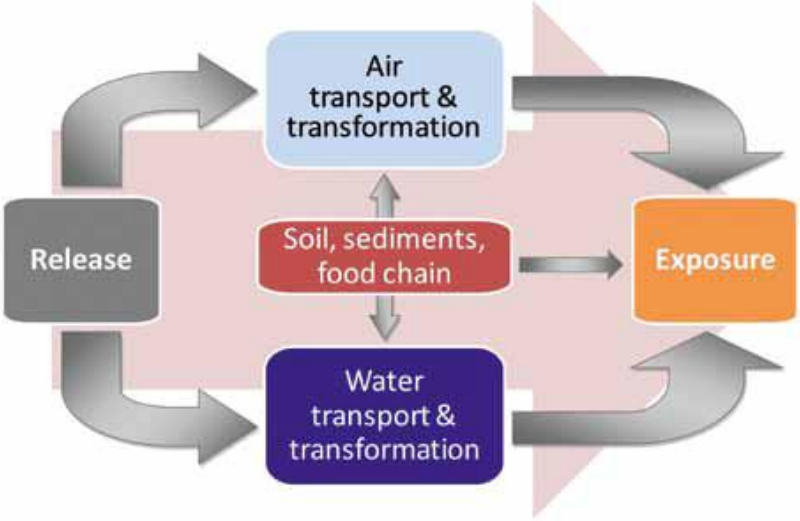
# Working group 3 Exposure




- Powered since 2014 by GUIDEnano
- Co-chairs
  - Derk Brouwer (Human Exposure)
  - Claus Svendsen (Environmental fate/ exposure)

# Objectives of WG3

(phrased during creation WG)

- Design and validate tests for the release of manufactured nanomaterials for the different stages of the life cycle.
- Work with the international scientific community to harmonize these types of tests.
- Provide industry and legislators with validated methodologies for exposure assessment to be integrated in future regulations as an RTD requirement in the pre-market testing for novel nanoproducts and applications.
- Evaluate and minimize risks associated to nanotechnologies of adverse or unexpected effects towards public health and the environment (risk management strategies).
- Risk analysis over the life cycle of nanoproducts and technologies.
- Analysis of the contribution of the life cycle stages to the overall environmental impact to prioritize improvements in products or processes (safe by design).

Currently re-phrased

# Main objectives & activities

- Joint Objectives: To promote harmonization by encouraging sharing of project methods, techniques/results/data and by coordination through various means and activities.
- STATUS:
  - Human Exposure: Started from developed techniques and concepts for particulate exposure – now has **10 years of Nano relevant human exposure data** – *in the phase of harmonizing and consolidate data collection and databases* (next slides)
  - Environmental Fate and Exposure: **Still at the stage of technical developments being needed** to extract, prepare and analyse samples, **to characterise and quantify NM exposure properties** (size, surface area and chemistry, core transformations) **in real environmental samples** – *time to share experiences and develop common best methods, techniques and practice* (next slides)

# Main Human Exposure objectives & activities

- To encourage sharing of project results/data by coordination of transfer and hosting of libraries/(databases)
- Coordination actions

  *ongoing*

  - Harmonization of data collection, analysis, reporting, and formats for storage and retrieval.
    - 5th Workshop Harmonization Measurement Strategies (Grenoble , November 2014)
    - 1st Workshop Harmonization Release Methods (Helsinki, April 2015 (SENN2015)
  - Coordination and resulting tuning of running/planned projects activities in the area of exposure assessment; subdivision of work etc.

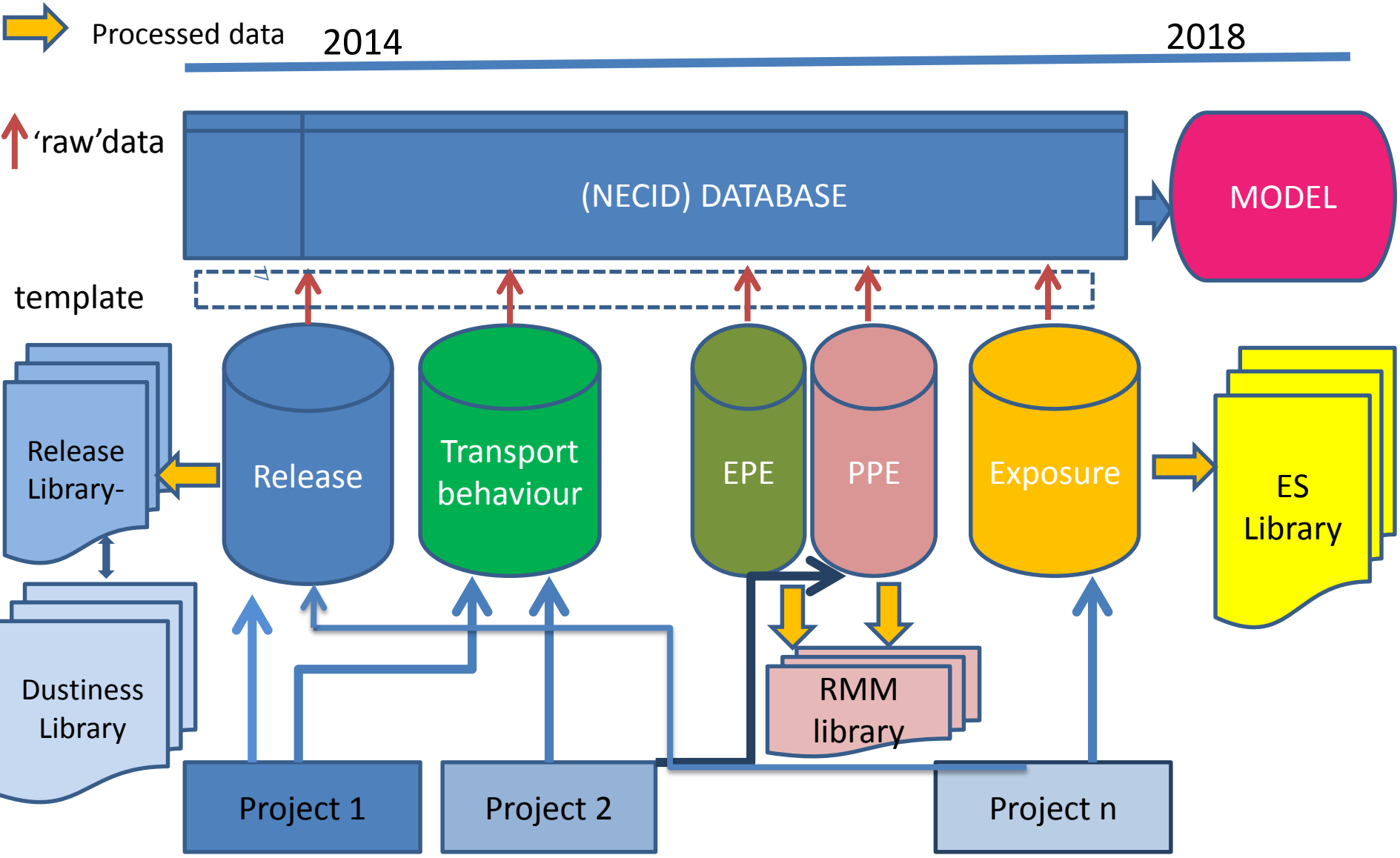
    – Selection and

    – agreement on research priorities

**Measurement event 2015 Q1 Copenhagen**

Joint effort to generate data for calibration and benchmarking of exposure models

# (worker/consumer) exposure roadmap



NanoSafety Cluster

Subset of projects that could provide data/information for library or database

| Exposure Data | Exposure Scenarios | Release | Dustiness | EPE/PPE efficacy |
|---|---|---|---|---|
| PEROSH | MARINA | MARINA | | |
| Nanodevice | NanoRisk | | Nanodevice | NanoRisk |
| Scaffold | ReachNano | | | |
| NanoValid | Nanomicex | NanoValid | DustiNano | Nanomicex |
| NanoIndex | NanoSafePack | | NanoSafe pack | NanoSafe pack |
| GuideNano | GuideNano | GuideNano | | GuideNano |
| NANOREG | | NANOREG | NANOREG | NANOREG |
| SUN | (SUN) | SUN | SUN | SUN |

SNAPSHOT

# Main Environmental Fate & Exposure objectives & activities

- To encourage cross project technical best practice for:
  - Model based Prediction of Environmental Concentrations
  - Methods to extract, prepare and analyse samples, to characterise and quantify NM exposure properties in real environmental samples and matrices.
- Main coordination tool – **Small focused meetings/workshops**
  - Focus on the **immediate science issues**, but keeping longer term issues (comparability & databases) in mind during development.
  - **~30pers, 1-2 days on a main issue** +possible mini workshops/training elements
  - **Target the relevant projects and their key people** to send for the set issue (based on NSC Compendium or FP7 NSC review).
  - Include **completed, finishing and starting projects <u>to ensure handover</u>** of the state of the art and research priorities between projects
  - Ideally focused towards **delivering a review paper or "hands on" workshop** (combining motivation and guarantee of communication all in one);

# Exposure issues 'progress'

- Human Exposure (and other areas)
  - Formalize between-project collaborations/ data sharing (SUN, NanoReg, Guidenano, Marina,..)
    - Exposure and other libraries/NECID database
    - Joint data generation events
    - Tuning work tasks

- Environmental Exposure
  - Continue joint project workshops
    - Methods & techniques
  - Formal handover and continuation of developments:
    - E.g. Models and "standard EU waters" from NanoFATE and ModNanoTox included in developments of NanoMILE and GUDIEnano etc
    - Technical development needs of lower detection limits in complex media highlighted by PEC models are taken on in Marina and NanoDefine to help enable PEC model validation.

# Main Environmental Fate & Exposure activities

- The suggested format is what has given the best NSC outcomes in the last 5 years, with **>10 smaller joint meetings on key subjects like: *Environmental risk assessment, LCA, Environmental sample characterisation etc*** involving: *NanoReTox, NanoFATE, ENNSATOX, NanoPolyTox, NanoSustain, MARINA, QualityNano & NanoMILE etc* amongst the organising projects and attended from many more.
- LATEST: "NanoFATE – QualityNano – NanoMILE" open meeting Birmingham in March '14 - "Putting environmental realism into nanosafety assessment"

  (60pers, 2 day mini conf, 2 Workshops &

  4 training courses, each of 30pers)




**SETAC 2014 NANO - Fate and effects of nanomaterials**

PLATFORM SESSIONS

3 Fate and effects of NPs under environmentally realistic conditions

2 Fate and Effects of NMs in soil
1 Carbon based NMs

2 Bio-nano interphase interactions
1 ERA of NMs

2 Mechanistic Tox of engineered NMs

BARCELONA 25
SETAC Europe 2015

May 2015 - 4 full days with 7 diverse proposed sessions addressing most of the NSC WGs topics. All chaired collaboratively from across NSC projects

# Main Environmental Fate & Exposure objectives & activities

Between projects
Coordination & Collaborations

NEXT WG3 Env TOPICS and lead projects?:

- Consensus building for advice on NM characterization method investment to non-specialist labs to allow minimum characterization set to be achieved with all future ecotox studies.
- Technical developments for following and predicting NM core transformations in realistic environments
- Addressing coating stability and dynamics in realistic environmental chemistries and samples
- Improving the fate estimates for environmentally relevant NM forms

*All suggestions and volunteers welcome* – contact Claus (csv@ceh.ac.uk) to coordinate

**Main projects going to end of FP7 here are:**

GUIDE nano

Focus on LCA & exposure relevant NM forms and environments

nano Solutions

Focus on mechanisms of uptake / release

SUN

Sustainable Nanotechnologies Project

Sustainability, LCA and safe by design

NanoMILE

Functional role of coatings and Classification scheme

# Near Future

- WG3 organisational issues
  - Explicitly differentiate Human and Environmental exposure (co-chairing) to enable more focused meetings
  - Inclusion of LCA (NanoSolutions, GUIDEnano, SUN, etc.)
  - Improve attractiveness and effectiveness of WG
    - Develop and post list of activities on website
    - Organize telcons on regular basis (a la the EU-US Coor groups)
    - Dissemination initiatives driven or aided by NSC projects:
      - » SENN2015 (April - Helsinki)
      - » EU-U.S.: Bridging NanoEHS – Workshop 2015 (March - Venice)
      - » SETAC Europe 2015 (May - Barcelona)
      - » ICEENN 2015 (July? - Vienna)