

Multiscale Simulation Software for High-Performance Materials

Developed by JSOL Corporation
Includes multi-scale engines (nanometer to micrometer) and pre-post functions
Trusted by over 100 industrial users globally

| The Challenge

SLOW, EXPENSIVE PHYSICAL TESTING

Every lab iteration costs weeks.

BLIND SPOTS IN NANOSCALE BEHAVIOR

How does silica really disperse in rubber? What is the polymer doing at the filler surface?

MANUAL OPTIMIZATION

Manual optimization is a trial-and-error guessing game.

| Applications

Rubber & Elastomers

Design compounds with lower rolling resistance and better filler dispersion.

Energy & Batteries

Model electrolytes, binders and composite electrode materials.

Adhesives, Paints & Coatings

Fine-tune mechanical and chemical properties without costly trials.

Polymers & Composites

Optimize formulations for strength, weight, and sustainability.

RUBBER & ELASTOMERS:

Filler dispersion, polymer-filler interfaces and viscoelastic response.

| The Impact with J-OCTA

FASTER TIME-TO-MARKET

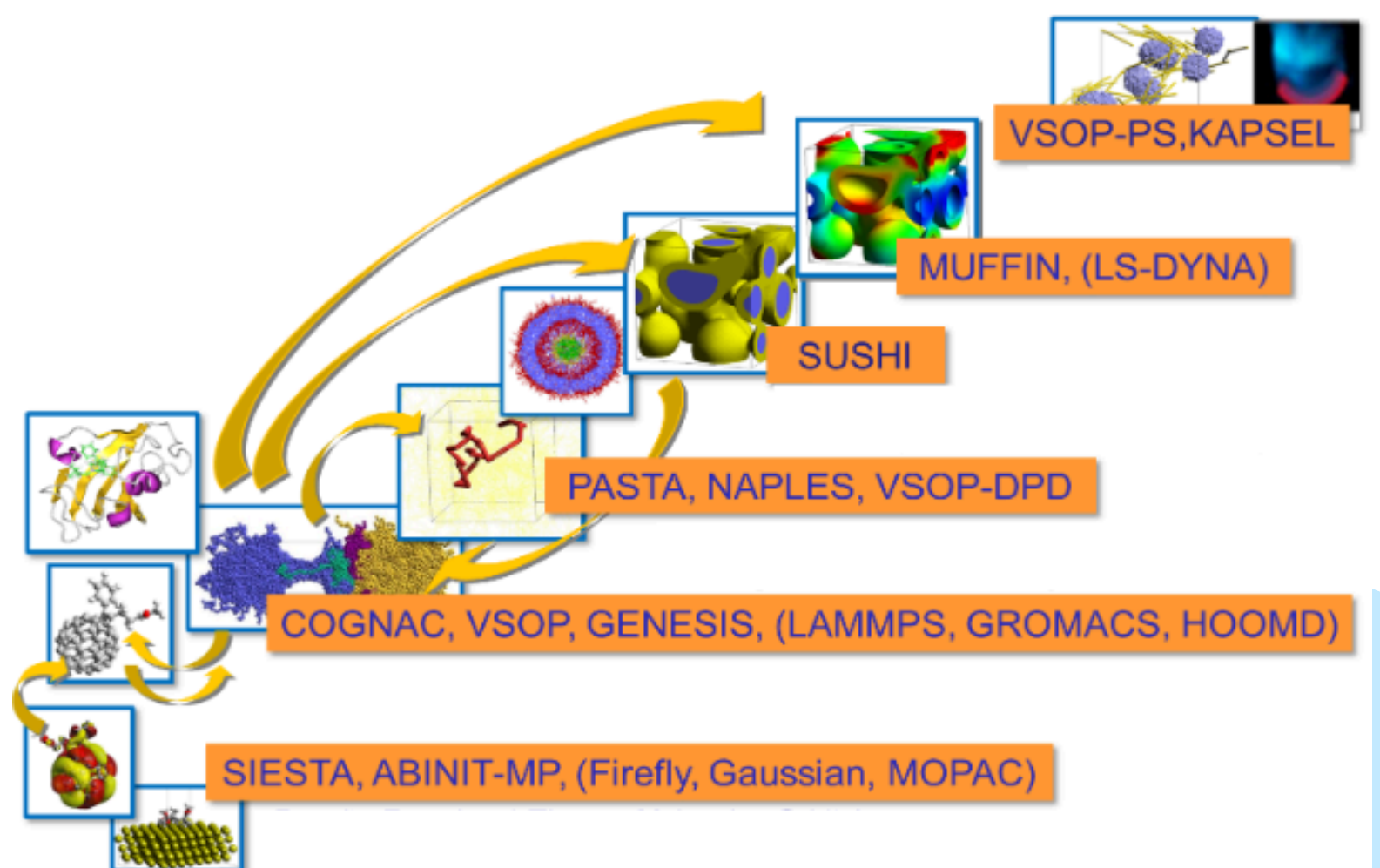
Predict material properties from the first design iteration, across scales.

CUT LAB COSTS

Run fewer physical trials and spend less on materials and lab time.

MAKE DATA-DRIVEN DECISIONS

Base formulation decisions on molecular structure and predicted properties.



The Magic Triangle at Material Level

Rolling resistance, wet grip and wear pull against each other.
J-OCTA gives you the material-level physics underneath.

FUEL EFFICIENCY

Where the Energy Is Lost

- Lower rolling resistance by analyzing polymer melts and simulating viscoelastic response across frequency and temperature.

FILLED DISPERSION

Control the Filler Network

- Analyze 3D filler dispersion (silica, carbon black) in rubber matrices.
- Optimize filler morphology, spatial distribution, nanoparticle aggregation and their effect on energy dissipation.

POLYMER-FILLER INTERFACE

Interfacial Reinforcement

- Model the polymer-filler interface and the bound-rubber layer that forms around the particle.
- Compare silane coupling agents and surface treatments by interaction strength and compatibility.
- Quantify distinct polymer and filler contributions to local stress under deformation.