

Report on

SEAMS-IMH-CIMPA SCHOOL ON ALGEBRAIC GEOMETRY

Hanoi, February 29 - March 11, 2016

<http://math.ac.vn/conference/seams16/>

I. Scientific report

Organizers:

- Dr. Doan Trung Cuong (Institute of Mathematics)
- Prof. Phung Ho Hai (Institute of Mathematics)
- Prof. Le Tuan Hoa (Institute of Mathematics)
- Dr. Nguyen Chu Gia Vuong (Institute of Mathematics).

Lectures and exercise sessions are given by

- Prof. Arnaud Beauville (Université de Nice)
- Prof. Michel Brion (Université Grenoble Alpes)
- Dr. Doan Trung Cuong (Institute of Mathematics)
- Dr. Nguyen Chu Gia Vuong (Institute of Mathematics).

There were 31 students selected for the school.

Schedule: February 29 - March 11 (12 days), 2 lectures per day.

Titles of the courses:

1. Introduction to Algebraic geometry
 - 10 Lectures (Prof. Arnaud Beauville).
 - 4 Exercise session (Dr. Nguyen Chu Gia Vuong).
2. Algebraic curves
 - 10 Lectures (Prof. Michel Brion).
 - 4 Exercise session (Dr. Doan Trung Cuong).

A detailed schedule and contents of lectures were put on the website of the school:

website: <http://math.ac.vn/conference/seams16/> (see also Appendix 5, 6)

In the weekend during school, a trip outside Hanoi was organized for all participants.

II. Administrative report

- The school was planned by IMH at the end of 2014.



- Later on, CIMPA agreed to support this school, and SEAMS agreed that the financial support of CIMPA will be only used to support students from South East Asia outside Vietnam.
- The school was announced at the website of VAST: website: <http://math.ac.vn/conference/seams16/> (see Appendix 1)
- The deadline for application was January 30, 2016. There were 31 applications. Among them there were 10 applications from students outside Vietnam (from South East Asia) and 21 Vietnamese students. They consist of master students, PhD. Students and undergraduate students (see List 1 below). The grants were announced on December 1, 2015.
- First students came on February 28th, and last students left the institute on March 13rd.

List 1. List of Students

No	Name	Sex	Position	Address
1	Khon Vanny	Male	Undergraduate student	Royal University of Phnom Penh, Cambodia
2	Ari Dwi Hartanto	Male	Graduate student	Universitas Gadjah Mada, Indonesia
3	Made Putri Lawiyuniarti	Female	Master student	Institut Teknologi Bandung, Indonesia
4	Galih Pradananta	Male	Undergraduate student	Institut Teknologi Bandung, Indonesia
5	Almira Larassanti Puspa	Female	Undergraduate student	University of Brawijaya, Indonesia
6	Mela Puspita	Female	Undergraduate student	University of Andalas, Indonesia
7	Tubagus Dhafin Rukmanda	Male	Undergraduate student	Univrersitas Indonesia, Indonesia
8	Kyle Marie Mangulabnan	Female	Undergraduate student	University of the Philippines – Diliman, Philippines
9	Ericha Anggelia Butar	Female	Undergraduate student	University of Sumetra Utara, Indonesia
10	Sri Novita Sari	Female	Undergraduate student	Andalas University, Indonesia
11	Đặng Tuấn Thương	Male	Master, Lecturer	University of Science, VNU-HCM

12	Nguyễn Anh Tuấn	Male	Undergraduate student	University of Science, VNU-HCM
13	Phan Ngọc Yến	Female	Graduate student	HCMC University of Pedagogy
14	Trần Thị Vân Anh	Female	Graduate student	National University of Education II
15	Trần Quốc Dân	Male	Graduate student	National University of Education
16	Nguyễn Thanh Huyền	Female	Undergraduate student	Vinh University
17	Phạm Hùng Quý	Male	Ph.D., Lecturer	FPT University
18	Phạm Thanh Tâm	Male	Ph.D. Student	National University of Education II
19	Trang Trọng Thức	Male	Undergraduate student	University of Science, VNU-HCM
20	Nguyễn Thị Trà	Female	Master, Lecturer	National University of Education II
21	Ngô Thị Bảo Trân	Female	Graduate	University of Science, VNU-HCM
22	Phạm Bá Đức	Male	Master student	Institute of Mathematics
23	Nguyễn Nguyễn Trúc Đào	Female	Master student	Institute of Mathematics
24	Nguyễn Đức Hoàn	Male	Master student	Institute of Mathematics
25	Nguyễn Thị Trà My	Female	Master student	Institute of Mathematics
26	Nguyễn Thị Thu Sương	Female	Master student	Institute of Mathematics
27	Hoàng Mạnh Trường	Male	Master student	Institute of Mathematics
28	Nguyễn Thị Thúy Vân	Female	Master student	Institute of Mathematics

29	Nguyễn Minh Thành	Male	Master student	Institute of Mathematics
30	Đoàn Nhật Minh	Male	Master student	Institute of Mathematics
31	Nguyễn Thị Ngọc Anh	Female	Master student	Institute of Mathematics

III. Financial report

Preliminary, the budget from CIMPA should only cover expenses of foreign students.

31 students were admitted to the school, among them 8 foreign students get financial supports from CIMPA.

IMH pay the lunch for all lectures and Vietnamese students, Drinks and Stationary, printing supply expenses, transportation.

Totally IMH spent 270.170.000VND (Two hundreds seventy million one hundred seventy thousand Vietnamese dong). This includes 123.480.000 VND (equivalent 5040 EUR) paid for foreigners.

Below is the detail of expenses

List 2. Financial report

Contents (February 29 – March 11, 2016)	Paid by	
	VAST (in VNĐ)	CIMPA (in EUR)
I. Expense for lecturers	34.200.000	
Lodging for lecturers	23.400.000	
Living expenses for lecturers	10.800.000	
II. Expense for students	82.000.000	5.040
Travel expenses for 6 Vietnamese students	18.000.000	
Meal expenses for 21 Vietnamese students and 2 International students	46.000.000	
Lodging for 6 Vietnamese students	18.000.000	

Travel expenses for 8 International students		1.600
Meal expenses for 8 International students		1.360
Lodging for 8 International students		2.080
III. Other expenses	30.490.000	
Stationary, printing supply expenses, transportation, ...	30.490.000	
Total (I+II+III)	146.690.000VND	5.040 EUR

In the file 16SEAMS_School_docu_Full and 16SEAMS_Payment_Foreigners we scan all documents concerning expenses for 8 foreign students (see Appendix 3).

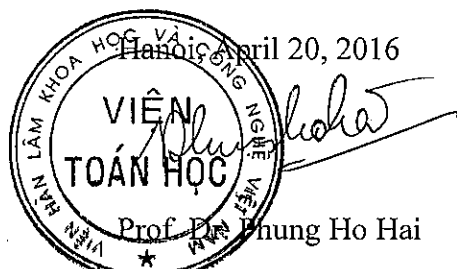
The original are kept at VAST and after CIMPA will approve this report, we will send it to CIMPA by post.

4. Conclusion

The SEAMS-school was a great success. Students had opportunity to learn algebraic geometry and algebraic curves from experts in the field. Students also had opportunity to meet and discuss with distinguish professors who taught at the school. Students in the region also had opportunity to meet each other, that could lead to a collaboration between them in the future.

On this occasion, the organizers and the Institute of Mathematics, VAST would like to thank SEAMS and CIMPA for supporting the idea to organize this international school for students, and especial thank to CIMPA for generous financial support, without it we cannot invite foreign students to come.

Hanoi, April 20, 2016



Prof. Dr. Phung Ho Hai
Chair of Organizing Committee
Deputy Director of IMH

Appendix I. Announcement

This is an introductory school to Algebraic Geometry. There are two mini-courses, each consists of ten two-hour lectures. There are also tutorial sessions and discussion.

Date: from February 29 - March 11, 2016

Organizing Institutions:

- Institute of mathematics – Vietnam Academy of Science and Technology (IMH).
- Centre International de Mathématiques Pures et Appliquées (CIMPA).
- South-East Asia Mathematical Society (SEAMS).

Main Sponsors:

- Centre International de Mathématiques Pures et Appliquées (CIMPA).

Organizers:

Doan Trung Cuong (Institute of Mathematics, VAST, Hanoi, Vietnam); **Le Tuan Hoa** (Institute of Mathematics, VAST, Hanoi, Vietnam); **Phung Ho Hai** (Institute of Mathematics, VAST, Hanoi, Vietnam); **Nguyen Chu Gia Vuong** (Institute of Mathematics, VAST, Hanoi, Vietnam)

Audience: Final year Undergraduate and Graduate students in Mathematics and Informatics.

Main Lecturers:

Prof. Arnaud Beauville, Prof. Michel Brion, Dr. Doan Trung Cuong, Dr. Nguyen Chu Gia Vuong.

Undergraduate students and graduate students can apply to participate in this school by sending application (form below) via email at ncgvuong@math.ac.vn and dtcuong@math.ac.vn

Language: English.

Appendix 2. Program

LECTURES

Lecture 1: Introduction to Algebraic geometry.

Lecturer: Arnaud Beauville

Abstract: The aim of the course is to introduce the main notions of algebraic geometry: algebraic varieties, morphisms, rational maps. The emphasis will be on examples; the necessary theoretical tools will be developed only when needed. Detailed plan:

1. Affine and projective varieties. Examples: curves, hypersurfaces.
2. Functions and morphisms. Examples: Veronese and Segre embeddings, projections.
3. Some algebra: ideals of varieties, irreducibility, irreducible decomposition.
4. Grassmannians
5. Rational functions and rational maps. Rational varieties, examples.
6. Dimension; smooth and singular varieties, tangent spaces. Examples : tangent space to the Grassmannian.
7. Degree of a projective variety. Bézout's theorem, applications.
8. Families of varieties
9. Quadrics, cubics, ...

Lecture 2: Algebraic curves.

Lecturer: Michel Brion

Abstract: The aim of this course is to give an introduction to algebraic curves. This will illustrate and complement the course of Beauville on algebraic geometry. Detailed plan:

1. Projective plane curves: linear systems of curves, theorems of Bézout and Max Noether.
2. Resolution of singularities of curves : blowing-up of a point, quadratic transformations, nonsingular models of curves.
3. Normalization of algebraic varieties; the case of curves.
4. Derivations, differentials on algebraic varieties; the case of curves (canonical divisors).
5. Riemann-Roch theorem and applications.
6. Automorphisms of curves.

References:

[Ful] William Fulton, Algebraic Curves: an introduction to algebraic geometry. Addison-Wesley Pub. Co., Advanced Book Program, 1989.

[Dol] Igor Dolgachev, Basic Algebraic Geometry, vol. 1. : A Modern View. Cambridge University Press; 1st edition (October 8, 2012).

SCHEDULE

29/2: 8H30: OPENING CEREMONY OF THE SCHOOL

	Monday 29/2	Tuesday 1/3	Wednesday 2/3	Thursday 3/3	Friday 4/3
9:00-11:00	Beauville	Beauville	Beauville	Beauville	Beauville
11:00-11:15	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>
11:15-12:00	Tutor (Vuong)	Tutor (Vuong)	Tutor (Vuong)	Tutor (Vuong)	Tutor (Vuong)
14:00-16:00	Brion	Brion	Brion	Brion	Brion
16:00-16:15	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>
16:15-17:00	Tutor (Cuong)	Tutor (Cuong)	Tutor (Cuong)	Tutor (Cuong)	Tutor (Cuong)

	Monday 7/3	Tuesday 8/3	Wednesday 9/3	Thursday 10/3	Friday 11/3
9:00-11:00	Beauville	Beauville	Brion	Beauville	Beauville
11:00-11:15	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>
11:15-12:00	Tutor (Vuong)	Tutor (Vuong)	Tutor (Cuong)	Tutor (Vuong)	Tutor (Vuong)
14:00-16:00	Brion	Brion	Beauville	Brion	Brion
16:00-16:15	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>	<i>Break</i>
16:15-17:00	Tutor (Cuong)	Tutor (Cuong)	Tutor (Vuong)	Tutor (Cuong)	Tutor (Cuong)

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**Appendix 3. Content of the file 16 SEAMS_School_docu_Full
(Concerning 8 foreign students)**

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VIII	Kyle Marie Mangulabnan	
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