# 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 network architectures for parameterized microstructures, multiphysics property prediction, incrementally affine formulation for nonlinear behaviors, **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**: 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, industrialization with R&D
- **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 **Digimat**
- **Rheological modeling** of fiber-reinforced composites: anisotropic fiber-dependent viscosity and fiber orientation evolution. Implementation via **Moldflow Solver 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**)
- Implementation in **FEniCS** (Python) and in an industrial explicit dynamics code **Europlexus** (Fortran) using **PETSc**: quasi-perfect scaling 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** and engagement with Eloquence de la Différence as a volunteer and treasurer

## STRENGTHS

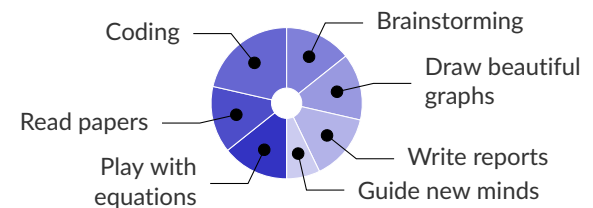Nonlinear mechanics    Computational mechanics    Scientific machine learning    Programming    CAE tools    Scientific communication    Listening and empathy

## TYPICAL DAY AT WORK



Coding · Brainstorming · Draw beautiful graphs · Read papers · Write reports · Play with equations · Guide new minds

## 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