

157. The Network Portal and Gaggle Workspace: New Generation of Tools for Network Biology

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<http://networks.systemsbiology.net>

Project Goals: The mission of this project is to develop set of tools to democratize access to the inference, storage, exploration, and visualization of gene regulatory networks. In addition, it aims to promote cross-platform data analysis and collaboration among researchers with distinct areas of expertise by extending the Gaggle framework.

Abstract: Recent years have witnessed a bloom of algorithms to infer regulatory network architectures to investigate the regulation of diverse biological processes. Yet the wider scientific community has limited access to tools for network inference, visualization, and analysis because these tasks often require advanced computational knowledge and expensive computing resources. We have designed the Network Portal (<http://networks.systemsbiology.net>) to serve as a modular database for inferring networks by integrating data (user uploaded and public). The portal is also fully equipped with tools for storage, visualization, and analysis of biological networks. The current release of the database contains networks for 13 prokaryotic organisms from diverse phylogenetic clades (4678 co-regulated gene modules, 3466 regulators and 9291 cis-regulatory motifs). The portal will be rapidly populated with additional networks from diverse organisms as relevant data become available in public repositories and through user input. The portal is fully integrated into the Gaggle framework for interactive exploration of diverse kinds of data using a wide array of desktop and web-based applications. We have also developed a Gaggle Workspace environment for data organization, storage, and analysis with workflow capabilities and a save state function. The Workspace is a data-centric, cloud-based, highly scalable, and multi-platform solution that improves the productivity of performing large-scale data analysis and visualization for biological researchers with and without programming expertise. The Network Portal has already contributed algorithms (e.g., the network inference pipeline) as well as data (e.g., networks) to the DOE KBase. We are also in the process of implementing KBase services into Gaggle Workspace environment.

References: Turkarslan, S., Wurtmann E. J., Wu W. - J., Jiang N., Bare C. J., Foley K., et al. (2013). Network portal: a database for storage, analysis and visualization of biological networks. *Nucleic Acids Res.* 42(1):D184-90