## INDIAN WOMEN AND MATHEMATICS (IWM)

## **ANNUAL CONFERENCE 2020-21**

## **CONFERENCE REPORT**

Department of Mathematics, Indian Institute of Technology Dharwad, March 27-28, 2021.



National Board for Higher Mathematics www.nbhm.dae. gov.in





## Summary

The IWM Annual Conference 2020-21 was held online hosted by the Indian Institute of Technology Dharwad, on 27-28 March, 2021.

The Executive committe members are as follows :

## **Executive Committe**

- Amber HABIB, Shiv Nadar University
- Anita NAOLEKAR, ISI Bangalore
- Anisa CHORWADWALA, IISER Pune
- B. Sri PADMAVATI, University of Hyderabad
- Gautam BHARALI, IISc
- Geetha VENKATARAMAN, Ambedkar University
- Mahuya DATTA, ISI Kolkata
- Neela NATARAJ, IIT Bombay (Chairperson)
- Nikita AGARWAL, IISER Bhopal
- Pooja SINGLA, IISc
- Riddhi SHAH, JNU
- Sachi SRIVASTAVA, University of Delhi
- Shreemayee BORA, IIT Guwahati
- Vijaylaxmi TRIVEDI, TIFR

The following people were actively involved in organizing the IWM Annual Conference 2020-21.

## Scientific Committee:

Prof. Riddhi Shah (Chair), Jawaharlal Nehru University

Prof. Neela Nataraj, IIT Bombay

Prof. Sagnik Sen, IIT Dharwad

Prof. Gautam Bharali, IISc

Prof. Nikita Agarwal, IISER Bhopal

## **Organizing Committee**

Prof. Sagnik Sen (Convenor), IIT Dharwad

Prof. Amlan Barua, IIT Dharwad

Prof. Shreedevi Masuti, IIT Dharwad

Prof. Dhriti Ranjan, IIT Dharwad

Taruni S, Research Scholar, IIT Dharwad

Being an online event, technical support for the set up and framework especially with Zoom trials for all esteemed speakers, monitoring while the conference was live, streaming it in Youtube etc, was much needed and taken care by our technicians.

## **Technical Experts**

Ananda K K, IIT Dharwad

Vince Vincent M, IIT Dharwad

## Volunteers

Dipayan Chakraborty

Shiwali Gupta

Tapas Das

Ravi Kumar Patel

There were 448 applications for participation in the conference of which around 160 participated on both days of conference conducted online via Zoom. A website was created for publishing the conference details online

#### https://sites.google.com/iitdh.ac.in/iwm2021/home

Prof. P Seshu, Director, IIT Dharwad presided as the Chief Guest for the Inauguaral Session. The session comprised of a welcome address by Prof. Shreedevi Masuti, IIT Dharwad and was followed by addresses by Prof. Riddhi Shah (Chair) JNU, Prof. Neela Nataraj, IWM Executive Committee Chairperson, IIT Bombay and the Chief Guest Prof. P Seshu, Director, IIT Dharwad and the session ended with a thank you note by Prof. Shreedevi Masuti, IIT Dharwad.

The conference mainly comprised of 4 plenary talks, 3 invited talks, 5 talks by young mathematicians. In addition to the talks, there were two breakout sessions conducted parallely on the topics such as Impact of COVID-19 on Women teaching faculties and Impact of COVID-19 on Women Researchers. The sessions were very interactive and the attendees raised many important and substantial points on both the topics. And the conference ended with the unvieling of IWM logo by Prof. Marie-Françoise with Prof. Shreemayee Bora explaining the meaning of logo and the Vote of Thanks was given by Prof. Sagnik Sen (Convener), IIT Dharwad. All the consented talks were streamed live in IIT Dharwad YouTube channel.

https://www.youtube.com/channel/UCG\_M5tP34-uO-Jkr9Q7VDsA

Despite being an online event, the feedback from the attendees were overwhelmingly positive on the aspects of organization of the conference, mathematical content discussed and the utility of the conference to the attendees. The attendees unanimously expressed interest in being a part of more conferences of this kind.

## Details of Speakers:

#### **Plenary Speakers**

- Prof. Ruchi Das, University of Delhi
- Prof. Sanoli Gun, IMSc Chennai
- Prof. Sujatha Ramdorai, University of British Columbia Canada
- □ Prof. Carolina Araujo, IMPA Brazil

#### Invited Speakers

- Prof. Swagata Nandi, ISI Delhi
- Prof. Pallavi Dani, Louisiana State University
- Prof. Thamizharasi Thamizhmani, VIT University

#### Young Mathematicians

- Dr. Asha Dond, IISER Thiruvananthapuram
- Dr. Debanjana Mitra, IIT Bombay
- Dr. Neeraja Sahasrabudhe, IISER Mohali
- Dr. Ambily Ambattu Asokan, CUSAT Cochin
- Dr. Sneha Chaubey, IIIT Delhi

# LIST OF SELECTED PARTICIPANTS

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3	DEEPIKA SHARMA	,
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12	Dr. P. Hemalatha	Vellalar College for Women, Erode-12
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13		Jaypee Institute of Information
14	Dr. Lakhveer Kaur	Technology
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19	Dr Manasa K J	Vidyavardhak a College of Engineering, Mysuru
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20	Ms.S.DIVYAPRIYA	AMALAI

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25	Ms. Jinny Ann John	Pondicherry Engineering College
26	Dr. Shailaja Shirkol	Affiliated VTU, Belagavi, Working in SDM College of Engineering and Technology, Dharwad, Karnataka
		National Institute of Technology
27	Ms. Neetu Garg	Kurukshetra
28	Dr. B. Sundaravadivoo	Alagappa University
29	Yogitaben Madhukantbhai Parmar	Government Science

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33	Mrs. Nagashree Narayan Bhat	Dharwad
36	Ms Saroja Y. Talwar	Karnatak University
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		University of
37	Apeksha	Delhi
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51		PhD
57		defended
	Pooja Punyani	defended from IIT
38	Pooja Punyani	defended
	Pooja Punyani	defended from IIT

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40	Dr.K.ANITHA	SRM INSTITUTE OF SCIENCE AND TECHNOLO GY-RAMAP URAM	49	Ant
41	Sh. Vinay Arora	PANJAB UNIVERSIT Y, UIET (PUSSGRC) Hoshiarpur	50	DR
42	G NITHYAKALA	The Madura College, Madurai.	51	Ι
43	JAGBIR KAUR	THAPAR ISTITIUTE OF ENGINEEIN G AND TECHNOLO GY	52	
44	Lalitha Pattabiraman	Working in SRM UNIVERSIT Y		
45	MANOJ KUMAR C N	Presidency university		
		School of Mathematics Jawaharlal Nehru University	53	DR A.
46	RAVI PRAKASH	New Delhi	57	D1.
47	S. Kavitha	Research scholar		
48	Rajula Srivastava	University of Wisconsin Madison	55	Uzn
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		Sri Sarada College for Women
49	Anbuvithya Ranganathan	Autonomous Salem-16
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50	DR. Priyanka Balasaheb Gaikwad	State: Maharashtra( India)
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54	Dr. Gayathri Palanisamy	PSG College of Arts & Science
55	Uzma Akhtar Mushtaque Ahmed Muchale	Punyashlok Ahilyadevi Holkar Solapur University
56	Amar Deep	Research Scholar

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57	Dr.G.Thamizhendhi	College
58	Mir Aaliya Manzoor	Lovely Professional University, Punjab, India.
59	Dr. Prabhavati Mandalgeri	Karnataka University Dharwad
60	TANNU RAJPUT	Gopalan College of Engineering and Management
61	Shruthi Mahalakshmi S	Bangalore
62	Ms. Anju A	Kerala University
63	Dr. Shashirekha B. Rai	NMAM Institute of Technology, Nitte, Udupi, Karnataka
64	Priyanga Ganesan	Texas A&M University, USA.
65	PRADEEP KUMAR YADAV	Just Completed M.sc.(Mathe matics)
66	Aradhana Santosh Bandekar	Ph.D student , Goa University
67	Dr Richa Sharma	Chandigarh university
68	Mamta Sanajykumar Amrutiya	Government Science College, Gandhinagar
69	Kalpana Kuntal	Parul University

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70	Shashikant Dwivedi	Avadh law college Barabanki Uttar Pradesh
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81	Dr.Deepa C Katagi	Visvesvaraya Technologica l University, Belagavi
82	Priyanka	Kalinga university, Naya Raipur (Chhatisgarh)
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91	Gul Agha Jan	South Asian University
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1	20	Dr.Shraddha Ingale	Ahmednagar, Maharashtra

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183	Harsha Gupta	Chegg Inc.
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		Chemical
186	Aditi Kulkarni	Technology
180		
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		nehru
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188	Meghana D	Tamil Nadu
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170	Mi. Chumkuur Shigh	1 411414

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		Gandhi engineering college
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193	Ms.Manjinder Kaur	Women, Jalandhar
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195	Gayatri Pany	University of Central Florida
196	Dr. Punam Gupta	Dr. Harisingh Gour University
197	Dr. S. Nithya	Manonmania m Sundaranar University
198	Dr. Gurninder Singh Sandhu	Patel Memorial National College, Rajpura
199	Dr Sita Ram	Chitkara University
177		Bhakt Darshan Gov. P.G. College, Jaiharikhal,
200	Vinita Devi	Uttarakhand

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211	Dr D KAVITHA	Audisankara College of Engineering and Technology, Gudur
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		PES UNIVERSIT Y -ELECTRON IC CITY
214	Mr. Ravikumar R	CAMPUS
215	Miss Swati Yadav	IIT BHU Varanasi
216	Prof. Vishalsingh Chauhan	DIEMS, Aurangabad
217	Akasmika Panda	National Institute of Technology Rourkela
218	Neelanjana Rajput	H.N.B.G University, Uttarakhand
219	Shivani Saini	Thapar Institute of Engineering and Technology
220	Vinod Trivedi	Bhavan's Science college(RTD) ,Ahmedabad

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221	Payel Sarkar	collage
		Government Degree College Thatyur (Tehri Garhwal) Uttarakhand,
222	Anita Tomar	India
223	NANDHINI MOHAN	BHARATHI AR UNIVERSIT Y
224	Ms. SHRILEKHA ELANGO	Bharathiar University, Coimbatore.
225	Ms. R. Premalatha	Bharathiar University
226	KALAMANI. D	Bharathiar University PG Extension and Research Centre, Perundurai, Erode, Tamilnadu
227	Dr. Rachana Desai	Assistant Professor, Somaiya College of Engineering, Mumbai
228	Dr. Shikha Maheshwari	Jagan Nath University
229	Ms.Amritha V.C.	Sree Ayyappa College for Women, Chunkankada i.

		SRI			RV College
		SATHYA SAI	238	Y Sailaja	of Engineering
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230	Dr. L Jyotsna	CE, KARNATAK A Hemwati	240	Dr.K.Meenakshi	CMR Institute of Technology Bengaluru
		Nandan Bhuguna Srinagar Garhwal University	241	Mr. Chander Mohan	Lovely Professional University PANIPAT
231	Ms. Meena Joshi	Uttarakhand			INSTITUTE
232	Dr. Manjil Saikia	Cardiff University			OF ENGINEERI NG AND
233	B. Harika	Lecturer in Mathematics, TSWRDCW Warangal West	242	MANJU RANI	TECHNOLO HY, SAMALKH A, PANIPAT
233	D. Halika	Madurai Kamaraj University	243	Dr. Prerna Pathak	SAGE University Indore
		Constitutent Model Arts and Science College	244	ADIL AHMAD	Mulana Azad national Urdu university, Hyderabad
		Tirumangala m Madurai Tamil Nadu	245	Aliya Naheed Kazmi	BML Munjal university
234	Dr. V. MEENA	India Sri GVG	246	Dr A Travis	Siddaganga Institute of
235	Ms. S. Loganayaki	Visalakshi College for women	246	Dr A. Tanuja	Technology Mahatma Basweshwar College,
236	Silpi Hazarika	Rajiv Gandhi University	247	Dhok Pallavi Ramhari	Latur
	Subi Internition	VIT Bhopal	248	Debamita	JNU, Delhi.
237	Dr. Mamta Agrawal	University	249	Debamita Chatterjee	JNU, New Delhi.

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271	Arpit Bansal	Jawaharlal Nehru University
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281	Simranjit Kaur	Study
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293	Anmol Kumar	Home
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294	Bobby	punjab, india
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295	Harkrishan	dasuya
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297	Darshpreet Kaur	Punjab, India
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298	Name-loveleen kaur	Dasuya
		JCDAV
		COLLEGE
299	NIDHI SHARMA	DASUYA
		JC DAV
		College
300	Sukhwinder Kaur	Dasuya
301	Nancy Sharma	Study
302	Nitika	Study
303	Manjit kaur	Study
		Department
		of
		mathematics,
	~	J.C.D.A.V.
304	Shawani	College

		Dasuya, Punjab, India
305	Karni Devi	Study
306	AGAM	STUDENT OF JC DAV COLLEGE DASUYA
307	Sandeep kaur	Study
308	Sharnpreet Kaur	JC DAV College Dasuya
309	Kajal Chib	JC dav college, Dasuya.
310	Shalu Salaria	JC DAV College Dasuya
311	Ms. Raveena Ganash	Jawaharlal Nehru University
312	Gurleen Kaur	JC DAV College Dasuya
313	Sonali Sharma	Jcdav college dasuya
314	Najuk Devi	JC DAV College Dasuya , Punjab , India
315	Harmanpreet Kaur	Jcdav clz dasuya
316	Harpreet Kaur	JCDAV College dasuya
317	Rupam	Jc dav college, dasuya
318	Radha Rani	JC DAV College Dasuya

319	Kajal	Study
320	Gurkiran kaur	J.C. D.A.V College Dasuya
321	Megha Varshney	B.M.G. Degree College Chandausi
322	Dr Tripti Dixit	SDS University uttarakhand
323	Uzma Mubeen	Central university of Kashmir, Ganderbal
324	Dr. V. Divya	Institute of Chemical Technology - Mumbai
325	Mr. TEJPAL	IIT Ropar
326	Indrani Y.R.L., Assistant Professor	Government Science College Autonomous
327	DR. RAM KRISHAN	Govt. Degree College Kathua
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330	Dr. Keerthi Mirajkar	Assistant professor

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		University of
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335	Ms. Raihana Rashid	Ganderbal
		Jawaharlal
		Nehru
		University,
336	Tanvi	New Delhi
		Rajiv Gandhi
		University of
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337	L Rama Mohan Reddy	Technologies
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338	Dr.S.Vasundhara	jntuh
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339	Subhash Kumar	ut
		Bengaluru
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		Govt College
341	Dr. Haseena A	Chittur
		Shaheed
		Mangal
		Pandey Govt.
		Girls PG
		College,
342	Dr. Soshal	Meerut

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343	Gayatri P B	Yuvaraja College Mysuru
344	Ms. Ramandeep Kaur	Mata Gujri College Fatehgarh Sahib, Punjab
345	Mr. Moirangthem Rameshwar Singh	Kumbi College, Kumbi
346	Sindhu J Achar	Tumkur University
347	Shobha K C	Tumkur University
348	Dr. Harinakshi Karkera	Manipal Institute of Technology, MAHE, Manipal
349	Garima Yadav	Hans raj college, University of Delhi
350	Diksha Gupta	IIT(BHU)
351	Dr Aparna Chaturvedi	Mayo International
352	A S Maragadam	Vijayanagara shree krishna devaraya university
353	RAVINA. R	Prepare to csir Net
354	Mr. Shyamsunder	MNIT, Jaipur
		PhD. Research scholar at Amrita vishwa vidyapeetham , Ettimadai,
355	Anila.S	Coimbatore.

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Ph.D. student, Shiv	365	Dr Privanka Grover	
366Sushil SinglaUniversity			Ph.D. student, Shiv Nadar
	367	Lalithasree.T	school of Engineering, Ettimadai,Coi
HNB Garhwal University,			Garhwal University, BGR Campus
BGR Campu Pauri			Pauri

		Uttarakhand India
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380	Shivani Goel	IIIT Delhi
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382	Akanksha Gupta	Dhanbad
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384	AMLAN KANTI HALDER	RY
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		and Technical
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		Commerce
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202	Danathan IN	Technology
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394	MEGHA P	NITK, SURATHKA L, KARNATAK A
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396	Ms. Rashi Sanjay Lunia	The Institute of Mathematical Sciences
397	Mr.Amit kumar arya	work
398	THIRUNAVUKKARASU.S	Working
399	Harshal Sharma	GDC Nowshera
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410	GAYATHRI V	Work
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		University of
411	Mr. Kalika Prasad	Jharkhand
		Guest
		lecturer in
		Hindu kanya
412	Diksha	mahavidhya
	ADODARIYA TANVIBEN	
413	HARESHBHAI	Study
414	Dr. Monika Srivastava	Rajasthan
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		Abdul Kalam
		University,
415	Mr. Showkat Ahmad Bhat	Indore
416	Firdous Ahmad Mala	GDC Sopore
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417	Miss Munesh Kumari	Jharkhand
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422	Shivanshi Gupta (Freelancers)	Freelancer in Chegg India
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427	Shikha sharma	Post graduated
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433	Pooja Nanaji Thoke	chalisgaon

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438	RAKESH	AND
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440	Dr.G.Kavitha	Work
		Kalasalingam
		Academy of
		Academy of Research and

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443	Dr Summiya Parveen	College of Engineering Roorkeee
444	Ankita Valmik Jejurkar	Student
445	Sayan Ghosh	Vidyasagar University
446	Dr. THULASIMANI T	Bannari Amman Institute of Technology
447	Mr. SOURABH BHANOT	DOE DELHI
448	Abdul Aijaz	Telangana University dichpally nizamabad

SCHEDULE OF TALKS

### Timetable: Annual conference of IWM 2020-21

Time	Title/Event	Speaker	Chair
09.00-09.30	Inaugural ceremony with Chief Guest : Prof. P.		
	Seshu (Director, IIT Dharwad)		
09.30-10.30	Class groups and Mordell-Weil groups.	Sujatha Ramdorai	Sanoli Gun
10.30-11.30	Breakout session		
11.30-12.15	Estimating nearly periodic signals.	Swagata Nandi	Monika Bhattacharjee
12.15-12.45	Urn models and their applications.	Neeraja Sahasrabudhe	Monika Bhattacharjee
12.45-15.00	Lunch break		
15.00-15.30	Adaptive finite element method for second order	Asha Dond	B.S. Padmavati
	linear non-self-adjoint elliptic problems.		
15.30-16.00	Stabilization of time-periodic flows.	Debanjana Mitra	B.S. Padmavati
16.00-16.30	Break		
16.30-17.30	Symmetries in algebraic geometry.	Carolina Araujo	Geetha Venkataraman

#### 27 March, 2021 - Saturday

#### 28 March, 2021 - Sunday

Time	Title/Event	Speaker	Chair
09.00-09.45	Stallings folds: a topological approach to free	Pallavi Dani	Sachi Srivastava
	groups and beyond.		
09.45-10.45	Product of prime ideals in ray class groups.	Sanoli Gun	Sachi Srivastava
10.45 - 11.45	Breakout session		
11.45-12.15	Distribution of sequences in number theory.	Sneha Chaubey	Shreedevi Masuti
12.15-12.45	Dickson-Siegel-Eichler-Roy elementary orthogonal	Ambily A. Asokan	Shreedevi Masuti
	groups.		
12.45-15.00	Lunch break		
15.00-16.00	Broadening horizons of transitivity and the butter-	Ruchi Das	Nikita Agarwal
	fly effect in dynamical systems		
16.00 - 16.45	Discrete integrability - blending Nevanlinna theory	Thamizharasi Thamizhmani	Nikita Agarwal
	and singularity confinement		
16.45 - 17.30	Closing ceremony with Guest of Honor: Prof.		
	Marie-Françoise Roy		

# BOOK OF ABSTRACTS





#### **INDIAN INSTITUTE OF TECHNOLOGY DHARWAD**

#### **Titles & Abstracts**

#### **Plenary Talks**

Speaker : Prof. Sanoli Gun ( IMSC Chennai, India )

Title : Product of prime ideals in ray class groups.

**Abstract** : A celebrated theorem of Linnik states that there exists a constant *b* such that for co-prime positive integers *a* and *q*, there exists a prime  $p < q^b$  which is congruent to *a*(*mod q*). This has been refined by Xylouris who proved that *b* can be chosen to be 5.

In this talk, we report on an ongoing work with Jyothsnaa Sivaraman and Olivier Ramare where we consider variants of this theme on number fields.

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Speaker : Prof. Carolina Araujo ( IMPA Brazil )

Title : Symmetries in Algebraic Geometry

Abstract : In this talk I will discuss symmetries of algebraic varieties. When studying a projective variety X, one usually wants to understand its automorphisms. Conversely, the structure of the group of automorphisms of X encodes relevant geometric properties of the variety. After describing some examples of automorphism groups of projective varieties, I will discuss why the notion of automorphism is too rigid in the scope of birational geometry. We are then led to consider another class of symmetries of X, its birational self-maps. Birational self-maps of the projective space  $\mathbb{P}^n$  are called Cremona transformations. Describing the structure of the group of Cremona transformations of the plane is a classical problem that goes back to the 19th century. In higher dimensions, not so much is known, and a natural problem is to construct interesting subgroups of the Cremona group.

I will end the talk by discussing a recent work with Alessio Corti and Alex Massarenti, where we investigate subgroups of the Cremona group consisting of symmetries preserving special objects.

#### Speaker : Prof. Ruchi Das ( University of Delhi, India )

**Title :** Broadening horizons of Transitivity and The Butterfly Effect in Dynamical Systems

Abstract : Transitivity and The Butterfly Effect (also known as sensitivity), key ingredients of Chaos, are of great importance in the qualitative study of dynamical systems. The concept of transitivity was introduced by Birkhoff in 1920 and is also regarded as an irreducibility condition as one cannot decompose a transitive system into two disjoint sets with non-empty interiors which do not interact under the transformation. It is the basis for the study of several important decomposition theorems such as Smale's Decomposition Theorem. In 1971 Ruelle introduced sensitivity which characterizes the unpredictability of chaotic phenomena. If a system is sensitive, then a small change in the initial conditions may lead to a drastic change in the dynamics of the system. To measure the interval in which the system remains sensitive, interesting and useful stronger forms of sensitivity have been studied.

Most of the real-world phenomena like weather and climate prediction, heartbeat patterns, spread of infectious diseases, etc., are time-variant, that is, they involve time dependent parameters, modulation and various other effects. Consequently, many of the well-established methods applied for autonomous systems are no longer applicable for time dependent phenomena and hence require an appropriate extension, giving rise to the notion of non-autonomous dynamical systems, as introduced by Kolyada and Snoha in 1996. Moreover, in recent years there has been a significant study of dynamics of semiflows under general monoid actions. We shall discuss some recent results on stronger forms of transitivity and sensitivity for non-autonomous discrete systems and for semiflows.

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Speaker : Prof. Sujatha Ramdorai (University of British Columbia, Canada)

Title : Class groups and Mordell-Weil groups.

Abstract : Class groups of algebraic number fields are important invariants in Algebraic Number theory. Rational points on Elliptic curves defined over a number field are of tremendous interest as well. This talk will explain how Iwasawa theory is useful in studying these objects, and the role that Iwasawa theory plays in the finer analysis of the arithmetic of elliptic curves over number fields.

#### **Invited Talks**

Speaker : Prof. Thamizharasi Thamizhmani (VIT University, India )

Title : Discrete Integrability -Blending Nevanlinna Theory and Singularity confinement

**Abstract :** Fundamental theorem of algebra is an important development in algebra- for polynomials. It's generalisisation to entire functions after many years is the popular Picard's theorem in complex analysis. The expected such development to meromorphic functions was an open problem for nearly 100 years ,which was finally solved by Ralph Nevanlinna (Finland Mathematician in the year 1925) considered to be the greatest development in Mathematics in 20 th century, popularly known as Nevanlinna theory.

How this theory is used to give an Integrability criteria for Discrete systems is explained in this lecture.

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Speaker : Prof. Pallavi Dani ( Loisuiana State University, USA)

Title : Stallings folds: a topological approach to free groups and beyond

Abstract : In a highly influential 1983 article, Stallings introduced the notion of "folds of graphs" to study subgroups of free groups. He used such folds to associate, to each subgroup of a free group, a canonical graph that carries the essential information about the subgroup. This topological perspective provided clean new proofs of many classical theorems on subgroups of free groups, and is now an indispensable tool which has been adapted to other classes of groups.

I will describe this theory in the context of free groups, and then mention some generalizations, including recent joint work with Ivan Levcovitz on subgroups of right-angled Coxeter groups.

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Speaker : Prof. Swagata Nandi ( ISI Delhi, India )

Title : Estimating nearly periodic signals

Abstract : Periodic and nearly periodic signals are observed in our daily life and in many areas of science and technology. In this talk, some signal processing models, for example, sinusoidal model, chirp model, random amplitude chirp models will be discussed which can be used for nearly periodic data. Several examples will be considered where such models can be used.

#### Talks by Young Mathematicians

Speaker : Dr. Asha K Dond ( IISER Thiruvananthapuram, India )

Title : Adaptive finite element method for second order linear non-self-adjoint elliptic problems.

Abstract : The adaptive finite element method (AFEM) is an elegant and powerful technique used to compute the numerical solution to initial and boundary value problems with a minimal computational cost. The explicit residual-based adaptive estimator allows reliable and efficient error control and motivates adaptive discretization, improving the empirical convergence rates. The quasi-optimal analysis of AFEM provides the mathematical foundation for this optimal behavior of AFEM.

In the talk, the quasi-optimal analysis of AFEM will be discussed for the lowest-order Raviart-Thomas mixed FEM for general second- order linear elliptic problems. The standard adaptive mesh-refinement strategy faces difficulty in the flux error control for these problems. Therefore, to achieve optimal convergence, a separate marking strategy: a split of a Dörfler marking for the estimator and some optimal data approximation strategy for the data approximation term has been utilized.

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Speaker : Dr. Debanjana Mitra ( IIT Bombay, India )

Title : Stabilization of time-periodic flows

**Abstract :** In the first part of my talk, I shall explain the stability and stabilizability of an ODE around a periodic trajectory. A characterization of the stability of ODEs around a periodic trajectory using the Poincar´e map and Floquet theory will be discussed.

In the second part of my talk, I shall explain the extension of the idea to the parabolic type of PDEs. In particular, as an application, the stabilization of the incompressible Navier-Stokes equation around a time-periodic trajectory will be discussed.

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Speaker : Dr. Neeraja Sahasrabudhe ( IISER Mohali, India )

Title : Urn Models and their applications

Abstract : Urns models or Balls and Bins are classical problems in probability theory. I will discuss some well known results for urn models and their application to network theory. Finally, I will give a quick overview of interesting problems and recent developments in the area.

Speaker : Dr. Ambily Ambattu Asokan (CUSAT Cochin, India)

Title : Dickson-Siegel-Eichler-Roy Elementary orthogonal groups

Abstract : In this talk, we shall discuss a generalized version of elementary orthogonal groups. Let R be a commutative ring in which 2 is invertible. Let Q be a non-singular quadratic space over R of rank *n* and let  $\mathbb{H}(R)^m$  denotes the hyperbolic space. We consider the elementary orthogonal transformations of the quadratic space Q  $\perp \mathbb{H}(R)^m$ . These transformations were introduced by Amit Roy in 1968. Earlier forms of these transformations over fields were considered by Dickson, Siegel, Eichler and Dieudonn'e. We call the elementary orthogonal transformations as *Dickson-Siegel-Eichler-Roy elementary orthogonal transformations or Roy's elementary orthogonal transformations*. The group generated by these transformations is called DSER elementary orthogonal group. We shall discuss the structure of this group.

In 1976, Vaserstein defined elementary symplectic matrices with respect to an invertible alternating matrix. In this talk, we shall discuss a similar construction of Roy's elementary orthogonal transformations in matrix form.

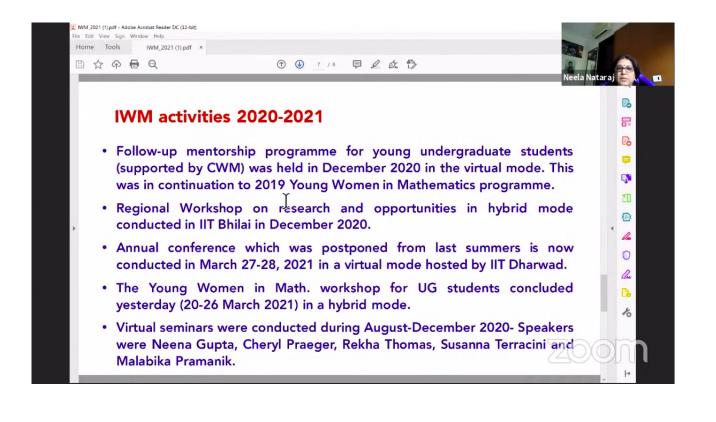
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Speaker : Dr. Sneha Chaubey ( IIIT Delhi, India )

Title : Distribution of Sequences in Number Theory

Abstract: The topic on the distribution of sequences saw its light with the seminal paper of Weyl. This being the motivation of this talk, we begin with a discussion on different types of arithmetic/integer sequences occurring around us, these include but not limited to zeros of L-functions, energy levels of harmonic oscillators, as well as some classical sequences modulo one. We look at various distribution questions concerning them, for example, questions on uniform distribution and nearest neighbour gaps of sequences.

# PHOTOGRAPHS







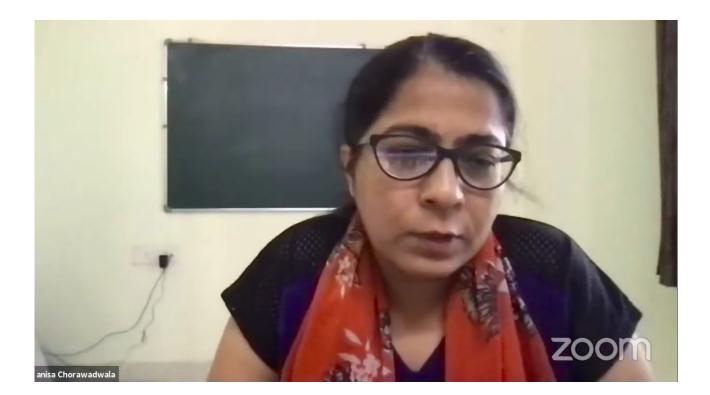








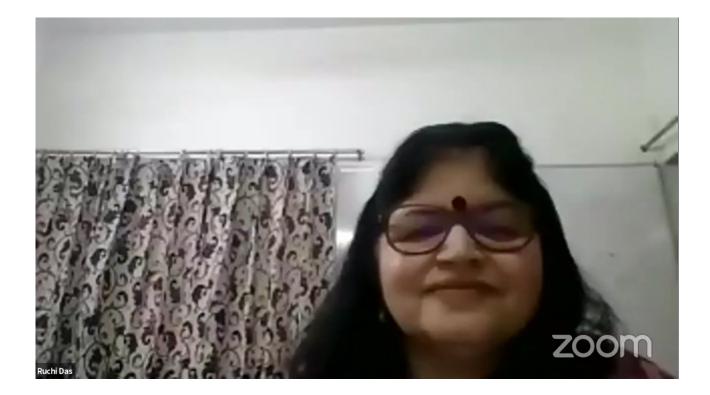
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## **Concept Note of the IWM Logo**



## The basic concept of the logo design is about connections and collaborations.

The repetitive visual elements establish a visual rhythm making it dynamic and harmonious.

The colour scheme is based on the Indian tricolour reflecting the Indianness.

In general, the logo design is conceived to be simple and direct with a play of letters. The design uses the initial letters of women and mathematics as a monogram to represent the organization.

The visual representation of the letters also depicts two hands coming together to make a connection.

The connections are implied at two levels, between women & mathematics and between women mathematicians.

Indian Women and Mathematics

They also connote networking, collaboration and togetherness which the organization exemplifies.

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## Dr. D. Udaya Kumar

Associate Professor & Head, Department of Design IIT Guwahati

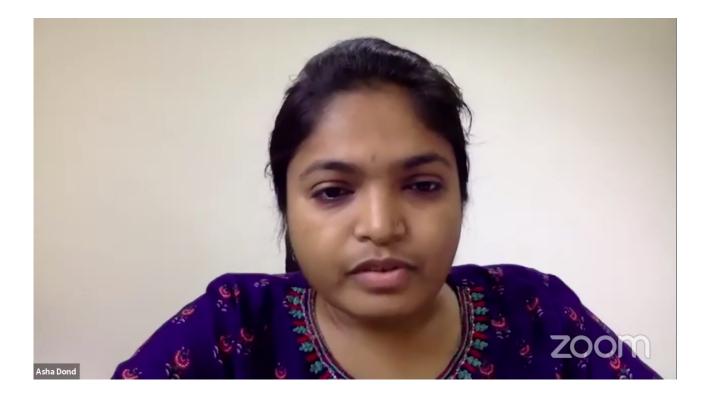




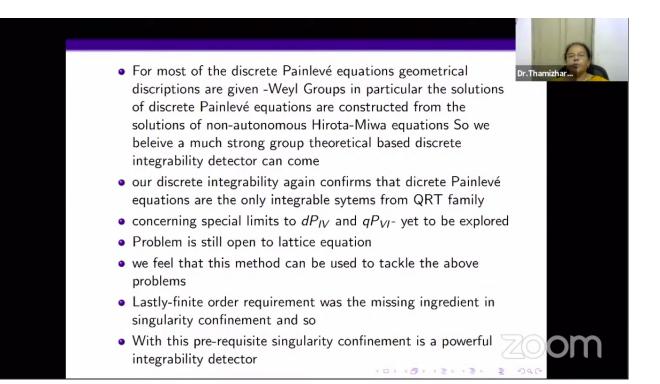




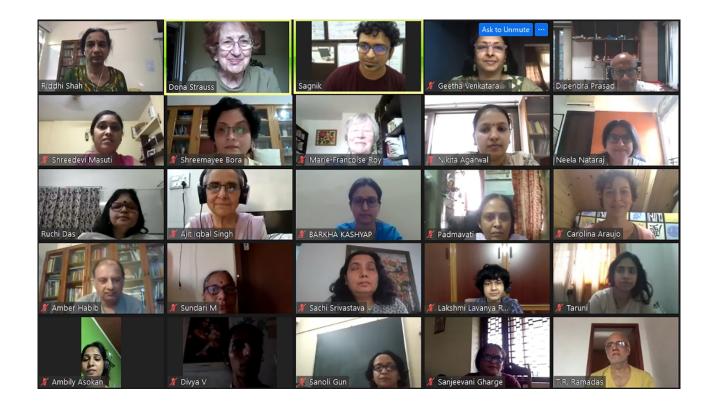


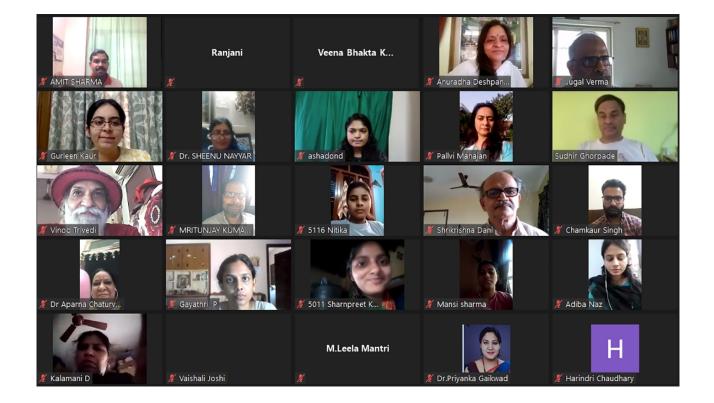














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