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Report on my visit to the National University of Mongolia
September 14-20, 2015, Ulaanbaatar (Mongolia)

This visit to the National University of Mongolia was the third and last leg of an Asian trip with Francesco Pappalardi, which started with our participation to a SEAMS School in Vietnam – see

http://webusers.imj-prg.fr/~michel.waldschmidt/articles/pdf/RptSEAMSschoolHCMC2015.pdf

The second step was a visit to the Academy of Mathematics and System Science, Chinese Academy of Sciences, under the invitation from Chaohua Jia and Wenguang Zhai.

We were invited at Ulaanbaatar by Bayarmagnai Gombodorj to give courses in the School of Mathematics and Computer Science of the National University of Mongolia. The activity of CIMPA in Mongolia started in 2013 with two research schools, the first one on

Partial Differential Equations in Mechanics, July 15-28, 2013
http://www.cimpa-mongolia.mn/

and the second one, organized by Michel Jambu, with the participation of F. Pappalardi, on

Hypergeometric Functions and Representation Theory, August 5-16, 2013,
http://www.smcs.num.edu.mn/cimpa/

A report (in French) has been written by J.J. Urroz and M. Jambu:

http://www.cimpa-icpam.org/IMG/pdf/Rapport_Mongolie%20mj-jj.pdf

A third CIMPA Research School took place in 2015 in the School of Mathematics and Computer Science at the National University of Mongolia, Ulaanbaatar:

Stochastic Analysis and its Applications Mongolia 2015, July 27-August 7, 2015
http://smcs.num.edu.mn/saam2015/

Besides, Michel Jambu visited the National University of Mongolia from August 18 to September 10, 2014. See his report

http://webusers.imj-prg.fr/~michel.waldschmidt/articles/pdf/ReportMJ-MongolieUB2014.pdf

During the first 4 days he was with Herb Clemens, from IMU–CDC, during the last 10 days he gave 14 lectures.

In October and November 2014, Bayarmagnai went to Berlin for 2 months and took this opportunity to spend one week in Nice University visiting Michel Jambu.

The main purpose of our visit with F. Pappalardi was to give courses, the topics of which were suggested by our host. My own course was on *Lattice cryptography*. I gave three courses of one and half hours: Monday 14, 4 pm; Wednesday 16, 4 pm. Friday 16, 10:30 pm. The main reference was the course on the same topic given in Ho Chi Minh City the previous week, for the SEAMS School. A few additional material is available on the slides of my own course

http://webusers.imj-prg.fr/~michel.waldschmidt/articles/pdf/LatticeCryptoVI.pdf

The topic of the course by Pappalardi was *Elliptic curves cryptography*. More information is available on his website

http://www.mat.uniroma3.it/users/pappa/missions/index.html

Some 10 people attended our courses, colleagues and students from NUM.

A meeting of the Mathematical Society of Mongolia took place during the afternoon of September 15, 2015. I gave a lecture on *CIMPA, SMF, EMS and IMU*:

http://webusers.imj-prg.fr/~michel.waldschmidt/articles/pdf/ExposeMongolieVI.pdf

while F. Pappalardi gave a lecture on *INDAM, UMI and ICTP*:

http://www.mat.uniroma3.it/users/pappa/missions/slides/ICTP_UMI_INDAM.pdf

The main goal of our presentations was to give examples of activities of national and international institutions which may be of interest for the leaders of the Mathematical Society of Mongolia. We reminded our colleagues the suggestion from J.J. Urroz and M. Jambu (in the report on the second CIMPA School) that Mongolia becomes an associate member of IMU

http://www.mathunion.org/members/associate-members/

The society should also have a website.

A talk on *The development of modern mathematics in Mongolia* was given by Uuganbaatar Ninjbat (Department of Mathematics, NUM). NUM was created in 1942, the Department of Mathematics in 1974. The international relations before 1990 were exclusively with Soviet Union. Now in Mongolia there are 13 PhD from Japan, Canada, Russia, UK.

Among some 30 mathematicians that we met were Lkhamsuren Altangerel from the German–Mongolian Institute for Resources and Technology and Rentsen Enkhbat, the Director of the Institute of Mathematics.

In the evening, we were invited for dinner, we could pursue our discussions with the Mongolian colleagues and simultaneously enjoy the Mongolian food.

On Friday, September 18, I gave a colloquium lecture on *Transcendental Number*

Theory: recent results and open problems.
   http://webusers.imj-prg.fr/~michel.waldschmidt/articles/pdf/TNT2015VI.pdf

On Wednesday, September 16, I visited the French Embassy in Ulaanbaatar where I met Jean-Florent Filtz, Conseiller de coopération et d'action culturelle. He is aware of the cooperation between France and Mongolia in mathematics since he met Michel Jambu last year when he visited the National University of Mongolia from August 18 to September 10. The MOU between UNM and the University of Nice, which was discussed at that time, is now in the hands of the University of Nice, it should be signed in the near future. Last year, no student in mathematics was strong enough to be supported for application for a scholarship from the French Embassy; this situation should change in the near future.

We are very much thankful to our colleagues from NUM, especially to Bayarmagnai, who organized very well our visit. We were taken care of very well during our stay in Ulaanbaaar; they were also very kind to help us organizing the free time we had (one day for Francesco and me on Thursday, where we enjoyed the Nomads Festival in Gun Galuut Nature reserve, some 100 km east of the capital; an extra day on Saturday for me, where I could go trekking to Tsetsee Gun in the Bogd Khan Mountain National Park).

This visit is only one contribution to a cooperation which is starting. One of the next steps will be the organization of a SEAMS School; the date and topic will be decided later, depending on the evolution of the economic situation, which is not easy to predict right now. After the SEAMS School, a CIMPA Research School should be planed, but this will not be before 2018.

Michel Waldschmidt.

This report is available on the internet at URL
http://webusers.imj-prg.fr/~michel.waldschmidt/articles/pdf/RptMongolie2015.pdf