Accounting for possible confounding factors and solutions:

- Individual visual acuity difference
    - All participants should have corrected to normal vision. That is if they need glasses or contact lenses they need to bring them for the experiment
- Weather disturbance
    - I think this could play an important role in explaining why my visual acuity matches with 230mm camera lens for SF but 250mm for Oakland even though Oakland is further away. Another possible explanation is vernier acuity similar to "Line orientation and chevron angle detection experiment" in Westhimer Hyperacuity paper: since the buildings in SF is taller than that in Oakland, hyperacuity allows us to see buildings in SF clearer than Oakland
- Diffraction theory
    - In conversation with Professor Herb Lin about the physical aspect of visual system, one idea that was brought up is a potential look into whether hyperacuity diffraction theory can enable people to see thing beyond the Diffraction Limit (wavelength of light/aperture, when transferred to arcminute degree, math.degrees(wavelength of light/aperture) * 60).

Ask them to fill out the demographic information on the laptop. If can't see a particular building, put Null.

Task 1: Image sharpness matching (2 images per building, 10 images per participant)

Goal: measuring the magnification of the camera (Canon EOS REBEL T3i) lens that matches human perceived sharpness of a distant object.

Hand participants the sample picture with 4 buildings labeled ("Salesforce Tower is the tallest; Transamerica Pyramid Center is triangular; 181 Fremont is the thinner one on the right of salesforce and 555 California Street is wider one on the left of Transamerica Pyramid Center; Hoover Tower is at the near-center of Stanford campus")

"Here we will measure your perceived sharpness. I will ask you to look for those four buildings. Can you see them with your naked eye?"

If yes, continue; if no, explain the target again and repeat question

Explain to the participant how to look through aperture and adjust the focal length of the telephoto lens.

Measurement:

> For each building in [Salesforce Tower/ Transamerica Pyramid Center/181 Fremont/555 California Street/Hoover Tower]
>
> Adjust camera to lowest magnification (75mm)
>
> "Look at the [Salesforce Tower/ Transamerica Pyramid Center/181 Fremont/555 California Street; Hoover Tower]. Adjust the camera magnification till it matches how sharp this building

looks to match with what you see with your naked eyes. To do so, you should switch back and forth glancing at the same building with your naked eye and through the camera lens. Take as much time as you need to do this adjustment as we would like to accurately identify what magnification best matches your perception. When you have found the matching point, take a photo."

Adjust camera to highest magnification (300mm)

(Same instruction as the previous task).

Task 2: Comparing buildings height

Goal: given a sample picture and a number of buildings marked out with their respective names, see if the participants can correctly identify which building are higher in a selection of building.

Hand participants the sample picture with 4 buildings but ask them to look specifically at 181 Fremont and 555 California Street.

"Here we will measure your ability in comparing the perceived height of the building. I will ask you to look at our target 181 Fremont (which is the one on the right) and 555 California Street (which is the one on the left). Can you recognize those two buildings with your naked eyes as identified in the sample picture?"

If yes, continue; if no, explain the target again and repeat question

"Which of the following statements best reflect what you see: 1) the building on the left is taller; 2) the building on the right is taller; 3) the two buildings are of the same height"

Attach the link to google form

Measurement:

(Record measurement)

Task 3: Building height mental measurements (5 measurement per participant)

Goal: measure participant's perceived size of a distant object's height

In this experiment we will assess how you perceive building' heights.

For each building in [Salesforce Tower/ Transamerica Pyramid Center/181 Fremont/555 California Street/Hoover Tower]

I will ask you to look at building and estimate its height. You will indicate your perception of height by using this ruler app on the iPad. You will move the dots till they match the perceived height of the building.

(Run example)

For example I may ask you to estimate the height of your cell phone. Can you move the dots and estimate the height of your phone? (make sure that they not putting the iPad next to the iPhone)

Ask participant to do task and record measurement

If subject understands task and instructions continue, if not repeat explanation.

Measurement:

> Create a google sheet to record the measurements (a separate one for demographic data)
>
> "For the next measurement, we will ask you to look at target X for 30 seconds, then adjust the ruler measurement in the iPad app to match how tall target X appears without looking at the building. (Record measurement).
>
> Reset measurement ruler to 0 between each participant and building.

Task 4: Building height veridical measurements (5 measurement per participant)

Goal: measure participant's perceived size of a distant object's height with veridical measurements

> For each building in [Salesforce Tower/ Transamerica Pyramid Center/181 Fremont/555 California Street/Hoover Tower]

Showing an example of what is means to align iPad with a building.

Ask participant to do task and record measurement.

If subject understands task and instructions continue, if not repeat explanation.

Measurement:

> Create a google sheet to record the measurements (a separate one for demographic data)
>
> "Here I would like you to hold up the iPad such that it is aligned with the target building and adjust the ruler measurement in the iPad app so it matches the height of the building as you did in the previous task. (Record measurement)
>
> Reset measurement ruler to 0 between each participant and building.