Supplementary Materials for

Data for all: Tactile graphics that light up with picture-perfect resolution

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The PDF file includes:

Figs. S1 to S3
Data S1
Legend for data S2

Other Supplementary Material for this manuscript includes the following:

Data S2
Figure S1. Symbols of visual ableism in the lab and marketplace: safety posters, meme stickers and “Funny science T-shirts.” (A) A common safety poster (produced by a supplier of educational science supplies) is still found throughout universities and high schools in the United States. This photograph is of a lab door in a chemistry lab at a college previously attended by one of the graduate students who is a co-author of this paper. (B-C) This safety poster has become an internet meme, with merchandise, e.g., (B) stickers, and (C) clothing available on Amazon. A co-author of this study (Dr. Cary Supalo) wearing goggles and analyzing tactile data (with gloves on) inside a chemistry lab.
Figure S2. Quantitative description of the correct answers in each of the five lithophanes used in testing. The digital image of each lithophane is labeled with the correct answers for each question asked.
Figure S3. Loss of signal and signal resolution in swell form/thermal form tactile graphics.

(A) Image of printed SDS-PAGE on swell form paper before (left) and after (right) thermal swelling. (B) Analysis of finer details in swell form SDS-PAGE showing unresolved bands and rimmed, cratering bands. (C) Pancaking bands, unraised bands, and unresolved bands in swell form paper, compared to sharp, well resolved, 3D peaks in lithophane of same image. (D) Left: scanning electron micrograph (SEM) of butterfly scale in swell form and lithophane format. Right: Center region of swell form graphic (bottom) showing that raised chitin fibrils are not spatially resolved (despite clear laser printing). Fibrils are resolved well in the lithophane form (top). (E) Topology diagram of swell form showing the raised β–strands. The loop regions remained unraised after thermal swelling; despite being clearly printed. (F) Top: Mass spectrum printed on swell form paper, after thermal swelling. Middle: The raised region of the noise in the swell form extends beyond the actual printed noise signal. Bottom: A lithophane of the same
data is shown for comparison. **(G) Left:** UV-vis spectrum printed on swell form paper, after thermal swelling. **Right:** Axis and signal are accurately raised in swell form graphic.

**Data S1.** Sample of test document (provided to student by QR code) listing all test questions. This figure is provided below, with accepted answers highlighted.

**Data S2. (separate file) Raw data set.** All collected data is provided as a separate excel file.
10 Lane SDS-PAGE

* Required

1. Blindfolded? *

   * Mark only one oval.

   ○ Yes
   ○ No

2. First and last name *

3. Baylor email *

4. Baylor ID # *

5. Gender *

   * Check all that apply.

   ○ Male
   ○ Female
   ○ Non-binary
   ○ Prefer not to say
   ○ Other: ☐

https://docs.google.com/forms/d/1R3irwdceIn6Wk73vMJCJnARaoFsPFORmhC7UeafOoO4/edit
6. Your corrected vision *

*Mark only one oval.*

- [ ] 20/20 or better
- [ ] 20/40 or worse

7. What is the mass (in kilodaltons) of the protein in lane 2? *

*Mark only one oval.*

- [ ] 5
- [ ] 10
- [x] 15
- [ ] 20
- [ ] 25
- [ ] 30
- [ ] 35
- [ ] 40
- [ ] 45
8. What is the mass (in kilodaltons) of the protein in lane 3? *

*Mark only one oval.*

- 5
- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45

9. What is the mass (in kilodaltons) of the protein in lane 4? *

*Mark only one oval.*

- 5
- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45
10. What is the mass (in kilodaltons) of the major protein in lane 5? *

*Mark only one oval.*

- [ ] 90
- [ ] 95
- [x] 100
- [ ] 105
- [ ] 110
- [ ] 115
- [ ] 120
- [ ] 125
- [ ] 130

11. What is the mass (in kilodaltons) of the 2 proteins in lane 6? *

*Mark only one oval.*

- [ ] 10 and 15
- [ ] 25 and 35
- [x] 45 and 50
- [ ] 70 and 80
- [ ] 100 and 110
- [ ] 120 and 130
12. Which lane between 7-10 is the purest (least number of bands)? *

*Mark only one oval.*

- [ ] 7
- [ ] 8
- [ ] 9
- [ ] 10

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Topology

* Required

1. Blindfolded? *

* Mark only one oval.

☐ Yes
☐ No

2. First and last name *

3. Baylor Email *

4. Baylor ID # *

5. Gender *

* Check all that apply.

☐ Male
☐ Female
☐ Non-binary
☐ Prefer not to say
Other: ☐

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6. Your corrected vision *

*Mark only one oval.*

- 20/20 or better
- 20/40 or worse

7. How many beta strands (arrows) are there? *

*Mark only one oval.*

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

8. Are the arrows parallel or antiparallel? *

*Mark only one oval.*

- Parallel (pointing in same direction)
- Antiparallel (pointing in opposite direction)
Mass Spec

* Required

1. Blindfolded? *
   
   * Mark only one oval.

   [ ] Yes
   [ ] No

2. First and last name *

   __________________________

3. Baylor email *

   __________________________

4. Baylor ID # *

   __________________________

5. Gender *

   * Check all that apply.

   [ ] Male
   [ ] Female
   [ ] Non-binary
   [ ] Prefer not to say
   Other: ____________________________

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6. Your corrected vision *

Mark only one oval.

- [ ] 20/20 or better
- [x] 20/40 or worse

7. What is the mass of the most intense peak? *

Mark only one oval.

- [ ] 14450
- [x] 14500
- [ ] 14550
- [ ] 14600
- [ ] 14650
- [ ] 14700
- [ ] 14750

8. What is the mass of the second most intense peak? *

Mark only one oval.

- [ ] 14450
- [ ] 14500
- [ ] 14550
- [x] 14600
- [ ] 14650
- [ ] 14700
- [ ] 14750
UV-Vis

* Required

1. Blindfolded? *

   Mark only one oval.
   ☐ Yes
   ☐ No

2. First and last name *

3. Baylor email *

4. Baylor ID # *

5. Gender *

   Check all that apply.
   ☐ Male
   ☐ Female
   ☐ Non-binary
   ☐ Prefer not to say
   Other: ☐

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6. Your corrected vision *

*Mark only one oval.

☐ 20/20 or better
☐ 20/40 or worse

7. What is the wavelength (x-axis) in nanometers of the highest peak? *

*Mark only one oval.

☐ 300
☐ 350
☐ 400
☐ 450
☐ 500
☐ 550
☐ 600

8. What is the absorbance (y-axis) in absorbance units of the highest peak? *

*Mark only one oval.

☐ 0
☐ 0.1
☐ 0.2
☐ 0.3
☐ 0.4
☐ 0.5
☐ 0.6
Electron Micrograph of Butterfly Scale

* Required

1. Blindfolded? *

   Mark only one oval.

   - Yes
   - No

2. First and last name *

   ___________________________________________________________________

3. Baylor email *

   ___________________________________________________________________

4. Baylor ID # *

   ___________________________________________________________________

5. Gender *

   Check all that apply.

   - Male
   - Female
   - Non-binary
   - Prefer not to say
   - Other: __________

https://docs.google.com/forms/d/1TqoWYiTsZ9jhdd1_dp2h_BgBoLdBuqR38sqYyzRzUEY/edit
6. Your corrected vision *

*Mark only one oval.*

- 20/20 or better
- 20/40 or worse

7. What is the length (horizontal) in micrometers of the single butterfly scale? *

*Mark only one oval.*

- 20
- 40
- 60
- 80
- 100
- 120
- 140

8. What is the width (vertical) in micrometers of the single scale on the butterfly wing? *

*Mark only one oval.*

- 20
- 40
- 60
- 80
- 100
- 120
- 140