N I R A J
KUSHWAHA

BASIC INFO

DOB	24/02/1997
E-mail	kushwaha@csh.ac.at / nirajkkushwaha1@gmail.com
Website	nirajkushwaha.github.io (gets updated more frequently than this CV)
LinkedIn	Link to profile
Bluesky	Link to profile

CURRENT POSITION

RESIDENT SCIENTIST / PHD CANDIDATE   2021-
Complexity Science Hub Vienna | *Josefstädter Str. 39, 1080 Vienna*
(Supervisor: Dr. Edward D. Lee, Prof. Stefan Thurner)

- Discovering mesoscale for chains fo armed conflicts
- Building dynamical models to explain population-level scaling in sessile organisms
- Joint affiliation with the Department of Physics, University of Vienna (Supervisor: Prof. Christoph Dellago)

EDUCATION

MSc. in PHYSICS   2018-2020
Indian Institute of Technology (IIT) Indore | *Khandwa Rd, Simrol, Madhya Pradesh 453552*

- Thesis topic: "Engineering chimera and novel technique based on machine learning"
- Minor project on, "Crop classification using satellite imagery"
- Minor project on, "Credit card fraud detection"

BSc. in PHYSICS (HONS.)   2015-2018
Institute of Science- BHU | *Ajagara, Varanasi, Uttar Pradesh 221005*

High school diploma   2014
Atomic Energy Central School | *Tarapur, India*

INTERNSHIP

MASTER THESIS INTERN   **2019-2020**

Complex Systems Lab, IIT Indore | *Khandwa Rd, Simrol, Madhya Pradesh 453552*
(Supervisor: Prof. Sarika Jalan)

- Worked on my master thesis for a year

WINTER INTERN   **2018**

Astrophysical Sciences Division, Bhabha Atomic Research Station | *Anushaktinagar, Mumbai - 400 094*
(Supervisor: Mr. Bitan Ghosal)

- Main project topic: "Synchrotron emission by charged particles in a non-uniform magnetic field"
- Minor project on data analysis of radiation data from "Major Atmospheric Cerenkov Experiment Telescope"

ACHIEVEMENTS

National level exams
- Top 1% national level toppers (All India Rank=66) in National Graduate Physics Examination-2018
- All India Rank=432 in the national entrance exam for the Indian Institute of Technology in 2018

Awards
- Runner-up winner of the Bertalanffy Doctoral Student Award 2025 given be the Complex Systems Society France.
- Significant Milestone Award of the 2023 Exner Lectures in the category of PhD by The Exner Foundation
- Gold medal in National Science Olympiad conducted by All India Science Teacher's Association

PUBLICATIONS

Articles

Kushwaha, Niraj and Edward D Lee (Aug. 2023). "Discovering the mesoscale for chains of conflict". In: *PNAS Nexus* 2.7, pgad228. ISSN: 2752-6542. DOI: 10.1093/pnasnexus/pgad228.

Kushwaha, Niraj, Naveen Kumar Mendola, Saptarshi Ghosh, Ajay Deep Kachhvah, and Sarika Jalan (2021). "Machine learning assisted chimera and solitary states in networks". In: *Frontiers in Physics* 9, p. 513969.

Kushwaha, Niraj, Woi Sok Oh, Shlok Shah, and Edward D Lee (2025). "Common indicators hurt armed conflict prediction". In: *arXiv preprint arXiv:2503.00265*.

CONFERENCES

INTERNATIONAL CONFERENCE ON COMPUTATIONAL SOCIAL SCIENCE   **2025**
Norrköping, Sweden

- Gave a talk.

THE GERMAN PHYSICS SOCIETY MEETING   **2025**
Regensburg, Germany

- Gave a talk titled, "Common Indicators Hurt Armed Conflict Prediction".

NETSCIX   2025
Indore, India

- Gave a talk titled, "The Triangle of Madness (Using causal network to uncover types of armed conflict)".

AI FOR DEVELOPING COUNTRIES FORUM (AIFOD)   2024
Vienna, Austria

- Attended as an invited delegate.

THE GERMAN PHYSICS SOCIETY MEETING   2024
Berlin, Germany

- Gave a talk titled "Conflict Classification Using Multinomial Mixture Models and Conflict Avalanches"

CONFERENCE ON COMPLEX SYSTEMS   2023
Salvador, Brazil

- Gave two talks, "From Narrative to Systematic Scales of Conflicts" and "Systematic Procedure for Extracting Causal Connections in Conflict Cascades"

NETSCI   2023
Vienna, Austria

- Volunteer with the organization team.

THE GERMAN PHYSICS SOCIETY MEETING   2023
Dresden, Germany

- Gave a talk titled "Population waves in sessile organisms"

CONFERENCE ON COMPLEX SYSTEMS (CCS)   2022
Palma de Mallorca, Spain

- Gave a talk titled "Multiscale causal structure in armed conflicts"
- Presented a poster

THE GERMAN PHYSICS SOCIETY MEETING   2022
Regensburg, Germany

- Gave a talk titled "Multiscale causal structure in armed conflicts"

CONFERENCE ON COMPLEX SYSTEMS (CCS)   2020
Online

- Gave a talk titled "Machine Learning assisted Chimera states in Networks"

UN 75 DIALOGUE   2020
Online, India

- Gave a talk at a local chapter of the UN 75 dialogues.

HARVARD COLLEGE US-INDIA INITIATIVE   2017
Mumbai, India

- Delegate

SCHOOLS AND WORKSHOPS

UNDERSTANDING DEMOCRATIZATION AND CIVIL WAR WITH STATISTICAL PHYSICS
Vienna, Austria
2025

- Gave an invited talk titled "Common Indicators Hurt Armed Conflict Prediction"

LIPARI SCHOOL ON COMPUTATIONAL COMPLEX AND SOCIAL SYSTEMS
Lipari, Italy
2023

LIPARI SCHOOL ON COMPUTATIONAL COMPLEX AND SOCIAL SYSTEMS
Lipari, Italy
2022

BIGSSS SUMMER SCHOOL IN COMPUTATIONAL SOCIAL SCIENCE
Groningen, Netherlands
2022

- Project topic: "Dynamical reciprocity in office spaces"

THE GREAT RESIGNATION WORKSHOP
Vienna, Austria
2022

GLOBAL INITIATIVE OF ACADEMIC NETWORKS (GIAN) WORKSHOP
Indore, India
2018

- Topic of workshop: "Network Science- from structure to dynamic"

MEDIA

Articles
- The Military's Recruitment of AI Has Already Begun
- Forscher beobachten "Lawinen" bei Ausbreitung bewaffneter Konflikte
- Scientists develop method to predict the spread of armed conflicts

Audio/Video
- Gave a live interview at the BBC newsday radio show.
- Our paper was featured in Sabine Hossenfelder's science news.

OTHER ACTIVITIES

Positions of Responsibility
- **PhD representative** at the Complexity Science Hub Vienna (one term)
- **Climate counsellor** appointed by the International Centre for Culture and Education at BHU (one term)
- **House captain** during school (one year)
- **House sports captain** during school (one year)
- **House prefect** during school (two years)

Volunteering Work
- Volunteered at the Buddy Project, Vielmehr für Alle! in Vienna
- Started an NGO with college friends at BHU to educate underprivileged kids in Varanasi

Select Online Courses

- "Network Dynamics of Social Behaviour" by University of Pennsylvania
- "From big bang to dark energy by Prof. Hitoshi Murayama" by University of Tokyo
- "Social Norms, Social change" by UNICEF
- "Digital media marketing" by Internshala

Model United Nations Conferences

- Attended the "BHU-Model United Nations conference, 2016"
- Attended the "Ganges model united nations, 2017"
- Attended the 'Malviya national youth parliament 2017"