DIFFERENTIAL RESILIENCE TO PERTURBATIONS OF CIRCUITS WITH SIMILAR PERFORMANCE

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Tuesday
FEB 16, 2021
4:00 pm CET

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SFB 1315 LECTURE SERIES 2019-2022
SFB 1315
Mechanisms and Disturbances in Memory Consolidation:
From synapses to systems
DIFFERENTIAL RESILIENCE TO PERTURBATIONS OF CIRCUITS WITH SIMILAR PERFORMANCE

Both computational and experimental results in single neurons and small networks demonstrate that very similar network function can result from quite disparate sets of neuronal and network parameters.

Using the crustacean stomatogastric nervous system, we study the influence of these differences in underlying structure on differential resilience of individuals to a variety of environmental perturbations, including changes in temperature, pH, potassium concentration and neuromodulation.

We show that neurons with many different kinds of ion channels can smoothly move through different mechanisms in generating their activity patterns, thus extending their dynamic range.

Image Courtesy Eve Marder: Alonso & Marder eLife 2020;9:e55470. Figure 5. Current contributions at the end of bursts across temperature.