October 6th, 4pm to 5 pm Opening seminar, H432
Balancing visual prediction and visual stability, David Whitney, UC Berkeley

Tuesday, October 7th 5 pm to 8 pm. Opening session: In this first meeting, various among us will present the individual topics with a few words, background, maybe some slides, perhaps some video demonstrations. This can take from 5 to 10 minutes. Some possibly longer with discussion to follow each. After all topics are covered, we chose which ones we want to work on, 2 or 3 people per topic. We can work on more than one topic if we want. Between sessions some of us will be meeting in our groups, planning and designing experiments, running subjects, analyzing data, checking leads in the literature, or being tourists. All very informal.

Jeudi, October 9th 3 pm to 6 pm. 2nd session: Here after working for 2 days on our topics, we present any progress, announce failures and abandonments, or preliminary successes and optimism. Those whose topics did not work out can switch to join other more successful groups. Like the other meetings, this may take less than the scheduled 3 hours or might extend further. Next session is 4 days away, time for experiments and local travel over the weekend.

Monday, October 13th 3 pm to 6 pm, 3rd session: More preliminary results, perhaps a few more topics abandoned. Our first data! Next session is 2 days away so time for last dash to working experiments, data.

Wednesday, October 15th 10 am to 2 pm. Closing session (with lunch included): Time for the final reckoning on the topics, which should be followed up with further experiments (or first experiments), planning for collaborations between our labs, articles written and submitted.

Berkeley Workshop Topics List

1. Discover the basis of space-time continuity. The double-drift gabor (illusion formerly known as the infinite regress) produces a startling shift in motion direction and position. The perceived position appears to depend on the starting point of the trajectory. This can be demonstrated by introducing temporal gaps in the trajectory that reset the perceived location with a big jump to its actual physical position. What other interruptions will break the continuity and reset location: spatial gaps, color, or shape changes, stopping the motion? What properties define object continuity? Does switching attention between multiple trajectories cause an interruption and position reset? What about overlapping object trajectories?

2. Projecting sound into the future (or present). We have many examples of position extrapolation for moving visual stimuli (flash lag, flash jump, flash drag, flash grab, trajectory shortening to name a few). Similar effects are undoubtedly present with auditory stimuli but only the flash lag version has been tried, with moderate success. A new demo from Daniel with a moving sound source and a mid trajectory click appears to put that to shame. This, and other
versions like trajectory shortening and “click grab” are a start with equivalent effects possible in pitch space for glissando-like stimuli. All good evidence for motion coding in audition and motion-based prediction of location and pitch. Good quality, over the ear headphones required.

3. Projecting touch into the future. Like above but with stimuli that move along the skin and have an abrupt change mid trajectory. With moving tactile probe (think, a pencil) or moving hand over a surface with one bump. Where was that bump? Mislocalization of nearby stimuli or landmarks (elbow, wrist, etc) due to repetitive tactile motion. Eyes closed please.

4. What’s that behind your head? Extrapolation behind the head for visual targets using Gerrit’s textured motion stimulus that works to extrapolate into the blind spot. Find the edge of the visual field for one eye and measure its position with other eye. Try moving objects as well as texture within a fixed strip. Apparent motion all the way behind your head, coming out the other side. Cross modal effects behind your head? Monster Flash — afterimages behind your head. Can sounds outside the visual field support visual experience at the same location?

5. What is visually stored or represented outside the visual field? Test for MAE or TAE outside the visual field : adapt in visual field, move adapted region outside, again using monocular crescent, test in other eye. Monster Flash!

6. Using Deubel’s ghost to produce trans-saccadic fusion. Long ago in lab far away, O’Regan and Levy reported no trans-saccadic fusion when they presented half a word before the saccade and the other half after. The subjects saw mush. They did not know that Saccadic Suppression of Displacement would move the pre- and post-saccadic bits so they overlapped as much as possible, thus destroying the spatial registration required to read the integrated word shape. Using a common disc in the pre- and the post-saccadic stimuli, bits and pieces present in the two should combine in register – to make surprise shapes unrecognizable from either half alone. Like letters or Mooney faces.

7. Shape distortions of patterns in motion. Moving dot patterns have odd shape distortions. A shape presented in the flash grab is stretched along the motion direction. What happens with noncontinuous trajectories? Why are shape distortions so much weaker with solid objects versus dots? What is going on?

8. Time distortions around moving objects. Dots flashed simultaneously at different locations around a moving object appear asynchronous. What is up with that, James Intriligator (who discovered this long ago)?

9. Attention and motion-induced position shifts. Is attention required or not?? Attention distraction, multiple targets (e.g., Linares), multiple rings of motion. Mix in biological motion – point light walkers. Then add motion induced blindness.

10. Disturb the motion to change the position. OK, if motion produces some predictive position shift, what happens when you disrupt the motion? Do you change position? This is Sabine’s compression effect with masked apparent motion – degrade motion, position must be closer. Think of other ways to disrupt the motion signal – e.g., a trajectory that passes over area of strong motion aftereffect in opposite or orthogonal direction, what happens to trajectory?

11. What’s up with the vertical meridian? Anything. How to measure changes in the flash-drag and double drift gabor (infinite regress) near the meridian. Is this the cause of the change from spatial compression between two stimuli followed by a mask (Sabine Born) to attentional
repulsion (expansion) that otherwise use very similar stimuli? How are the left and right visual fields bound—how do we make comparisons (e.g., relative location judgments) across the vertical meridian? Are position judgments made across the two visual fields fundamentally different than within a visual field? Is there some special construction process to represent space across the vertical meridian?

12. **In the blink of an eye.** Where do things go when you blink? And for how long? Why don’t we see our blinks? What do we see instead? Is there extrapolation into the blink temporal blind spot – temporal variant of Gerrit’s extrapolation into the blind spot. Is there object continuity through blinks (more so than during other interruptions)?

13. **Serial effects:** Staying the course, how the past biases the present. Serial dependence in perception vs action. Serial dependence (or reverse serial dependence?) for saccades, reaching movements.

14. **Face crowding (!)** Use unrecognizable outline Mooney faces to crowd proper Mooney faces. Related to David’s undergraduate thesis project (which received a C+, but maybe we can get that bumped up to a B, with revision).

15. **Object based position shifts.** Gaussian windowed partial faces, misaligned, does the envelope also seemed misaligned? Face rotates one way in place but gaze is steady forward.

16. **Do masked stimuli attract saccades?** Use eye movements as an indicator of sub conscious processing. Do stimuli have to reach awareness before they can trigger a saccade? With object substitution masking making stimuli invisible, will saccades still head out to the stimulus even if it cannot be reported?

**Topic Presenters**

1. Space-time continuity: Matteo Lisi, Alina Lieberman
2. Projecting sound into the future: Hannah Krüger, Sundeep Teki
3. Projecting touch into the future: Patrick Cavanagh, Marianne Duyck
4. What's behind your head: Santani Teng, Daw-An Wu
5. What is represented outside the visual field: Daw-An Wu, Jason Haberman
6. Transsaccadic fusion with the ghost: Céline Paeye, Ben Wolfe, Gracie Edwards
7. Shape distortions of patterns in motion: Gerrit Maus, Allie Yamanishi
8. Time distortion around moving objects: David Whitney, Gerrit Maus, James Intriligator
9. Attention and motion induced shifts: Nika Adamian, Anna Kosovicheva
10. Disturb the motion to change position: Sabine Borne, Patrick Cavanagh
11. What’s up with the vertical meridian: Anna Kosovicheva, Nika Adamian
12. Blinks: Mark Wexler, Marianne Duyck
13. Serial effects: Alina Lieberman, David Whitney
14. Face crowding: Wes Chaney, Jason Haberman
15. Object-based position shifts: David Whitney, Ben Wolfe
16. Do masked stimuli attract saccades? Claire Sergent, Thérèse Collins