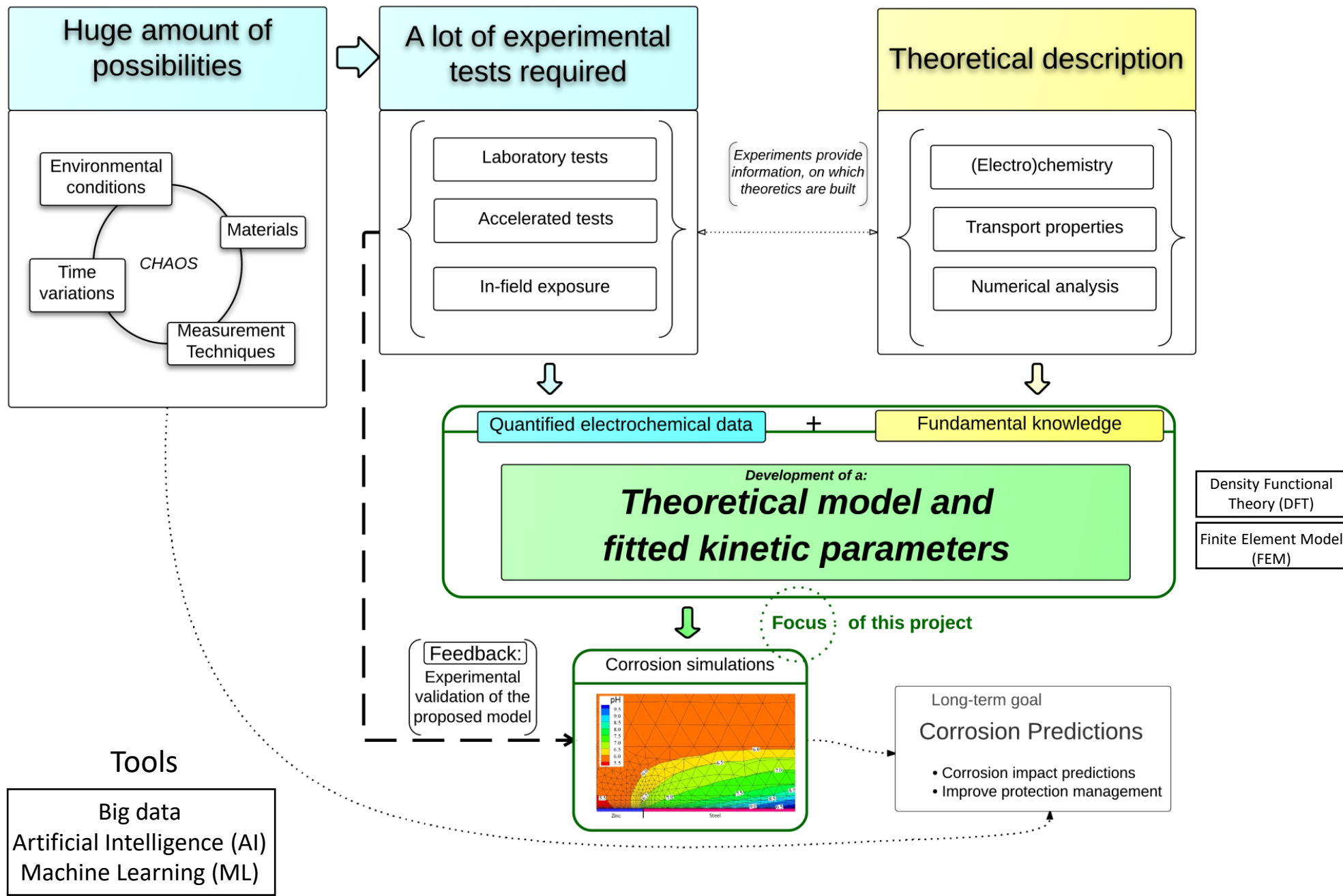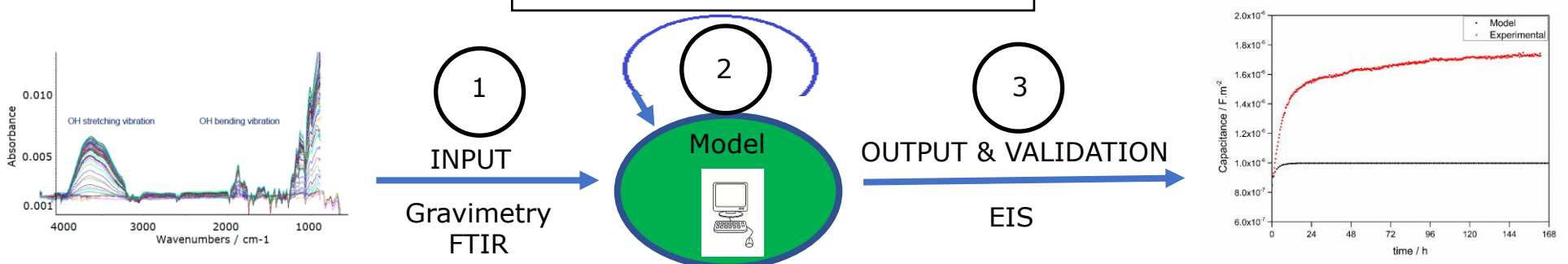# Predictive Corrosion and Protection Research in SURF

Corrosion defined as the degradation of materials due to interaction with their environment is a severe problem that involves enormous costs for modern society. Within the Surface and Electrochemistry engineering research group (SURF) at the Vrije Universiteit Brussel we work on experimental and model approaches to predict corrosion.

Huge amount of possibilities

- Environmental conditions
- Materials
- Time variations
- Measurement Techniques

CHAOS

A lot of experimental tests required

- Laboratory tests
- Accelerated tests
- In-field exposure

Experiments provide information, on which theoretics are built

Theoretical description

- (Electro)chemistry
- Transport properties
- Numerical analysis

Quantified electrochemical data + Fundamental knowledge

Density Functional Theory (DFT)

Finite Element Model (FEM)

Development of a:
Theoretical model and fitted kinetic parameters

Focus of this project

Feedback: Experimental validation of the proposed model

Corrosion simulations

Long-term goal
Corrosion Predictions
- Corrosion impact predictions
- Improve protection management

Tools
Big data
Artificial Intelligence (AI)
Machine Learning (ML)

Corrosion prediction @ SURF
Prediction of transport properties

1 INPUT
Gravimetry FTIR

2 Model

3 OUTPUT & VALIDATION
EIS

Interested in **corrosion prediction research**? Do you want to contribute to moving towards a **sustainable and environmentally-friendly society**? Are you interested in doing either experimental, computational or combined research? Please let us hear from you, we are very excited to work with you!

Experimental research: contact Benny.Wouters@vub.be
Computational research: contact: Nils.Van.Den.Steen@vub.be Mats.Meeusen@vub.be

See you soon!

SURF ELECTROCHEMICAL & SURFACE ENGINEERING RESEARCH GROUP

VUB VRIJE UNIVERSITEIT BRUSSEL