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**Ilya Shmulevich\*** ([is@ieee.org](mailto:is@ieee.org)), 401 Terry Ave N, Seattle, WA 98109. *Probabilistic Boolean Networks as Models of Gene Regulatory Networks.*

I will present Probabilistic Boolean Networks (PBNs), which are models of genetic regulatory networks that i) incorporate rule-based dependencies between genes; ii) allow the systematic study of global system dynamics; iii) are able to cope with uncertainty; iv) permit the quantification of the relative influence and sensitivity of genes in their interactions with other genes. PBNs share the appealing rule-based properties of Boolean networks, but are robust in the face of uncertainty.

The dynamics of PBNs can be studied in the context of Markov Chains, with standard Boolean networks being special cases. I will also discuss the relationship between PBNs and Bayesian networks – a family of graphical models that explicitly represent probabilistic relationships between the variables. A major objective is the development of computational tools for the identification of potential targets for therapeutic intervention in diseases such as cancer. I will describe several approaches for finding the best genes with which to intervene in order to elicit desirable network behavior. (Received August 21, 2015)