

Yuriy Sinchuk

Curriculum Vitae

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PRIMARY SKILLS

Applied Mathematics, Scientific Programming, Machine Learning, Image Processing, Numerical Modelling, Finite Element Methods, Computational Geometry, Numerical Optimization

PROGRAMMING: Python, C++, Matlab, Fortran

LIBRARIES & FRAMEWORKS: TensorFlow, NumPy/SciPy, Scikit-learn, Scikit-image

ENVIRONMENTS & SOFTWARE: Linux shell, Git, HPC, SLURM, ImageJ, Abaqus

WORK EXPERIENCE

02/2024–PRESENT Laboratory of Mechanics Paris-Saclay, ENS Paris-Saclay, France

Postdoctoral researcher / Industrial collaboration with Safran Aircraft Engines

Numerical modelling of composite materials forming process.

Technologies: Numerical analysis software, Fortran, HPC, Linux shell

01/2022–01/2024 Centre for Mathematical Morphology – MINES Paris, PSL University, France

Postdoctoral researcher / Industrial collaboration with Safran Aircraft Engines

- Conceptualization and implementation of innovative solutions to automate the reconstruction of textile composite microstructures from image data.
- Developing deep learning techniques for processing micro-computed tomography (μ CT) images to model textile composite structures in aircraft engines.

Technologies: Deep Learning, Python, TensorFlow, Image Processing, HPC, Linux shell, Git

05/2018–11/2021 Mechanics of Composite Materials Group of Ghent University, Belgium

Postdoctoral researcher / Industrial collaboration with Siemens PLM Software

Deep learning segmentation and denoising of low-contrast and noisy μ CT images

Technologies: Deep Learning, μ CT Image Processing, Python, HPC

05/2015–05/2018 Physics and Mechanics of Materials Dept., University of Poitiers, ENSMA, France

Postdoctoral researcher

Image-based modelling of composite materials

- Design and implementation of a mesh generation method for multi-material image input
- Multi-scale and multiphysics modelling of composite materials and poly-crystals
- Material subroutines implementation

Technologies: Mesh Generation, Image Processing, Python, Matlab, Fortran, HPC, Abaqus

02/2010–11/2014 Institute of Engineering Mechanics, Karlsruhe Institute of Technology, Germany

Scientific employee

Composite materials modelling and optimal design

- Topology optimization of metal/ceramic microstructures
- μ CT based material modelling for homogenization of thermo-mechanical properties
- Damage and plasticity modelling

Technologies: Matlab, Optimization, FEM, Abaqus, Material Modelling

07/2009–01/2010 LLC “Mathematical Centre”, Ukraine

R&D engineer

Software development for modelling natural gas flow in the networks of pipes (FEM, Delphi)

04/2004–03/2007 SoftServe Inc., Ukraine

C++ software developer

11/2004–10/2008 I. Franko National University of Lviv, Ukraine

PhD in Math.

Thesis: *Adaptive schemes of finite element method for singularly perturbed convection-diffusion problems*

Skills: C++, Numerical Modelling, FEM, Teaching Responsibilities

EDUCATION

09/1999–06/2004 I. Franko National University of Lviv, Ukraine

M. Sc. in Applied Mathematics and Informatics

LANGUAGE SKILLS

English (fluent), German (basic), Russian (near native), Ukrainian (native)

SELECTED PUBLICATIONS

- Sinchuk, Y. et al. 2022. X-ray CT based multi-layer unit cell modeling of carbon fiber-reinforced textile composites: segmentation, meshing and elastic property homogenization. *Composite Structures* 298.
- Sinchuk, Y. et al. 2021. Geometrical and deep learning approaches for instance segmentation of CFRP fiber bundles in textile composites. *Composite Structures* 277.
- Sinchuk, Y. et al. 2020. Variational and deep learning segmentation of very-low-contrast X-ray computed tomography images of carbon/epoxy woven composites. *Materials* 13(4).

Full publication list: <https://scholar.google.com/citations?hl=en&user=HTOhzwsAAAAJ>