

Yogesh Verma

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📁 yoverma.github.io/yoverma.github.io/

Education

2022- **PhD Machine Learning**, *Department of Computer Science*, Aalto University, Finland.

Research in Physics-inspired Deep Representation Learning

Supervisors: Prof. Vikas Garg, Dr. Markus Heinonen and Prof. Samuel Kaski

2016–2021 **B.S & M.S Physics**, **CGPA: 9.3**, IISER Mohali, Punjab, India.

INSPIRE Scholarship awardee (2016-2021)

Master Thesis: Applications of deep learning techniques in characterizing quark gluon plasma

Publications

- 2024 **Topological Neural Networks go Persistent, Equivariant and Continuous**, [Yogesh Verma*](#), [G. Mercatali*](#), [A. Freitas](#) and [V. Garg](#), **NeurIPS 2024**, Vancouver, Canada.
- 2024 **Topological Neural Networks go Persistent, Equivariant and Continuous**, [Yogesh Verma](#), [Amauri Souza](#) and [Vikas Garg](#), **ICML 2024**, Vienna, Austria.
- 2024 **ClimODE: Climate Forecasting with Physics-Informed Neural ODEs**, **Oral (Top 1 %)**, [Yogesh Verma](#), [Markus Heinonen](#) and [Vikas Garg](#), **ICLR 2024**, Vienna, Austria.
- 2023 **AbODE: Ab initio Antibody Design using Conjoined ODEs**, [Yogesh Verma](#), [Markus Heinonen](#) and [Vikas Garg](#), **ICML 2023**, Hawaii, USA.
- 2022 **Modular Flows: Differential Molecular Generation**, [Yogesh Verma](#), [Samuel Kaski](#), [Markus Heinonen](#) and [Vikas Garg](#), **NeurIPS 2022**, New Orleans, USA.

Research Experience

- 2024 **ML Research Intern**, *Device Concept Lab*, Huawei, Finland.
- Developed novel ML-based probabilistic methods for simulations and inference for wearable technology, and incorporated in-vivo data for real world applicability.
 - Investigated deployment challenges of ML methods in real-world scenario and developed ML software pipeline for online evaluation.
- 2022- **Doctoral Researcher**, *QuML group*, Aalto University, Espoo, Finland.
- Formulated and developed ML methodologies for critical applications in modeling dynamical systems, generative modeling, protein modeling, drug discovery, etc.
 - Investigated challenges and led the development of ML software for substantial contribution internationally.
 - Authored scientific publications at top-tier international conferences
- 2021 **Research Associate**, *EHEP group*, University of Zurich, Zurich, Switzerland.
- Researched and analyzed data to evaluate to examine the detection of outliers, leading to a critical contribution to CMS Experiment
 - Increased the efficiency to detect rare events by 20% by developing physics-inspired ML-based software incorporating essential inductive biases with minimal human intervention.
- 2020 **Summer Research Fellow**, *CMS Experiment*, CERN & University of Zurich, Geneva.
- Examined core methodologies and data to resolve the challenges around optimizing sensitivity for event analysis.
 - Optimized the sensitivity by 10% by formulating ML methods and developed software for production with implementation in the CMS Experiment pipeline.

- 2019 **Summer Undergraduate Researcher**, *ATLAS group*, Polish Academy of Sciences, Krakow, Poland.
- Analyzed and evaluated data in order to discover novel ML methods to improve the current benchmark on the classification of events
 - Developed novel ML methods for events classification tasks and developed software leading to a crucial contribution and implementation in the ATLAS experiment pipeline.

Invited Talks

ELLIS APML Seminar *ELLIS Helsinki*
 Workshop on Physics-Informed Learning, ELISE Wrap Up Conference *ELLIS, ELISE*
 AI4Science Talks *University of Stuttgart and NEC Labs Europe*
 Research Seminar *MLLS Institute, Denmark*

Skills

Programming, Scripting Languages

Python, C++, R, MATLAB, \LaTeX

Machine Learning

TensorFlow, Keras, Pytorch, Scikit-Learn, OpenCV

Operating Systems

LINUX, Windows, Mac

Leadership Experience

- 2020 **Convener**, *Drama Club*, IISER Mohali.
 ○ Led organization of skills workshops, and practice sessions; increased the total number of yearly events by 40% from the previous year
- 2019 **Organisational head**, *Street Play*, INSOMNIA, IISER Mohali.
 ○ Organization of street play in annual cultural and science fest, with 100+ participants
- 2019 **Organisational head**, *Foundation Day*, IISER Mohali.
 ○ Organization of the visit of 1000+ school students to the university for science demonstrations.

Scholastic Achievements/Awards

ICML 2024 Travel Award *ICML*
 INSPIRE Scholarship fellow *DST, Government of India*
 Indian Academy of Science Summer Fellow *Indian Academy of Sciences*
 AIR-41, Nationwide Education Scholarship Test *SEBI, India*

Extra-Curricular Activities

Sports	Inter IISER Sports Meet, Cricket Gold Champion	2018,19
Sports	Intra-IISER Sports Meet, Volleyball Gold Champion	2019,20
Theatrics	Participated in Street Play, Won 2nd Prize	INSOMNIA 2017,18,19
Social	Demonstrated Street Play for Unnao Rape Case	
Demonstration	Scientific Demonstration in Foundation Day of IISER Mohali	2019