



**What will we  
build and what  
will it look like?**

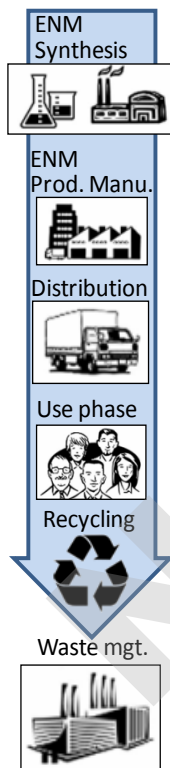
**Claus Svendsen**

# The NanoFASE Exposure Assessment Framework

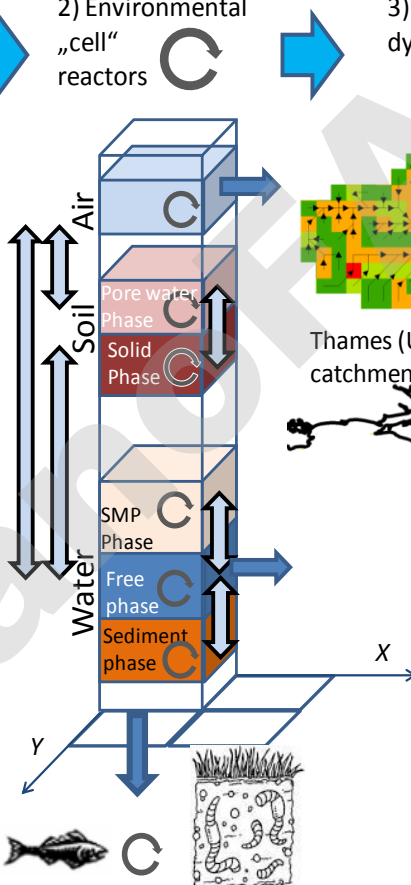
Deliver better models and methods for ENM fate in the environment:

## Where, in what form and for how long?

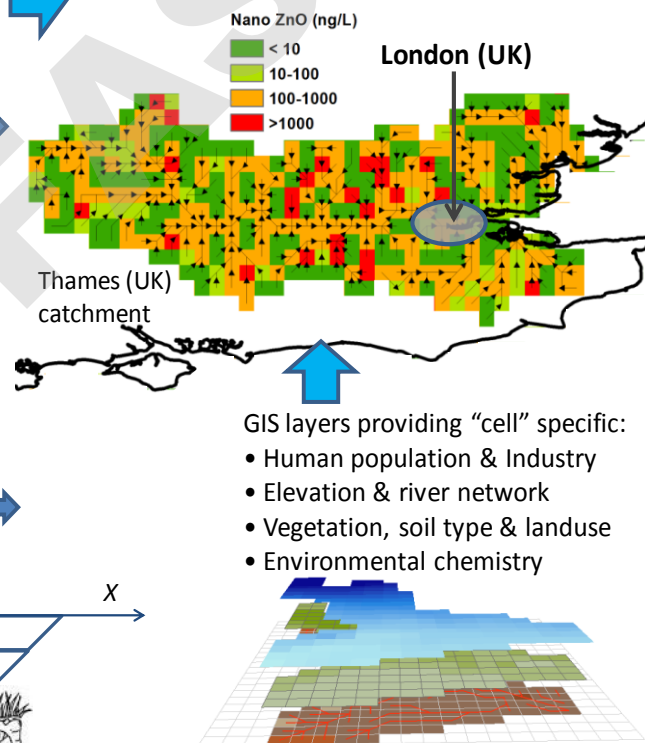
1) ENM enabled  
Product value chains  
& release pathways



2) Environmental  
„cell“  
reactors



3) Object-oriented multimedia fate models  
dynamically connecting “Environmental cells”

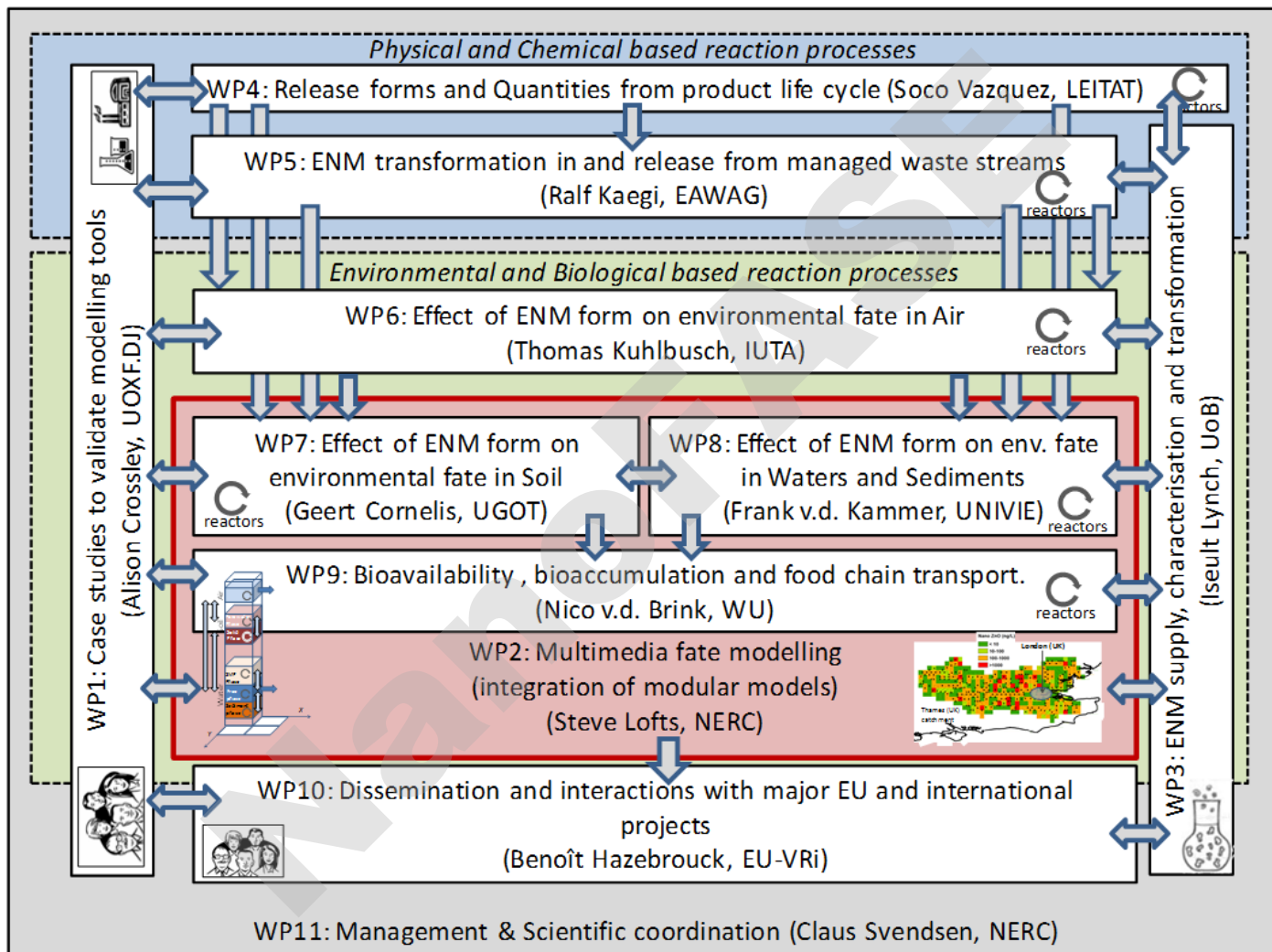


# NanoFASE – Scope and limitations:

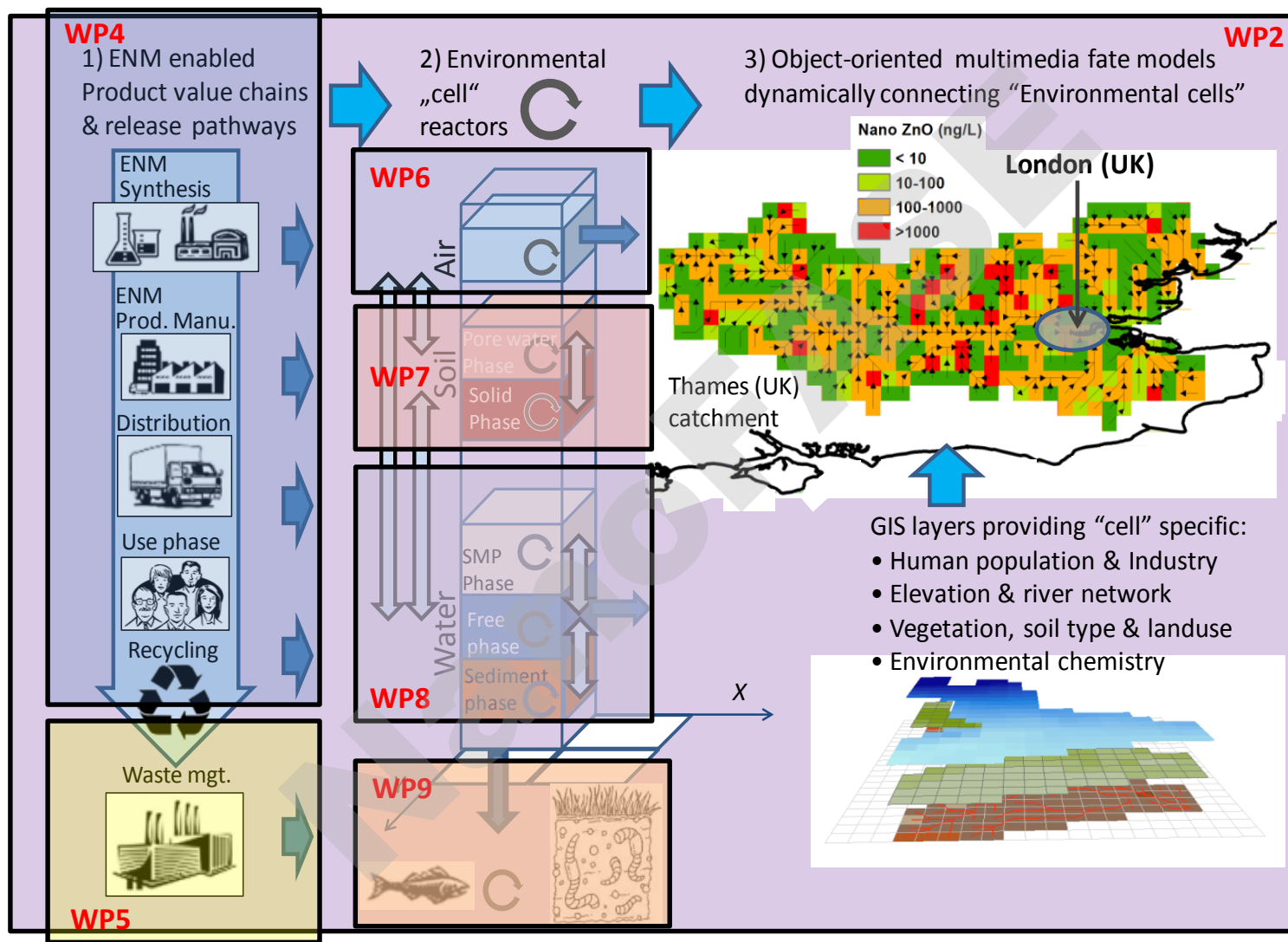
## ■ **The Scope and limitations:**

- **Focused on Release to and Fate in the environment**
- **Generation of Exposure Assessment Framework**
  - Models and Methods for parameterising these
- **Environmental Fate includes transfer to Biota**
  - EXCLUDED are measures of EFFECT/Hazard
- **Human exposure only through the environment**
  - EXCLUDED are Worker and consumer exposure

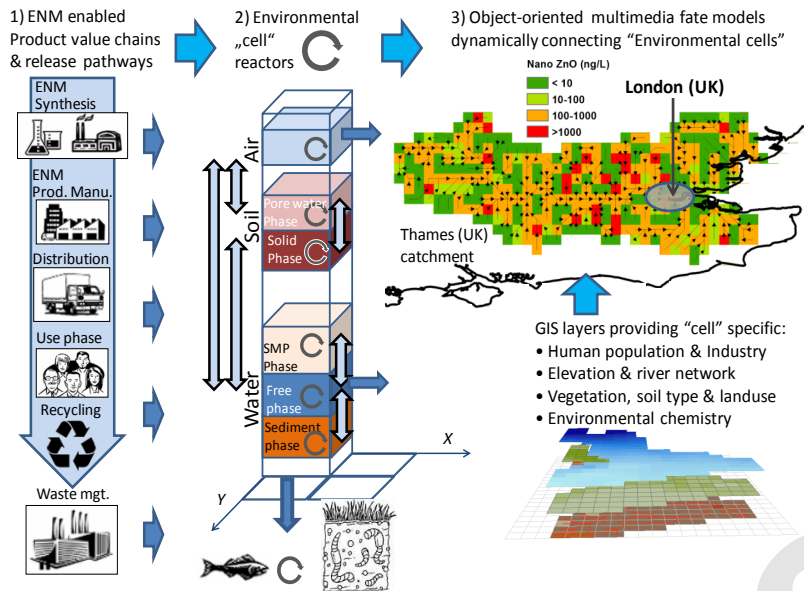
# NanoFASE the connections:



# NanoFASE the connections:



# NanoFASE – Cross cutting delivery:



Conceptual workflow for a framework to deliver dynamic multimedia fate prediction both in a generalised model environment and GIS enabled mode.

## WP1:

Exposure Assessment Framework for ENMs  
*From here comes the “EAF” and the “FFG”*

## WP2:

Integrated Multimedia Fate Model  
*From here comes the “Model Catalogue”*

## WP3:

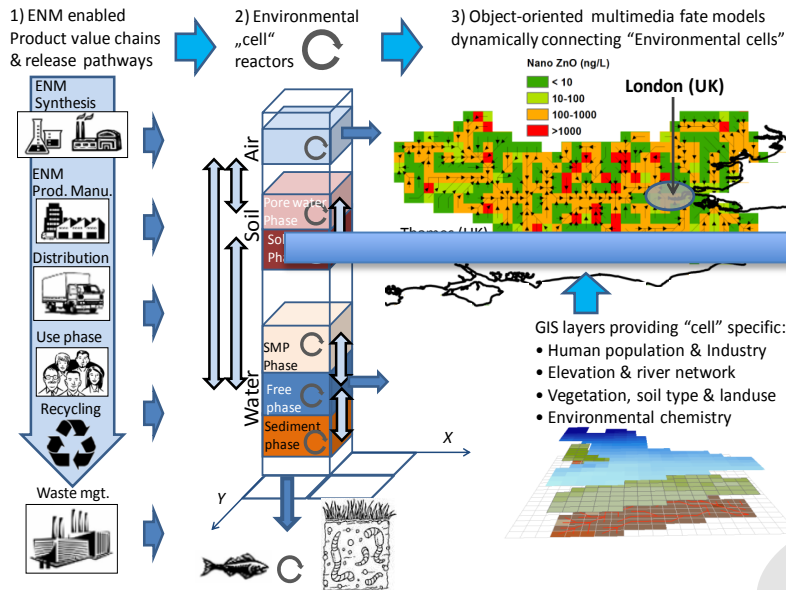
ENM Supply, characterisation,  
& Transformation

*From here comes the “Method Catalogue”*

- Exposure preparation and media
- “Pristine” & “Exposure relevant” ENMs
- Analytics & Characterisation
- “Functional fate assays”



# NanoFASE – What will the EAF look like:

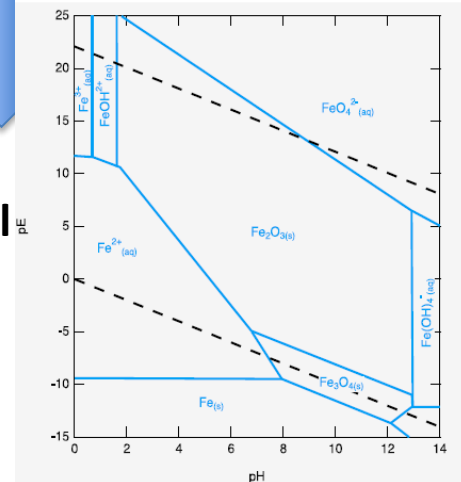
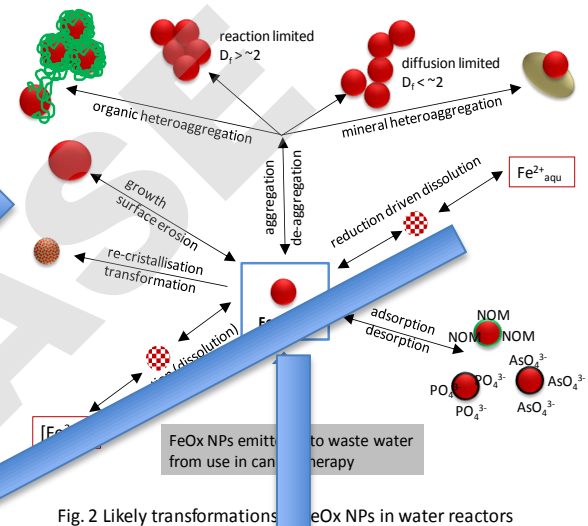


Conceptual workflow for a framework to deliver dynamic multimedia fate prediction both in a generalised model environment and GIS enabled mode.

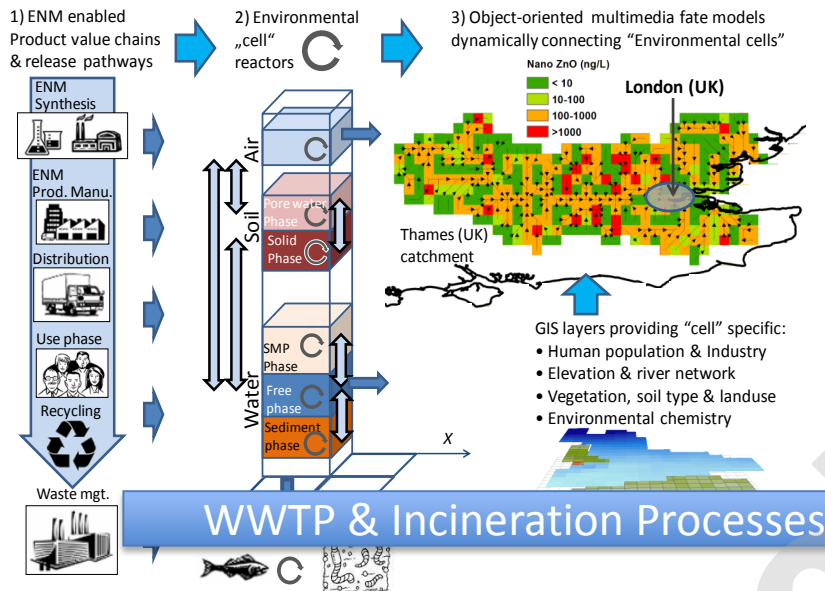
## Methods and protocols



## Summary Environmental Fate



# NanoFASE – What will the FFGs look like:



## The Functional Fate Groups:

- Reducing complexity
- Focusing on the main flows  
e.g. Where 80% of the mass goes  
e.g. Where the most reactive forms go

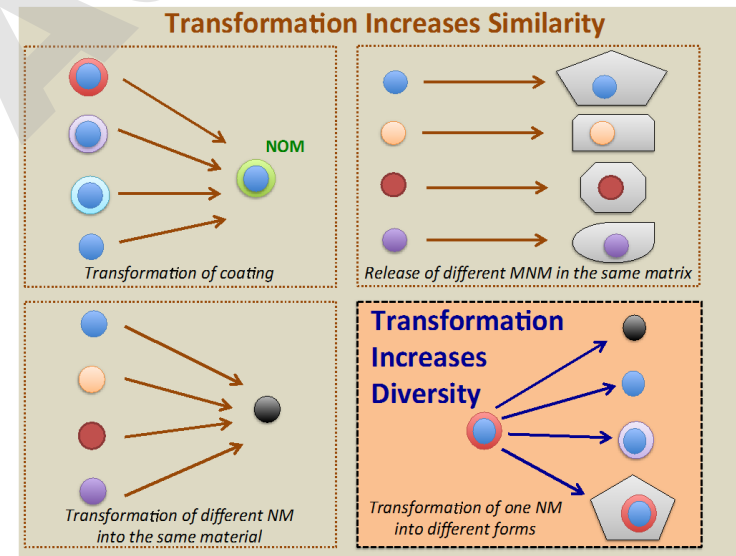


Fig. 1.3 Mitrano & Nowack (EMPA), et al. “Report on environmental transformation reactions” NanoMILE D3.1 – Submitted to ES&T



# Making the work have IMPACT

- How will people find all that we do?
- We have to tell them, show them, and give it to them.
- We have to select the right formats
  - We will use the Advisory Board to guide us
  - They will provide direct feedback and collaboration to the project **AND** the WPs

# Making the work have IMPACT

## ■ The Stake holder part of the AB:

| Name                | Role                       | Affiliation                                  | Expertise   |
|---------------------|----------------------------|--|---|
| Prof. Peter Dobson  | Industry Advisor 1 & Chair | Warwick Manufacturing Group, UK              | Former Director of Oxford University's Science Park housing 24 nano start-up companies (personally led 3) |
| Dr Wendel Wohlleben | Industry Advisor 2         | BASF, Germany                                | Involved in nanotechnology product development and applications   |
| Dr David Calander   | Industry Advisor 3         | Nanotechnologies Industry Association        | Contributions to the development of regulatory support of nanotechnology                                  |
| Fredrick Klaessig   | Industry Advisor 4         | Pennsylvania Bio Nano Systems LLC            | Product development and innovation in nanotechnology  |
| Yasir Sultan        | Regulation Advisor 1       | Environment Canada, Canada                   | Chair Steering Group on risk assessment and regulatory programs, OECD WPMN                                |
| Dr Kathrin Schwirn  | Regulation Advisor 2       | UBA, Germany                                 | Lead in national regulatory body for ENM risk assessment  |
| Simon Hoy           | Regulation Advisor 3       | Environment Agency for England and Wales     | Leads in national regulatory body for ENM risk assessment   |
| Steve Morgan        | Regulation Advisor 4       | Defra, UK                                    | Leads in chemicals and nanotechnology policy  |
| Dr Jenny Holmqvist  | Regulation Advisor 5       | ECHA (verbally accepted after grant awarded) | Head of Evaluation 1, European Chemicals Agency   |
| Andrej Kobe         | Regulation Advisor 5       | DG Environment                               | Chemical and nanotechnology policy oversight  |

# Making the work have IMPACT

## ■ The Academic part of the AB:

|                       |                    |                           |  |
|-----------------------|--------------------|---------------------------|--|
| Prof. Mark Wiesner    | Research Advisor 1 | Duke University, USA      | ENM fate, hazard and risk assessment including categorisation and governance |
| Prof. Mike McLauchlin | Research Advisor 2 | CSIRO, Adelaide, AUS      | International expert in environmental chemistry of trace metals              |
| Prof. Enzo Lombi      | Expert             | Uni South Australia, AUS  | Synchrotron and spectroscopy   |
| Dr Greg Lowry         | Expert             | Uni Pittsburgh, USA       | ENM transformations  |
| Dr Natalie Tufenkji   | Expert             | McGill University         | Colloid behaviour  |
| Dr Marie Croteau      | Expert             | US Geological Survey, USA | ENM bioavailability assessment   |
| Dr Jason Unrine       | Expert             | Uni Kentucky, USA         | Chemistry of ENMs in soils and waters  |
| Prof K. Wilkinson     | Expert             | Uni Motreal               | ENM characterisation   |

The “Experts” will:

- Link directly with selected WPs through collaboration where possible.
- Advise on upcoming events where NanoFASE should be present.

# Making the work have IMPACT

- **Feedback from the 1<sup>st</sup> AB:**
- Need to create “acceptance” for a set of models to begin populating as a community
- Need spatially resolved models
- Need to include chemistry in the models
- Need to consider integration of models, e.g. particle number basis or mass basis.
- Need bio-uptake models
- Need “groupings” for NMs and determine how we define transformations
- Need general models and assays for “screening” fate



Fate and Exposure models for you - [www.nanofase.eu](http://www.nanofase.eu)

NanoFASE