RUPP-Master of Mathematics & CIMPA SEAMaN Workshop 8-10 June 2015

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International Center for Pure and Applied Mathematics CIMPA http://www.cimpa-icpam.org

Mission

In accordance with one of the recommendation expressed by UNESCO at its 18th General Conference, the mission of CIMPA is

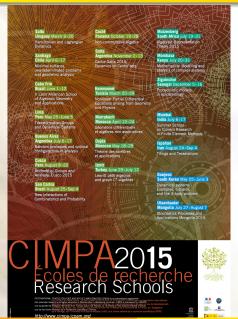
the training of mathematicians coming primarily from developing countries, through internships during the academic year and summer schools, and in developing means of documentation.

> CIMPA schools (~ 20 each year), few in SouthEast Asia, Only one in Laos 2014. CIMPA-SEAMS schools (since 2008). Doctoral and Master trainings.

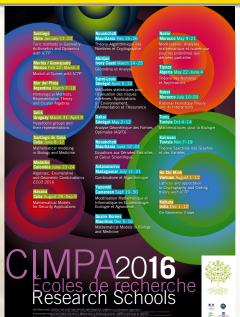
Some other institutions include

ICTP (Italy) http://www.ictp.it ISP (Sweden) http://www.isp.uu.se IMU-CDC • http://www.mathunion.org/cdc/ EMS-CDC • http://euro-math-soc.eu/EMS-CDC/

International Center for Pure and Applied Mathematics



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Preliminary

How did this project start?

- 2003: Conference in Kunming (China),

Two Cambodian PhD holders: Dr Chan Porn & Dr Chan Roath.

Request the help of CIMPA to promote maths in Cambodia.

- 2004 Short visit: R.A.C.; R.U.P.P.; I.T.C.

Maths at RUPP: Bachelor (4 years) training for students to become teachers.

Project of CIMPA to organize a Master of Mathematics in Cambodia.

- 2005 Opening of the Master of Mathematics at R.A.C.
- 2006 ITC hosted the Master during 3 years.

R.A.C. & R.U.P.P.

Two years: Master I & Master II. New generation every two years.

8 to 10 courses per year, each course lasts from 3 to 4 weeks.

In Master 2, the students have to write a thesis.

Requirements to get the Master diploma: 15 courses + Thesis.

| R.A.C. | 2005-07 | 1st generation | $\sim 35 \; \mathrm{students}$ |
|----------|---------|----------------|--------------------------------|
| R.U.P.P. | 2007-08 | "Pre-Master" | |
| R.U.P.P. | 2008-10 | 2nd generation | 22 students |
| R.U.P.P. | 2009-11 | 3rd generation | 11 students |
| R.U.P.P. | 2011-13 | 4th generation | 17 students (2 from NUOL) |
| R.U.P.P. | 2013-15 | 5th generation | 22 students |
| R.U.P.P. | 2015-17 | 6th generation | 12 students |
| | | | Total: about 120 stduents |

Responsibles of the Master:

R.U.P.P.: Mam Mareth • http://www.rupp.edu.kh/master/mathematics/

International: Prof. Brigitte Lucquin (University of Paris 6)

& Prof. Michel Jambu (University of Nice Sophia Antipolis).

Master I 2014-15

Master I 2014-15

- Numerical Analysis 1 (Seam Ngonn, RUPP)
- 2 Real Analysis (Maxime Zavidovique, Paris 6) September 29-October 24
- 3 Topology (Michel Jambu, Nice) November 24-December 31
- 4 Probability 1 (Pierre Arnoux, Marseille) January 5-23
- 5 Financial Mathematics (Thomas Lim, Evry) January 26-February 13
- 6 Advanced Algebra (Takayasu Kuwata, Tokyo) February 16-March 6
- \blacksquare Differential Geometry (Naoyuki Ishimura, Tokyo) March 9-20 & June 1-5
- Approximation of PDE 1 (Brigitte Lucquin, Paris 6) March 23-April 10
- Algebra and Geometry (Michel Waldschmidt, Paris 6) April 20-May 8
- Control of Statistics 1 (Xavier Bressaud, Toulouse) May 12-30
- ODE (Mark Gockenbach, Houghton, US) June 8-July 3

Master II 2015-16

Master II 2015-16

- Statistics II (Federica Giardina , Stockholm) 26 October-13 November
- 2 Applied Geometry (Michel Jambu, Nice) 23 November-31 December
- 3 Functional Analysis (Ayman Moussa, Paris 6) 10-31 January
- 4 Approximation of PDE2 (Brigitte Lucquin, Paris 6) 1-26 February
- Applied Probability and Statistics (Naoyuki Ishimura, Tokyo) 29 February & 18 March
- 6 Probability II (Pierre Arnoux, Marseille) 21 March–8 April
- **7** Financial Mathematics II (Thomas Lim, Evry) 18 April-6 May
- 8 Number Theory (Michel Waldschmidt, Paris 6) 9-27 May
- 9 Optimization (Mark Gockenbach, Houghton, US) 30 May-24 June
- Discrete Mathematics (Sok Lin and Hun Kanal, RUPP)
- Numerical Analysis II (Seam Ngonn, RUPP)

Partners

Partners

This project is international. Total budget: \sim \$130 000 per year.

- 2005-06: AUF (Agence Universitaire de la Francophonie) CIMPA & IMU-CDC.
- 2007 Visit of Prof. Herb Clemens (IMU) (creation of Volunteer Lecturer Program).

- 2007-15:
- Strong support from IMU-CDC & US National Committee for Mathematicians
- UNESCO (PISF: 1 year)
- Toyota Foundation (2 years)
- ISP
- French Embassy (<2012)
- AUF (scholarships)
- Universities (Japan, France, Spain, Philippines, Australia, USA, Sweden)
- CIMPA

Documents & Materials

Documents & Materials

- Almost all lecturers have their own lecture notes.
- Donations of books from CIMPA.
- ISP offered free access to many e-books.
- Need more documents.
- Students must have a free access to the books in the department of maths.
- IMU-CDC provided \$10 000 to buy 25 laptops.
- South Korea provided 10 laptops and 2 printers.

- The crucial point: the Master has not the standard international level.
- Very low level of the students after 4 years of Bachelor.
- The best students have to complete a Master abroad, before starting a PhD.
- So, after the Bachelor, they need at least

2 years (RUPP Master)+ 2 years (Master abroad)+ 3 or 4 years (PhD), i.e. a total of 7 or 8 years.

- Master should be the continuation of the Bachelor.
- Only weak interactions with the department of Mathematics.
- The master received support from neither RUPP nor MEoYS.
- Partnerships should be important for the sponsors.
- First step of collaboration of the young PhD's holders with the foreign lecturers.
- In a few years, Master courses will be done by PhD's holders.

Scholarships

Scholarships

Great difficulties to find funds for mobility programs for the best students who are selected to continue their studies till the PhD.

Main sponsors:

AUF

French Embassy

IMU-CDC

EMS-CDC

CIMPA

Scholarship programs (France, Mexico, South Korea, India, Malaysia.)

Graduate students

Graduate students

- 8 PhD's holders back in Cambodia since 2011:
- France, 5. China, 1. Thailand, 1. Russia, 1.
 - Positions:

RUPP 4, ITC 1, NIE 1, Ministry of Finance 1, and 1 has no position.

- 5 PhD students:

France 2, South Korea 2, Malaysia 1.

- 20 Master abroad (since 2007):

France 5, South Korea 1, Mexico 4, India 1, Malaysia 1, Japan 2, Tunisia 1, Thailand 3, Philippines 2.

4 students stayed 2 years (2012-2014) in Philippines.

- Postdoc 1 (6 months, University of Nice Sophia Antipolis)
PhD is the first step of the life of a mathematician. PhD's holders must do

postdoc.

 ≥ 2014

New

- Recruitment of the new generation done by locals.
- Orientation: more applied.
- New courses on Financial Mathematics.
- Practical training in "Pasteur Institut".
- Tutoring with new PhD's teachers.

Future

Prospective

- Excellence Program: The goal is to raise the level of the students before starting the Master in order to have a Master with normal level. So, the best students will be able to start a PhD without having to complete another Master.

It is also the first step towards the succession by the young PhD's holders. From 2015, special trainings by PhD's holders for some selected students after Bachelor 2, to raise their level and to go towards a master at the international level.

It will be the first step of a collaboration with the department of Mathematics. Hope that the department of Mathematics agrees with this project.

Needs for financial support for these training sessions ($\sim \$ 4000$ per year).

Prospective

- **SEAMaN:** 11 Master students for this generation and not more than 5 or 6 will be selected for Master 2.

From September 2015, some students from NUOL and Mandalay could attend the RUPP Master II.

- **SEAMaN:** From 2016, relationship RUPP-Master and network to be defined.
- **SEAMaN:** from 2016, Organization every year of at least one CIMPA-SEAMS-ISP school either in Phnom Penh or Vientiane or Mandalay.
- $\bf SEAMaN:\ 2018$ or 19, Organization of a CIMPA-ISP school at Phnom Penh.