

N I R A J

KUSHWAHA

BASIC INFO

DOB	24/02/1997
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Link to short CV	Click here

CURRENT POSITION

RESIDENT SCIENTIST / PHD CANDIDATE	2021-
<i>Complexity Science Hub Vienna</i> <i>Josefstädter Str. 39, 1080 Vienna</i> (Supervisor: Dr. Edward D. Lee, Prof. Stefan Thurner)	
<ul style="list-style-type: none">• Discovering mesoscale for chains of 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
<i>Indian Institute of Technology (IIT) Indore</i> <i>Khandwa Rd, Simrol, Madhya Pradesh 453552</i>	
<ul style="list-style-type: none">• 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
<i>Institute of Science- BHU</i> <i>Ajagara, Varanasi, Uttar Pradesh 221005</i>	
High school diploma	2014
<i>Atomic Energy Central School</i> <i>Tarapur, India</i>	

INTERNSHIP AND RESEARCH VISITS

RESEARCH 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

- Runner-up winner of the Bertalanffy Doctoral Student Award 2025 given by 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 <i>Norrköping, Sweden</i>	2025
<ul style="list-style-type: none"> • Gave a talk. 	
THE GERMAN PHYSICS SOCIETY MEETING <i>Regensburg, Germany</i>	2025
<ul style="list-style-type: none"> • Gave a talk titled, "Common Indicators Hurt Armed Conflict Prediction". 	
NETSCIX <i>Indore, India</i>	2025
<ul style="list-style-type: none"> • Gave a talk titled, "The Triangle of Madness (Using causal network to uncover types of armed conflict)". 	
AI FOR DEVELOPING COUNTRIES FORUM (AIFOD) <i>Vienna, Austria</i>	2024
<ul style="list-style-type: none"> • Attended as an invited delegate. 	
THE GERMAN PHYSICS SOCIETY MEETING <i>Berlin, Germany</i>	2024
<ul style="list-style-type: none"> • Gave a talk titled "Conflict Classification Using Multinomial Mixture Models and Conflict Avalanches" 	
CONFERENCE ON COMPLEX SYSTEMS <i>Salvador, Brazil</i>	2023
<ul style="list-style-type: none"> • Gave two talks, "From Narrative to Systematic Scales of Conflicts" and "Systematic Procedure for Extracting Causal Connections in Conflict Cascades" 	
NETSCI <i>Vienna, Austria</i>	2023
<ul style="list-style-type: none"> • Volunteer with the organization team. 	
THE GERMAN PHYSICS SOCIETY MEETING <i>Dresden, Germany</i>	2023
<ul style="list-style-type: none"> • Gave a talk titled "Population waves in sessile organisms" 	
CONFERENCE ON COMPLEX SYSTEMS (CCS) <i>Palma de Mallorca, Spain</i>	2022
<ul style="list-style-type: none"> • Gave a talk titled "Multiscale causal structure in armed conflicts" • Presented a poster 	
THE GERMAN PHYSICS SOCIETY MEETING <i>Regensburg, Germany</i>	2022
<ul style="list-style-type: none"> • Gave a talk titled "Multiscale causal structure in armed conflicts" 	

SCHOOLS AND WORKSHOPS	CONFERENCE ON COMPLEX SYSTEMS (CCS) <i>Online</i>	2020
	<ul style="list-style-type: none"> Gave a talk titled "Machine Learning assisted Chimera states in Networks" 	
	UN 75 DIALOGUE <i>Online, India</i>	2020
	<ul style="list-style-type: none"> Gave a talk at a local chapter of the UN 75 dialogues. 	
	HARVARD COLLEGE US-INDIA INITIATIVE <i>Mumbai, India</i>	2017
	<ul style="list-style-type: none"> Delegate 	
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	UNDERSTANDING DEMOCRATIZATION AND CIVIL WAR WITH STATISTICAL PHYSICS <i>Vienna, Austria</i>	2025
	<ul style="list-style-type: none"> Gave an invited talk titled "Common Indicators Hurt Armed Conflict Prediction" 	
	LIPARI SCHOOL ON COMPUTATIONAL COMPLEX AND SOCIAL SYSTEMS <i>Lipari, Italy</i>	2023
	LIPARI SCHOOL ON COMPUTATIONAL COMPLEX AND SOCIAL SYSTEMS <i>Lipari, Italy</i>	2022
	BIGSSS SUMMER SCHOOL IN COMPUTATIONAL SOCIAL SCIENCE <i>Groningen, Netherlands</i>	2022
	<ul style="list-style-type: none"> Project topic: "Dynamical reciprocity in office spaces" 	
	THE GREAT RESIGNATION WORKSHOP <i>Vienna, Austria</i>	2022
	GLOBAL INITIATIVE OF ACADEMIC NETWORKS (GIAN) WORKSHOP <i>Indore, India</i>	2018
	<ul style="list-style-type: none"> Topic of workshop: "Network Science- from structure to dynamic" 	
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MEDIA	Articles	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Gave a live interview at the BBC newscast 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"