] Airplanes go in. I don't know, like, maybe that could be cool.

Speaker 2 [00:32:48] If.

Speaker 1 [00:32:48] It doesn't add extra, a lot of extra weight or cumbersome weight I don't know. Yeah I don't know.

Speaker 2 [00:32:57] No. That's interesting. Yeah. look at my other questions. Is like with your garments especially like base layers and intimate layers. Is there any issue with like, especially if you're wearing it for like 3 or 4 days? Any issues with, like, odor control or like hygiene like.

Speaker 1 [00:33:20] Yeah. Yeah that's issue. Yeah, yeah. Massive issues. Like I think it's mostly annoying for you, for the individual. I don't think if you're wearing so many layers that it isn't a problem for anybody else, like, okay. But for sure.

Speaker 2 [00:33:39] Like, yeah.

Speaker 1 [00:33:40] For sure you're going to end up with probably a yeast infection or some kind of kind of like weird. Rub or rash or something. But again, I think my experience has always just been whatever. You just deal with it.

Speaker 2 [00:33:56] Yeah.

Speaker 1 [00:33:57] Yeah, I guess there is a thing that typically alpine base layers are a synthetic material. And so when you get dirty in a synthetic material it's very stinky. That I don't know what maybe this is a thing for you to solve is like you can't wear cotton. But what else could you wear that has better qualities to absorb.

Speaker 2 [00:34:23] Yeah.

Speaker 1 [00:34:23] All of it.

Speaker 2 [00:34:24] Yeah. That was one of actually my questions. I'm curious if if it sounds like you're somewhat partial to synthetic materials and it seems like that's like the general trend. As far as, like, like some sort of like wool blend, is that something that that would maybe manage that odor and still have breathability and warmth? Would that be something you would be interested in?

Speaker 1 [00:34:47] I have used wool layers in the past. And you know, I always, like, changed my mind on them because it just. For me. I run hot and low layers are too warm for me, so I just could never stomach it. And I'm sure I've had wool underwear, but I don't actually like recall. If it made a difference, I'm sure it probably did make a difference. But I would never underwear. I would entertain for having a wool layer, but nothing like nothing else would be too warm for me.

Speaker 2 [00:35:27] Okay. And then as far as.

Speaker 1 [00:35:32] Your.

Speaker 2 [00:35:33] Layers go, I'm curious about, like, how often you're replacing them or, like, how or how often you have to repair them.

Speaker 1 [00:35:48] I feel like my layers of always stood up for a really long time. Like there's not a lot of wear and tear that it's not part of, like my experience and base layers. But what is, is that over time, because I'm often using synthetic layers, they just start to stink and I can't stomach it anymore because it's like you wash it, you put it on the instant you start to sweat. All of a sudden the shirt is unbearable. And that was common for me.

Speaker 2 [00:36:15] Okay.

Speaker 1 [00:36:16] Well you know, you know what can I actually. If I need to go. I have actually a meeting that I probably should jump in.

Speaker 2 [00:36:27] Yes of course. Yes, the. Thank you so much.

Speaker 1 [00:36:31] I'm very happy to continue this. I'm actually. I'm going to be in, Hawaii. I'm going on vacation next week. So if you want to send me a message once, I'm there and know what the general, plan it is, I'm sure if I can squeeze out time a lot easier for us to connect more. Okay. And I was going to suggest that I put you in touch with Rolo. Garibaldi. Okay. And Rolo, obviously is like the godfather of Patagonian albinism. Yeah. Enrolls down there now and very connected and is very invested. Like he worked on that within state of the art project with me. So is very invested and curious about centering women's voices in albinism. So I would probably connected to him and then he could down with, you're both down there, introduce you to some of the women that are down there climbing up.

Speaker 2 [00:37:22] That would be amazing.

Speaker 1 [00:37:23] So send me a message and let's let's try and connect again. And then I can make the connection to Rolo for you.

Speaker 2 [00:37:29] Amazing. Thank you so much. This was very helpful. It was very fun getting to know you well. Yeah.

Speaker 1 [00:37:35] Awesome I love I love this kind of thing I yeah, keep it up. Good work.

Speaker 2 [00:37:38] Okay. Thank you. I will connect with you, for next week.

Speaker 1 [00:37:43] Sounds good. Thanks, McKenna.

Speaker 2 [00:37:44] Yeah. Take care. Bye.

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