

Sketching Collaboration: Lessons from SMARTWEAR

By Al Young

Page 2: Thank You

This zine wouldn't be possible without contributions from the following people:

Marilène Oliver, Dr. Yelena Gluzman, Ginger Carlson, Aynaz Raoufian, Michelle Kwasnycia, Donna Johnson, Colin Young, Lauren Sutton, Dr. Dan Sameoto, Yapa Mudiyanseelage Akila Bandara, Ahmed Abdelrahman, Melwin Moncy, Ajwa Niaz, Md Rashedul Islam, Dr. Patricia Dolez, Dr. Rashid Mirzavand, Dr. Lingzi Sang, Xiang Yu, Dr. Taymy J. Caso, Hamdi Ben Khelifa, Teri Thorson and Anna Rita Moukarzel

Page 3: Who Am I?

Hello, my name is Al Young! I am a multidisciplinary artist and the creator of this zine. In this section I will talk about my experience as a caregiver and a person with an invisible disability. Both of these positions have deeply influenced both who I am as a person and my art. I hope that by sharing my experience you can better understand how to support the caregivers in your life!

What I want as a Caregiver more than SMARTWEAR

- More than 40 hours a week of homecare coverage a week
- Benefits/job security for homecare workers
- More funding for respite
- Better AISH coverage, no more ADAP!
- Regulations on pricing for assistive technology
- A healthcare system that is easier to navigate
- Not having to prove that we need help before getting any
- To regularly sleep 8 hours a night

Why Make a Zine?

In the summer of 2026, I was a practicum student with the Smartwear Revolution. During this time, I heard a lot about interdisciplinary collaboration but, what does it look like in practice? How do we build solidarity beyond research? I spent four months trying to understand how and if we've met our goals of collaboration. This all culminated in this zine, my perspective on how we work together.

Page 4: So, What is SMARTWEAR?

"Co-designing a SMARTWEAR Revolution" is a six-year research project led by the University of Alberta developing assistive clothing. The project is divided into three working groups; the Textiles and Technologies working group (TTWG), the Art and Design Working Group (ADWG) and the Social Justice Working Group (SJWG). The Textiles and Technology group includes researchers from mechanical engineering, textile science, rehab medicine and biomechanics. All working together to create a garment which can use sensors to read movement and constrict and stiffen accordingly. SMARTWEAR will also be discreet, appearing like normal clothing. This will allow users to use the garment without having to sacrifice fashion for functionality. Now with all of these goals established, SMARTWEAR now has a prototype by 2026.

Page 5: Supportive

3.75' x 8", Ceramic, epoxy sculpt, acrylic paint

Most of my exploration in the studio this summer centered on recreating my mother's back brace out of ceramics to appear in a show in McMullen Gallery October 5th-25th 2026. The brace is molded to look like a tree with peeling bark, rippling off the wall with the fluidity of the

fabric version. Where the bark of the tree peels back, there are ant trails, referencing the stumps in the front yard of my parent's house. The texture of the brace was made through a combination of pressing tree bark into the edges of the wet clay and using a fork to create grain lines. I highlighted this texture post bisque firing by layering washes of acrylic paint before dry brushing to bring out highlights.

Page 6 & 7: A Peek Inside the Labs

What has the Textiles and Technologies Working Group been up to?

I.M.P.A.C.T. Lab

Dan Sameoto is the head of I.M.P.A.C.T. Labs and a Professor of Mechanical Engineering at the University of Alberta. They specialize in microfabrication and are currently working on producing the actuating fibers for SMARTWEAR. This means they are creating thread which will be able to constrict and stiffen within the garment.

I got to draw student researchers Ahmed and Akila as they worked.

HECOL Lab

In the Human Ecology Lab, I met Ajwa, Rashedul and Melwin.

Patricia Dolez is a Professor in the Department of Human Ecology specializing in Textile Sciences. Her lab has been testing how to incorporate electronic elements into the garment. They have also been helping Dan's lab with stress testing the fibers they are creating.

Page 8 & 9: Who's Taking Care of the Caregivers?

I am often told by people that I need to take a break or that I need to take better care of myself. While I appreciate the concern, it can be frustrating always having to explain to people why that isn't always possible. In order to rest, we need to get my mom's care covered but, who is going to cover it? My dad, my aunt, my grandma and my mother's friends already help out as much as they can. The best option is government assistance. However, a lack of funding towards homecare, long wait lists for respite and tight AISH requirements mean that we are ineligible for further government assistance. This means any additional help has to be paid for out of pocket, approximately \$100 a night. That nighttime coverage is crucial, it's the difference between my dad waking up 2 times a night or not. This lack of support is systemic, I am not the only caregiver who is burnt out. Caregivers do what they do because when people are able to stay in their home and communities, they live longer and their quality of life improves. **I don't want to stop being a caregiver, but I worry that eventually, I won't have any other choice.**

Did You Know...

46% of Canadians over the age of 15 (around 13 million people) **have acted as unpaid caregivers**. Of that group, **1 in 4 report negative health effects** because of their role as caregivers.

Page 10 & 11: How I Drew a Battery System

Before the annual meeting, I collaborated with Dr. Rashid Mirzavand and Dr. Lingzi Sang on creating a model of SmartWear's battery system. Through this process, I identified a few useful questions to ask labs to provide when working with artists going forward:

- Specific measurements of pre-existing parts like height, width, etcetera
- Examples of previous versions. An example of this would be what do other battery packs with lithium coin cell batteries look like?

- Electrical system diagrams or how each of the parts are going to be connected to each other.
- Photos or samples of the materials.

The Steps for Drawing the Battery System

1. First, I created a preliminary sketch based on conversations with Dr. Sang and Dr. Marzivad.
2. Now I begin refining the layout of batteries, antennas and backing fabric.
3. I then finished the following version, fixing the perspective and adding velcro and the RFID tag.
4. Upon receiving input on layout and more accurate measurements, I was able to make a 3D model.
5. After getting confirmation that the changes were correct, I created a line drawing of the battery based on the 3D model. I then digitally coloured the battery based on lithium batteries, fabric samples and photos of antennas provided by the labs. These diagrams were then used in the Textiles and Technologies Quarterly Meeting.

Page 7 & 8: Social Justice Isn't Free

With Dr. Taymy Caso

“There is a cost to this work. It is not free and it is not superfluous” said Dr. Taymy J. Caso, PhD, lead of PLEX (people with lived experience) engagement on the project. We spoke on hurdles they have faced both historically and on this project around interdisciplinary collaboration. Historically, the people who use assistive technology haven't been included in their research. This means our team has the difficult position of not just developing SMARTWEAR but creating a new system for how research gets done going forward. Including PLEX in every part of

development means restructuring every part of the development. However, with such tight deadlines, time isn't on our side. So how do we solve this? Just like any other question on this project, you fund the research. That isn't to say it will be easy. Getting people experiencing ableism, racism, sexism and/or transphobia to disclose their medical information presents unique challenges. As Dr. Caso put it **"Science has a long history of eugenics and misconduct, there's a reason why people don't trust how their information will be used"**. This historical context means that whilst Dr. Caso has been reaching out to physiotherapists, doctors and clients, finding people from diverse backgrounds that are willing to fully participate will take time. What about disabled people living in long term care in rural areas or on reservations? Speaking to them means a budget for everything from transportation to the remote areas to snacks for participants. There will also probably be hidden costs as we cannot know exactly how each community wants to be interacted with until after we ask them. We need to remember that **"there is no project, there is only people"**. If you want people to care about something, then you need to show that you care about them. For Dr. Caso, that means attending events like the Indigenous Trailblazers summit to ensure that the offerings given to elders come from Indigenous owned businesses. It means listening to the current concerns of Indigenous leaders and supporting their goals. It isn't short term either, there needs to be a standard of profit sharing or upfront payment to the people consulted. This is especially important with Indigenous collaborators as they historically have seen very little monetary compensation for their sign off on projects, even when it is a granting requirement. **"You don't know what people need until you sit with them and hear their stories"**, Dr. Caso reiterated. There have been many projects that have promised to improve the lives of people with disabilities, unpaid caregivers and careworkers. The way that we succeed where they have failed is by giving people the power and freedom to improve themselves.

Page 9: Double Up Research

How can the ADWG and the SJWG work together more?

Both the Social Justice Working group and the Art and Design Working group pick undergraduate researchers who are then paired together. The end goal of this experiment is the creation of both an artwork and an accompanying research paper. The Artist and the Social Justice researcher can begin by deciding what they want to focus their research on. This collaboration can be further encouraged by giving both researchers a shared studio space. Each team will be co-lead by both the SJWG and the ADWG. As a part of their performance review at the end of their contracts, they can be evaluated on both their ability to work together and the content created.

Page 10: Image

Image Description: This page is a close up photograph of a variety of fabrics that are patchworked together. All of the fabric and thread is in various shades of blue, gray, yellow and purple.

Page 11 & 12: Spotlight! On Collaboration

Extruding Fibers

Ahmed Abdelrahman works in microfabrication whilst Hamdi Ben Khelifa works in the fabrication of textiles. Both fabricate with polymers at a microscopic scale, however Hamdi specializes in fabrication of fibers for use in textiles. Hamdi was able to make the suggestion of using cold drawing for post processing the fibers Ahmed and Akila created through thermal drawing. This led to more consistent results that stood up better to sewing tests!

Pattern Drafting

Teri Thorson was originally doing work mostly with the Social Justice Working Group because she has a lower spinal cord injury. However, Teri has over 20 years of experience in developing accessible clothing. She was able to provide not only a list of possible limitations but solutions to design problems. Teri is now a valued member of the Technology and Textiles Working Group.

How can we encourage more collaboration going forward?

Organized by Task: Rather than being organized by administrative working groups, researchers should get organised by task. These groups could be sorted by similar materials, manufacturing techniques or portions of SMARTWEAR that they are working on. Some examples of possible groups are 3D printing and modeling, textile development, electrical system design, pattern drafting and fittings, battery production, programming and machine learning. “When we all gather to discuss the results, that crosspollination of ideas will naturally generate creative solutions and build much stronger partnerships” suggested Ahmed Abdelrahman

Lab Assignments: One member of the ADWG and one member of the Social Justice Working Group should get assigned to each lab. They can either work remotely or they can request space to work within the lab. This will guarantee an everyday point of contact for the lab with PLEX, ensuring that each lab gets input on how race, age and gender will affect access needs.

Page 18 & 19: Image

You Sit With Me, I Sit With You

Image Description: A rug is woven out of the artist's childhood shirts, once cut and prepared for a quilt by the artist's mother. Pastel pinks, teals, blues

and purples are woven together to form the shadow of the artist's mother's wheelchair. The weaving is interrupted by the words "you sit with me" in the center of the rug. The letters were made by blanket stitching over rolls of fabric, slowly forming letters. A promise and a place setting within the gallery.

Beside the rug, a light blue chair with a clamshell back and delicate, wooden arms and legs is covered in patches and decorative stitching. A closer look reveals cyanotypes of large scale photo negatives of the artist's family, a list of tips for better mental health and carefully attached buttons and lace. Pink fabric is adhered with couching to the back of the chair, proudly reading "you sit with me". The other side features a larger cyanotype, made up of excerpts of legislation used to justify holding the artist's great grandmother in an asylum. This cyanotype also features text from the artist's planner, photos of their family and photos from their childhood. In the center of the cyanotype, you can read the following:

"I promise to love myself and to accept my madness as part of who I am, I promise to hold my mother and my friends close especially when it isn't easy. I promise I will take time to rest, to fall apart and to stitch myself back together. I promise to extend the understanding that wasn't afforded to my great grandmother. I promise to exist in spite of the systems that convince me it would be easier if I disappeared. BECAUSE OUR WORTH AS A HUMAN IS NOT MEASURABLE, IT EXISTS BECAUSE WE DO!"

Page 20: The Valley Of Death

With Teri Thorson

"The Valley of Death" is what happens once the research is done and the funding has dried up (Price 2019). Once the leads move on to other things, what happens to the research? Teri Thorson has seen this fate befall multiple projects she has advised on. Because most of her work happens outside of university funded projects, she's been able to see how research can disappear into filing systems and institutional logins. **"Working only**

with researchers is a bit short sighted. If new research has the potential to improve lives but people outside of academia don't have access to it, then does it actually help?" As someone who has dedicated the last 20+ years of her life to making fashionable adaptive clothing, she recognises how this specific research could have wider applications. **"You just need one champion or organisation that can find resources outside of academia that could utilize the information."**

Page 21: Image

Image Description: Multiple pages of notes from my sketchbook during the project are stacked haphazardly. On top of them is a sticky note with the words "Finish Later" crossed out and replaced with the words "Cut From Zine"

Page 22 & 23: Extra Credit

Resource Overview

Need Support?

Caregivers Alberta

<https://www.caregiversalberta.ca/>

Taproot Support Services

<https://taproot.ca/>

Spinal Cord Injury Alberta

<https://sci-ab.ca/>

MS Society Canada

<https://mscanada.ca/>

FashionABLE

A Guideline for Adaptive Clothing Solutions for People with Spinal Cord Injury (SCI)

<https://fashion-able.info/>

Crip Trip

Directed by Daniel Ennett and Frederick Kroetsch

“Quadruple amputee Daniel and his caregiver Frederick embark on an ambiguous road trip across North America, navigating art, the television industry, and their complex friendship - to keep Daniel from being Institutionalized.” **Watch for free on Ami TV**

Reading Recommendations

Skin, Tooth, and Bone: A Disability Justice Primer by Sins Invalid

Care Works: Dreaming Disability Justice by Leah Lakshmi

Piepzna-Samarasinha

The Future is Disabled by Alice Wong

Back Cover:

Want to learn more? You can access sources, a printable pdf and a plain text version through this URL:

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