



KNOWLEDGE INCUBATION FOR TEQIP
IIT KANPUR

TEQIP Workshop
on
Recent Research Trends in Non-linear Dynamics
December 11 -15, 2018



TEQIP WORKSHOP
ON
**RECENT RESEARCH TRENDS IN NONLINEAR
DYNAMICS**

December 11, 2019
Venue: PBCEC Building

Organized by: Dr. Sagar Chakraborty
Department of Physics
IIT Kanpur





More Pictures: [Here](#)

ABOUT

This workshop aimed at introducing the participants to the basics of nonlinear dynamics from the experts in the respective field. Subsequently, the participants were encouraged to attend selected talks of the [CNSD2019](#) where they got to know the latest developments in the field of nonlinear dynamics research and would get to interact with the researchers in person.

WORKSHOP ORGANIZER

1. Dr. Sagar Chakraborty

Associate Professor
Department of Physics
Indian Institute of Technology Kanpur
<http://home.iitk.ac.in/~sagar/>



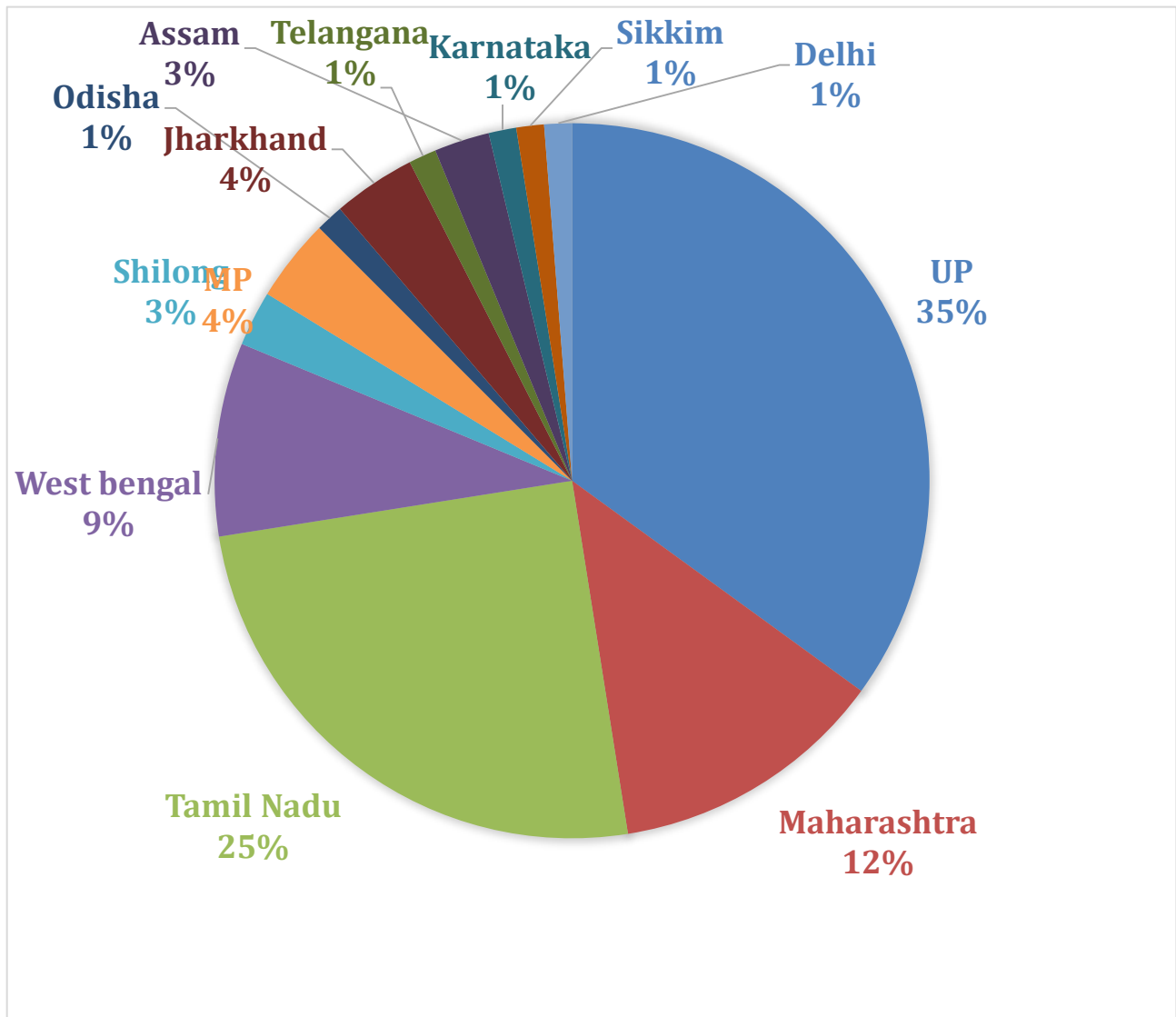
LIST OF SPEAKERS

1. Dr. Jayant Kumar Bhattacharjee, S.N Bose National Centre for Basic Sciences
2. Dr. Sagar Chakraborty, IIT Kanpur

PARTICIPATING INSTITUTES

S. No.	Institute Name	No. of Participants
1	IIT Kanpur	22
2	IIT Bombay	10
3	IIT Madras	20
4	NIT Durgapur	6
5	NIT Meghalaya	2
6	IIT Indore	3
7	VSSUT, Sambalpur	1
8	BIT Mesra	2
9	IIT Hyderabad	1
10	AMU, Aligarh	3
11	IIT Guwahati	2
12	NIT Karnataka	1
13	NIT Sikkim	1
14	MNNIT Allahabad	1
15	UNSIET, VBS Purvanchal University, Jaunpur	1
16	IET BU Jhansi	1
17	IIT Delhi	1
18	Chaibasa Engineering College	1
19	IIT Kharagpur	1
	Total	80

STATEWISE PARTICIPATION



SCHEDULE

December 11	
Time	Event
9:45 – 10:45	Introduction to Fractals <i>Dr. Sagar Chakraborty</i>
10:45 – 11:00	<i>High Tea</i>
11:00 – 12:00	Basics of Nonlinear Maps and Flows I <i>Dr. Jayanta Kumar Bhattacharjee</i>
13:00 – 14:30	<i>Lunch Break</i>
14:30 – 15:30	Basics of Nonlinear Maps and Flows II <i>Dr. Jayanta Kumar Bhattacharjee</i>
15:30 – 16:30	Synchronization <i>Dr. Jayanta Kumar Bhattacharjee</i>
16:30 – 17:00	Tea Break
17:00 – 18:00	Introduction to Pattern Formation <i>Dr. Jayanta Kumar Bhattacharjee</i>

[Click here for schedule from December 12 to 15, 2019](#)

OUTCOME

This workshop was held in association with CNSND 2019. The Conferences on Nonlinear Systems & Dynamics provided a forum for bringing the various groups working in the area of Nonlinear Systems and Dynamics on a single platform for exchanging views and reporting research findings. Participants got exposed to experts in this area and they interacted with them about their research work. Poster presentation were also held. Participants were introduced to following topics:

- Fractals, fractional dimension's meaning, topological dimension, box dimension.
- Dynamics and dynamical systems in general, conservative and nonconservative, one-dimensional systems
- Transcritical bifurcation, Pitchfork bifurcations (forward and backward), hysteresis, why are one dimensional systems relevant, two-dimensional systems
- Classification of fixed points in two dimensions-nodes, spirals, centre and saddle, Hopf bifurcations, Van der Pol oscillator, Limit cycles, Index of a closed curve, Brusselator as an example of all bifurcations in one.
- Three dimensional dynamical systems, Lorenz model, Meaning of chaos.
- Synchronization: firefly trying to synchronize with a flashing source, Kuramoto oscillator synchronization in the mean-field limit, Synchronization of two coupled chaotic systems (two Lorenz models)
- Turing instability, Reaction Diffusion systems and pattern formation

Course Webpage	https://www.teqipiitk.in/workshop/2019/rrtnd2019/
Pictures	https://www.teqipiitk.in/image-gallery/wid/81
Lecture Video	YouTube link

Organizer's Report: [Click here](#)