How the Cytoscape Cyberinfrastructure Promotes Collaborations in Network Biology

The mission of the National Resource for Network Biology (NRNB.org) is to advance biomedical research, which is increasingly dependent on knowledge of biological networks of multiple types and scales, including gene, protein and drug interactions, cell-cell and cell-host communication, and social networks. The NRNB aims to achieve its mission by developing leading edge methods for assembling and analyzing networks, and engaging leading edge biomedical investigators in productive collaborations.

Accordingly, NRNB is producing robust end-user software, databases, and a high performance computing infrastructure that enables network analysis and visualization methods for a broad biomedical research community and invites collaboration.

The Cytoscape Cyberinfrastructure (CI) is a service-oriented, distributed, and scalable computing system that both incorporates NRNB's highly regarded software portfolio (e.g., Cytoscape, GeneMANIA, cBioPortal) and encourages a new breed of network-oriented analysis, visualization, and storage services orchestrated into novel, extensible, reusable, and reproducible scientific workflows.

We will describe and demonstrate the structure and principles of the CI, including service construction, deployment, publishing, and reuse as applied to the particular problem of stratification of tumor mutations[1]. We will show how the CI can be an organizing point for new and existing collaborations.

[1] Hofree M, Shen JP, Carter H, et al. Network-based stratification of tumor mutations. http://dx.doi.org/10.1038/nmeth.2651