

Future designers need to meet climate challenges hands-on.



Working together toward climate solutions and reconciliation

KPU's CLIMATE+CHALLENGE

Leon Dame, Model,
Peter White, Getty Images

TODAY

- Interdisciplinarity in teaching climate.
- 3 forces for change for Design/ers.
- What it means for Teachers?

climate literacy is expected to achieve in-depth comprehension about the essential principles of Earth's climate system, critical knowledge about assessing scientifically credible information about climate, wider dissemination of the information about climate and climate change in a meaningful way, and ability to make informed and responsible decisions with regard to personal actions that may affect climate....

<https://doi.org/10.1016/j.pdisas.2022.100222>

A common framework for MOOC curricular development in climate change education - Findings and adaptations under the BECK project for higher education institutions in Europe and Asia

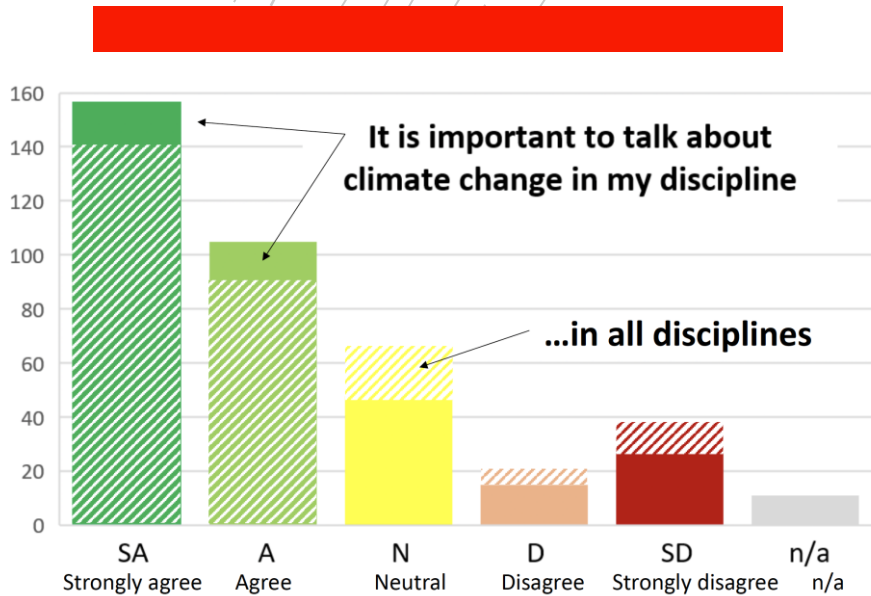
Climate CHANGE IS AN ABSTRACT PROBLEM.

WHAT DOES THAT MEAN TO YOU as EDUCATORS?

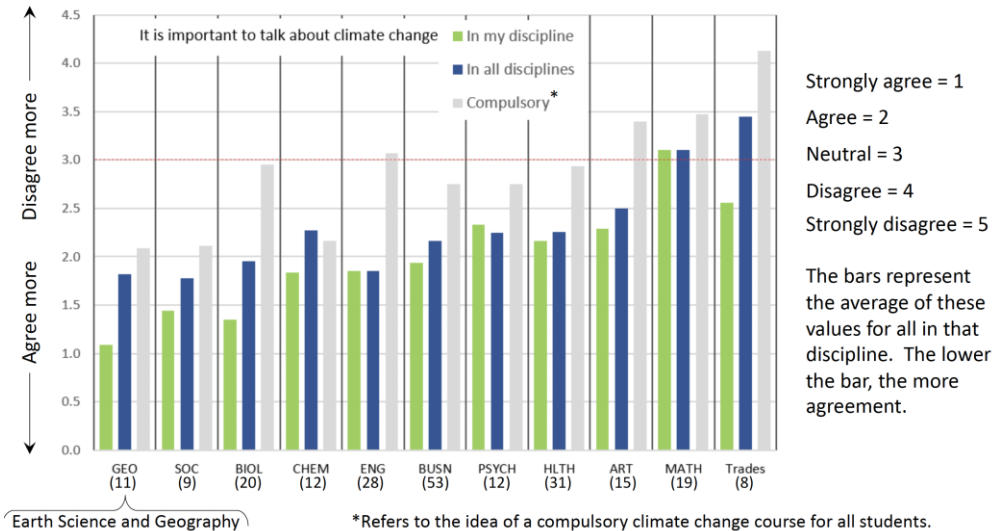
Climate CHANGE IS COMPLEX.

WHAT DOES THAT MEAN TO YOU as EDUCATORS?

FPSE CASC: What we heard from Post-Secondary Faculty across BC...

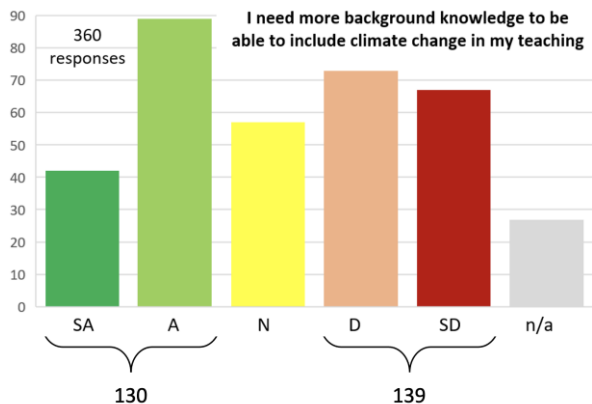
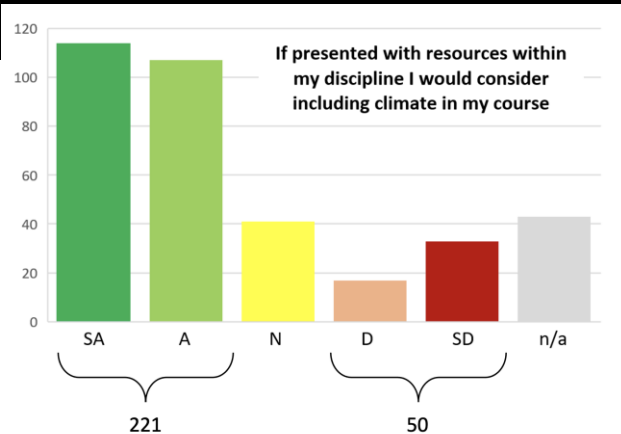


“It is important to talk about climate change” – by discipline



(FPSE CASC Survey Spring 2023) Presentation by Steven Earle to CASC Team Summer 2023
 Survey responses = 367 across 16 institutions

FPSE CASC: What Faculty across BC need, what they'd do with resources.

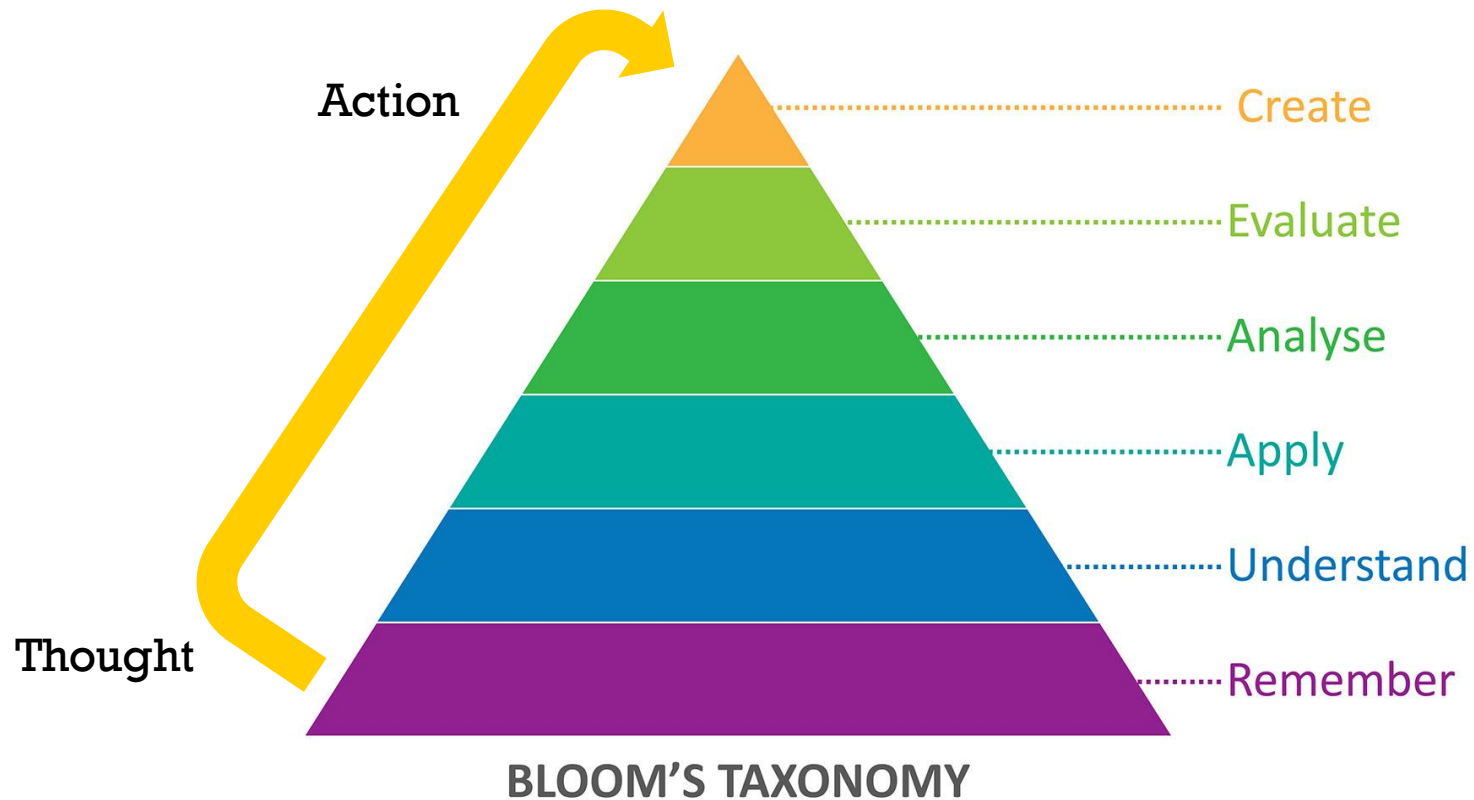


- I find that personal experiences in nature tend to have the biggest impact on students. In-class discussion is helpful, but they seem to be profoundly moved by engaging in things like nature meditations, hikes, etc. As well as conversations that highlight themes of the interdependence of all living things.
- It would be good to have a working group of instructors that could exchange approaches, information and experiences in teaching about climate change. A list of potential speakers would be a useful resource as well.
- Forcing students to take courses would be the best way to make sure they don't give a crap about climate change.
- I personally believe it is current, real and relevant. I believe students appreciate current real issues being applied in their learning of theory and/or technology, and climate change is top of mind for many.

(FPSE CASC Survey Spring 2023) Presentation by Steven Earle to CASC Team Summer 2023

STOP
Questions?
Observations?

Future designers need to meet climate challenges hands-on. How?




Future designers need to meet climate challenges hands-on.

By Designing for meaningful problems.



Local Partners in the Technical Apparel/Fashion/Product sector:

1. Circularity:
2. Inclusivity:
3. New Extremes:



Arc'tyrex,
Lululemon,
Debrand,
Mustang Survival,
Sugarhouse Collective,
Renewt,
Aqualung,
Aritizia,
Samsara,
Watson Gloves,
MEC
Fluevog
Native Shoes
...
General Recycled,
Apparel Coalition,
Vital Mechanics Research
Arbutus Medical
UBC Forestry
SFU Engineering

1. Circularity: science & tech

https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements_en



 English

Search

[Home](#) > [Energy, Climate change, Environment](#) > [Standards, tools and labels](#) > [Products - labelling rules and requirements](#)

Products - labelling rules and requirements

Rules and requirements for labelling eco-friendly products, energy, fuel consumption and chemicals.

CO₂ emission limit targets for road vehicles

Requirements, standards and eco-innovation for CO₂ emission reduction for cars, vans, and heavy-duty vehicles.

Chemicals

Legal information on the classification, labelling and packaging of chemical substances and mixtures.

Ecolabel for eco friendly products and services

EU Ecolabel is a voluntary environmental performance certificate that is awarded to products and services. Learn how to apply for it.

Energy label and ecodesign

[About the energy label and ecodesign](#)

[Energy-efficient products](#)

[Product database](#)

[Rules and requirements for energy labelling and ecodesign](#)

Fuel consumption labelling for passenger cars

This label has been introduced to help drivers choose new cars with low fuel consumption and CO₂ emissions. Information on policies and procedures.

Product environmental footprint

EU initiative to measure product environmental performance.

1. Circularity

<https://debrand.ca>

debrand

HOME SERVICES SOLUTIONS ABOUT PROJECTS THE LOOP CONTACT

The Loop

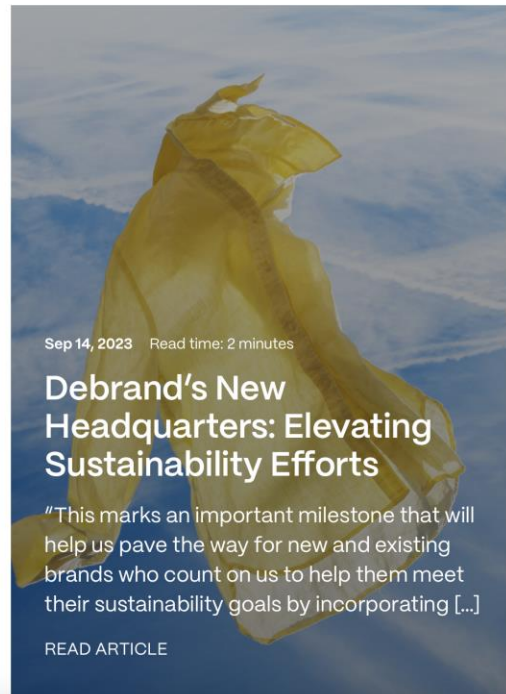


Oct 18, 2023 Read time: 1-2 minutes

The world's first circular lanyards produced in partnership with Debrand and Coleo

This year, Debrand is projected to divert nearly 1,000 tons of used textiles (125% year-over-year growth), from landfills through resale, reuse, recycling and recovery channels. With a reputation for exceptional [...]

READ ARTICLE

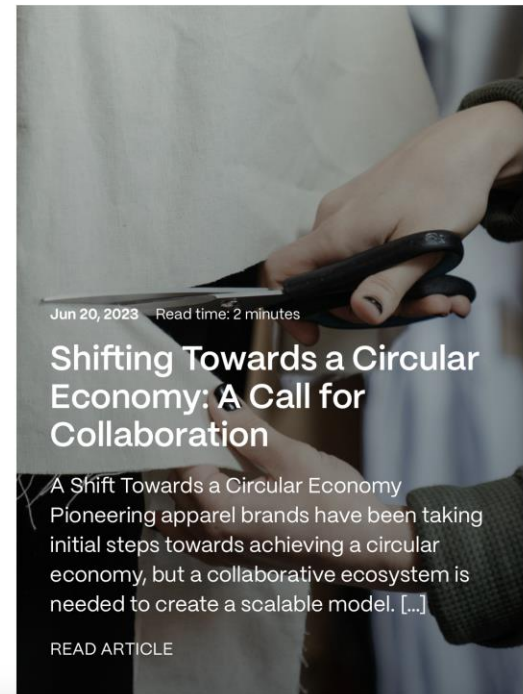


Sep 14, 2023 Read time: 2 minutes

Debrand's New Headquarters: Elevating Sustainability Efforts

"This marks an important milestone that will help us pave the way for new and existing brands who count on us to help them meet their sustainability goals by incorporating [...]"

READ ARTICLE



Jun 20, 2023 Read time: 2 minutes

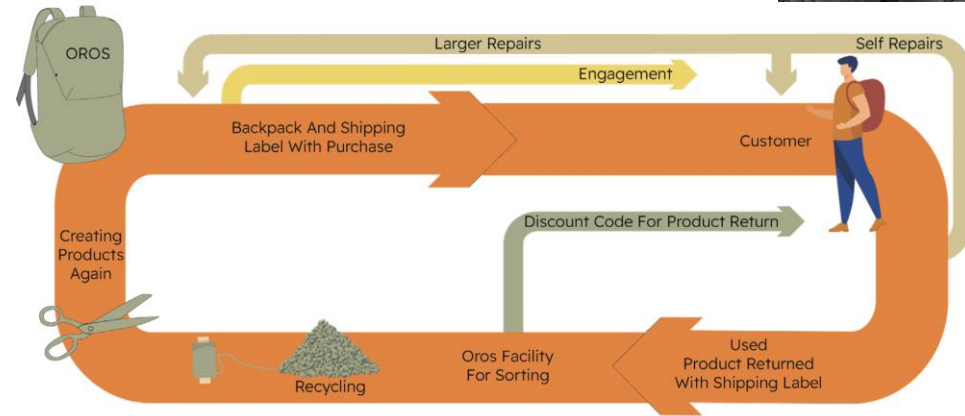
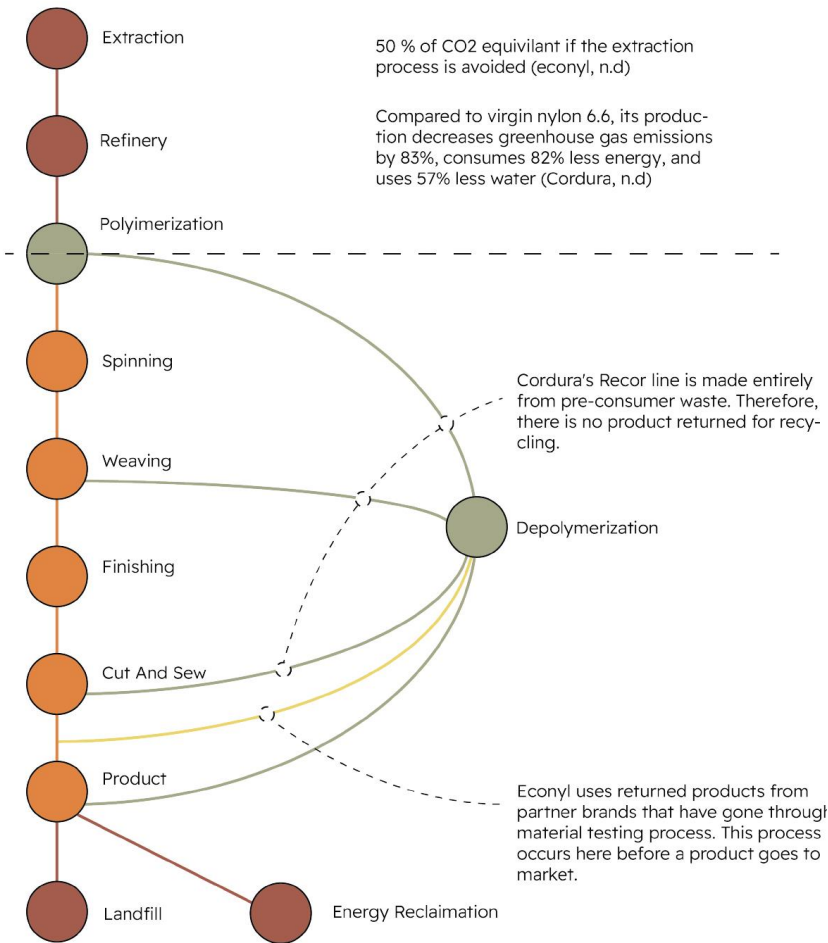
Shifting Towards a Circular Economy: A Call for Collaboration

A Shift Towards a Circular Economy
Pioneering apparel brands have been taking initial steps towards achieving a circular economy, but a collaborative ecosystem is needed to create a scalable model. [...]

READ ARTICLE

1. Circularity

Gavin Grace, OROS
DEPD 2023, Now@ Arc'tyrex



OROS



Figure 40 Life cycle map of Nylon fabric creation with examples of two closed loop systems in place.

1. Circularity

Glen Downie 2023
"Sonubus"
collab with
Native Shoes / Remix

WEAR



GRIND



REMI



1. Circularity

THEN: Industry worked in silos.

Design Teams < > Sustainability Teams

NOW: Companies are working in a changing policy landscape (C6 > C0 – 2025 EU Policy).

E.g. local industry using breathable fabrics:
Design & Sustainability teams are integrated.

Design Teams+Sustainability Teams work collaboratively to design with membranes using environmentally-friendly Chemistry. *In the Market by 2024/25.

2. Inclusivity: society

<https://www.helgawear.com>



Meadows_Plumbing_Womens_Safety_Coveralls.png

Home About Jodi Women's Workwear Speaking Resources

Shop

0

Coveralls for Women, by Women



" Helga Wear safety clothing is made for us women. My Helgas fit like they should, they are effortless to work in. "

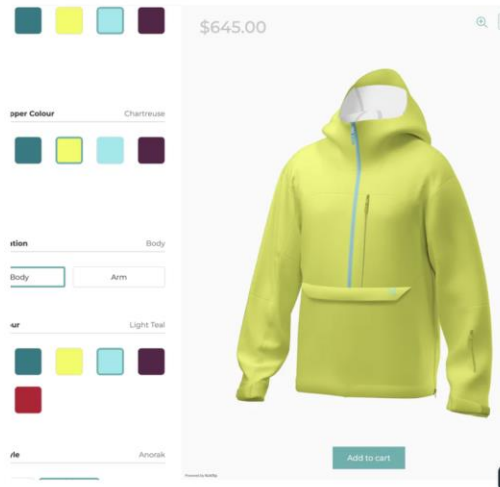
2. Inclusivity

<https://madeoutdoor.com>
Cheryl LeBarr, WSD Alumni

How it Works

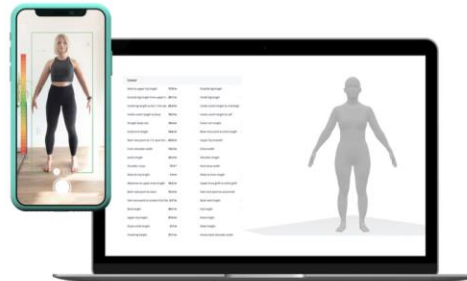


Step 1: DESIGN



You choose the details for your apparel - from materials and color to pockets and hood. How you want it is how we'll build it.

Step 2: SCAN



After you've placed your order you will get a link to our AI-based measurement tool. It only takes 2 minutes to get the perfect fit.

Step 3: SHRED



Get outside in your new custom gear. Tweaks and adjustments are on us - we won't stop until they're perfect.

2. Inclusivity

Alex Wyse, FASN 2023

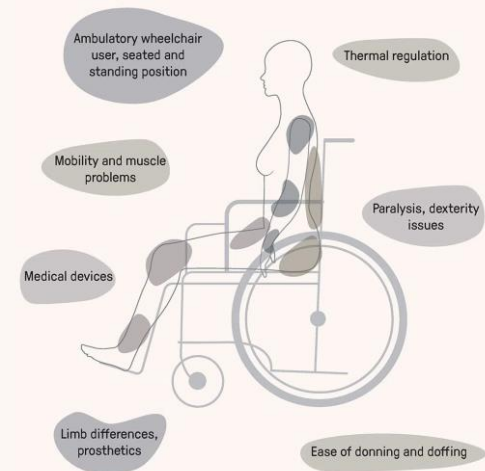
Recreational technical apparel for women in wheelchairs.

**WILSON
SCHOOL
OF DESIGN**

scout society



Design Challenges + Solutions



2. Inclusivity

Hanae Yaskawa, DETA

Resilience Climbing Pants:
outdoor paraclimbing pants
for climbers living with
spinal cord injuries.

RED DOT AWARD WINNER
2022



2. Inclusivity

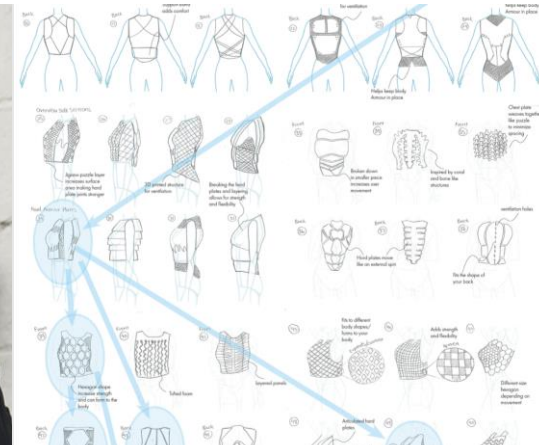
<https://designawards.core77.com/Commercial-Equipment/112093/ADIRA-Active-Duty-Impact-Resistant-Armour>

Clarissa Martins

ADIRA (Active-Duty Impact Resistant Armor for Female-identifying Officers)

DEPD Student 2021

CORE 77 Student Notable Commercial Equipment Design 2022



Shoulder Straps

Loop Fasteners along the full length of straps allows for maximum shoulder length adjustability. Accommodating female officers with a longer or shorter upper torso. Shoulder straps should be adjusted accordingly making sure the carrier sits just below the jugular notch and 2 to 3 finger width above the duty belt when standing.



Articulated Layers

Having the inner layers of the carrier be articulated allowed for optimal protective coverage, eliminated the unnecessary empty space that put female officers at higher risk.



Hard Plate Pockets

The pocket allows for easy access to the hard plates. So that you can easily interchange the hard plates with different bullet impact resistant standards.

Hard Plate

The Hexagon shape adapts to the user's body and accommodated for slightly different bust positions creating a flat surface for optimal protection.

Adjustable waistband

Loop Fasteners along the waistband has been measured accordingly to account for multiple layers worn under the garment indicating the maximum size while retaining



2. Inclusivity

Joshua Demian, DEPD (2023)

Inclusive PPE for under-represented users: adjustability strategies to accommodate different body shapes.

WILSON SCHOOL OF DESIGN

Joshua Demian
STUDIO 5 / 2023

MAKING HAZMAT SUITS MORE INCLUSIVE

Designing hazmat suits to be more adjustable, in order to comfortably and safely fit as many body shapes as possible.



WHAT'S THE PROBLEM?

Hazmat suits are currently made to follow the traditional sizing format (S, M, L, XL, etc.). So suits are like a second skin on your body. But being a tall body suit is like **the clothes are made of cardboard**. This means that only women are doesn't have what is considered a "standard body shape" will be constantly needing to readjust their suit, which has led some to make their own accommodations. At worst, having a suit too large can lead to:
Leaking contaminants - leaving the wearer unprotected and vulnerable to danger
Heat stress - being "intolerant" the design clearly didn't consider usability for women. One rising example of this is the **Heat Exchanger** (While most users will adjust and use the buttons, **Heat Exchanger** is **not** adjustable) On top of the heavy focus of heavy lifting PPE, it isn't work-unfriendly and goofy for the user.

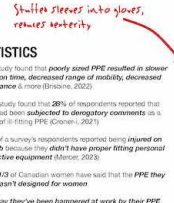
WHO?

Level C Hazmat suits are used in many professional sectors, including construction, manufacturing, and healthcare. Some more examples include: asbestos abatement, management and removal, hazardous site recovery (gas free), agriculture protection, decontamination, hazardous waste management, waste management, sanitation, food processing, mining, painting protection, and many more.

USER EXPERIENCE

I remember this lady, Abigail Demian. For her summer job working at a restaurant, she has to wear a Level C Hazmat suit when doing the dishes. If not more chemical treatments on the dishes. A corporate name and employee of a line of hazmat suits of various sizes, which she took the smallest available option, which was still much too large for her. She had many complaints about fit:
• The hood and arms were too long for her, so she had to **roll up the hood and the cuffs**.
• The hands around the wrists and ankles were uncomfortable and itchy.

"I was drowning in the suit"
- Abigail Demian



• **Shoulder sleeves into gloves, reduces dexterity**

STATISTICS

- One study found that **poorly sized PPE resulted in slower reaction time, decreased range of mobility, decreased endurance & more** (Brispne, 2022)
- A UK study found that **20% of respondents reported that they had been subjected to derogatory comments as a result of ill-fitting PPE** (Gonzalez, 2021)
- **40% of a survey's respondents reported being injured on the job because they didn't have proper fitting personal protective equipment** (Science, 2023)
- **Over 1/3 of Canadian women** have said that the **PPE they use wasn't designed for women**
- **80% say they've been hampered at work by their PPE.**
- **Half claimed that they must adjust their PPE everytime it's worn** (but on, at least once).
- **30% incorporate a workaround to modify their PPE** (using Duct tape and pads for hot patches)
- **40% reported experiencing injury or incident related to their ill-fitting PPE** (CSA, 2022)



• **Hood obstructs eye level**

Body Part/Feature	Female - Min	Female - Max	Male - Min	Male - Max
Shoulder to wrist	27.4	44.2	30.0	45.1
Shoulder height (to shoulder)	133.9	168.4	163.2	192.4
Waist	109.4	136.4	109.4	136.4
Shoulderwidth	44.2	50.7	44.2	50.7
Forearm to elbow (measuring the distance between shoulders)	37.6	50.7	37.6	50.7
Hip breadth (hip width)	37	42	39.2	43.8
Vertical inside thigh length (from waist)	79	285.2	81.3	284.6
Vertical inside thigh length (from shoulder to fingertip)	87.6	168.4	87.6	168.4
Waist length (from "natural waistline" to the wrist)	86.1	109.4	91.7	104.6
Lower leg (from knee to heel)	81.3	104.6	81.3	104.6
Lower arm (elbow to wrist)	37.6	50.7	37.6	50.7

ANTHROPOMETRY (in cm)

It's important to use living data that is relevant to real world bodies in order to successfully complete the improvements that I aim to. For this chart, I chose to report both the smallest and largest dimensions for both men and women. (Gordon, 2020)



• **Zipper doesn't unzip far enough to allow for fit-down bathroom use**

MY SOLUTION

- 1. Create adjustability points using locking cords and channels on specific points of the suit.
- 2. Add in a zipper into the inner-high seam for improved hygiene access.

TWO MAIN POINTS OF FOCUS:

- 1) addressing fit issues, and
- 2) improving hygiene access

WHAT HAZMAT SUITS?

Level C Hazmat suits are the most common, used most often in situations where toxic materials in the air are below OSHA's permissible exposure limits. Workers do not require self-contained breathing apparatus, though an air-purifying mask is still necessary to protect from inhaling particulate matter. The suit also protects users from harmful liquids. It adheres to the suit itself (and a respirator) **Level C products also include:**
Level C protective suits with self-contained breathing apparatus
While there are both reusable and disposable hazmat suits available that provide adequate protection for this level, I will be focusing on disposable suits as they are more accessible for my prototyping and testing.

HAZMAT LEVELS



GUEST SPEAKERS

1. **Sheve Tye** came to give our class a lecture on workplace BC standards and gear. He brought lots of different physical gear to show and models to us, including the **Fuller™ Tyvek® 400** (as seen being worn in this poster's images). There was a lot of interesting information about things like safety requirements and what is required of companies and their employees.

2. **Jade Huettner** gave us a presentation on women's workplace and her company **Higgs Wear**. She started off her career as a mechanical engineer, where she was required to wear coveralls. Because her employers gave PPE made for men, she often had to wear men's sizes. **PPE issues mean not only discomfort for women, but a safety issue** that she said over some how wouldn't be covered. Some can adjust their mid-waist, and how the outfit being too low can make it impossible to safely climb a ladder.

Jade thinks that the worst part of wearing coveralls as a woman is when you have to use the bathroom. Men can just unzip the suit, do their business, and then go back to working. Women need to tie the coveralls they are carrying outside their body, and it's so uncomfortable that they have to go to the bathroom every time they go outside.

Jade talked about how her former colleagues would call them "fat" if they had a headache or felt light-headed to drink anything. Having in your body functions get that long, obviously if you're going to get used to having coveralls, which should be completely avoidable.

Facing these issues inspired Jade to start **Higgs Wear**, a workwear company that designs for women.

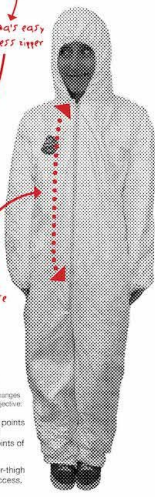
"It was really hard to do my job effectively when the PPE I wore made me look like I was playing dress up in my dad's clothes."
- Jade Huettner

EXISTING SOLUTIONS & MARKET RESEARCH

- **International Equipment's** **ProActiv™** and **Fuller™ Tyvek®** line are some of the standard options when it comes to disposable hazmat suits.
- **Higgs Wear's** overall and coverall products feature a **easy-access zipper for toilet access**. Unfortunately, these innovations have not yet been brought to hazmat suits.
- **The Tyvek 400 is being worn in the images on this poster.**
- **Higgs Wear's** overall and coverall products feature a **easy-access zipper for toilet access**. Unfortunately, these innovations have not yet been brought to hazmat suits.
- **The Higgs with its zipper is pictured below as one example.**



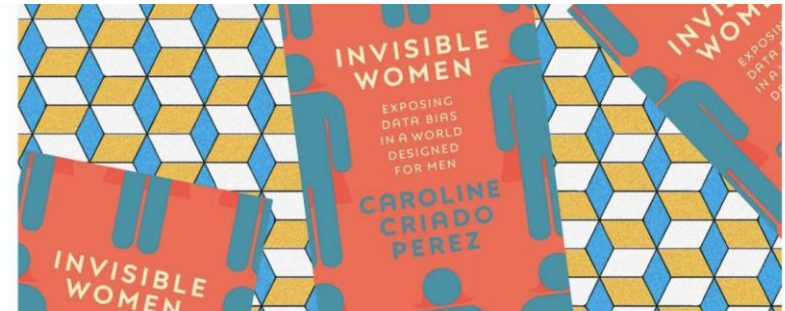
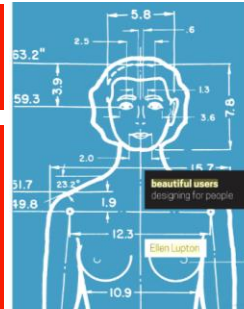
• **The Higgs's easy access zipper**



• **Zipper doesn't unzip far enough to allow for fit-down bathroom use**

2. Inclusivity

Data bias: Anyone interested in working in design needs to learn about different body types and how to design with inclusivity.



Books to get:
Beautiful Users (Lupton)
Invisible Women (Criado Perez)
Design meet Disability (Pullin)

3. New Extremes: scenarios

<https://designawards.core77.com/Commercial-Equipment/87384/BURRITO-Passive-Rewarming-Device-for-Polar-Conditions>



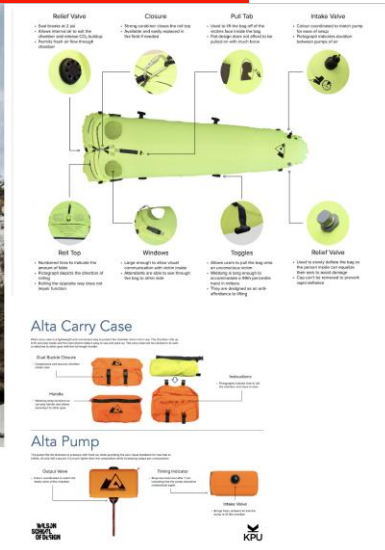
Polar Burrito, 2018

water Rescue: passive thermal rewarming

Passive rewarming device designed for female polar snorkelers (2018), Core77 Award 2019

3. New Extremes

<https://designawards.core77.com/Commercial-Equipment/104656/Alta-Hyperbaric-Chamber>



Altitude Rescue: personal hyperbaric chamber
 Device designed for temporary treatment of altitude sickness (2020), Core 77 Award 2021

3. New Extremes

Climate Anticipation Personal Environment (Fairburn et al, 2018)

Extending learning through New Extremes:

Learning about unfamiliar settings and unpredictable situations can help push boundaries, expand our thinking and yield innovative results.



***Climate CHANGE IS AN ABSTRACT PROBLEM.
Climate CHANGE IS COMPLEX.***

**MAKE THE ABSTRACT TANGIBLE.
VISUALISE COMPLEXITY.**



ME:

Applied Human Sciences: MSc Environmental Physiology
 Environmental Design: MEdes in Industrial Design

Cold water swimmer, former diver, Free Diver (AIDA-in progress)

I read across disciplines – anthropology, environmental science, architecture, material science, geology, human geography, ecology, design, cultural theory... literary ecology, science fiction...

Contact me:

sue.fairburn@kpu.ca

@granitegirl8

<https://ca.linkedin.com/in/sue-fairburn-90417a14>

The Collaborative: Inspiring Climate Action in BC Secondary Schools
20 Oct 2023 INNOVATION SPOTLIGHT
Sue Fairburn, Design Faculty/Researcher

KPU's CLIMATE+ CHALLENGE

What is it?

A KPU-wide initiative that engages students and instructors in learning about climate change, through an empathetic and solution-oriented lens. Everyone of us can take action to stop accelerated climate change, and growing social inequities. Every discipline, and every student, can contribute to a better understanding of the challenges, and employ critical and creative thinking, testing and innovation to find solutions.

What's the point?

To get more people at KPU talking, learning, thinking about and finding solutions to the climate emergency, and various climate-related challenges. The more we talk about this, and plan and take action, the more capacity we build to meet the upcoming challenges. This year is a pilot of what we hope will become a permanent part of KPU's sustainability vision, and our teaching and learning at the university.

Why Climate Plus?

There are many reasons to consider climate change as an inter-related challenge, rather than a stand-alone crisis, such as: vulnerability to climate impacts cannot be separated from structural inequities; climate change is a threat multiplier, so we need to concurrently address inter-related challenges like the biodiversity crisis; climate change can be seen as an extension of a colonial and capitalist project, which some argue must be addressed to effectively also deal with the climate crisis.

What are we looking to get out of the Climate+ Challenge?

Ideas, solutions, hope, action across a wide range of disciplines, such as horticulture, political science, journalism, environmental protection, and creative writing! We'll be sharing some of the projects and student work publicly, and other work will feed back into the project to support further work in other courses. And we'll be increasing our ability to respond to and reduce future impacts. We look forward to seeing you involved!

