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Please find enclosed our manuscript “Pinpoint: trajectory planning for multi-probe electrophysiology and injections in an interactive web-based 3D environment”, which we would like to submit for consideration at eLife as a Tools and Resources article in the Short Report format.

Neuroscience has increasingly shifted from studying the properties of individual neurons and regions to investigating the dynamics of complex interconnected brain-wide networks. This shift has been possible thanks to improvements in electrophysiology recording equipment, which have enabled researchers to record brain-wide neural activity from rodents. While such data sets provide unprecedented access to the dynamics of the brain, performing these experiments remains difficult. Among the difficulties researchers encounter is the complexity of planning trajectories for multiple electrophysiology probes and executing these recording plans in an efficient and reproducible manner.

Here we present “[Pinpoint](https://data.virtualbrainlab.org/Pinpoint/)”, a tool for trajectory planning and execution of insertions (screenshot on next page). Pinpoint makes trajectory planning for simultaneous multi-probe recordings intuitive through a 3D interface and accessible through browser-based access. To use Pinpoint, researchers navigate to the website (no installation needed!), add their probes, and then optimize the trajectories within the mouse Common Coordinate Framework reference atlas. Pinpoint reports the stereotaxic coordinates necessary for performing an experimental surgery. Among Pinpoint's many features are: 3D and 2D visualizations of trajectories, multiple probe options (incl. Neuropixels gen 1 and 2), craniotomy planning, collision detection, reference atlas scaling to match the in vivo brain, and sharing of probe insertion plans through permanent URLs. One of Pinpoint's most powerful features is that it can connect to hardware micro-manipulators as well as data acquisition software. These features mean that experimenters can track the position of their probes live during experiments and then send that anatomical position information to their data acquisition software to be visualized alongside the raw electrophysiology data. Taken together, all of these features make Pinpoint a significant improvement in our ability as neuroscientists to plan and execute reproducible electrophysiology experiments.

We would like to suggest the following reviewers: Mark Harnett (MIT), Dan Denman (CU Anschutz), Alex Kwan (Cornell), and Nicholas Timme (Purdue).

Sincerely,

A close up of a sign

Description automatically generated  
Daniel Birman­

A computer screen and a brain

Description automatically generated with medium confidence

Screenshot of the Pinpoint website, accessible at <https://data.virtualbrainlab.org/Pinpoint/>. Two Neuropixels 1 probes are shown with their trajectories visible on the left side. The stereotaxic coordinate readout, necessary for performing this insertion plan in an experiment, is visible on the right side.