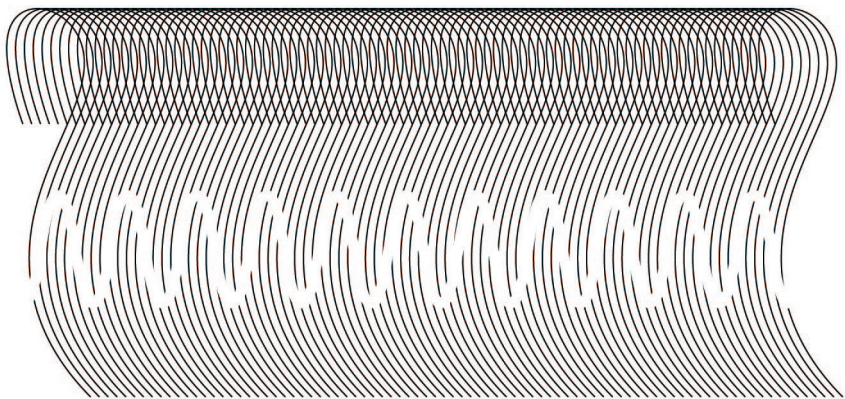


SPLITTING HAIRS

AN ART/SCIENCE EXHIBITION FROM JAMES WEDUM & CASEY FLETCHER



**Thank you to Andrew Hanus, Chele Issac, Tim O'Neill,
and the Wisconsin Institute for Discovery.**

**Special thank you to our subjects
A, C, M, J, & L**

Splitting Hairs is a collaborative art-science project produced by computer scientist James Wedum and visual artist Casey Fletcher made possible by the Marie Christine Kohler Fellowship through the Wisconsin Institute for Discovery. The exhibition showcases the double-slit experiment conducted by Thomas Young in the early 19th century which determined that light behaves as both a particle and a wave. In the original experiment, Young used a piece of paper with a small hole in it to cover a window and create a narrow beam of sunlight. A thin card was then used to split this beam, demonstrating how light can behave as both a wave and a particle. Hairs collected from volunteers are used instead of a card, and cast a pattern of dots unique to each sample when struck by a laser.

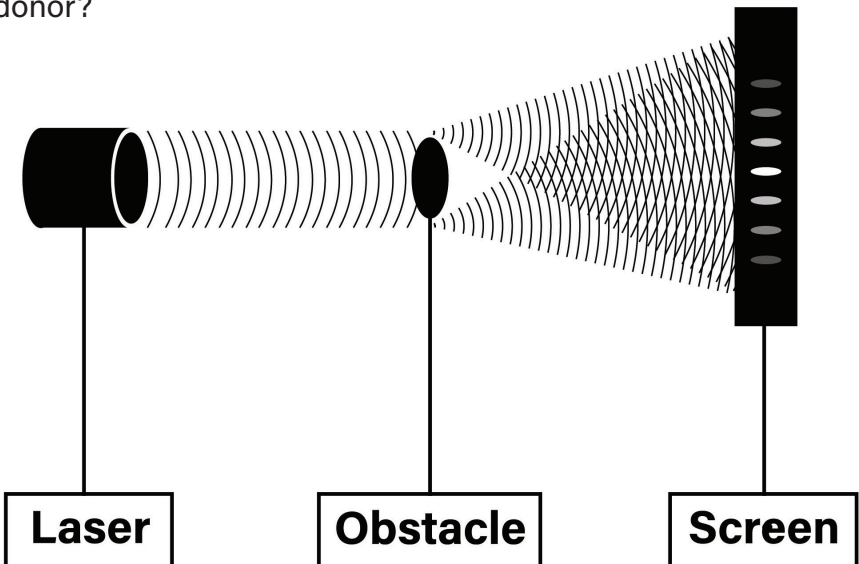
This project is meant to draw attention to the limits of categorization and empirical evidence. These distribution patterns created by the hair can provide us with a precise understanding regarding a specific quality belonging to a specific person, yet this information is limited in its ability to give us a complete picture. The distribution pattern and survey responses are unique to the each subject and are enmeshed with part of their identity, but they are decidedly not the whole identity of the individual. This exhibition is meant to be a conduit for reflection of what we collectively choose to look to as signifiers of identity. Each one of these (race, sex, gender, faith, political affiliation, etc.) is based in empirical reality but each is chosen to be emphasized or ignored on the basis of the subjective values of a given culture.



What am I seeing?

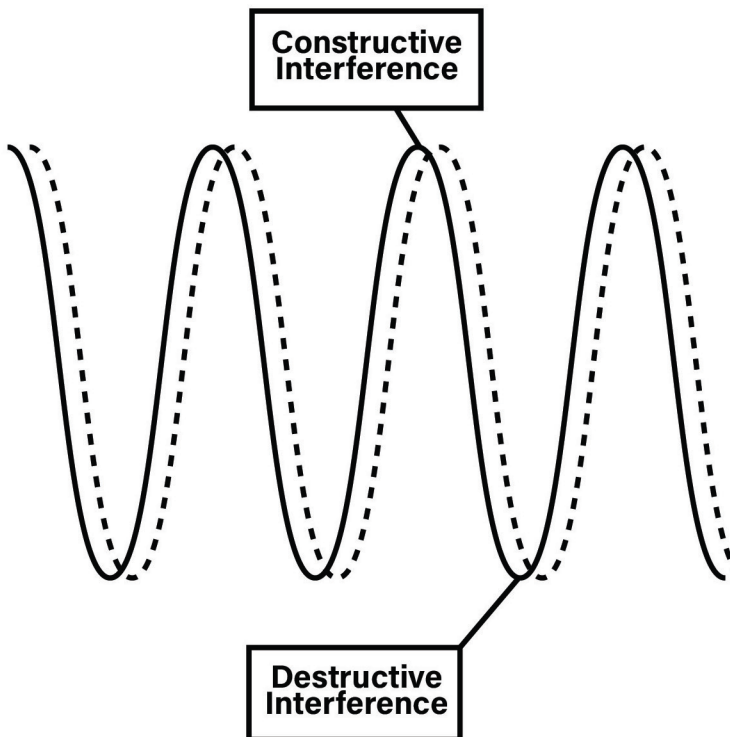
This exhibition consists of five armatures, each holding a laser directed towards a human hair taken from a diverse spread of subjects. As the collimated light from the laser passes the hair suspended in the steel plate at the end of the armature, its particles begin to behave strangely. Instead of casting a singular beam of light, the laser ripples like an ocean wave breaking against a rock and creates the distribution pattern seen in the shadowbox. These ripples of light pass over each other, causing constructive and destructive interference. This interaction, where the peaks and troughs of the waves either cancel or amplify each other, creates the pattern of light and darkness you see.

Each individual's pattern is influenced by the unique features of their hair sample (texture, thickness) and can serve as a fingerprint. When measured, the space between light (constructive interference) and dark (destructive interference) points can reliably be used to measure the diameter of each hair. But, can it meaningfully tell us anything else about the donor?



[Fig. 1]

This diagram [Fig. 1] illustrates the principle of the double-slit experiment. As light passes through a thin opening or around a thin object two wave patterns are cast. Their intensity of light is increased through constructive interference where their wave's peaks intersect. Their intensity is lessened where their troughs intersect, resulting in darkness from destructive interference [Fig. 2].

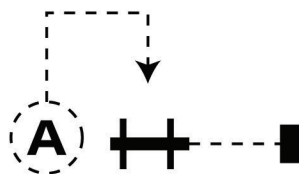
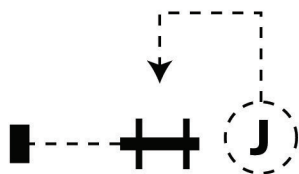
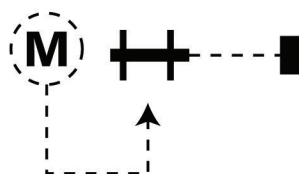
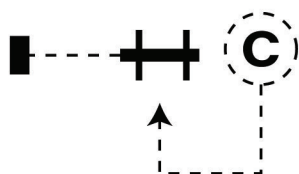
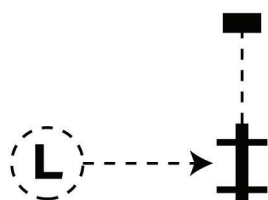


[Fig. 2] Constructive interference is generated when peaks of two or more waves intersect. Destructive interference is generated when troughs intersect

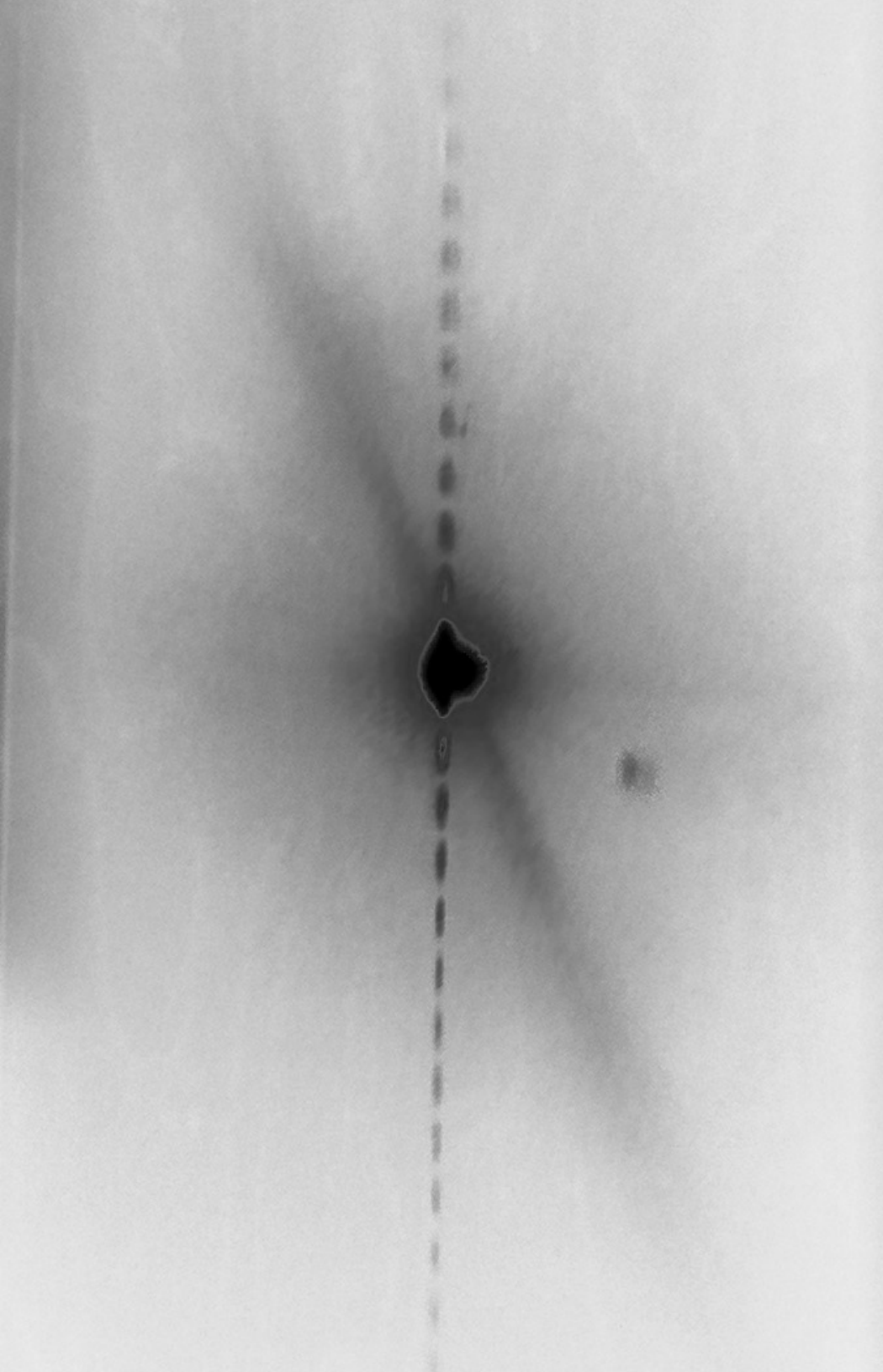
Subjects

Subjects J, C, L, M and A were chosen for survey and hair donation due to their disparate signifiers of identity.

Each subject was given a survey. Selected portions of their responses as well as observations from the reserachers have been included next to a photograph of their respective distribution pattern.



Subject Map



Subject A

Gender Identity: Cisgender Female

Age: 41

Race: White

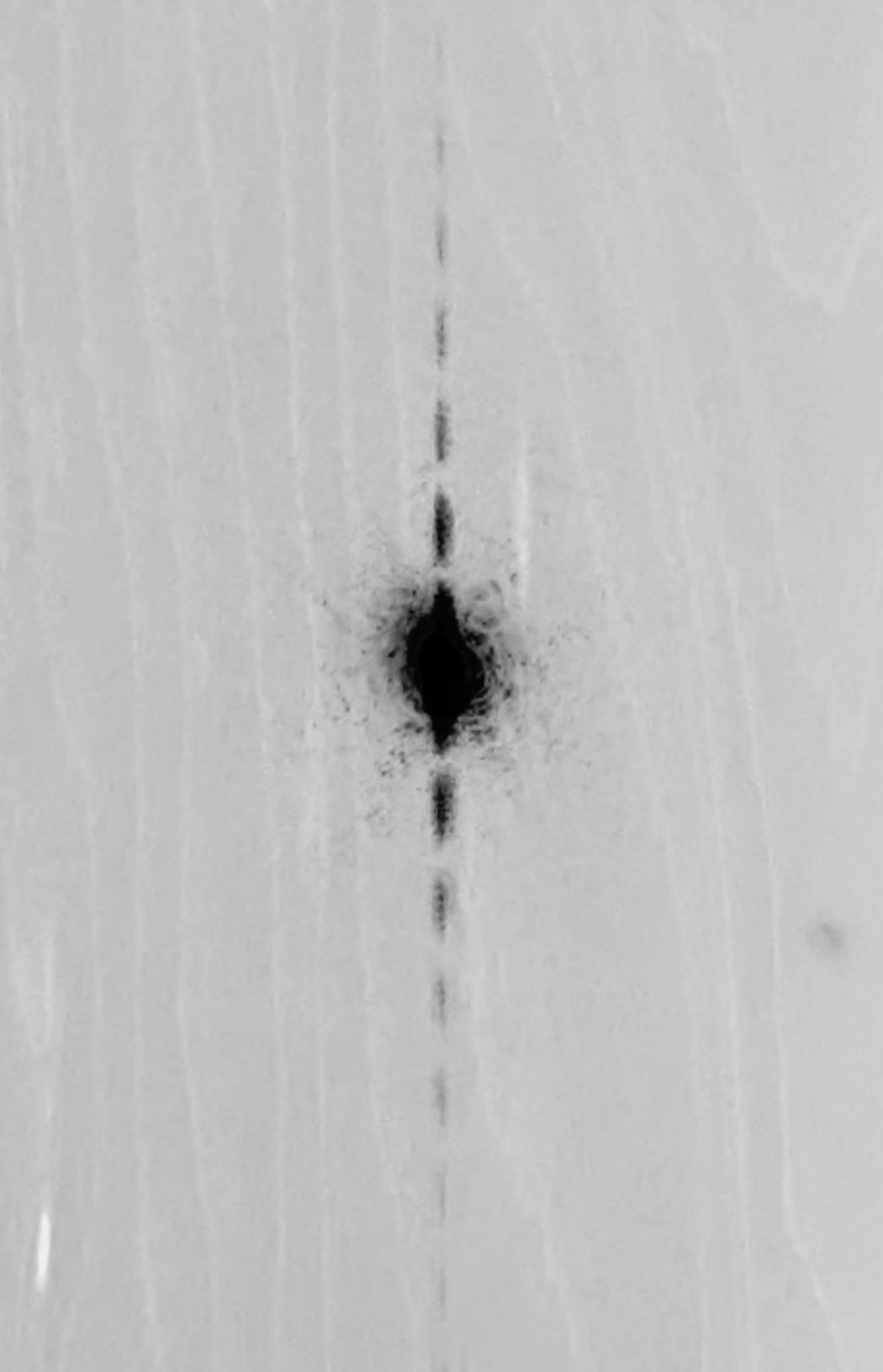
Disability Status: n/a

Subject A's hair is dyed

Subject A neither agrees nor disagrees that the unique qualities that each person brings is more important than the shared qualities that connect us all.

Subject A agrees that her identity has been misunderstood by technology or by the media through the use of technology

Subject A regularly and effectively deploys kindness unto strangers without knowing it



Subject M

Gender Identity: Cisgender Male

Age: 19

Race: Hispanic

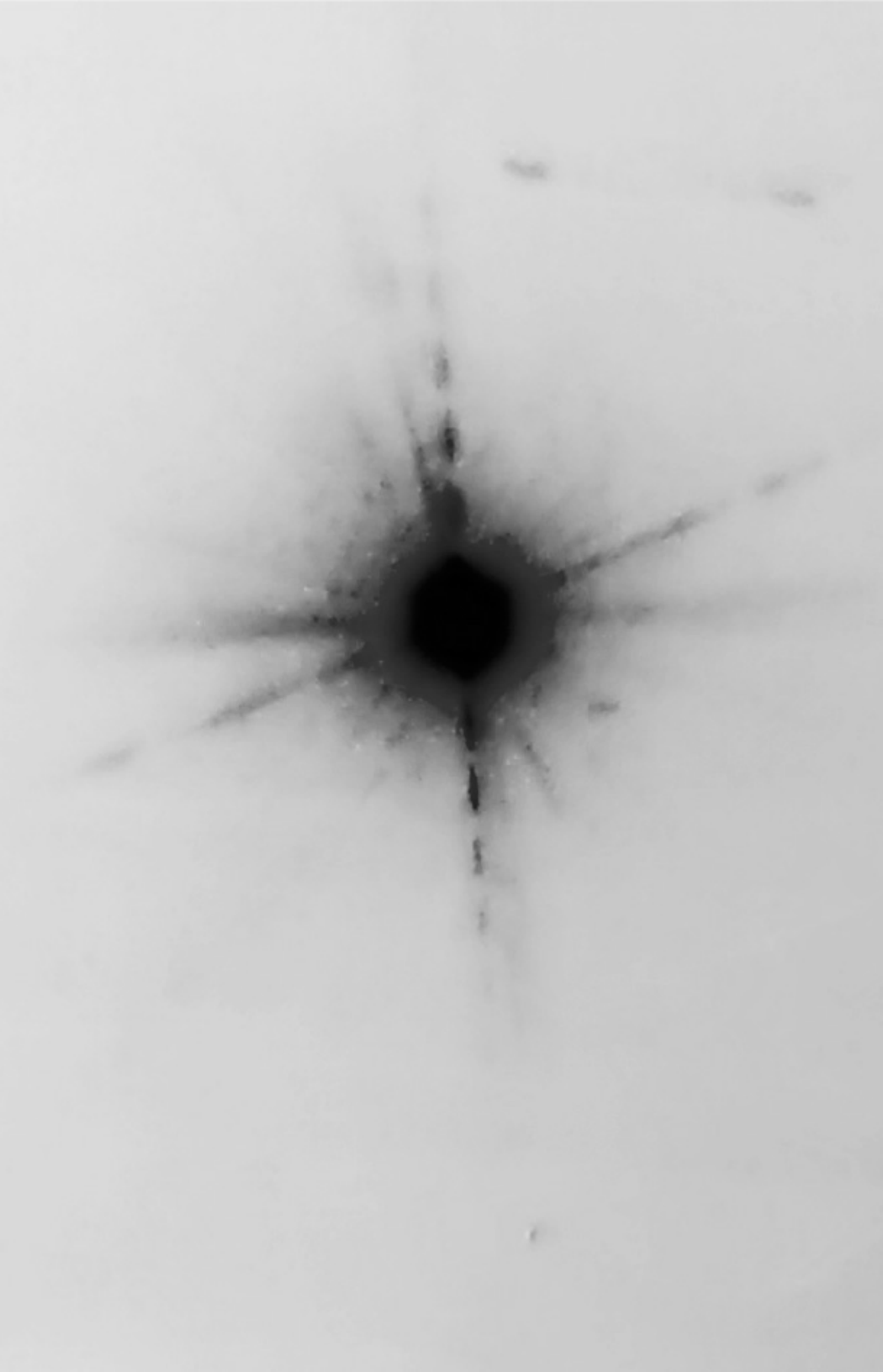
Disability Status: n/a

Subject M's hair is black

Subject M has demonstrated a commitment to personal growth

Subject M is proficient in public speaking despite a generalized discomfort with it

Subject M wears prescription lenses



Subject C

Gender Identity: Cisgender Male

Age: 31

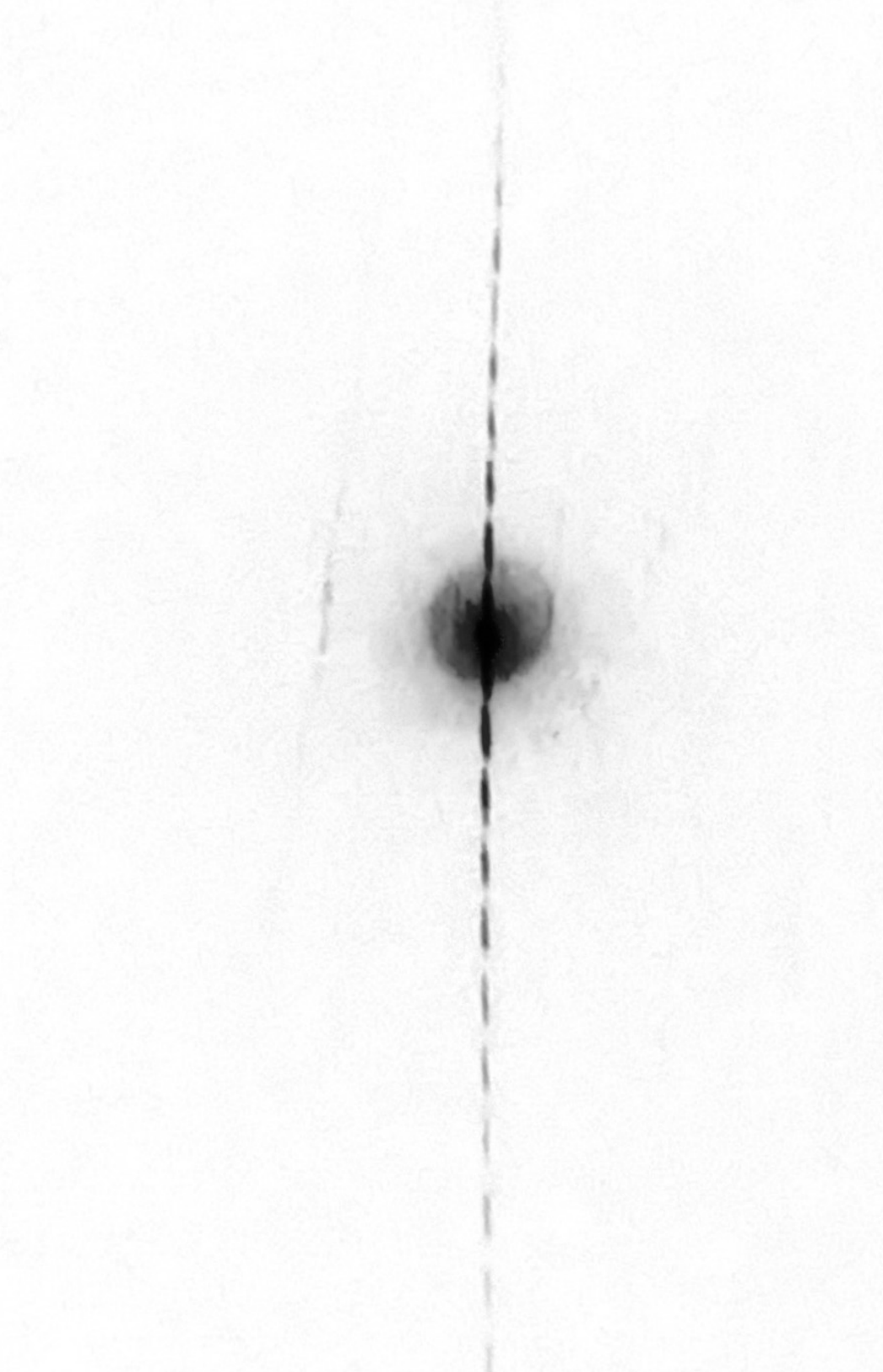
Race: Biracial

Disability Status: n/a

Subject C disagrees that technology is better for making certain decisions about people because it is less partial/biased than people

Subject C struggles admitting when he is wrong, to others and to himself

Subject C has been empowered by his sense of personal identity



Subject J

Gender Identity: Cisgender Male

Age: 36

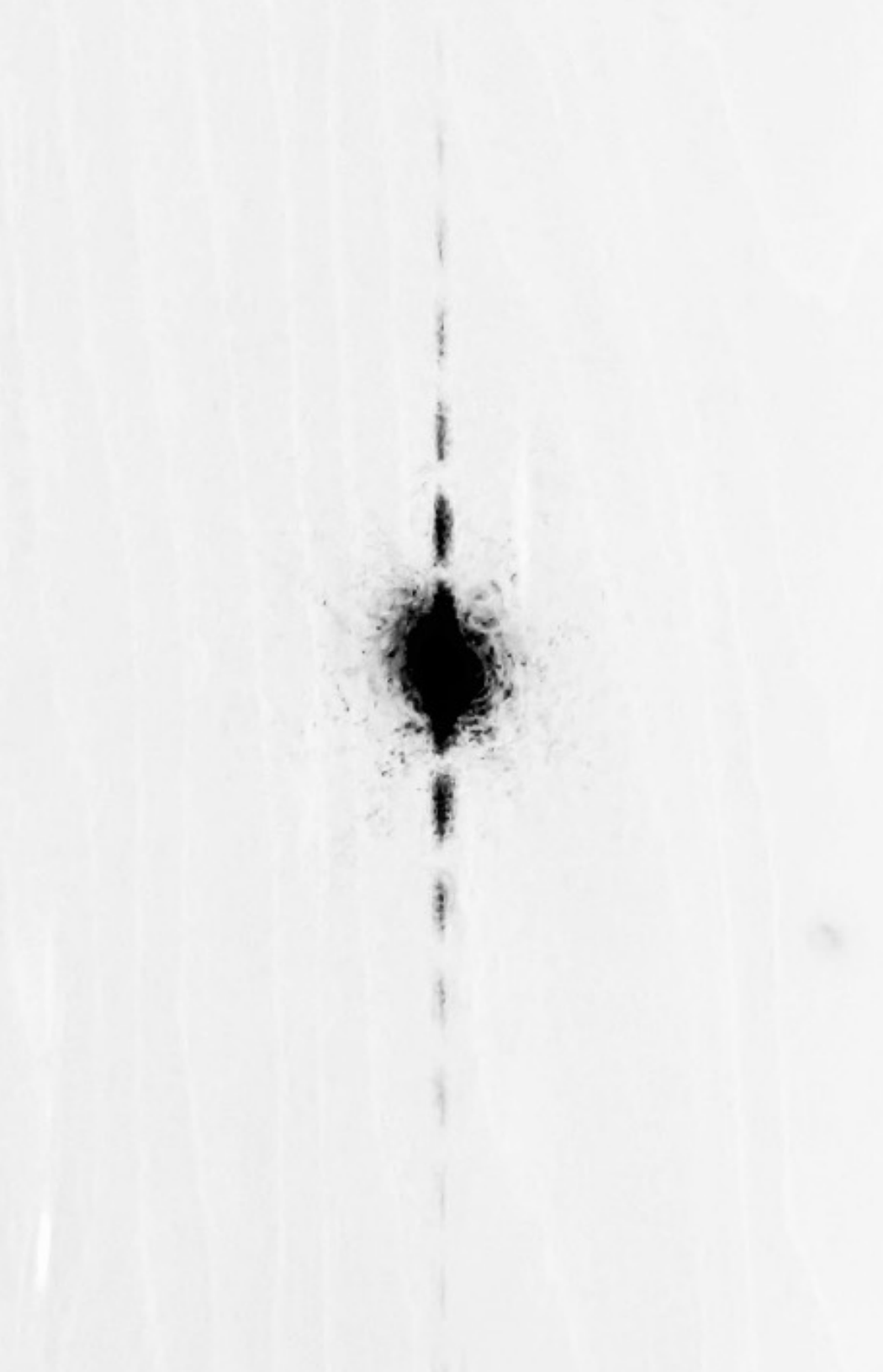
Race: White

Disability Status: n/a

Subject J is a twin

Subject J is a veteran

Subject J is full of surprises



Subject L

Gender Identity: Transmasculine

Age: 19

Race: White

Disability Status: n/a

Subject L strongly agrees that technology influences societal perceptions of identity and/or their own perceptions

Subject L does not believe that technologies that categorize or identify individuals (such as AI recruitment or predictive policing) are generally fair and accurate

Subject L practices gratitude

Oh, hello.

You have perhaps by this point noticed that you are being recorded.

An AI system is working in real time to collect three points of reference on your face to create a score. You are being categorized you on your combined features average chromatic value by the AI system housed in the Nvidia Jetson Nano near the display.

Like the hairs chosen for the works behind you, an arbitrary identifier is the sole source of categorization performed by the AI system.

