

# SMART MULTI-SCALE ZONING TECHNIQUE: DATA- DRIVEN\PHYSICAL MODELING & MATERIAL SUB- DOMAIN ONTOLOGIES

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# SMART MULTI-ZONE DOMAIN ONTOLOGY

## Material Property

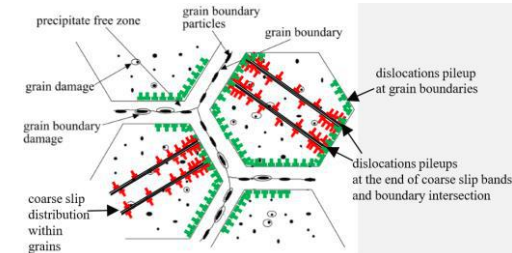
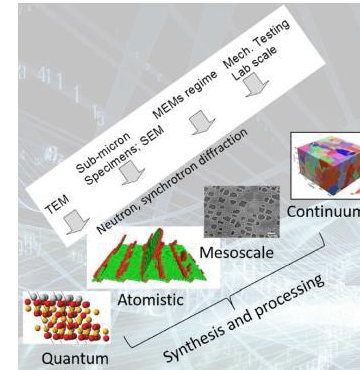
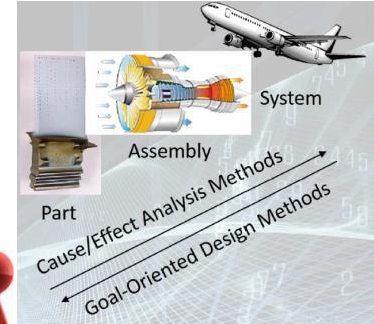
- **Virtual scale\zone driven material information:** Using concepts of hybrid measured\computational\digitized material data libraries at different scales over layers of virtual material zones.
- **Material data exchanger:** smart exchange of material properties between single & multi-scale material databases.

## Material Modeling

- **Multi-scale\zone domain concept:** Using concepts of multi-scaling & multi-resolution with advanced bridging techniques for material modelling at multi-layer zones.
- **AI & ANN concepts :** Using smart technologies in both systematic parameter recognition\patterning for data-driven discovery\ definition and virtual zone layering.

## Material Processes

- **Multi-physical\resolution processes:** Using recent developments in dynamic zoning & overlapping techniques.
- **Smart layer zoning technique:** Using of AI and ANN techniques for dynamic evolution of material and also zonal dynamic positioning.

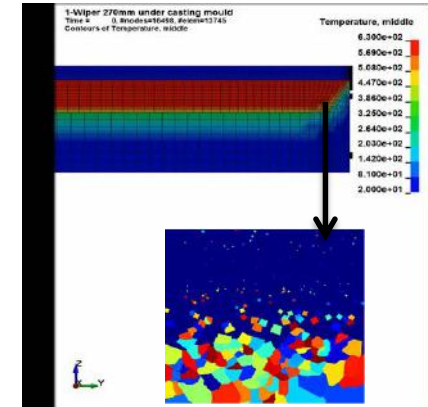
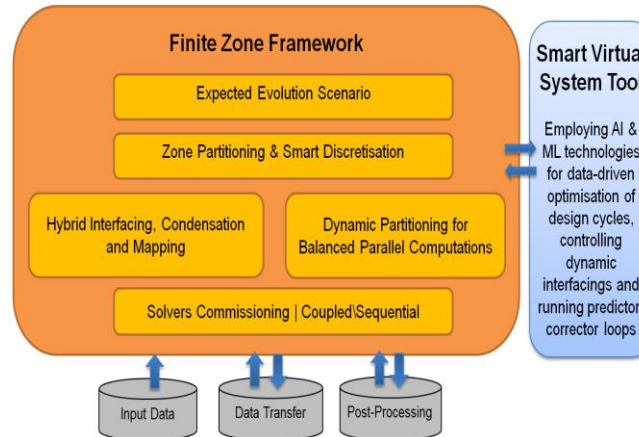
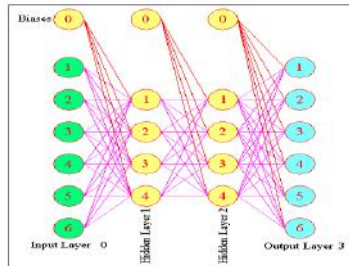


# HYBRID MULTI-SCALE MATERIAL\PROCESS MODELLING

Bridging material modeling (discrete, continuous) at various time\length scales using systematic zoning interpretation

Using our ANN experience from other engineering projects for material digitization\characterization

Using our smart dynamic zoning and also multi-resolution technique for through process\service material evolution concept



# MATERIALS ONTOLOGY: VIRTUAL LAYERED ZONING FOR MATERIAL KNOWLEDGE

Integration of the material data\characteristics at associated scaled zones (time\length scale) using integrated measured\computational\digitized framework

Implementation of full multi-scaling for material\process modelling using recently proposed smart zoning technique

Evaluation of the material evolution during material processes (through processes) using multi domain\sub-domain ontology technique

