Molecular complexity of voltage-gated sodium channels

Propositions belonging to the Dissertation:

Molecular complexity of voltage-gated sodium channels; theory and applications in mutation-response prediction

- Cumulative hydropathic topology represents the "fingerprint" of a voltage-gated sodium channel's functional architecture
- Invariants of cumulative hydropathic properties represent the "memory" of a voltage-gated sodium channel structure, i.e., they encapsulate evolutionary-conserved information
- Phase transitions can occur in voltage-gated sodium channel structures due to hydropathic inhomogeneities in the atomic structure
- Disease-causing variants of voltage-gated sodium channels can be largely predicted from structure-site-specific hydropathic information
- Cumulative hydropathic effects can provide a first-principles understanding of channel protein stability, function, and, eventually, assembly
- Molecular complexity approaches can efficiently reduce the complexity of the problem of analyzing a channel protein's functional architecture

- Machine-learning approaches should be coupled with complexity theory in order to understand ”fine-tuning” phenomena in channel protein structures

- Complexity-driven inquiries in the field of biomedicine can revolutionize the way we understand molecular pathophysiology which, in turn, can improve prognosis, diagnosis, and treatment of human diseases.

- ”And there was a beautiful view, But nobody could see. 'Cause everyone in the Island was saying, Look at me! Look at me!” - Laurie Anderson