

# Development of a Platform for Ontology Engineering and Evolution for Nanotechnology

Axel Mustad  
Nordic Quantum Computing Group AS

A key concept in the Semantic Web (SW) initiative of the WWW consortium is the notion of ontologies. In the nanoscience and nanotechnology field, there is still no ontology standard in place. The goal is to automate engineering and maintenance of nano-ontology standards for improved data integration and interoperability in order to advance science & technology and bring big savings for the industry and the public sectors. To achieve this we provide a collaborative environment for research, standardization and innovation in nanotechnology and the integration of advanced techniques of ontology design. The platform and approaches used are general and can be applied in any sector or information system.

This project addresses the problem of building a platform for ontology engineering, evaluation and evolution that facilitates the task of establishing and keeping updated industry-quality ontologies. The platform incorporates a range of interchangeable techniques and theories and is geared towards the needs from the nanoscience and nanotechnology discipline. Project focus is to provide cost-effective practical technologies for producing high-quality relevant ontologies. The project's technologies and models impact the industry and the research community at different levels:

- Intelligent search & mining: Content-based processing of and reasoning about domain-dependent data sources
- Seamless infrastructure: Open infrastructures for all types of media and equipment as permanent available resources for collaboration and exchange
- Communication: Interactive, value-increasing services and information for collaboration in and across communities and organizations, and for people in roles as citizens and customers.

The deliverables of the project include a platform for semi-automatic learning and evolution of ontologies, logical and statistical techniques for ontology manipulation and refinement, and a full-fledged ontology for searching and mining nanoscience and nanotechnology research papers and electronic media. The platform is realized through an executable model and related tool support, and demonstrated by applications to case studies relevant to nanoscience, nanomaterials and nanotechnology.