

# N I R A J

## KUSHWAHA

### BASIC INFO

DOB	24/02/1997
E-mail	kushwaha@csh.ac.at / nirajkushwaha1@gmail.com
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LinkedIn	<a href="#">Click here</a>
Link to short CV	<a href="#">Click here</a>

### CURRENT POSITION

<b>RESIDENT SCIENTIST / PHD CANDIDATE</b>	<b>2021-</b>
<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"><li>• Discovering mesoscale for chains of armed conflicts</li><li>• Building dynamical models to explain population-level scaling in sessile organisms</li><li>• Joint affiliation with the Department of Physics, University of Vienna (Supervisor: Prof. Christoph Dellago)</li></ul>	

### EDUCATION

<b>MSc. in PHYSICS</b>	<b>2018-2020</b>
<i>Indian Institute of Technology (IIT) Indore</i>   <i>Khandwa Rd, Simrol, Madhya Pradesh 453552</i>	
<ul style="list-style-type: none"><li>• Thesis topic: "Engineering chimera and novel technique based on machine learning"</li><li>• Minor project on, "Crop classification using satellite imagery"</li><li>• Minor project on, "Credit card fraud detection"</li></ul>	
<b>BSc. in PHYSICS (HONS.)</b>	<b>2015-2018</b>
<i>Institute of Science- BHU</i>   <i>Ajagara, Varanasi, Uttar Pradesh 221005</i>	
<b>High school diploma</b>	<b>2014</b>
<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

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

	<b>CONFERENCE ON COMPLEX SYSTEMS (CCS)</b> <i>Online</i>	<b>2020</b>
	<ul style="list-style-type: none"> <li>Gave a talk titled "Machine Learning assisted Chimera states in Networks"</li> </ul>	
	<b>UN 75 DIALOGUE</b> <i>Online, India</i>	<b>2020</b>
	<ul style="list-style-type: none"> <li>Gave a talk at a local chapter of the UN 75 dialogues.</li> </ul>	
<b>SCHOOLS AND WORKSHOPS</b>	<b>HARVARD COLLEGE US-INDIA INITIATIVE</b> <i>Mumbai, India</i>	<b>2017</b>
	<ul style="list-style-type: none"> <li>Delegate</li> </ul>	
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	<b>UNDERSTANDING DEMOCRATIZATION AND CIVIL WAR WITH STATISTICAL PHYSICS</b> <i>Vienna, Austria</i>	<b>2025</b>
	<ul style="list-style-type: none"> <li>Gave an invited talk titled "Common Indicators Hurt Armed Conflict Prediction"</li> </ul>	
	<b>LIPARI SCHOOL ON COMPUTATIONAL COMPLEX AND SOCIAL SYSTEMS</b> <i>Lipari, Italy</i>	<b>2023</b>
	<b>LIPARI SCHOOL ON COMPUTATIONAL COMPLEX AND SOCIAL SYSTEMS</b> <i>Lipari, Italy</i>	<b>2022</b>
	<b>BIGSSS SUMMER SCHOOL IN COMPUTATIONAL SOCIAL SCIENCE</b> <i>Groningen, Netherlands</i>	<b>2022</b>
	<ul style="list-style-type: none"> <li>Project topic: "Dynamical reciprocity in office spaces"</li> </ul>	
	<b>THE GREAT RESIGNATION WORKSHOP</b> <i>Vienna, Austria</i>	<b>2022</b>
	<b>GLOBAL INITIATIVE OF ACADEMIC NETWORKS (GIAN) WORKSHOP</b> <i>Indore, India</i>	<b>2018</b>
	<ul style="list-style-type: none"> <li>Topic of workshop: "Network Science- from structure to dynamic"</li> </ul>	
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<b>MEDIA APPEARANCES</b>	<b>Articles</b>	<ul style="list-style-type: none"> <li>The Military's Recruitment of AI Has Already Begun</li> <li>Forscher beobachten "Lawinen" bei Ausbreitung bewaffneter Konflikte</li> <li>Scientists develop method to predict the spread of armed conflicts</li> </ul>
	<b>Audio/Video</b>	<ul style="list-style-type: none"> <li>Gave a live interview at the BBC newscast radio show.</li> <li>Our paper was featured in Sabine Hossenfelder's science news.</li> </ul>

## OTHER ACTIVITIES

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### 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"