THE NEUROSCIENCE INFORMATION FRAMEWORK (NIF):
A UNIFIED SEMANTIC FRAMEWORK AND ASSOCIATED
TOOLS FOR DISCOVERY, INTEGRATION, AND
UTILIZATION OF BIOMEDICAL DATA AND RESOURCES
ON THE WEB

Objectives:
Neuroscience, as with other biological sciences, has become a data intensive science where new insights and
discoveries are critically dependent on researchers ability to integrate and synthesize related biological data. The
Neuroscience Information Framework (NIF; http://neuinfo.org) was launched in 2008 to address the problem of
finding and integrating neuroscience-relevant resources through the establishment of a semantically enhanced
framework. To enable researchers to gain access to data and information they may not have been aware of, the NIF
has deployed a discovery portal that connects neuroscientists and biomedical researchers to available resources.
These sources include the: (1) NIF Registry: A human-curated registry of neuroscience-relevant resources; (2) NIF
Literature: A full text indexed corpus derived from the PubMed Open Access subset as well as an entire index of
PubMed; (3) NIF Database Federation: A federation of independent databases that enables discovery and access to
public research data, contained in databases and structured web resources (e.g. queryable web services) that are
sometimes referred to as the deep or hidden web.

On-going activities:
In addition to fielding, maintaining and growing the current NIF system, NIF has outlined a strategy for sustainability
through the provision of core services in support of researchers, resource providers, companies, organizations and
government entities. NIF assets have been used to quickly jump-start or create other customized portals without
needing to duplicate efforts. We’ve provided these services to individual researchers, organizations like the Spinal
Muscular Atrophy Foundation and One Mind for Research, and large projects like the Monarch Initiative and the
NIDDK’s Information Network. The Monarch initiative (http://monarchinitiative.org) aims to provides basic and
clinical science researchers, informaticists, and medical professionals with an integrated interface and set of
discovery tools to reveal the genetic basis of disease, facilitate hypothesis generation, and identify novel candidate
drug targets. DKnet (http://dknet.org), the NIDDK Information Network, is meant to serve the needs of basic and
clinical investigators by providing seamless access to large pools of data relevant to the mission of NIDDK. Its goal is
to develop a community-based network for integration across disciplines to include the larger DK universe of
diseases, investigators, and potential users.

Results:
Over the past year, NIF has continued to grow significantly in content, providing access to over 6,000 resources
through the Registry, and more than 200 independent data resources in the data federation, making NIF one of the
largest sources of biomedical information and one of the largest federated data repositories on the web (Cachat et
al., 2012). NIF’s semantic search system provides the user the ability to simultaneously search over these sources of
information. To support a concept-based search system, NIF employs domain knowledge in the form of the NIFSTD
ontologies that enable the query system to interpret a user’s search request and convert it into richer yet
semantically equivalent searches against the NIF services. The NIFSTD ontologies are a set of community ontologies
implemented in OWL covering the major domains of neuroscience, which were assembled from existing ontologies
in use in the broader life science community but enhanced with neuroscience specific content. The NIFSTD
ontologies are used to provide a semantic framework for searching and annotating diverse content.

URL: http://neuinfo.org

CONTACT DETAILS:
INITIATIVE NAME: NEUROSCIENCE INFORMATION FRAMEWORK
NAME: JEFFREY S. GRETHE
ORGANIZATION: UNIVERSITY OF CALIFORNIA, SAN DIEGO
EMAIL: JGRETHE@UCSD.EDU