

# TIANYI LI

Research engineer with 10+ years of experience in advanced simulation methods, bridging data-driven modeling and physics-based mechanics across scales

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## EXPERIENCES

### Simulation Technology Specialist

**Dassault Systèmes, Corporate Research**

📅 Jan 2020 – now

📍 Vélizy-Villacoublay, France

- **Deep Material Network** for multiscale material modeling: novel formulation for parameterized microstructures, **PyTorch** and **UMAT** (C++) implementations, industrialization with R&D, integration into both **CATIA** and **SIMULIA** products
- **Data-driven (model-free) computational mechanics**: theoretical and numerical investigations, extensions to nonlinear and inelastic behaviors, manifold learning, fixed-point acceleration
- **Physics-Informed Neural Network** (PINN): early research for solid mechanics applications using **PyTorch**, mixed formulations
- **GPU-based voxel solver** for simulation-driven design (C++, Python): fictitious domain method, matrix-free approach, geometric multigrid for linear elasticity and (transient) heat transfer, iterative linear solvers
- **Partitioned multiphysics coupling** methods (C++, Python): results mapping, temporal interpolation, dynamic mode decomposition surrogates, fluid-structure interaction simulations using **OpenFOAM** and **CalculiX**
- Development of various **ParaView Python plugins** for real-time simulation data interaction and visualization
- Patent drafting; journal and conference paper publications; participation in academic and industrial conferences

### Research and Development Engineer

**Promold**

📅 Apr 2017 – Dec 2019

📍 Paris, France

- Injection molding (process) and integrative multiscale (structural) simulations of fiber-reinforced polymers with **Moldflow**, **Moldex3D**, **Optistruct**, **Radioss**, **code\_aster** and **Digmat**
- **Rheological modeling** of fiber-reinforced composites: anisotropic fiber-dependent viscosity and fiber orientation evolution. Code development through **Moldflow API** in C++
- Numerical tools development (Python) for results **mapping**, **mean-field homogenization** of fiber composites and **uncertainty propagation** using data-driven surrogates
- Adaptive optimization methodology of fiber orientation model parameters using **Kriging** and **Expected Improvement**
- Buckling analysis of fiber-reinforced materials with the finite element library **FEniCS** and eigenvalue solver **SLEPc**

### PhD Candidate in Solid Mechanics

**IMSIA (CNRS-EDF-ENSTA research lab)**

📅 Oct 2013 – Sep 2016

📍 Palaiseau, France

- **Phase-field fracture** modeling of brittle materials: variational formulation and numerical simulations (📄 **PhD thesis**)
- Code development (Fortran) in an industrial explicit dynamics finite software **Europlexus** using **PETSc**: quasi-perfect scaling efficiency obtained
- Contributions (C++) to the open-source finite element library **FEniCS**

## MOST PROUD OF

🔗 **Recent integration of the Deep Material Network model into Abaqus** thanks to continuous efforts and collaboration with SIMULIA teams

📢 **My speech in front of 900 people** engagement with @Eloquence de la Différence as a volunteer and treasurer

## STRENGTHS

Nonlinear mechanics

Computational mechanics

Scientific machine learning

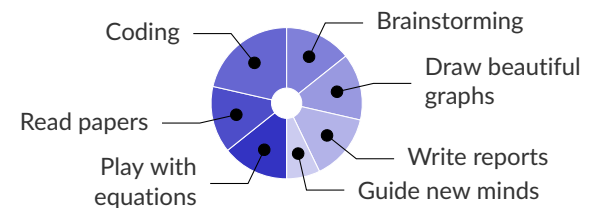
Programming

CAE tools

Scientific communication

Listening and empathy

## TYPICAL DAY AT WORK



## LANGUAGES

Chinese



French / English



## EDUCATION

PhD in Solid Mechanics

**Univ. Paris-Saclay (Ecole Polytechnique)**

📅 2013 – 2016

📍 Palaiseau, France

Engineer in Mechanics

**Université de Technologie de Compiègne**

📅 2010 – 2013

📍 Compiègne, France

Bachelor in Mechanics

**Université de Technologie Sino-Européenne de Shanghai**

📅 2007 – 2010

📍 Shanghai, China