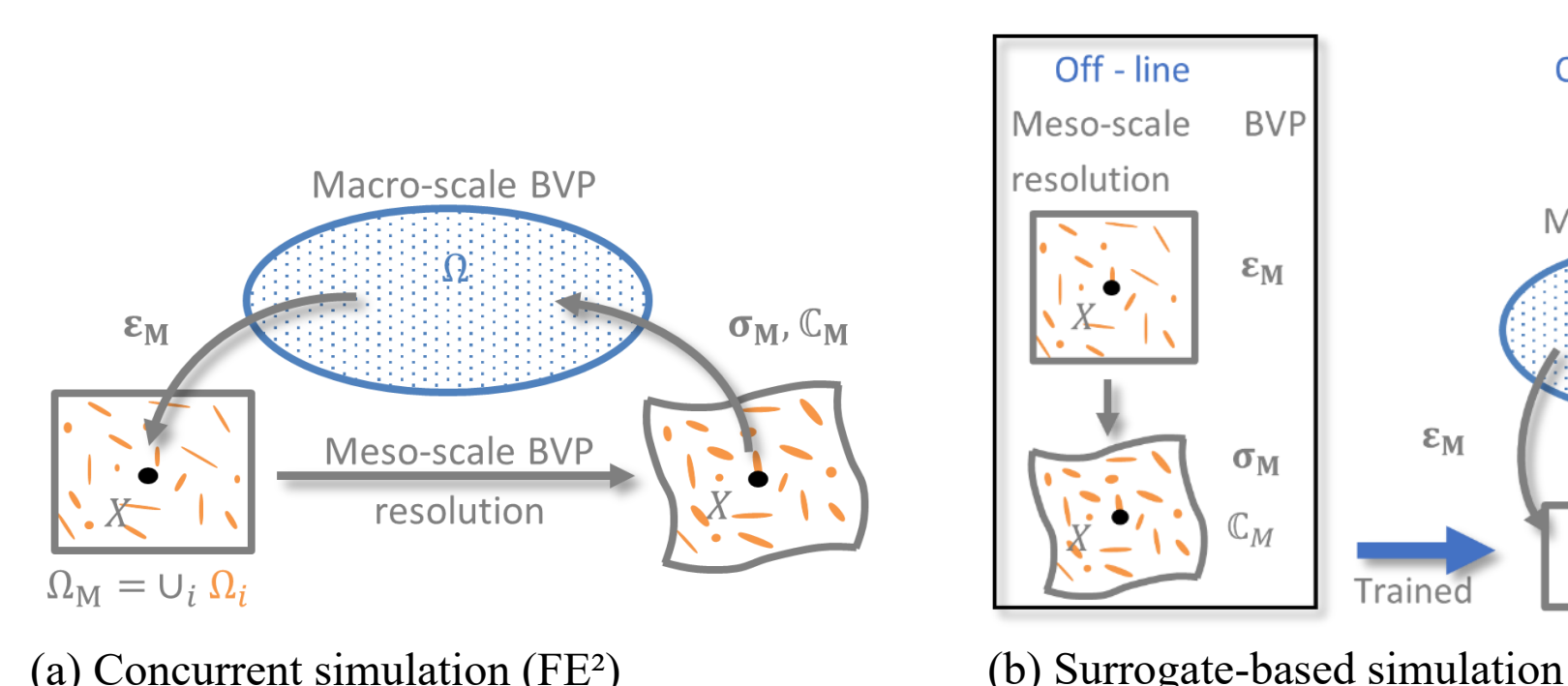




Machine-learning based surrogate of composite micro-scale response in a multi-scale setting

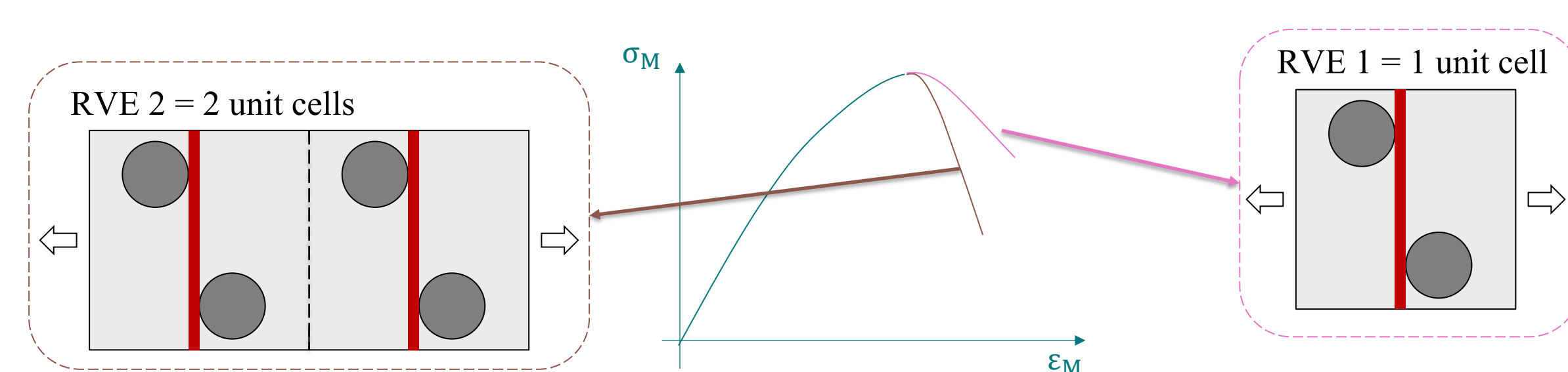
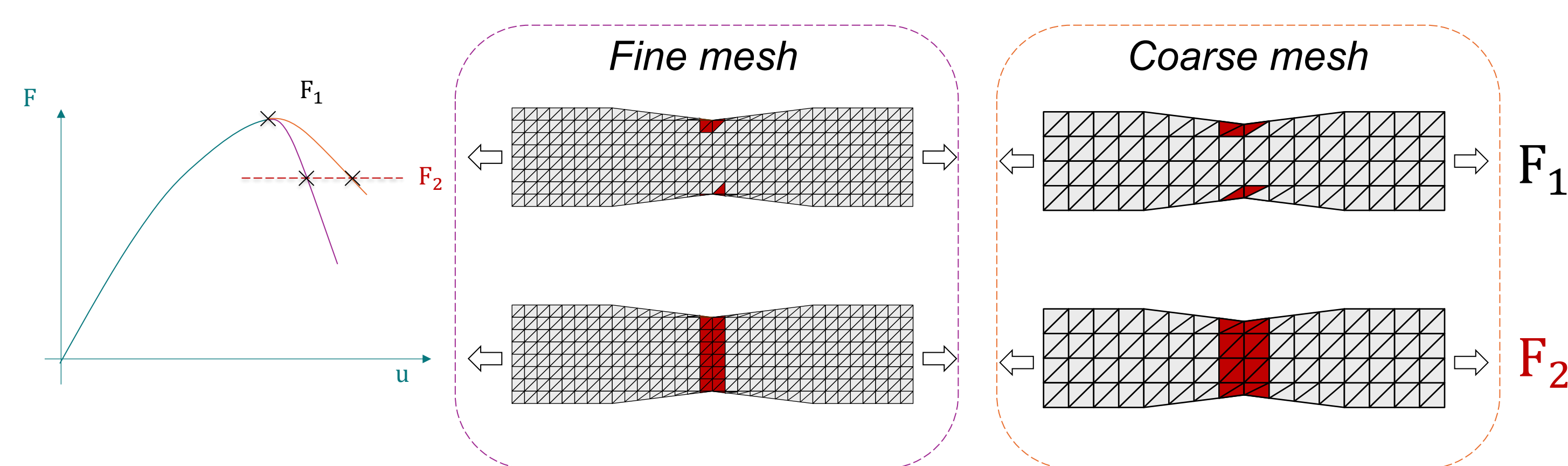
C. Anglade, L. Wu, L. Noels (ULiège, Belgium)

1. Accelerating multi-scale simulations

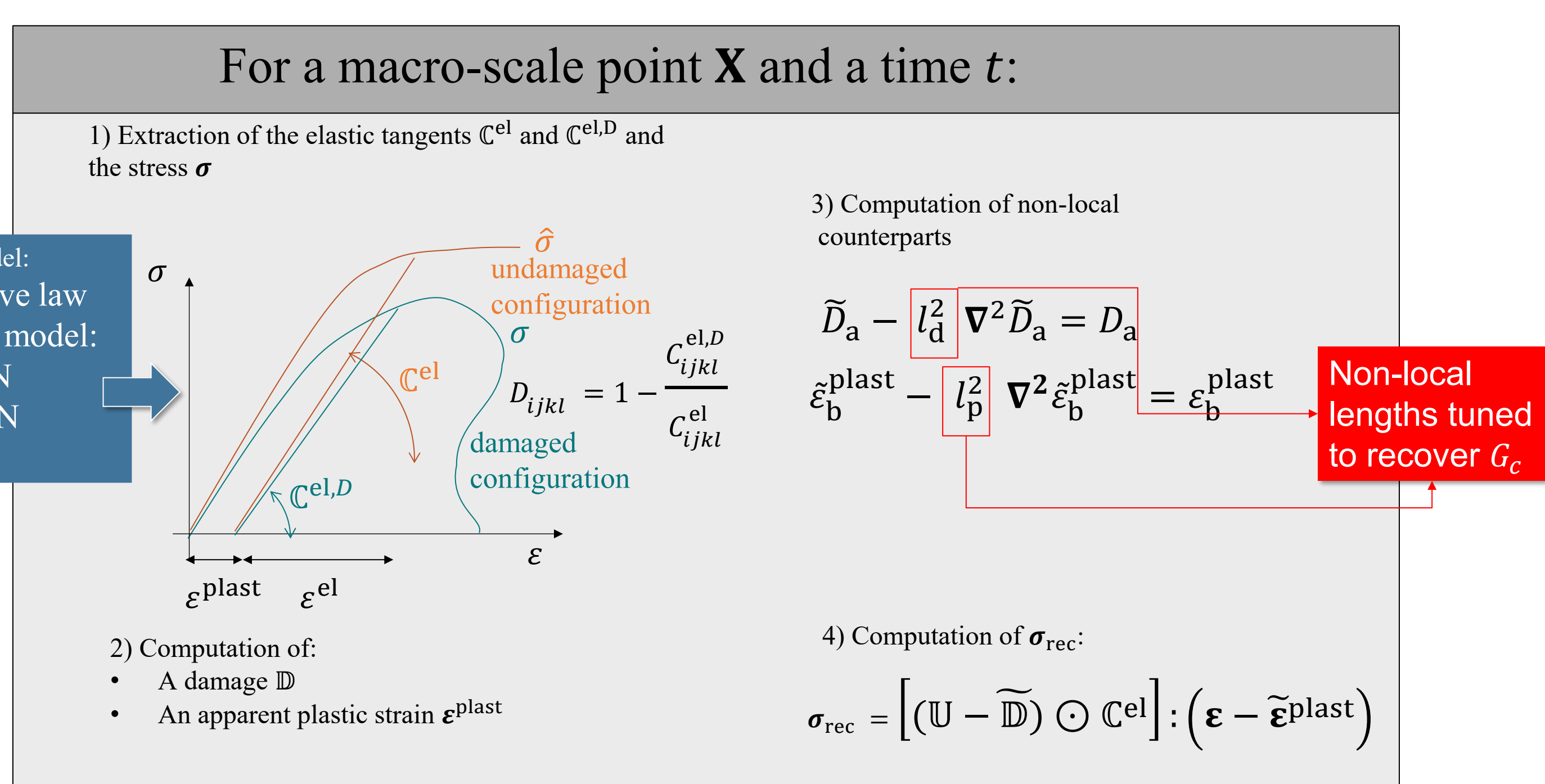


Machine learning-based surrogate for multi-scale simulations to become a reality

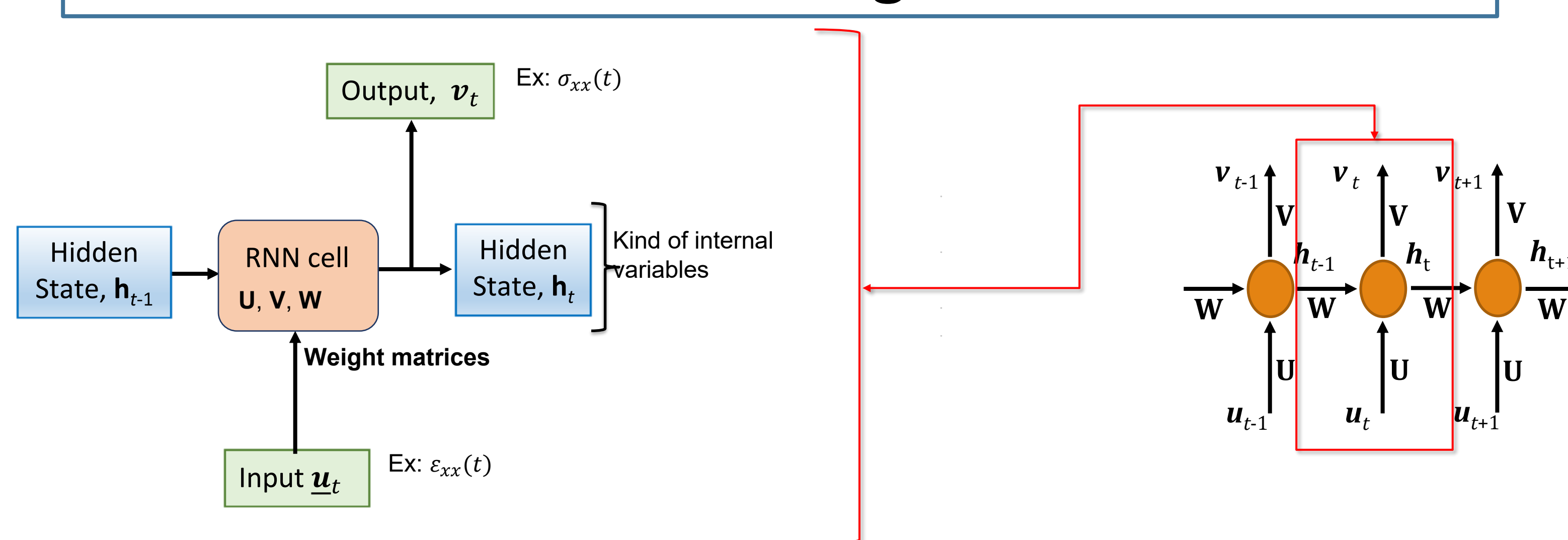
2. Multi-scale simulations with damage



3. Encapsulating non-local framework

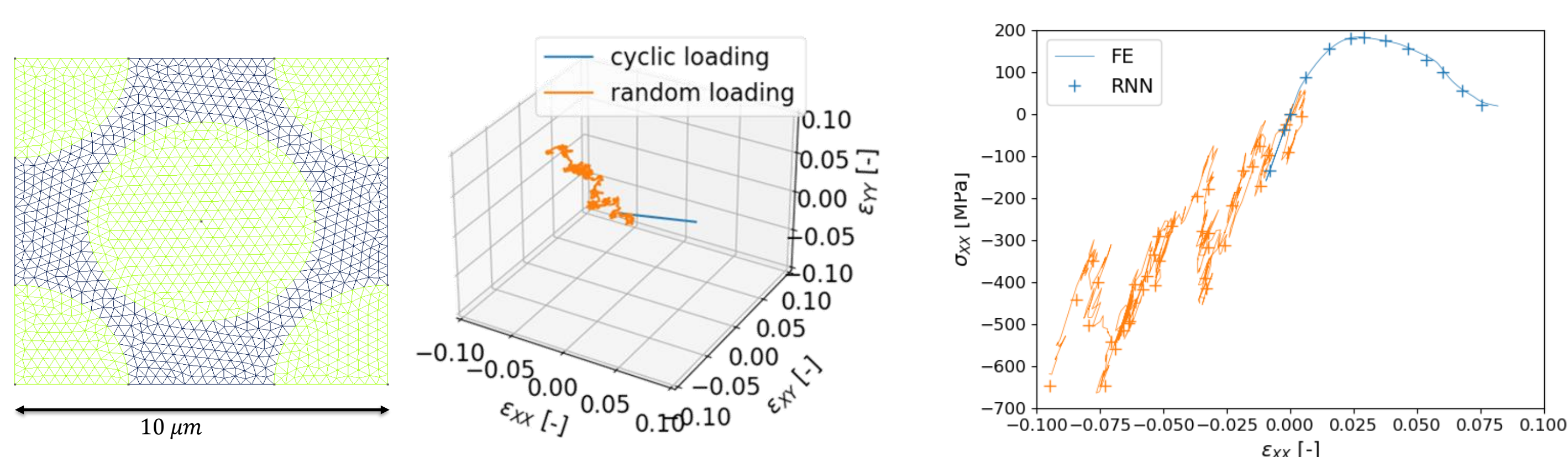


4. RNN as a surrogate model

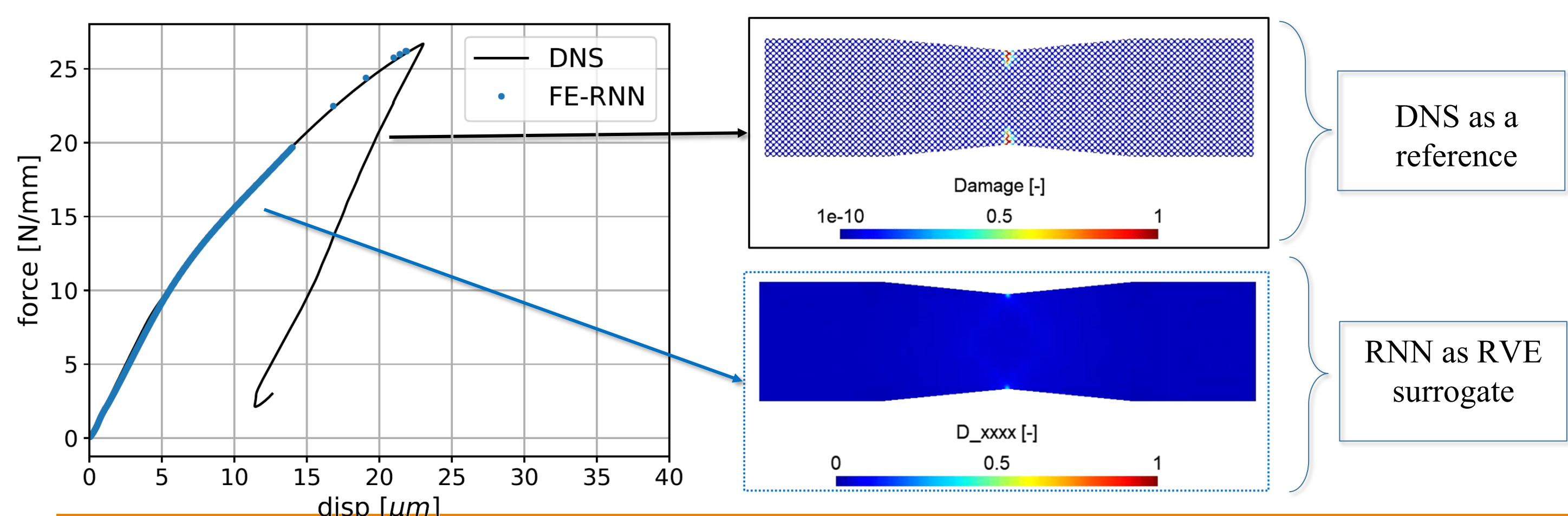


The vector of hidden variables $\mathbf{h}$ play the role of internal variables so that the outputs (stress tensor, undamaged elastic operator and damaged elastic operator) can be predicted from the inputs (strain) history

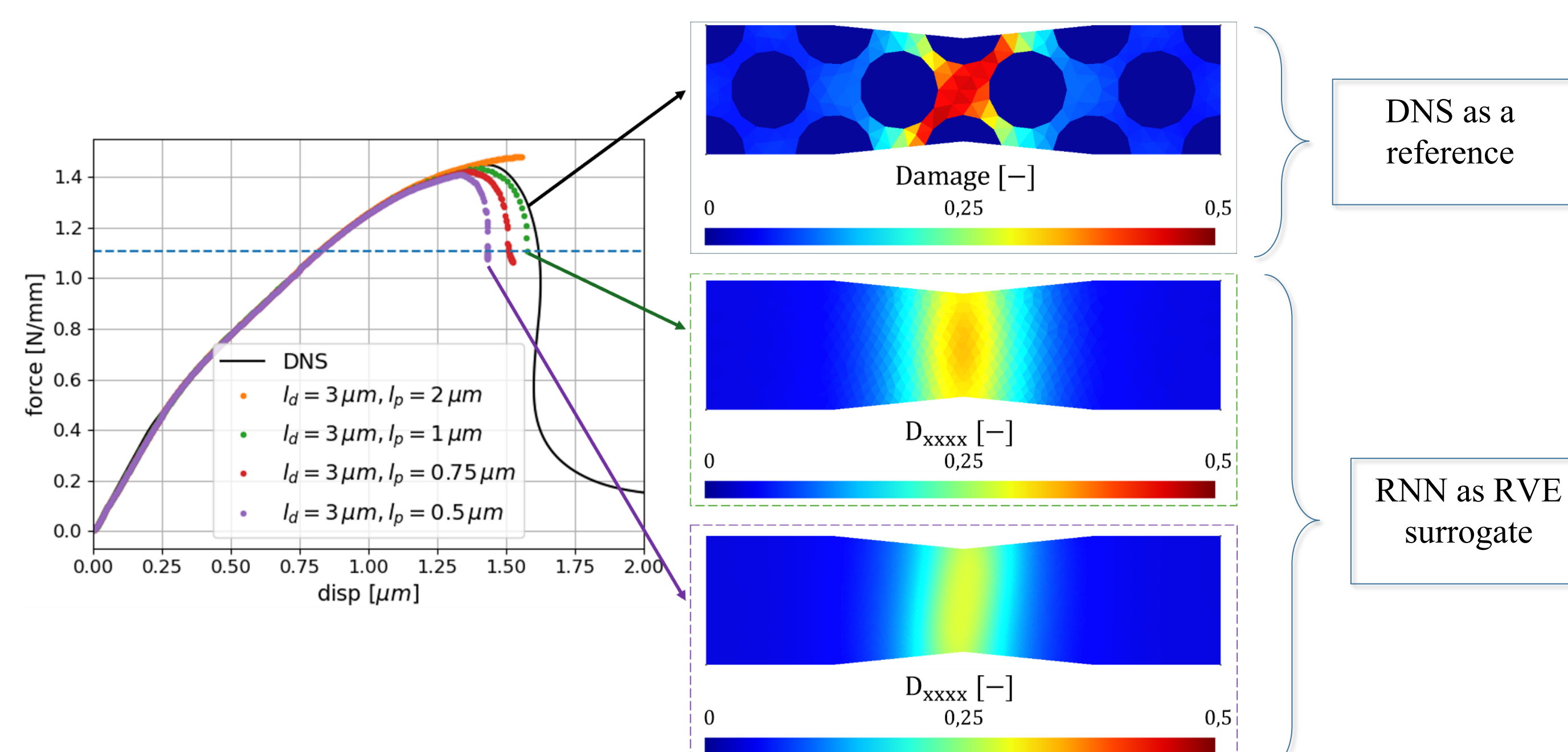
5. RNN training for UD composites



7. Toward structural simulations



6. Calibration of (macro) non-local lengths



Non-local lengths l_d, l_p are identified to recover the same fracture energy as DNS results



didearot-project.eu

[@DIDEAROT_EU](https://twitter.com/DIDEAROT_EU)

[DIDEAROT - HE](https://www.linkedin.com/company/didearot-he)

Cenaero

BSC Barcelona Supercomputing Center Centro Nacional de Supercomputación

AIRBUS

AERNnova

sonaca GROUP

Advisory Board members

SAFRAN

LIÈGE université

ineqi

HEXAGON

tecnal:a

DASSAULT AVIATION

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101056682