NIRAJ KUSHWAHA

BASIC INFO

DOB	24/02/1997
E-mail	kushwaha@csh.ac.at / nirajkkushwaha1@gmail.com
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LinkedIn	Click here
Link to short CV	Click here

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 AND RESEARCH VISITS

RESARCH VISIT **2024**

Complexity Science research group, Universität Potsdam | *Potsdam, Germany - 14476*

(PI: Prof. Karoline Wiesner)

- Research visit for a week

MASTER THESIS INTERN **2019-2020**

Complex Systems Lab, IIT Indore | *Indore, India - 453552*

(Supervisor: Prof. Sarika Jalan)

- Worked on my master thesis for a year

WINTER INTERN **2018**

Astrophysical Sciences Division, Bhabha Atomic Research Station | *Mumbai, India - 400094*

(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 and grants

- Winner of the yrCCS Bridge Grant 2025
- 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 **2025**
Vienna, Austria

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

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

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

BIGSSS SUMMER SCHOOL IN COMPUTATIONAL SOCIAL SCIENCE **2022**
Groningen, Netherlands

- Project topic: "Dynamical reciprocity in office spaces"

THE GREAT RESIGNATION WORKSHOP **2022**
Vienna, Austria

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

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

MEDIA APPEARANCES

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

Students/interns supervised

- **Shlok Shah** from Princeton University in 2024.
- **Clemens Baldzuhn** from TU Berlin in 2024.)

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. Taught refugee high school students.
- 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"