Manifesto of the **AdvancedNano** GO FAIR Implementation Network

For a concerted action to dovetail FAIR data and services in nanosafety.

Introduction

The aim of the manifesto is to actively support the implementation of the FAIR (Findable, Accessible, Interoperable and Reusable) principles in the current nano-EHS databases (i.e. data on NM physico-chemical characteristics, release and exposure, toxicity and functionality) by the formation of an alliance/implementation network. Such an alliance/network for FAIR data is needed to take new, ground-breaking steps in the nanosafety domain, specifically in the areas of grouping and read-across, hazard and risk assessment, Safe by Design, development of *in silico* approaches (e.g. QSARs) and development of nano-Adverse Outcome Pathways. A crucial step for the implementation of FAIR data is to establish a Nanosafety GO FAIR Implementation Network, **AdvancedNano IN**, in which key players in nanosafety data take steps to make their data sets and databases FAIRer. Key players are data generators, database developers, data(base) users and regulators/policy makers, who can generate, stimulate and facilitate FAIR nanosafety data.

Purpose of AdvancedNano IN

The undersigned represent major public and private stakeholders in nanoscience, who are currently developing the appropriate and efficient data management for nanomaterials. This is a distributed infrastructure that enables the use and reuse of nanosafety data for the benefit of companies and society. **AdvancedNano IN** aims to advance innovation in nanoscience while improving human health and the environment through a shared infrastructure to support the generation, management, analysis, and (re)use of data.

AdvancedNano IN constitutes a crucial element of various (inter)national initiatives, including DTL, ELIXIR, EMMC, EUON, NanoSafetyCluster, OpenRiskNet, several ongoing NMBP projects, and it will act as a GO FAIR Implementation Network. This Manifesto is a formal statement of the principles that guide **AdvancedNano IN** development.

Guiding principles

The nanotechnology community needs to create a FAIR culture, which is supported by standards and infrastructure development leading to machine readable nanosafety data and other essential digital resources. Hence, the **AdvancedNano IN** commits to the following guiding principles that will bring about:

- A **change in culture** around FAIR data stewardship and data sharing practice
- **Findable** nanosafety data
- **Control over data**. Data owners manage their own data and decide about sharing their data.
- **Reusable code and data**: validation, compilation/aggregation, incorporation into future work, data mining
- The use of **standards** at source and throughout the information lifecycle (interoperability)
- Availability and accessibility of **tools and infrastructure**
- **Machine-readability** at the core, with focus on creating machine-readable and interpretable data, metadata, workflows, and services, aiming for maximal interoperability between diverse systems
- The **Governance** of standards
- The use of **general data standards** outside of nanosafety where appropriate and FAIR in their implementation
- **The Enablement and promotion** of the use of nanosafety data standards

Overarching Principle of Operation

We commit to comply with the Rules of Engagement of GO FAIR Implementation Networks.

Targeted Objectives for the Internet of FAIR Data and Services (IFDS)

1. To provide a cross-domain interoperability framework consisting of methods, tools and guidelines for implementing and assessing semantic interoperability of heterogeneous research data across discipline borders.
2. To develop and evaluate reference implementations of interoperability for real-world cross-domain research uses case by broadly applying existing standards, vocabularies and semantics technologies.
3. To engage with other GO FAIR implementation networks and related initiatives to disseminate and exchange best practice solutions for cross-domain interoperability.

Membership AdvancedNano IN

We consider this Manifesto to be one way by which the undersigned stakeholders can **speak with one voice** on a number of critical issues that are of generic importance to the objectives of FAIR and on which we have reached consensus. We will therefore coordinate our investments in and support of the technological and social developments in the distributed management and analysis of machine-readable nanosafety data.

Membership list (preliminary—this list will be expanded prior to official launch):

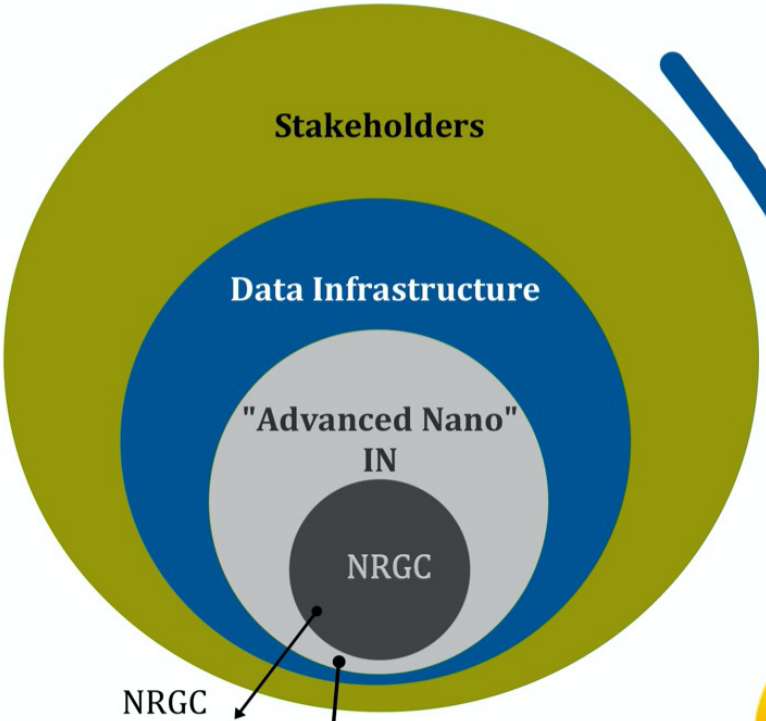
- Ronald Flipphi, Ministry of Infrastructure and Water management, The Netherlands
- Martine Bakker, National Institute of Public Health and the Environment (RIVM), The Netherlands
- Cornelle Noorlander, National Institute of Public Health and the Environment (RIVM), The Netherlands
- Blair Johnston, German Federal Institute for Risk Assessment (BfR), Germany
- Nina Jeliazkova, IdeaConsult Ltd., Bulgaria
- Peter Ritchie, Institute of Occupational Medicine (IOM), United Kingdom
- Penny Nymark, Karolinska Institute (KI), Sweden

Advanced Nano

NanoEHS--GO FAIR Implementation Network

Gov4Nano
meeting the needs of nanotechnology

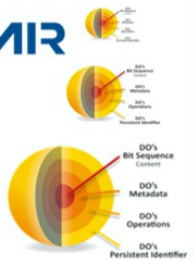
CODATA RDA WORLD DATA SYSTEM



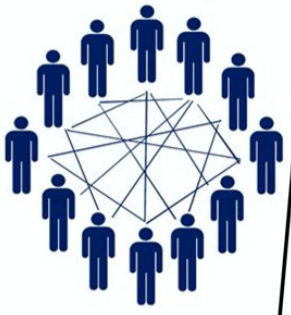
EUROPEAN OPEN SCIENCE CLOUD

National , Industrial, Institutional, and local data repositories

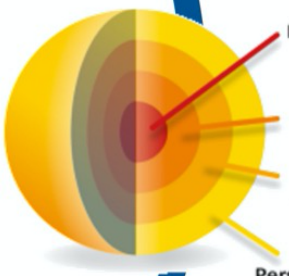
GO FAIR

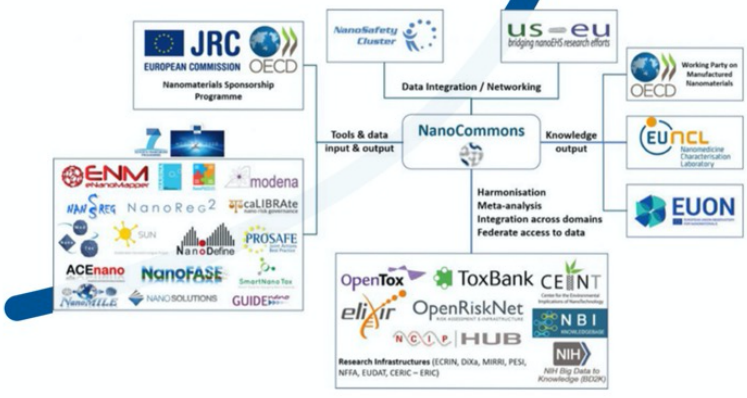


NRGC

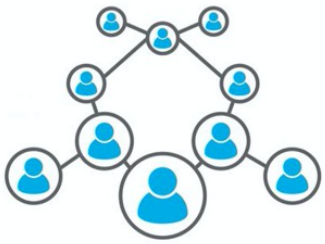


FAIR Digital Objects (FDOs)





"Advanced Nano"
IN



Steering Committee:
Communucation and Coordination

- Gov4Nano Portal
- Newsletter
- Twitter
- Slack Channel (working area)
- Webinars
- Meetings and Workshops

Case Studies:

- Persistent identifiers (Task 1.2)
- ELNs (Task 1.3)
- Re-use of 'omics data (Task 1.4)
- Re-use of Ecotoxicological data (Task 1.4)
- Re-use of NanoReg2 genotoxicity data (Task 1.4)
- Re-use of NECID exposure data (Task 1.4)

INTEROPERABLE