



FOR EXCELLENT RESEARCH IN VIETNAM

## Vietnam Institute for Advanced Study in Mathematics (VIASM)

Founded in 2011

Address:

7th fl., Ta Quang Buu Library, in HUST campus, 1 Dai Co Viet Str., Hanoi, Vietnam.

Tel: (+84)-4-36231542

Fax: (+84)-4-36231543

Website: <http://www.viasm.edu.vn>

### Board of Directors

**Scientific Director:** Ngo Bao Chau

**Managing Director:** Le Minh Ha

**Deputy Director:** Trinh Thi Thuy Giang

### FOR RESEARCH FELLOW APPLICANTS

For more information, please visit:

<http://viasm.edu.vn/news-and-events/information-for-applicants>

## THE 9th VIETNAM MATHEMATICAL CONGRESS, 2018

On August 14, 2018, the Opening Ceremony of the 9th Vietnam Mathematical Congress took place at Telecommunications University in Nha Trang City.

It was an honor to welcome the presence of Mr. Nguyen Huu Do - the Vice Minister of Education and Training, Prof. Ngo Bao Chau - Scientific Director of Vietnam Institute for Advanced Study in Mathematics, Prof. Dang Vu Minh - President of Vietnam Union of Science and Technology Associations, and

Prof. Nguyen Dinh Cong - Vice President of Vietnam Academy of Science and Technology. Besides, there were nearly 800 delegates who were young scientists and researchers in the Vietnam mathematical community from universities and institutes throughout the country.

Vietnam Mathematical Congress is the largest scientific event in the country happening once every 5 years. This year, the 9th Vietnam Mathematical Congress was organized from August 14 - 18, 2018 and divided into 2 parts: Scientific Conference and Congress of the Vietnam Mathematical Society (VMS).

The Scientific Conference comprised of 8 parallel sessions: Algebra - Number Theory - Geometry - Topology, Analysis, Differential Equations and Dynamical Systems, Discrete Mathematics and Mathematical Foundations of Computer Science, Optimization and Scientific Computing, Probability - Statistics, Mathematical Applications, and Mathematics Education and History of Mathematics. There were 5-7 parallel lectures for every session, 7 plenary lectures, and almost 350 contributed lectures about different mathematical topics. These lectures presented research achievements of individuals and research groups of Vietnamese mathematicians on theory and application of mathematics. Lectures were selected based on several criteria: quality, variety, lecturers with remarkable research results.

The Congress of the Vietnam Mathematical Society was held on August 15, 2018 summarized the activities of the VMS in the



last five years from 2013-2018, and set out the course of actions for the term 2018-2023. The Congress also voted the VMS Executive Committee for the term 2018-2023 including 19 scientists from all universities and institutes in the country.

Below are some photos from The Congress of the Vietnam Mathematical Society:



## FAST FACTS

## 65 and 24

65 research fellows and visiting professors came to work at VIASM from July to December 2018. Among them, there were 24 foreigners or Vietnamese people from abroad.

## Research groups

From July 2018 to December 2018, there have been 9 research groups working at VIASM:

- ➔ Group on High-dimensional approximation of some problems with random input consisted of 3 members: Prof. Dinh Dung (Head).
- ➔ Group on Inverse and Ill-Posed Problems for Partial Differential Equations consisted of 5 members: Prof. Dinh Nho Hao (Head).
- ➔ Group on Selected topics of variational analysis in optimization and equilibrium problems consisted of 5 members and 2 visitors: Assoc. Prof. Phan Quoc Khanh (Head).
- ➔ Group on Asymptotic behaviour of solutions of Optimal control problems governed by differential inclusions consisted of 2 members: Assoc Prof. Huynh Van Ngai (Head).
- ➔ Group on Some qualitative problems in optimization and control theory consisted of 5 members: Prof. Nguyen Khoa Son (Head).
- ➔ Group on Some selected problems in the theory of partial differential equations, II consisted of 3 members: Prof. Nguyen Minh Tri (Head).
- ➔ Group on Qualitative analysis of some classes of partial differential equations consisted of 1 member and 2 interns: Assoc Prof. Dr. Le Xuan Truong (Head).
- ➔ Group on Arithmetic and Geometry of local and global fields consisted of 10 members and 5 visitors: Assoc Prof. Ngo Dac Tuan (Head).
- ➔ Group on Existence of solutions of variational inequalities and equilibrium problems under generalized monotonicity consisted of 2 members: Dr. Nguyen The Vinh (Head).

## Visitors

- ➔ Prof. Alexander Kruger, Federation University Australia.

- ➔ Prof. Christiane TAMMER, Martin-Luther- University Halle-Wittenberg, Germany.
- ➔ Dr. Detchat Samart, Burapha University, Thailand.
- ➔ Assoc. Prof. Floric Tavares Ribeiro, Université de Caen Normandie, France.
- ➔ Prof. Le Hong Van, Institute of Mathematics of Czech Academy of Sciences, Czech Republic.
- ➔ Prof. Lorenz Schwachhofer, TU Dortmund, Germany.
- ➔ Prof. Yasuhide Fukumoto, Kyushu University, Japan.
- ➔ Prof. Moshe Rosenfeld, University of Washington Tacoma, USA.
- ➔ Prof. Lionel Schwartz, Université Paris 13, France.
- ➔ Prof. Jeroen Lamb, Imperial College London, United Kingdom.
- ➔ Prof. Phong Q. Nguyen, Inria and CNRS/JFLI/Univ. of Tokyo.

### MATH OPEN DAY 2018 "Mathematics Decodes the Chaotic World", the 2017-2018 Mathematics Outstanding Paper Award and the 2017-2018 Scholarship Award Ceremony

On Sunday, November 4, 2018 the Vietnam Institute for Advanced Study in Mathematics (VIASM) and the Hanoi - Amsterdam High School for the Gifted co-organized successfully the Math Open Day 2018 - MOD 2018: "Mathematics Decodes the Chaotic World". This festival attracted nearly 2,000 attendees. The MOD 2018 included a wide variety of activities and exhibitions for students of all ages, parents, educators, scientists and all those who are interested in mathematics and science.



The MOD 2018 was focused on the broad applications of Mathematics, especially the increasing and essential role of Mathematics

in the Digital Age. Because of the challenges in maintaining Big Data security, the breakthrough of the emergence of AI, the exploration of natural phenomena, the development within a chaotic world, applied Mathematics plays an utterly important role in these scientific and technological advances.



*Prof. Phan Duong Hieu*

A series of public lectures, "Mathematics without boundaries", were conducted during the event, commencing with the lecture titled "Information Security in the Digital Age" by Prof. Phan Duong Hieu. Following was the lecture titled "Computational Astro-Physics, from a supermassive black hole to the formation of a planet system" conveyed by Prof. Dinh Van Trung. The lecture "Which AI for Viet Nam" given by Prof. Ho Tu Bao concluded the series. Despite having abstract and complex nature, the presented knowledge and information was comprehensively and concisely explained by the professors.

In the talkshow "Vietnam - From AK to AI", Vietnam's experts in AI: Prof. Ho Tu Bao, Mr. Bui The Duy - Deputy Minister of Science and Technology, Mr. Pham Kim Hung - Base CEO, Mr. Dao Duc Minh - Acting Managing Director of Institute of Big Data, Assoc. Prof. Pham Bao Son - Vice President of University of Technology -

Vietnam National University, Mr. Truong Dinh Tuyen - former Minister of Trade of Vietnam (now the Ministry of Industry and Trade), commented on important issues that have great impact on the future of Vietnam. "From AK to AI" described the lives of many Vietnamese scientists, who formerly served in the military armed with guns to protect their homeland

subsequently became great experts in their respective fields after returning home from war. The name also represented the path to



development of the nation with a desire for a brighter future. The Ministry of Science and Technology is currently developing a strategy to support research and technological application of the "Industry 4.0" in Vietnam. One opportunity for Vietnam in developing AI as well as technology that attracts large number of experts around the world is that there are many specific math problems to be solved. However, it is important to note that in order to effectively captivate those experts, promotion of the training of human resources in the country is essential.

During this event, the 2017-2018 Mathematics Outstanding paper Award and the 2017-2018 Scholarship Award Ceremony funded by the National Program for the Development of Mathematics also took place.

In 2017 and 2018, the country had 197 outstanding mathematical papers awarded. In addition, there were 295 scholarships awarded to students from 71 specialized high schools, and 188 scholarships awarded to students from 13 universities nationwide.

Speaking at the ceremony, Mr. Nguyen Huu Do - Vice Minister of Education and Training congratulated the scientists who received the awards, the students who earned the scholarships, and symbolically expressed gratitude towards the teachers for training such excellent generation of students. He said that these awards and scholarships would create a movement that would improve the quality of teaching and learning mathematics in the country.



Mr. Nguyen Huu Do - Vice Minister of Education and Training congratulated the scientists

Representing specialized high schools, Mr. Nguyen Dang Khanh, principal of Dong Thap specialized high school, expressed his gratitude to the practical activities of the National Program for the Development of Mathematics, and hoped there will be more activities held in the Mekong Delta region.

Among the universities with many professors who are awarded, Thang Long

University – the first private university in Vietnam, has focused on investing in developing Mathematics in recent years. Representing professors who received the award, Dr. Ngo Thi Thanh Nga introduced the university and emphasized the important role of the National Program in supporting young scientists.

### Signing ceremony between VIASM – ALPHABOOKS

On August 2, 2018, Vietnam Institute for Advanced Study in Mathematics (VIASM) signed a collaboration agreement with Alpha Books Joint-Stock Company to set up a book collection named "VIASM Bookshelf". At the signing ceremony, both parties agreed to select and publish: 1) high quality mathematics books, textbooks, reference materials for undergraduate and postgraduate programs, 2) mathematics books for Vietnamese youth and children.



VIASM role is ensuring professional quality, selection, and introduction of fine, useful mathematics books, and directly participating in translation and editing process. Especially, as the coordinating unit of the National Program for the Development of Mathematics, VIASM will support and collaborate with universities in Vietnam to employ "VIASM Bookshelf" as curriculum, official reference materials for undergraduate and postgraduate programs. Alpha Books is responsible for licensing, publishing, and distribution of products in the collection.

### Summer Schools 2018

In 2018, implementing the National Program for the Development of Mathematics period 2010-2020, VIASM continues to organize Summer school in mathematics for training and fostering teachers, students from gifted high schools and Mathematics majors throughout the country.

Every year, Summer school in mathematics attracts over 500 teachers and students from gifted high schools and Mathematics majors in universities across the country. This year, the number of participants was

673 including 417 high school students, 110 teachers, and 146 college students. Summer school is becoming increasingly more attractive, as there are more and more teachers and students registering every year.



This Year (2018), The Mathematics Summer School has been organized throughout all three regions in Vietnam: North, Center and South.

Summer school not only trains students at all levels, but also helps improve teachers and students' extensive knowledge in mathematics.

Summer school for students focuses on supplementing specialized, advanced mathematics topics, or extra-curricular applied mathematics subjects, encouraging students to maximize their potential and practice their scientific research skills. Henceforth, students shall develop a passion to continue studying mathematics and utilize mathematics as an essential tool for their work in the future.



In 2018, Prof. Ngo Bao Chau directly gave lectures at Summer school for high school students in North and Central Vietnam, and for Summer school for college students.

Lecturers at summer schools are prestigious, highly experienced professionals in teaching mathematics. In addition to the lectures, the organizer also encourages teachers from gifted high schools to register for the training course for teachers.

VIASM commits to maintaining and improving the quality of the summer school to achieve the highest results, creating the environment and motivation for students to pursue and study mathematics. Moreover,

VIASM has developed a network of high school mathematics teachers nationwide with the purpose of sharing information and mutual support in a professional manner.



Students listening to the lecture at summer school 2018

## DATA SCIENCE WEEK

From August 21-28, 2018, Vietnam Institute for Advanced Study in Mathematics and Hanoi University of Science and Technology co-organized Data Science Week Course with the participation of many leading experts in this field:

Lecture: Mathematical foundations of machine learning by Prof. Le Hong Van, Institute of Mathematics of Czech Academy.

Tutorial Lectures: Gaussian and Dirichlet processes for statistical learning and inference; Streaming dynamic and distributed inference of latent geometric structures by Prof. Nguyen Xuan Long, University of Michigan, Ann Arbor.

Lecture: Neural Random Access Machines – a deep learning technique for sequential data by Prof. Nguyen Hung Son, Warsaw University.

should focus on in the era of Industrial Revolution based on the country's development goals.

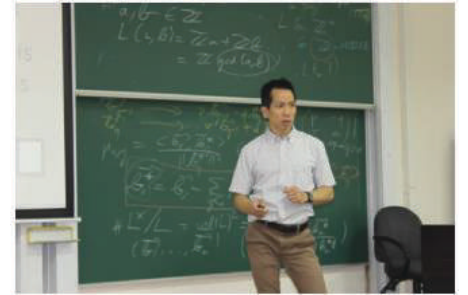
## Workshops/ Conferences

12 workshops, conferences have been organized by the VIASM since July 2018:

- Mini-workshop on Dynamical systems and Partial Differential Equations, July 10, 2018.
- The 9th Vietnam Mathematical Congress, August 14-18, 2018.
- A series of lectures about Machine Learning, August 20-24, 2018.
- Data Science week, August 21-30.
- A series of lectures about Geometry, Physics, Art, August 27-30, 2018.
- Mini-course: Deep Learning, September 9-12, 2018.
- International Mini-Workshop on Continuous Optimization, October 5-6, 2018.
- Workshop "Graph Theory and Application", November 15-16, 2018.
- Mini-courses: Essential Mathematics and Computing for Data Science, December 2018.
- Mini-Workshop "Partial Differential Equations and Applications", December 12, 2018.
- Workshop "Summer Schools in Mathematics: Lessons from Vietnam and the World", December 22, 2018.
- Winter School on Post-quantum Cryptography: Lattice Cryptography, December 25-29, 2018.



Prof. Yasuhide Fukumoto -Institute of Mathematics for Industry, Japan.



Prof. Phong Q. Nguyen - Inria and CNRS/JFLI/Univ. of Tokyo

## UP-COMING ACTIVITIES

- The Second Vietnam Workshop on Graph Theory and Discrete Geometry, January 9-13, 2019.
- International Workshop on Probability Theory and Related Fields, February 25 – March 3, 2019.
- The International Conference on Applied Probability and Statistics (CAPS 2019), April 2-6, 2019.
- Workshop "Recent developments in mean-field game, machine learning and quantitative finance", May 21-24, 2019.
- Workshop "Function Spaces and Operator Theory", June 4-8, 2019.
- Vietnam-USA Joint Mathematical Meeting, June 10-14, 2016.



Lecture: Data Science in Healthcare and Medical Research by Prof. Ho Tu Bao, VIASM. During the week, there was also a public lecture titled "Which AI for Vietnam" by Prof. Ho Tu Bao. The lecture summarizes the development of AI in general. In the following section, the lecturer shares some ideas about which areas of AI Vietnam

