

E-NEWSLETTER

INFINITY TIMES

A new beginning to reach an endless infinity...

DEPARTMENT OF STATISTICS AND
APPLIED MATHEMATICS



CENTRAL UNIVERSITY OF TAMIL NADU
THIRUVARUR.

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MESSAGE FROM HOD'S DESK

Greetings from the Department of Statistics and Applied Mathematics!

I am delighted to present our maiden newsletter with brief profiles of our faculty members indicating their research interests and activities after joining the CUTN.

Unfortunately, the Covid-19 pandemic has paralysed all the sectors including education, which is not an exception. Thanks to the internet, we could overcome this difficulty (to some extent) by communicating to the students through electronic media. However, there is no substitute for classroom teaching. We have been in constant touch with our students in this difficult period. To get the feedback from the parents of our students, we organised an online meeting with them. Some snap shots of this meeting also appear in this issue.

Ours is a new department, established in the year 2019. At present the department has one Professor, two Associate Professors and two Assistant Professors. The process of recruitment of additional faculty members is in progress.

One of the goals of our department is to achieve excellence in teaching and research, which is in tune with the vision of the University. To start with, we have a post-graduate programme in Statistics and Applied Mathematics. The course work has a mixture of courses from Mathematics and Statistics, where students learn the fundamental concepts in both the disciplines. After successful completion of this programme, a student will be able to pursue a career in one of the streams. We are introducing Ph. D programmes in both the subjects from the next academic year. This will facilitate the faculty members with the opportunity of training students in advanced research in the respective discipline. We are also revising our curriculum for the post-graduate programme to include frontline areas in the elective courses and keeping balance in the core courses. On completion of this programme, students could aim for higher studies in the respective subjects or take up jobs in Industries.

Starting from next academic year we plan to organise many activities benefitting the students in their learning process. Labs and other infrastructure for the department are being planned, which are essential for the students to get hands on experience of the concepts they learn from the course work.

There is a scope to have collaborative programmes (like Data Analytics) with the cooperation of the Computer Science department, which will be pursued in due course of time. This will be in line with our goal of strengthening research and teaching activities.

In addition to faculty profiles, this newsletter presents other activities by academic members during the last semester. On June 29th Professor P. C. Mahalanobis' birth anniversary was observed as National Statistics day. In this issue, we also present a brief biography of Professor Mahalanobis, which is compiled by Dr. Deepak M. Sakate. Contributions from our students include "Student's Corner" and a section on their activities. Some of our students have given their feedback about our M.Sc., programme.

Thanks to all the faculty members and students for their cooperation in bringing out our first newsletter. Our special thanks to Dr. J. Kokila for her efforts in creating this informative magazine.

With best wishes,

B. Ramakrishnan

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FACULTY DETAILS



- **Dr. B. Ramakrishnan** is the Professor and Head of the Department of Statistics and Applied Mathematics, Central University of Tamil Nadu, who has joined on Dec 18th 2019.
- He is an expert in Number Theory, specifically the theory of automorphic forms.



- **Dr. Deepak M. Sakate** is an Associate Professor in the Department of Statistics and Applied Mathematics, Central University of Tamil Nadu, who has joined on Dec 10th 2019.
- His specialisations are Regression Models, Data Mining and Nonparametric Inference.



- **Dr. C. Vijayalakshmi** is an Associate Professor in the Department of Statistics and Applied Mathematics, Central University of Tamil Nadu who has joined on May 21st 2020.
- She has expertise in Optimization Techniques, Statistical and Stochastic modeling, Data Analysis, Machine Learning Algorithms and Fuzzy Optimization

RESEARCH PLAN @ CUTN

- Apart from continuing research in Number Theory, Prof. B. Ramakrishnan will offer elective courses for the M.Sc., students on some applications of number theory, especially in Cryptography. This will enable the students to pursue their career in this challenging field.
- Dr. Sakate will continue to work on development of variable selection techniques, nonparametric tests and data mining procedures. He has plans to initiate interdisciplinary collaborative research studies with other scientists at CUTN and other institutions in India and abroad. He will strengthen existing collaboration and establish new collaboration for research in Statistics.

FACULTY DETAILS



- **Dr. J. Kokila** is an Assistant Professor in the Department of Statistics and Applied Mathematics, Central University of Tamil Nadu, who has joined on Nov 23th 2019.
- She is an expert in Fractional Differential Equations, Fractional Control Systems and Inverse Problems.



- **Dr. Narsimhulu Dunna** is an Assistant Professor in the Department of Statistics and Applied Mathematics, Central University of Tamil Nadu, who has joined on Dec 18th 2019.
- His specialisations are Hyperbolic Systems of Partial Differential Equations (PDEs), Group Theoretic Methods for PDEs, Nonlinear Gas Dynamics and Magneto hydrodynamics (MHD).

RESEARCH PLAN @ CUTN

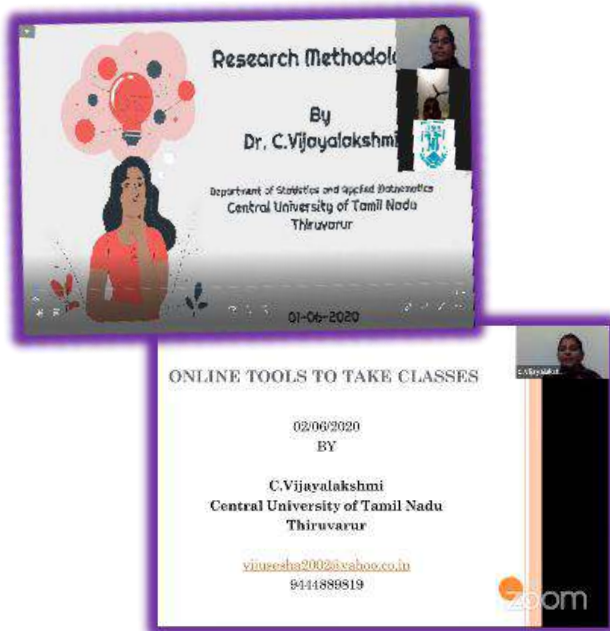
- Dr.C. Vijayalakshmi will continue to do research on Data analysis using Statistical techniques to do research on Data analysis using Statistical techniques, Machine learning algorithms. She will strengthen existing collaboration through Inter disciplinary research with CUTN Professors and other Institutions in India and Abroad.
- Dr. J. Kokila will do research on “Inverse Problems on Time and Space Fractional Parabolic Equations” with the start up on “Fractional Boundary Value Problems” and do collaborative research with experts from India and Germany in the topic “Existence of Solutions of Fractional Elliptic Equations”.
- Dr. Narsimhulu Dunna has plans to work on Lie group approach over similarity method, Supersonic and hypersonic flows, MHD fluids with plasma (the MHD flows are governed by the Navier-Stokes equations coupled with Maxwell equations through the coupling terms) and Study of relativistic shock waves can be explored.

DEPARTMENT SNIPPETS DR. B. RAMAKRISHNAN ■ INVITED TALK

- ◆ Delivered Professor K. Subramanian endowment lecture on “Shimura maps and sums of squares” at the Department of Mathematics, RKM Vivekananda College, Chennai on Feb 21th 2020.



DR.C. VIJAYALAKSHMI ■ RESOURCE PERSON



- ◆ Served as Resource Person in Two day Faculty Development Programme, “Research Methodology”, organized by Jeppiaar Institute of Technology during June 1-2, 2020.
- ◆ Served as Resource Person in Two day Workshop organized by C.Abdul Hakeem College of Engineering and Technology, Vellore, “Teaching and Learning through Online tools”, on May 23rd 2020.

ACTIVITIES ON ONLINE SOURCES

- Dr. C. Vijayalakshmi received appreciation certificate for COVID-19 Samadhan | MHRD Mega Innovation Challenge - Touch voice of SARI(Severe Acute Respiratory Infection) patients in ICU.
- Dr. C. Vijayalakshmi has completed the course in Cognitive -AI, IBM, “Machine Learning with Python” on May 30th 2020.

DR. DEEPAK M. SAKATE ■ INVITED TALK

- ◆ Delivered a talk on “Statistics in Practice” at Vivekanand College, Kolhapur on Jan 14th, 2020.
- ◆ Delivered an invited talk on “Variable selection in zero and one inflated Poisson regression using smooth threshold estimating equations” and Chaired a Session in National Seminar on “Advances in Statistical Modeling and Inference” (NSASMI-2020) organized by the Department of Statistics, Shivaji University, Kolhapur during Feb 14-15, 2020.



- ◆ Delivered a series of lectures on Multivariate Analysis and Generalized linear models at SGM college, Karad, Maharashtra on Feb 13th 2020.
- ◆ Delivered a series of lectures on Generalized Linear Mixed Models at Department of Statistics, Shivaji University, Kolhapur on Mar 10th 2020.

DR. J. KOKILA ■ RESEARCH ACTIVITIES

- Dr. J. Kokila has participated in the "International Conference in conjunction with the 15th Biennial conference of the Indian Society of Industrial and Applied Mathematics"(IC-ISIAM 2019) jointly organized by Department of Applied Mathematics , Bharathiar University and Department of Mathematics, Anna University Regional Campus, Coimbatore during Dec 5-7, 2019.
- Dr. J. Kokila visited Indian Institute of Technology Palakkad to explore avenues of research collaboration in Fractional Elliptic Problems during Jan 6-9, 2020.

INITIATIVES

FORUM FOCUS:

It includes monthly faculty seminars about their current research arena, thus, in turn the students will get adequate knowledge on both Applied Mathematics & Statistics aspects.

STUDENTS SEMINAR CLUB:

The department encourages the students to take seminar in alternate weeks to improve their Confidence, to strengthen their communication and teaching skills and to ensure their learning ability by sharing with their peer group.

WISDOM ONSCREEN:

The department promotes e-learning for the students to enrich their subject knowledge and to widen their perspective in learning skills, by providing various online platforms such as online live stream talks by subject experts, lecture series, subject based films and so on.

ACTIVITIES ON ONLINE SOURCES

- Dr.J. Kokila has completed Scilab test organized at Sinhgad College of Engineering, Vadgon with course material provided by Spoken Tutorial Project, IIT Bombay on May 4th 2020.
- Dr. J.Kokila has completed online Covid-19 awareness quiz conducted by Vivekananda Arts and Science College for Women on May 3rd 2020.
- Dr. Narsimhulu Dunna has completed Scilab test organized at Sinhgad College of Engineering, Vadgon with course material provided by Spoken Tutorial Project, IIT Bombay on May 4th 2020.

FEEDBACK

Coming from a background of triple major system that is being implemented in Karnataka, there had been a big gap between the Mathematics studied in my B.Sc (Physics, Mathematics, Computer Science) and the beginning of M.Sc (Statistics and Applied Mathematics) at CUTN, in terms of depth in the topics that were taught. This made my beginning days difficult to cope with the subject, but eventually by means of effort and support from the very approachable faculty, I believe I have improved greatly.

Having no background in statistics, I expected it rather to be difficult as it would be a new topic and a deviated subject domain from mainstream Mathematics. Fortunately, the curriculum formed is apt for anyone who has a Bachelor's degree in Mathematics and who wants to explore various aspects of Statistics. And the faculty here at the Department of Statistics and Applied Mathematics at CUTN promote learning based education, which is, a major plus point to be a part of this Masters' programme. The only limitation in this course in my opinion is the lower number of courses held per semester. This course is a perfect blend of Mathematics and Statistics which is a very rare but extremely productive combination of knowledge especially required in Bio-medical, Data Science, Economics and Commerce domains both in terms of research as well as Industry. As a student looking forward to be a researcher in the near future, it'll be wrong if I don't mention that I feel privileged to be a part of Department of Statistics and Applied Mathematics at CUTN where the faculties not just teach us but mentor and guide us to the right paths to be taken which makes this an excellent space for Academia.



*I - M.Sc.,
Stat & Appl. Math.
Batch : 2019-2020*

Meghana D
First year
M.Sc., Statistics and Applied Mathematics



STUDENTS ACTIVITIES

- Ms. Meghana D of first year master student attended a livestreamed talk on May 17th 2020, titled "Automating Mathematics?" by Prof. Siddhartha Gadgil from IISc, Bengaluru organised by International Centre for Theoretical Sciences through their outreach program "Kuriosity during Kuarantine" which in normal circumstances is recognized and well known as "Kaapi with Kuriosity".
- On May 24th 2020, Ms. Meghana D of first year master student participated and cleared with 80% score in an quizonline organised by K.Ramakrishnan College of Technology, Samayapuram, Trichy.
- On May 27th 2020, Ms. Meghana D of first year master student participated in a Webinar on "Writing an effective research paper - Means and methods." organised by Hindusthan College of Engineering and Technology, Coimbatore .
- On May 28th 2020, Ms. Meghana D of first year master student participated in a Webinar on "Sagemath - An open source Tool for Learning Mathematics" organized by Department of Mathematics, VLB Janakiammal College of Arts and Science, Coimbatore.
- On May 29th 2020, Ms. Meghana D of first year master student participated in a Webinar on "R - Programming Language for Data Analytics" organized by Department of Mathematics, VLB Janakiammal College of Arts and Science, Coimbatore.
- Ms. Meghana D of first year master student enrolled for two online courses starting from June 15th offered by Udemy namely
 - "Complete Python Bootcamp: Go from zero to hero in Python 3"
 - Econ 101: " The Complete Intro to Economics for Beginners" .

FEEDBACK

I joined CUTN for M.Sc Statistics and Applied Mathematics after my B.Sc in Statistics from Calicut University, Kerala. I was also accompanied by 3 of my classmates hailing from the same place who largely share a similar understanding. From the beginning itself we were very intimidated by the course name "Statistics and Applied mathematics" itself. Though we did study Mathematics in our Bachelors, it wasn't taught in a deeper sense which made it extremely difficult for us during the first semester. We developed a fear to such an extent that we had thoughts of even dropping the course and returning to our homeland. But as days passed by, we understood that this was not a major issue. To come to this understanding the prime reason was the kind of classmates we have who taught us and stood by our side in all situations.

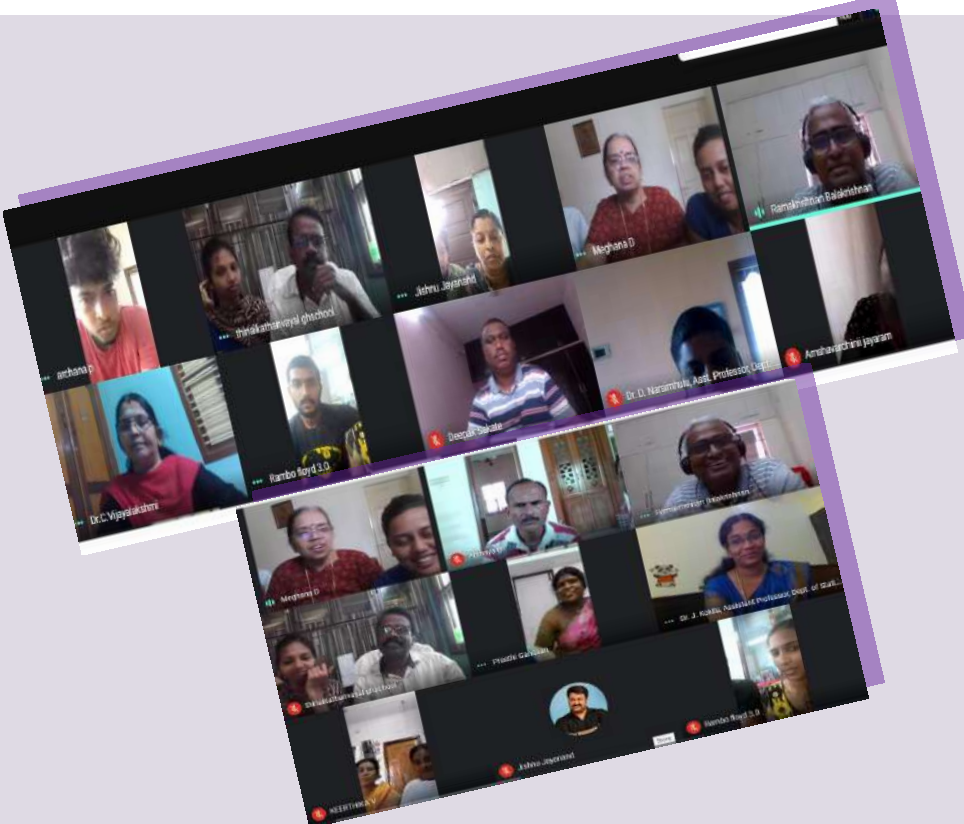
After First semester, things changed gradually by the introduction of the new faculty. They helped us understand the basic concepts and learning became much easier later on. But it is true that even now we have a special attention among them due to the lack of knowledge in the subject of Mathematics that we have. The one major concern regarding the course we have is that as the name of the course suggests, equal importance must have been given for both Statistics and Mathematics. I personally feel more of Statistics courses must be added to the current curriculum. This suggestion is based on the idea that Statistics is the future as it possesses plenty of opportunities in all fields. When we look into our university itself there are plenty of courses which have Statistics as a compulsory topic to be studied. Putting it all in a nutshell, for someone like me who is interested to get into the industry, this course at CUTN has added to my confidence levels.

Jishnu Jayanand
First year,
M. Sc., Statistics and
Applied Mathematics





FACULTY MEETING
HELD IN
JUNE 2020



PARENTS TEACHERS
MEETING
HELD IN
JUNE 2020

AN ARTICLE - *Compiled by Dr. Deepak M. Sakate*

PROF. PRASANTA CHANDRA MAHALANOBIS: FATHER OF MODERN STATISTICS IN INDIA

A Physicist by Training, a Statistician by Instinct and a Planner by Conviction. (Jun 29, 1893 - Jun 28, 1972)

Prof. Prasanta Chandra Mahalanobis was honored with several awards:

- *The Weldon Medal from Oxford University (1944)*
- *Sir Devaprasad Sarbadhikari Gold Medal from Calcutta University (1957)*
- *Gold Medal from Czechoslovak Academy of Sciences (1964)*
- *Durga Prasad Khaitan Memorial Gold Medal from Asiatic Society (1968)*
- *Srinivasa Ramanujam Gold Medal (1968)*
- *Honorary Deshikottama from Visva Bharati University (1961).*
- ***Padma Vibhushan (1968)***, the second highest civilian award by the Republic of India for his contribution to science and services to the country.



Prof. P.C. Mahalanobis

Prof. Prasanta Chandra Mahalanobis was born into an educated and relatively wealthy family which was well established in Calcutta (now Kolkata). His roots are in Panchasar village, now in Vikrampur, Bangladesh. He was born on 29th June 1893 at his grandfather's house in Clucutta as the first child of Probodh Chandra Mahalanobis and Nirodbasini Devi. Prof. Prasanta Chandra Mahalanobis earned a Bachelor degree in Science with Honours in Physics from the Presidency College, Calcutta in 1912, before he sailed to England and joined Cambridge University.

As a student, Mahalanobis never confined himself in his subject books. He was very interested in various subjects like amateur astronomy, philosophy, architecture, and psychology. Around this time, Mahalanobis met with pioneer of Mathematics Srinivasa Ramanujan in Cambridge. Just before he left the Cambridge University in 1915, he was introduced to Statistics by one of his Tutors. He was fascinated by reading *Biometrika*, the journal founded by Karl Pearson on his return journey to India.

He first joined Presidency College in 1915 as a teacher of Physics and taught Physics for 33 years (1915-1948). He was also the Principal of Presidency College for a few years and held the post of Meteorologist in the Alipore Observatory in Calcutta from 1922 to 1926. Rabindranath Tagore and Mahalanobis shared a unique relationship. Rabindranath Tagore used to take a keen interest in Mahalanobis's statistical work from the very beginning. Even his early career in statistics was very largely influenced by the poet. At the time Mahalanobis was a Professor of Physics at Presidency College, he was highly involved in the work of statistics. He set up the Statistical laboratory in the baker laboratory of Presidency College, Calcutta, in the early 1920s. In the initial phase, his statistical research was in anthropometry, in meteorology and in problems of flood control in North Bengal and Orissa. The anthropometric studies led to the formulation of D-square Statistic, known in statistical literature as Mahalanobis Distance, which has proved to be a valuable tool not only in taxonomy but in many other fields including economics and geology. A rich field of research in multivariate analysis opened up; Sir Ronald Aylmer Fisher accepted this concept by giving it the name 'Mahalanobis D-square' or 'Mahalanobis distance'.

In 1931, Prof. Mahalanobis set up the Indian Statistical Institute (ISI) for advanced research and training in statistics. Later during the 1950s, ISI shifted to the present premises at Baranagar, a suburb of Kolkata, West Bengal. Mahalanobis was called upon to tackle the problem of flooding after two devastating floods, one in North Bengal in 1922 and the other in Orissa in 1926. This led him to undertake extensive statistical studies of rainfall and floods in Bengal and Orissa covering a span of about sixty years. The studies yielded some of the basic calculations that were later used for the two hydro-electric and irrigation projects in Hirakud and Damodar Valley. *Sankhya, The Indian Journal of Statistics*, founded by Mahalanobis in 1933 is the official publication of Indian Statistical Institute. He established the National



MAHALANOBIS ON A 1993 STAMP OF INDIA.



Prof. P.C. Mahalanobis was honoured with this Google Doodle on his 125th Birth Anniversary on 29th June, 2018.

sample Survey in 1950. It is a continuing survey in which information is collected year by year with the help of a whole time field organization, spread all over India, and which provides periodic estimates on social and economic factors affecting the national economy. In 1958, he found a simple but very effective technique known as Fractile Graphical Analysis. Mahalanobis was one of the first people in the country to recognize the importance of machines – mechanical, electrical as well as electronic – to make fast, accurate and complicated calculations with masses of figures.

In the 1950s, Mahalanobis arranged to have a large number of electromechanical data processing machines from IBM; the Hollerith and the Power Samas varieties were installed to process NSS data. Through his initiative in 1953, a small analog computer was designed and built in ISI. In 1956, Mahalanobis arranged for the installation of a British made digital computer, to be in operation anywhere in India.

In 1957, Mahalanobis invited Dr. Pamela Robinson of the University College London to the ISI to set up the Geological Studies Unit. The team under the leadership of Dr. Pamela Robinson discovered for the first time in India the fossil bones of the giant prehistoric lizard; the largest animal that lived on the earth. Over ten tons of bone material were collected from the Pranhita–Godavari valley and brought to Calcutta. The bones were assembled and later mounted in 1976, in record time into a full length skeleton of the dinosaur in the Geological Studies Unit. The skeleton was named *Barapasaurus tagorie*.

Mahalanobis played an important role in Indian National Economic Planning. He took major responsibility in drafting the Second Five Year Plan for India. He believed in perspective planning and used simple logical ideas in deriving an economic model for planning in a under developed country, like India.

Coins Released on the occasion of 125th Birth Anniversary of Prof. P. C. Mahalanobis in 2018.



NON CIRCULATING COMMEMORATIVE COIN



CIRCULATING COMMEMORATIVE COIN

He was elected as fellow of the:

- Royal Society of London in 1945,
- Chairman of the United Nations Sub-Commission on Statistical Sampling (five sessions- 1947-1951)
- Fellow of International Econometric Society (1951)
- Chairman of United Nations Statistical Commission (1954-1958)
- President of National Institute of Sciences of India (1957 and 1958)
- Fellow of American Statistical Association (1961)
- Fellow of World Academy of Art and Science (1963).

Prof. Prasanta Chandra Mahalanobis viewed statistics not as a branch of mathematics but as a technology. Mathematics and probability theory are only the means to promote the use of statistical methods in the world of reality. He shaped Indian Statistical Institute as a beacon of knowledge with commitment for national development and social welfare. He is still being remembered for the Mahalanobis Distance, a statistical measure, and for his great contribution in the large scale sample survey. He continues to inspire statisticians in India and around the world. He breath his last on 28 June, 1972. To commemorate his contributions to Statistics, the government of India decided in 2006 to celebrate his birthday, 29 June, as National Statistical Day.



The theme for the year 2020 is sustainable development goals: Good health and well-being and Gender Equality

Prof. Prasanta Chandra Mahalanobis received a number of awards and honors in India and abroad for his outstanding and fundamental contribution to Statistics and Planning. He perceived statistics as, *“Statistics is the Universal tool of inductive inference, research in natural and social sciences and technological applications. Statistics, therefore, must always have purpose, either in the pursuit of Knowledge or in promotion of human welfare”*.

MATH MATTERS...

“Abel Prize 2020 shared by 2 Trailblazers of probability and dynamics”

The Norwegian Academy of Science and Letters announced the Abel Prize Laureates 2020 to two mathematicians

- * **Dr. Hillel Furstenberg**, Hebrew University of Jerusalem, Israel
- * **Dr. Gregory Margulis**, Yale University, New Haven, USA.

*“for pioneering the use of methods from **probability and dynamics** in group theory, number theory and combinatorics”*.

The Abel prize award ceremony, which was held to be in Oslo on May 19th 2020, has been postponed to May 25th 2021 because of the Covid-19 pandemic.

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EDITOR:
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