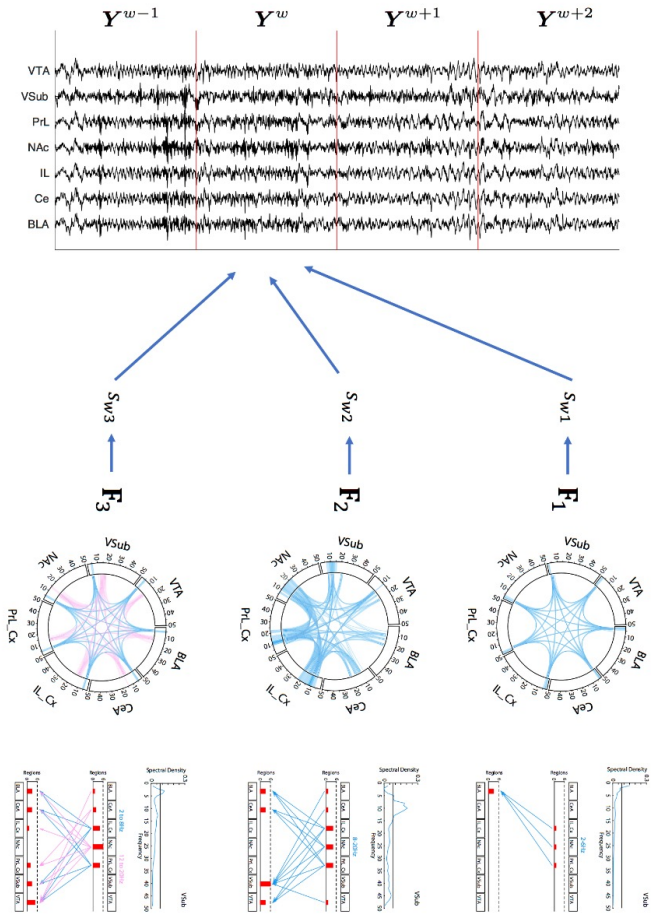
Uncovering Population-Level Cellular Relationships to Behavior via Mesoscale Networks

What will be delivered? We are developing mathematical models of coordinated electrical activity in the mesoscale (across many regions), which we call the *Electrical Connectome (Electome).* We are developing machine learning approaches for fast inference, domain generalization, and links to neural firing. Mathematical theories are being published and code is being publicly released.

What is new inside? We have developed deep learning approaches to improve these network models, both in terms of representation fidelity and predictive power. These models are efficient, and we can integrate a number of advances from deep learning (domain adaptation, multi-modal approaches) to further increase the utility of the models.

How will this change current practice? In addition to developing coherent multi-scale models of the brain, our *electome* modeling approach can be used to design testable hypotheses. Recent preprints have used the methods to design and evaluate neurostimulation procedures.

End Users The target end user is the systems and network neuroscience community working in electrophysiology. Tools are designed in Python using standard deep learning toolkits (PyTorch). Code is publicly available.



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