

Pham Tien Son, Mutsuo Oka, Ha Huy Vui, Shuichi Izumiya, Katsusuke Nabeshima were about local study such as classification of singularities. In celebration of Mutsuo Oka's 70th birthday, his students (Ishikawa, Kawashima and Tai) gave a talk of his contributions to mathematics.



There were more than 40 participants during the workshop.

Workshops/ Conferences

8 workshops, conferences have been organized by the VIASM since January 2017:

- Monodromy Conjecture and Singularity Theory, January 13-16, 2017 in Tuan Chau (Quang Ninh province).
- Vietnam - Korea workshop on selected topics in Mathematics, February 20-24, 2017 in Da Nang.
- Topology of Singularity in Hanoi 2017, February 20-22, 2017.
- Stochastic processes and their applications, March 9, 2017.
- The 15th Workshop on Optimization and Scientific Computing, April 20-22, 2017 in Ba Vi (Hanoi).
- Some selected problems in modern probability, May 12-14, 2017 in Tuan Chau (Quang Ninh province).
- Fundamental group schemes in Arithmetic Geometry, May 21-25, 2017 in Tuan Chau (Quang Ninh province).
- Nevanlinna theory and Diophantine approximation, June 22-25, 2017 in Tuan Chau (Quang Ninh province).



Workshop "Stochastic processes and their applications"

Special Programs

3 special schools and 4 mini-courses have been organized:

- Mini-course "Periodic and Almost Periodic Solutions to Fluid Flow Problems" by Prof. Matthias Hieber (Technische Universität Darmstadt), February 20, 2017.
- SEAMS School "Mathematical Modelling in Biology", March 8-15, 2017.
- Spring School on "Dynamical Systems and Evolution Equations", March 28-30, 2017.
- Course "A brief introduction to fractional calculus and rough path theory" by Dr. Luu Hoang Duc (Max Planck Institute for Mathematics in the Sciences, MPI MIS and Institute of Mathematics - VAST), April 4-25, 2017.
- Mini-course "Stochastic differential equations with H older continuous coefficients - PDE vs Geometry" by Dr. Tran Tat Dat (Max Planck Institute for Mathematics in the Sciences, MPI MIS), April 11-27, 2017.
- Minicourse "Introduction to Data Science" in Hanoi and Ho Chi Minh City, May 15-21, 2017.
- Mathematics and Science Summer Program - MaSSP 2017, June 19-July 1, 2017.

Up-coming activities

In the coming months, VIASM will organize some other scientific activities as well as assisting the NPDM to implement its tasks.

Some of coming VIASM's scientific activities:

- Workshop on Stochastic Dynamical Systems, July 10-15, 2017.
- VIASM Lecture Series in Applied Mathematics 2017: "Control of nonlinear systems" by Jean-Michel Coron (Université Pierre et Marie Curie, France), August 14 - 15, 2017.
- Workshop "Stochastic processes- Actuarial science and Finance", July 31 - August 3, 2017.
- VIASM Annual Meeting 2017, August 19-20, 2017.

Some NPDM's activities:

- Summer School for students 2017, July 9-21, 2017 in Quang Nam.
- Summer Schools for high-school students and high-school math teachers, for schools in the North (July 16-23, 2017 in Bac Ninh), in the Middle (July 23-30, 2017 in Vinh City, Nghe An Province) and in the South (July 30-August 6, 2017 in Binh Duong).
- Math Open Day 2017, August 13, 2017 in Hanoi.

WHAT RESEARCHERS SAY?

"My one-year stay at Vietnam Institute for Advanced Study in Mathematics (VIASM) as a postdoctoral fellow is coming to an end. I would like to say some words expressing my impression about this successful period for my research developments. This is the first time I can focus completely on research, through working on mathematics is always my hobby and even the goal of my life. The working conditions and environment here are really wonderful. I have met and mathematically discussed with famous mathematicians and colleagues from various institutions of Vietnam and overseas, who have raised my research enthusiasm, ideas, and knowledge. The seminars, workshop and others mathematical activities are very attractive and helpful. I have also got several significantly deepen results than my previous papers. I really think that when being back to my Institute in Ho Chi Minh City, I can keep this research enthusiasm in order to continue the work. I have clone here. I hope as well to have an opportunity to come back to VIASM soon for further studies.

On this occasion, I would like to express my warm and deep gratitude to the leaders and staff of VIASM for their kind helps and collaborations during this unforgettable year." – Dr. Nguyen Hong Quan.



Dr. Nguyen Hong Quan
(Post & Telecommunication Institute of Technology)

Spring School "Dynamical Systems and Evolution Equations"

The Spring School "Dynamical Systems and Evolution Equations" took place at VIASM from March 28 to March 30, 2017. The School focused on some mathematical analysis' methods for researching of the well-posedness and asymptotic behavior of solutions to evolution equations and dynamical systems. The main topics included spectral theory of functions, spectra of operators arising from dynamical systems, existence and smoothing properties of strongly continuous semigroups, wellposedness of evolution equations, interpolation functors and duality estimates. The abstract results are then applied to study the well-posedness and asymptotic behavior of dynamical systems and nonlocal boundary-valued problems as well as solutions to Navier-Stokes equations and stability of fluid flows. This school was useful for senior undergraduate students, graduate students, PhD students and young researchers.



FOR EXCELLENT RESEARCH IN VIETNAM

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FAST FACTS

79 and 25

79 research fellows and visiting researchers came to work at VIASM from January to June 2017. Among them, there were 25 foreigners or Vietnamese people from abroad.

Mini-course "Introduction to Data Science"

The Mini-course "Introduction to Data Science" was jointly held with John von Neumann Institute – VNU HCMC (JVNI) in Hanoi from May 15 to May 17 and in Ho Chi Minh City from May 19 to May 21, 2017. The lecturers of the course were data scientists working overseas, who were also sponsored by the FIRST project of Ministry of Science and Technology: Prof. Ho Tu

Bao (JAIST, Japan), Prof. Phung Quoc Dinh (Deakin, Australia), Dr. Bui Hai Hung (Adobe Research, USA), and Prof. Nguyen Xuan Long (Michigan, USA).

Data science, also known as data-driven science, is an interdisciplinary field about scientific methods, processes, and systems to extract knowledge or insights from data in various forms, either structured or unstructured. The mini-course "Introduction to Data Science" brought in the overview of data science, its mathematical fundamentality, its principles and its methods. The lecturers also discussed the new developments of the field as well as the industry 4.0 which is based on innovative production.



Participants of the course in Ho Chi Minh City.

The course attracted more than 1,000 participants who were lecturers, researchers, students from universities and staff from start-ups and R&D centers in Vietnam.

SEAMS School "Mathematical Modelling in Biology"

The SEAMS School "Mathematical Modelling in Biology" was held at VIASM from March 8 to March 15, 2017. The School aimed at providing basic knowledge of mathematical modelling in biology as well as introducing some problems of the subject which are currently in the field of



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intensive research. The school is addressed to senior undergraduate students, graduate students, PhD students and researchers who are interested in this topic, especially those from South-East Asia.

The lecturers were Prof. Hien Tran (North Carolina State University, USA), Prof. Marc Peigné (Université François Rabelais, France), Prof. Fugo Takasu (Nara Women's University, Japan), Dr. Do Thanh Ha (Hanoi University of Science, VNU Hanoi) and Dr. Tran Tat Dat (Max Planck Institute for Mathematics in the Sciences, Germany). The lectures covered a wide range of topics on mathematical modeling techniques for biological systems, branching processes, individual-based modeling of population dynamics, mathematical population genetics and numerical tools for simulation.

The School attracted more than 50 participants, including 20 international students from Japan, Indonesia, Malaysia, Thailand, Cambodia and the Philippines. Among them, 28 students were sponsored by the National Program for the Development of Mathematics (NPDM) of Vietnam.



Participants of the SEAMS School

WHAT RESEARCHERS SAY?

"I have been in VIASM since the beginning of February 2017; it is a wonderful occasion to get an insider's view of the vitality of the Vietnamese school of mathematics.

The VIASM offers very good working conditions and nice environment to concentrate on research, to open up new topics, to exchange with colleagues and to organize events. A working group in applied probability took place in the first semester 2017; it was first the opportunity to read and understand some backgrounds on stochastic models in biology and second, to hear presentations of recent results obtained by researchers in VIASM during the semester. An important event during these few months was the SEAMS school "Mathematical Modelling in Biology", which was held from 8th to 15th of March and where I gave a course.

VIASM plays a central role for the knowledge dissemination of mathematics in Vietnam. Its director and its staff actively help me to organize and support a conference on stochastic dynamical systems, which takes place in July in Ha Long Bay, with the participation of researchers coming from different areas of Vietnam. During my stay here I received several invitations to give talks in other departments of mathematics in Ha Noi, in particular VAST... – Prof. Marc Peigné (former president of French Mathematical Society).

Program which was founded by some graduate students at MIT and Wellesley College, USA. The mission of MaSSP is to provide Vietnamese high school students, especially those from underprivileged backgrounds, with opportunities to explore applications of mathematics and science. In addition, students learn how to conduct re-search appropriately, think computationally, and communicate science effectively.

There were 58 high-school students studied four subjects (Mathematics, Computer Science, Physics and Computational Chemistry) under the mentorship of more than 30 Vietnamese graduates from universities over the world at MaSSP 2017.

This year program was sponsored by BIDV, FUNIX, Summit and Tinh Van Outsourcing.

For further information on the Program, please visit: <http://www.massp.vn>.

Research groups

From January until June 2017, there have been 18 research groups working at VIASM:

- Group on *Error Bounds for Generalized Equations and Variational Systems with Applications in Optimization* consisted of 2 members and 1 visitor: Prof. Pham Ky Anh (Head), Prof. Le Dung Muu, Prof. Stephan Dempe.
- Group on *Some problems on Geometry and Singularity of affine algebraic curves, surfaces and polynomials* consisted of 4 members and 4 visitors: Prof. Dr. Nguyen Van Chau (Head), Dr. Pho Duc Tai, Dr. Nguyen Tat Thang, Dr. Le Quy Thuong, Prof. Masaharu Ishikawa, Prof. Mutsuo Oka, Prof. Christophe Eyrat, Nguyen Hong Duc.
- Group on *Some selected problems in the theory of partial differential equations* consisted of 3 members: Prof. Nguyen Minh Tri (Head), MSc. Dao Quang Khai, MSc. Duong Trong Luyen.
- Group on *Homogenization of two-dimensional very rough interfaces* consisted of 3 members and 3 visitors: Assoc. Prof. Pham Chi Vinh (Head), Dr. Tran Thanh Tuan, Dr. Do Xuan Tung, Prof. Chiara Zanini, Prof. Marita Thomas, Prof. Marcos Aurelio Capistran Ocampo.
- Group on *No-gap second-order optimality conditions for optimal control problems governed by partial differential equations*



Professors, mentors and students of MaSSP 2017

with pure state constraints consisted of 2 members: Dr. Bui Trong Kien (Head), Dr. Vu Huu Nhu.

- Group on *Carleman estimates and applications* consisted of 2 members: Dr. Nguyen Anh Tu (Head), Dr. Dang Anh Tuan.
- Group on *Complex and Riemannian Geometry* consisted of 3 members and 1 visitor: Dr. Ninh Van Thu (Head), Dr. Ngo Quoc Anh, Dr. Nguyen Thac Dung, Kim Hyeseon.
- Group on *Qualitative Theory for Evolution Equations and Applications* consisted of 3 members, 4 visitors and 1 intern: Assoc. Prof. Nguyen Thieu Huy (Head), Dr. Trinh Viet Duc, Dr. Vu Thi Ngoc Ha, Prof. Matthias Hieber, Prof. Nguyen Van Minh, Dr. Vu Trong Luong, Prof. Wolfgang Arendt, ThS. Nguyen Thanh Tung.
- Group on *Some problems about approximation of plurisubharmonic and holomorphic functions* consisted of 3 members: Prof. Nguyen Quang Dieu (Head), Dr. Phung Van Manh, Dr. Tang Van Long.
- Group on *Optimization Approaches for Computing Geometric Shortest Paths in Low Dimensions: Algorithms, Implementations and Visualizations* consisted of 5 members: Assoc. Prof. Phan Thanh An (Head), Dr. Hoang Nam Dung, Dr. Dinh Thanh Giang, Dr. Nguyen Duc Manh, Dr. Le Hong Trang.
- Group on *Stationary measures for stochastic differential equations with Hölder continuous coefficients* consisted of 2 members, 1 visitor and 2 interns: Dr. Luu Hoang Duc (Head), Dr. Tran Tat Dat (Head), MSc. Phan Thanh Hong, MSc. Cao Tan Binh, Prof. Max-Olivier Hongler.
- Group on *Liouville-type theorems for nonlinear elliptic and parabolic problems* consisted of 2 members: Dr. Phan Quoc Hung (Head), Dr. Duong Anh Tuan.
- Group on *Numerical Solutions and Long-term Behavior of Stochastic Differential Equations with non-Lipschitz Coefficients* consisted of 3 members and 1 intern: Dr.

Ngo Hoang Long (Head), Dr. Nguyen Thanh Dieu, Dr. Ta Cong Son, MSc. Tran Dinh Tuong.

- Group on *On the Nevanlinna theory and its applications* consisted of 6 members, 6 visitors and 2 interns: Assoc. Prof. Tran Van Tan (Head), Prof. Ha Huy Khoai, Assoc. Prof. Ta Thi Hoai An, Dr. Le Giang, Dr. Nguyen Van Thin, Dr. Nguyen Thi Ngoc Dieu, Prof. Paul Vojta, Prof. William Allen Cherry, Prof. Liang-Chung Hsia, Prof. Julie Tzu-Yueh Wang, Prof. Min Ru, Prof. Gisbert Wustholz, MSc. Nguyen Viet Phuong, Vu Thuy Duong.
- Group on *Some problems on D-modules in positive characteristic* consisted of 3 members, 2 visitors and 2 interns: Prof. Phung Ho Hai (Head), Dr. Nguyen Chu Gia Vuong, Dr. Ngo Lam Xuan Chau, Assoc. Prof. Joao Pedro dos Santos, Prof. H. Esnault, Nguyen Luong Thai Binh, Pham Thanh Tam.
- Group on *Some selected problems of probability theory and statistics* consisted of 3 members and 2 interns: Prof. Nguyen Van Quang (Head), Dr. Nguyen Van Huan, Dr. Duong Xuan Giap, MSc. Bui Nguyen Tram Ngoc, MSc. Do The Son.
- Group on *Multivariate Public Key Cryptography* consisted of 2 members and 4 interns: Dr. Duong Hoang Dung, Dr. Le Van Luyen, MSc. Ngo Thi Bao Tran, MSc. Nguyen Thuy Duong, Nguyen Anh Tuan, Bui Kim Minh.
- Group on *Definitive Screening Designs using Weighing Matrices* consisted of 2 members: Dr. Nguyen Ky Nam (Head), MSc. Pham Dinh Tung.

Vietnam-Korea Workshop on selected topics in Mathematics

Fifty Korean researchers and one hundred mathematicians from the Institute of Mathematics and universities nationwide attended the Vietnam-Korea Workshop on selected topics in Mathematics at Duy Tan University (DTU, Da Nang) from February 20 to February 24, 2017. The Workshop was jointly held by the Institute of Mathematics (Vietnam Academy of Science and Technology), VIASM, the Korean Institute for Advanced Study (KIAS), the Korean Advanced Institute of Science and Technology (KAIST), and DTU.

The Workshop provided a forum for participants from the two countries to share their ideas and results, as well as strengthening ties between Vietnamese and Korean mathematicians.

Speaking at the event, Prof. JongHae Keum, the former President of KIAS, said: "The collaboration between Vietnamese and Korean mathematicians started more than 20 years ago. In recent years, more workshops have been organized to create excellent



Representatives of participants of Vietnam-Korea Workshop on selected topics in Mathematics

opportunities for mathematicians to exchange information and their experiences. Their ideas and the results of their research have been successfully applied in real-life in many areas of society."

Ninety-three papers were presented at the Workshop, focusing on the following selected areas in Mathematics: Algebra; Geometry; Commutative Algebra and Number Theory; Dynamics; Partial Differential Equations and Differential Equations, Systems of Dynamics and Optimization.

Notable work were presented by Vietnamese and Korean participants, including "Dynamics beyond hyperbolicity" by Prof. Keonhee Lee from the National Chungnam University in Korea, and "Dynamical behavior of population in random environments" by Prof. Nguyen Huu Du – Managing Director of VIASM.

For further information, please visit: <http://viasm.edu.vn/en/hdtk/vk2017>

Visitors

- Prof. Wolfgang Arendt, University of Ulm, Germany.
- Prof. Nero Budur, KU Leuven, Department of Mathematics, Belgium.
- Prof. William Allen Cherry, University of North Texas, USA.
- Dr. Nguyễn Hồng Đức, Basque Center for Applied Mathematics, Spain.
- Prof. H. Esnault, Freie Universität Berlin, Germany.
- Prof. Christophe Eyrat Institute of Mathematics, Polish Academy of Sciences, Poland.
- Prof. Matthias Hieber, Technische Universität Darmstadt, Germany.
- Prof. Max-Olivier Hongler, EPFL SMT-GE, Switzerland.
- Prof. Liang-Chung Hsia, National Taiwan Normal University, Taiwan.
- Prof. Kim Hyeseon, Center for Mathematical Challenges, KIAS, Korea.
- Prof. Masaharu Ishikawa, Tohoku University Aoba, Japan.

Workshop on topology of singularity in Hanoi 2017

The three-day workshop "Topology of Singularity" started at VIASM on February 20, 2017. The aim of the workshop was to create a forum for researchers from Japan and Vietnam to exchange methods, new ideas, results, and perspectives on singularity theory. The studies of polynomial maps and plane curves have had great progresses in these thirty years due to deep communications between Japanese and Vietnamese mathematicians. The methods of these studies were very wide, including many techniques in algebraic geometry, topology and singularity theory. In the workshop, researchers discussed recent progress following these communications and related topics in the field.

There were 11 talks and a poster session. The talks by Hiroo Tokunaga, Christophe Eyrat, Nguyen Viet Dung, Jean-Paul Brasselet, Ichiro Shimada were about global study such as topology of the complement; the talks by