

Report for JSPS Asian Science/Academic Seminar FY2013 <Summary>

Date January 27, 2014

1. Title of Seminar JSPS-DST Asian Academic Seminar : Discrete Mathematics and its Application

2. Purpose of Seminar

Discrete mathematics, which provides variety of analytic tools for discrete objects, forms an important research area in mathematics and the mathematical sciences. Fundamental theories and techniques developed in this area apply to other academic fields beyond mathematics such as physical science, life science, social science, humanities and engineering. There are many remarkable contributions to society at large. For example, discrete mathematics includes cryptology as an application of number theory, discrete geometric analysis applied to materials science, fluid dynamics using integrable systems, wavelet analysis as an application of representation theory and real analysis, simulation methods using numerical analysis, quantum information and statistical physics using discrete stochastic processes. The aim of this seminar is to exchange knowledge in those research areas intensively studied in Japan and in India, and to encourage and expose young researchers in Asian countries, mainly from Japan and India, to new progresses. This seminar will also focus on identifying important potential cooperative research themes between Japanese and Indian mathematicians, in particular on the fundamental theory and application of discrete mathematics, which is recognized as a cutting edge research area in both Japan and India.

3. Period

From Sunday, November 3 through Sunday, November 10, 2013 (8 days)

4. Venue

Graduate School of Mathematical Sciences, the University of Tokyo (Lecture Hall)

5. Organization

(1) Cosponsors

Japan Side	Japan Society for the Promotion of Science
	Graduate School of Mathematical Sciences, the University of Tokyo
India Side	Department of Science and Technology, India
	Indian Statistical Institute

(2) Organizer

1) Japan side

Name in full Professor Motoko Kotani

Affiliation and position Advanced Institute for Materials Research, Tohoku University, Director

2) India side

Name in full Professor Bimal K. Roy

Affiliation and position Indian Statistical Institute, Director

6. Program: Agenda, topics, related activities (e.g., reception, excursion)

See attached program etc. (Exhibit No.1)

7. Lecturers and Participants

1) Number of Persons

	Lecturers	Participants	Total
Japan side	20	20	40
(Number who participated under program funding)	18	7	25
India side	11	15	26
(Number who participated under program funding)	11	15	26
Other persons	3	5	8
(Number who participated under program funding)	3	5	8
Total	34	40	74
(Number who participated under program funding)	32	27	59

2) List

A: Lecturers

Name in full	Position /Affiliation/ Institution(Country of affiliated institution)	Remarks
-Japan side		
Benoit Collins	Junior PI / Tohoku University/ Japan	*
Ryoki Fukushima	Lecturer/ Kyoto University/ Japan	*
Shinsuke Iwao	Research Associate/ Aoyama Gakuin University/Japan	*
Yasuyuki Kawahigashi	Professor/ the University of Tokyo/ Japan	*
Toshiyuki Kobayashi	Professor/ the University of Tokyo/ Japan	*
Tetsuji Miwa	Project Professor/ Kyoto University/ Japan	*
Kanta Matsuura	Associate Professor/ the University of Tokyo/ Japan	
Akihiro Munemasa	Professor/ Tohoku University/ Japan	*
Makiko Sasada	Associate Professor/ Keio University/ Japan	*
Junji Shikata	Associate Professor/ Yokohama National University/ Japan	*
Toshikazu Sunada	Professor/ Meiji University/ Japan	*
Yuichiro Tanaka	Ph.D. Student/ the University of Tokyo/ Japan	
Tatsuya Tate	Associate Professor/ Tohoku University/ Japan	*
Yohei Watanabe	Ph.D. Student/ Yokohama National University/ Japan	*
Ralph Willox	Associate Professor/ the University of Tokyo/ Japan	*
-India side		

Avishek Adhikari	Assistant Professor/ the University of Calcutta/ India	*
Ramachandran	Professor/ the Institute of Mathematical Sciences/ India	*
Balasubramanian		
Partha Sarathi	Professor/ the Institute of Mathematical Sciences/ India	*
Chakraborty		
Karthick Thiyagarajan	Visiting Scientist/ Indian Statistical Institute/ India	*
Krishna Maddaly	Professor/ the Institute of Mathematical Sciences/ India	*
Pampa Paul	Post Doctoral Fellow, Visiting Scientist / Indian Statistical Institute/ India	*
Dipendra Prasad	Professor/ Tata Institute of Fundamental Research/ India	*
Bimal Kumar Roy	Professor & Director/ Indian Statistical Institute/ India	*
Sushmita Ruj	Assistant Professor/ Indian Statistical Institute/ India	*
Kilkothur	Professor/ Pondicherry University/ India	*
Munirathinam		
Tamizhmani	Post Doctoral Fellow/ the Institute of Mathematical Sciences/ India	*
Vaibhav Vaish		
-Other Persons		
Basil Grammaticos	Professor/ the University of Paris 7/ France	*
Nicola Santoro	Professor/ Carleton University/ Canada	*
Jennifer Seberry	Professor/ the University of Wollongong/ Australia	*
-Organizing Committee		
Motoko Kotani	Professor/ Tohoku University/ Japan	*
Yoshiaki Maeda	Professor/ Keio University/ Japan	*
Mitsuaki Nozaki	Professor/ High Energy Accelerator Research Organization, KEK/ Japan	*
Tetsuji Tokihiro	Professor/ the University of Tokyo/ Japan	*
Takashi Tsuboi	Professor/ the University of Tokyo/ Japan	*

Place a check [*] in the Remark Column for those who participated using JSPS's seminar funding.

B: Participants

Name in full	Position /Affiliation/ Institution(Country of affiliated institution)	Remarks
-Japan side		
Masataka Kanki	Research Fellowship Young Scientist of Japan Society for the Promotion of Science/ the University of Tokyo/ Japan	*
Kenta Noguchi	Ph.D. Student/ Keio University/ Japan	*
Xiao-Nan Lu	Ph.D. Student/ Nagoya University/Japan	*
Kazuhide Oshiro	Ph.D. Student/ Nagoya University/ Japan	*
Keisuke Matsuya	Project Researcher/ the University of Tokyo/ Japan	*
Yiling Lin	Ph.D. Student/Nagoya University/ Japan	*
Masahide Konishi	Ph.D. Student/ Nagoya University/ Japan	*
Koutarou Mine	Postdoctoral Fellow/ the University of Tokyo/ Japan	
Kosuke Nakama	Postdoctoral Fellow/ the University of Tokyo/ Japan	
Kousuke Suzuki	Ph.D. Student/ the University of Tokyo/ Japan	
Mitsuaki Kimura	Ph.D. Student/ the University of Tokyo/ Japan	
Naoto Okubo	Ph.D. Student/ the University of Tokyo/ Japan	
Yuji Kaneko	Ph.D. Student/ the University of Tokyo/ Japan	
Morimichi Kawasaki	Ph.D. Student/ the University of Tokyo/ Japan	
Naohiko Kasuya	Ph.D. Student/ the University of Tokyo/ Japan	
Ryosuke Nakahama	Ph.D. Student/ the University of Tokyo/ Japan	
Masatoshi Kitagawa	Ph.D. Student/ the University of Tokyo/ Japan	
Takafumi Mase	Ph.D. Student/ the University of Tokyo/ Japan	
Kenkichi Tsunoda	Ph.D. Student/ the University of Tokyo/ Japan	
Sachio Ookawa	Ph.D. Student/ the University of Tokyo/ Japan	

-India side Sandip Banerjee	Junior Research Fellow/ Bengal Engineering and Science University/ India	*
Avik Chakraborti	Ph.D. Student / Indian Statistical Institute/ India	*
Nilanjan Datta	Ph.D. Student / Indian Statistical Institute/ India	*
Issan Patri	Ph.D. Student with designation Senior Research Fellow/ the Institute of Mathematical Sciences/ India	*
Sruti Gan Chaudhuri	Senior Research Fellow/ Indian Statistical Institute/ India	*
Madeswaran	Research Scholar/ Pondicheerry University/ India	*
Sathishkumar		
Sabyasachi Dutta	Senior Research Fellow/ the University of Calcutta/ India	*
Partha Sarathi Roy	Senior Research Scholar/ the University of Calcutta/ India	*
Arpan Bagchi	Ph.D. Student/ Pondicherry University/ India	*
Shailaja Shankar	Assistant Professor/ Sri Dharmasthala Manjunatheshwara	*
Shirkol	College of Engineering and Technology/ India	
Soumya Banerjee	Research Scholar/ Chennai Mathematical Institute/ India	*
Biswajyoti Saha	Junior Research Fellow/the Institute of Mathematical Sciences/ India	*
Sumit Giri	Senior Research Fellow/the Institute of Mathematical Sciences/ India	*
Arindam Pal	Ph.D. Candidate/IIT Delhi/ India	*
Soumen Nandi	Ph.D. Student/ Indian Statistical Institute/ India	*
-Other Persons		
Phoebe Chloe Fajilan Ramos	Assistant Professor/ the University of the Philippines/ Philippine	*
James Kuo-yuan Lan	Postdoctoral Research Fellow/ National Taiwan University/ Taiwan	*
Sheng-Hua Chen	Ph.D. Candidate/ National Taiwan University/ Taiwan	*
Kim Visa	Ph.D. Student/ Khemarak University/ Cambodia	*
It Sokly	Ph.D. Student/ Khemarak University/ Cambodia	*

Place a check [*] in the Remark Column for those who participated using JSPS's seminar funding.

8. Please describe the achievements of the seminar.

This seminar featured many fruitful discussions on outstanding research problems of strong interest in both Japan and India, which suggested many cooperative research projects for the future that should lead to new insights and new approaches. These discussions furthered the development of our cooperative program in mathematics and mathematical sciences. We also organized five research groups for students to discuss open problems and to present their own results on the last day. These discussions were at a very high level and often continued through the night, which allowed the students to form friendships and share their own research interests. This opportunity gave them a strong basis for beneficial professional relationships in the future.

JSPS-DST Asian Academic Seminar 2013 Time Schedule (November 3 – November 10, 2013)

Schedule

	Sunday November 3	Monday November 4	Tuesday November 5	Wednesday November 6	Thursday November 7	Friday November 8	Saturday November 9	Sunday November 10
9:45-10:00		Event information	—————	—————	—————	—————	—————	—————
10:00-10:50	Arrival	Combinatorial design		Analysis of graphs and graph algorithms	Combinatorial design		10:20-11:50 Presentations by students (2groups)	Departure
11:00-11:50		Discrete integrable systems						
11:50-13:30		Lunch break		※12:10 Depart	Lunch break			
13:30-17:40		13:30-14:20 Combinatorial design 14:30-17:40 Analysis of graphs and graph algorithms	Number theory and combinatorial cryptography	Excursion	Representation theory	Mathematical physics	13:30-16:00 Presentations by students(3groups) 17:00-17:30 Award for best presentations	
18:30-20:30	Welcome party	Dinner Discussion	Dinner Discussion	Buffet reception	Dinner Discussion	Dinner Discussion	Farewell party	

Time Schedule

Day-1

Reception: 10:30~

Sunday November 3	10:30-15:00	Reception of visitors / lunch will be served until 14:00 @ Samurai Café (inside Apa Hotel 2F)
	15:00-18:30	Check in and break @ Samurai Café (inside Apa Hotel 1F)
	18:30-20:30	Welcome party @ Samurai Café (inside Apa Hotel 2F)
	20:30-->	Free time

Day-2

Monday November 4	7:00-9:00	Breakfast @ Samurai Café (inside Apa Hotel 2F)
	Departure to Graduate School of Mathematical Sciences, The University of Tokyo	
	9:45-10:00	Event information (Promoter: Motoko Kotani)
	10:00-10:50	Bimal Roy (Indian Statistical Institute) Combinatorial design1
	11:00-11:50	Basil Grammaticos (Univ. Paris 7) Discrete integrable systems1
	Lunch break @ Common room 2F [Lunch box]	
	13:30-14:20	Bimal Roy (Indian Statistical Institute) Combinatorial design2
	14:30-15:20	Tatsuya Tate (Tohoku University) □ Analysis of graphs and graph algorithms1
	Coffee break	
	15:40-16:10	Ryoki Fukushima (Kyoto University) Analysis of graphs and graph algorithms2
	16:10-16:40	T. Karthick (Indian Statistical Institute, Chennai) Analysis of graphs and graph algorithms3
	16:50-17:40	Nicola Santoro (Carleton University) Analysis of graphs and graph algorithms4
	Departure to APA Hotel	
	18:30-20:30	Dinner Discussion @ Samurai Café (inside Apa Hotel 2F)
20:30-->	Discussion and free time	

Day-3

Tuesday November 5	7:00-9:00	Breakfast @ Samurai Café (inside Apa Hotel 2F)
	Departure to Graduate School of Mathematical Sciences, The University of Tokyo	
	10:00-10:50	Jennifer Seberry (University of Wollongong) Combinatorial design3
	11:00-11:50	Munirathinam Tamizhmani (Pondicherry University) Discrete integrable systems2
	Lunch break @ "Kouryu Lounge 3F" (Komaba Campus)	
	13:30-14:20	Ramachandran Balasubramanian (the Institute of Mathematical Sciences) Number theory and combinatorial cryptography1
	14:30-15:20	Junji Shikata (Yokohama National University) Number theory and combinatorial cryptography2
	Coffee break	
	15:40-16:10	Avishek Adhikari (the University of Calcutta) Number theory and combinatorial cryptography3
	16:10-16:40	Yohei Watanabe (Yokohama National University) Number theory and combinatorial cryptography4
	16:50-17:40	Kanta Matsuura (the University of Tokyo) Number theory and combinatorial cryptography5
	Departure to APA Hotel	
	18:30-20:30	Dinner Discussion @ Samurai Café (inside Apa Hotel 2F)
	20:30-->	Discussion and free time

Day-4

Wednesday November 6	7:00-9:00	Breakfast @ Samurai Café (inside Apa Hotel 2F)
	Departure to Graduate School of Mathematical Sciences, The University of Tokyo	
	10:00-10:50	Toshikazu Sunada (Meiji University) Analysis of graphs and graph algorithms ⁵
	11:00-11:50	Tetsuji Miwa (Kyoto University) Discrete integrable systems ³
	Break	
	12:10-13:20	Excursion and observation (going to Kashiwa campus by bus)
	13:25-13:55	Lunch break at cafeteria (sandwiches will be served)
	14:00-17:00	14:00 Explanation about the Graduate School of Frontier Sciences by Nobuo Takeda, Dean of the Graduate School of Frontier Sciences 15:00 ◆ Observation of Kavli Institute for the Physics and Mathematics of the Universe (IPMU) 15:30 ◆ Observation of 3 laboratories at the Graduate School of Frontier Sciences (1) RT-1 Experiment on Laboratory Astrophysics, Plasma Physics, Nonlinear Science by Professor Zensho Yoshida http://www.ppl.k.u-tokyo.ac.jp/index.html (2) Hypersonic and high-enthalpy flows, Atmospheric entry, Lunar and planetary exploration by Professor Kojiro Suzuki http://daedalus.k.u-tokyo.ac.jp/ http://wt/wt_index.htm (3) Advanced space propulsion system by Professor Kimiya Komurasaki http://www.kml.k.u-tokyo.ac.jp/en/research.htm
	17:00-18:30	Departure to Graduate School of Mathematical Sciences, The University of Tokyo
	18:30-20:30	Buffet reception @ Komaba Faculty House
20:30-->	Departure to APA Hotel and free time	

Day-5

Thursday November 7	7:00-9:00	Breakfast @ Samurai Café (inside Apa Hotel 2F)
	Departure to Graduate School of Mathematical Sciences, The University of Tokyo	
	10:00-10:50	Sushmita Ruj (Indian Statistical Institute) Combinatorial design ⁴
	11:00-11:50	Ralph Willox (the University of Tokyo) Discrete integrable systems ⁴
	Lunch break @ "Kouryu Lounge 3F" (Komaba Campus)	
	13:30-14:20	Toshiyuki Kobayashi (the University of Tokyo) Representation theory ¹
	14:30-15:20	Vaibhav Vaish (the Institute of Mathematical Sciences) Representation theory ²
	Coffee break	
	15:40-16:10	Yuichiro Tanaka (the University of Tokyo) Representation theory ³
	16:10-16:40	Pampa Paul (the Institute of Mathematical Sciences) Representation theory ⁴
	16:50-17:40	Dipendra Prasad (Tata Institute of Fundamental Research) Representation theory ⁵
	Departure to APA Hotel	
	18:30-20:30	Dinner Discussion @ Samurai Café (inside Apa Hotel 2F)
20:30-->	Discussion and free time	

Day-6

Friday November 8	7:00-9:00	Breakfast @ Samurai Café (inside Apa Hotel 2F)
	Departure to Graduate School of Mathematical Sciences, The University of Tokyo	
	10:00-10:50	Akihiro Munemasa (Tohoku University)□ Combinatorial design ⁵
	11:00-11:50	Shinsuke Iwao (Aoyama Gakuin University) Discrete integrable systems ⁵
	Lunch break @ "Kouryu Lounge 3F" (Komaba Campus)	
	13:30-14:20	Yasuyuki Kawahigashi (the University of Tokyo) Mathematical physics ¹
	14:30-15:20	Benoit Collins (Tohoku University)□ Mathematical physics ²
	Coffee break	
	15:40-16:10	Partha Sarathi Chakraborty (the Institute of Mathematical Sciences)□ Mathematical physics ³
	16:10-16:40	Makiko Sasada (Keio University) Mathematical physics ⁴
	16:50-17:40	Krishna Maddaly (the Institute of Mathematical Sciences) Mathematical physics ⁵
	Departure to APA Hotel	
	18:30-20:30	Dinner Discussion @ Samurai Café (inside Apa Hotel 2F)
20:30-->	Discussion and free time	

Day-7

Saturday November 9	7:00-9:00	Breakfast @ Samurai Café (inside Apa Hotel 2F)
	Departure to Graduate School of Mathematical Sciences, The University of Tokyo	
	10:20-11:50	Presentations by students
	Lunch break @ "Kouryu Lounge 3F" (Komaba Campus)	
	13:30-16:00	Presentations by students
	Coffee break	
	17:00-17:30	Award for best presentations
	Departure to APA Hotel	
18:30-20:30	Farewell party @ Samurai Café (inside Apa Hotel 2F)	
20:30-->	Free time	

Day-8

Sunday November 10	7:00-9:00	Breakfast @ Samurai Café (inside Apa Hotel 2F)
	10:00	○ Reception: 10:00~ ◆ Departure of the participants