

Systems Biology Research Symposium

Oral Presentation Session

Grand Ballroom
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7:00-8:30pm

Fault Diagnosis Engineering in Molecular Signaling Networks

Ali Abdi¹ and Effat Emamian²

¹Center for Wireless Communications and Signal Processing Research, Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, NJ 07102, USA

²Advanced Technologies for Novel Therapeutics, Enterprise Development Center, New Jersey Institute of Technology, Newark, NJ 07103, USA

Presenter's email address: abdi@adm.njit.edu

Systems biology envisions that the application of complex system engineering approaches to cell signaling molecular networks can lead to novel understandings of complex human disorders. In this paper we show that by developing biologically-driven vulnerability assessment methods, the vulnerability of complex signaling networks to the dysfunction of each molecule can be determined. We have analyzed signaling networks that regulate mitosis, and the activity of caspase3, p53, and the transcription factor CREB. Our results indicate that biologically-relevant critical components of intracellular molecular networks can be identified using the proposed systems biology/fault diagnosis engineering technique. The application of this approach can improve our physiological understanding of the functionality of biological systems, can be used as a tool to identify novel genes associated with complex human disorders, and ultimately, has the potential to find the most prominent targets for drug discovery.

Key words: systems biology, fault diagnosis, vulnerability assessment, molecular biology, signal transduction, drug discovery