



## **SWAPNEEL AMIT PATHAK**

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### EDUCATION

#### **Ph.D. | Physics**

University of Strasbourg

Aug 2017 – Mar 2021

Strasbourg, France

#### **Integrated Master of Science | Physics, Major: condensed matter physics**

Indian Institute of Technology Roorkee

Jul 2009 – May 2014

Roorkee, India

### WORK EXPERIENCE

#### **Visiting Scientist**

Scientific Support Unit for Computational Science, MPSD, CFEL

Oct 2021 – present

Hamburg, Germany

- Machine-learning models to cluster simulation data, extracting micromagnetic material parameters, and 3D reconstruction of magnetization field from experimental data
- Magnetic skyrmion dynamics using vortex laser pulses
- Accelerating micromagnetic simulation Python package using NVIDIA CUDA kernels

#### **Postdoctoral researcher**

University of Southampton, Computational Modelling Group

Apr 2022 – Jan 2023

Southampton, UK

- Developing and maintaining Ubermag (micromagnetic simulations in Python)
- Unsupervised machine-learning algorithms to cluster micromagnetic simulation data

#### **Ph.D. Candidate (IdEx Fellow)**

CNRS, IPCMS, University of Strasbourg

Aug 2017 – Mar 2021

Strasbourg, France

- Numerical implementation of DMI in micromagnetism
- Study of magnetic skyrmions in FeGe nanospheres
- Skyrmion confinement in non-centrosymmetric ferromagnets

#### **Research Associate**

Tata Institute of Fundamental Research (TIFR)

Jul 2015 – Jul 2017

Hyderabad, India

- Study of magnetization dynamics in FM, AFM, and Insulator multi-layers with STT
- Set up of Molecular Beam Epitaxy facility
- FPGA based automation and differential pumping for Ultra High Vacuum (UHV)

#### **Research Assistant**

Tata Institute of Fundamental Research (TIFR)

Apr 2015 – Jun 2015

Hyderabad, India

- Simulation of magnetic multi-layers with OOMMF

#### **Research Assistant**

Indian Institute of Science (IISc)

Jul 2014 – Dec 2014

Bangalore, India

- Characterization of Au nanowires and graphene based gas sensors
- Study of change in resistance noise of sensors due to physisorption of different gases

#### **Graduate Research Assistant**

Indian Institute of Technology Roorkee

May 2013 – May 2014

Roorkee, India

- Calculation of photonic band gaps using Finite Difference Time Domain (FDTD)

## CONFERENCES AND PRESENTATIONS

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<b>Oral presentation at Conference on Magnetism and Magnetic Materials</b>	Nov 2022 USA (Hybrid)
<b>Workshop on Ubermag at SOL-SKYMAG 2022</b>	Jun 2022 Spain
<b>Oral Presentation at INTERMAG 2020</b>	May 2020 Virtual
<b>Oral Presentation at DPG Spring Meeting 2019</b>	Apr 2019 Germany

## HONORS AND AWARDS

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<b>IdEx Fellow (Initiative for Excellence)</b> University of Strasbourg	Oct 2017 – Mar 2021 Strasbourg, France
<b>INSPIRE Scholarship</b> Ministry of Science and Technology	Jul 2009 – May 2014 Roorkee, India

## TEACHING EXPERIENCE

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<b>Co-Supervised three M.Sc. thesis</b> Imperial College, London	Jul 2022 – Sep 2022 London, UK
<b>Teaching under-privileged girls using flipped classroom technique</b> Tata Institute of Fundamental Research	Jan 2016 – Jan 2017 Hyderabad, India

## PUBLICATIONS

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S. J. R. Holt; M. Lang; J. C. Loudon; T. J. Hicken; D. Cortés-Ortuño; **S. A. Pathak**; M. Beg; H. Fangohr, Towards virtual micromagnetic experiments: mag2exp, *in preparation for submission 2022*, draft available [here](#)

**S. A. Pathak**; R. Hertel, Three-Dimensional Chiral Magnetization Structures in FeGe Nanospheres, *Physical Review B* 2021, 103, 104414

**S. A. Pathak**; R. Hertel, Geometrically Constrained Skyrmions, *Magnetochemistry* 2021, 7(2), 26

## SKILLS

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- Micromagnetic and atomistic simulation studies of magnetic materials
- Epitaxial growth and characterisation of magnetic thin films in ultra-high vacuum
- Implementation of machine learning algorithms in study of magnetic materials
- Software engineering: Version control, unit tests, CI/CD
- Maintenance and setup of High Performance Computation (HPC) clusters
- Programming skill in Python, C/C++, Rust, Bash, and MATLAB

## REFERENCE

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<b>Prof. Hans Fangohr</b> hans.fangohr@mpsd.mpg.de	MPSD, CFEL Hamburg, Germany
<b>Dr. habil. Riccardo Hertel</b> hertel@ipcms.unistra.fr	IPCMS, CNRS Strasbourg, France