Finding thermodynamics in computing biological and artificial networks

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Computing networks in intelligent machines and animals are typically consist of large numbers of neurons. While the states of these constituent neurons are simple, these collective dynamics that give rise to all sorts of functional dynamics is complicated by the large degrees of freedom. By match the statistical properties of the neural systems to statistical models, we can describe the dynamics of the networks using concepts in statistical physics. In this talk, I will provide some backgrounds on our work in this direction and introduce some common software packages (Brian2 and PyTorch in Python) that will be useful for people who are interested in some hand-on experience in studying these systems.