

# Faces of ICME-12

## Excursion Course 0 – An Elementary School in Korea



A room full of math teachers, professors, and researchers gathered to visit The Elementary School

Attached to Seoul National University of Education. Located near a core business sector, the elementary school is one of the most prestigious elementary schools in Korea.

In Korean elementary schools, one homeroom teacher teaches all the subjects including art and P.E., though schools may have specialized teachers for some subjects, depending on their region. Normal math classes in Korea follow the government

curriculum with additional workbooks or activities that are devised by each teacher.

The tour group had the chance to sit in on a 4th grade math class. The class was learning about finding a pattern related to numbers. The teacher would show them one stone and show them another picture that is made up of three stones. The students are then asked to guess what would appear next. The teacher gives them time to figure out the next pattern and sometimes makes students work in a team to discuss the question. Making students work in a team helps



them understand the mathematical concepts more easily, a teaching method one particular teacher from the group said that they were trying to implement back in the United States. The students were eager to participate in classroom discussion, chipping in with creative ideas about what the subsequent pattern would be.

Next, the teacher thought of a motto for the students to repeat after, whenever the class seemed to be losing concentration. The teacher would say “listen” and students would say “carefully” in return.

Although they only spent 40 minutes of lecture time, the visitors were keen on capturing many photos of the classroom activity projects. One of the members in the group, Duanghathai Katwibun from Chiang Mai University, Thailand, mentioned that she had gone to the bookstore to look at some of the math textbooks. She was intrigued by the fun methods utilized in the books, like cartoons and stories used to capture students’ eyes and get them interested in math.

## Excursion Course 1 – Main Tourist Attractions (Cheongwadae, Gyeongbok Palace)



of Glenbrook South High School. The entire complex covers approximately 250,000 meters, or 62 acres.

Though the Blue House is packed with security, they attempted to add an attractive quality to the security it self. Police officers in protective helmets and knee pads were circling the area in rollerblades, as a “sign of friendliness” towards visitors.

“Everything felt quite serene at the Blue House; I felt at peace,” said Janet Stramel of Fort Hays State University. Her friend, Jakucyn, added how it was neat that Korea’s presidential house seems to reflect the dynastic roots of the country, unlike the White House, which conversely reflects their old colonial roots for them. The Blue House is, in fact, based on the dynastic roots of the country, as it was built upon the center of the Goryeo Dynasty, and later upon the royal garden of the Joseon

Dynasty.

A five-minute drive away from the Blue House is the **Gyeongbok Palace**, which is the main and largest of the total five grand palaces in Korea. In the olden days, the King would stay at the **Gyeongbok Palace** with the royal family. Guards would be, and still are today, stationed at the main front gate, also known as the **Gwanghwamun**. The guards are ‘changed’ at every hour of the day, in what they call the “Royal Guard Changing Ceremonies.” Guardsmen in traditional costumes, and holding antique weapons and accessories, hold a colourful ceremony in initiating the changing of the guards.

Federic Gourdeau of the Universite Laval complimented on how the **Gyeongbok Palace** is neatly organized and set, in that “everything seems so simple but sophisticated at the same time unlike, say, the palaces in Europe.”

“I really like Korea so far and the culture is quite interesting,” said Judy Anderson of the University of Sydney. “The people here seem especially nice and polite, that I was quite surprised.”



### Did You Know?

- **Cheongwadae** literally translates to “pavilion of blue tiles.”
- In 1968, North Korean infiltrators nearly entered **Cheongwadae** in an attempt to assassinate President Park Chung-hee at the time. 28 North Koreans, 68 South Koreans and three Americans were killed.
- **Gyeongbokgung** literally translates to “Palace Greatly Blessed by Heaven.”
- Nearly destroyed by the Japanese government in the early 20th century, the **Gyeongbok Palace** has been restored several times since then.

Course 1 was one of the most popular of the 14 excursion courses, as it visits the main traditional attractions in the heart of Seoul.

The tour began with **Cheongwadae**, or Blue House, the executive office and official residence of the President of South Korea (currently, President Lee Myung Bak). Though visitors are not permitted to enter the premises, they were still able to receive a full view from the front gate.

“I was impressed by how much land there was for the Blue House complex, unlike the amount of land that is used for the White House back in the United States,” said Natalie Jakucyn,

### Announcements

- **Regular Lectures** on Friday start at **13:30** - Refer to the Timetable (p.12) on ICME-12 Programme Book.
- All **TSG** sessions on Friday begin at **15:00**.
- **WSG42** (Fri, 11:00-12:00, Room 306)  
Title: The improvement of teaching of space figures that bring up spatial awareness and power of spatial reasoning using pop-up cards that are called ‘Origamic Architecture’.  
Presenter: Kazumi Yamada, NIIGATA UNIVERSITY, Japan
- Plenary Lecture VII (Jo Boaler) is now changed to Regular Lecture sessions (Sat, 13:30-14:30, Room 327C). Dr. Jo Boaler will be absent due to health problems. One of her students will be replacing her.
- Survey Team 2 will cover for PL VII (Sat, 9:00-10:00) and will continue their own

presentation afterwards (Sat, 15:00-16:30, Room 402).

- For Participants of **HPM2012** - Remember **July 15, 2:40 PM Poster Session Place!!**  
The MEETING POINT FOR THE CHARTERED BUS to Toyoko Inn in Deajeon is changed due to parking and loading.

1. New Meeting Point: Information Desk in the foyer of Grand Ballroom on the first floor near **North Gate** of COEX. This is the place where the poster session of ICME-12 is held. After the Happy Hour, take the escalator down to the first floor. Then you will arrive at the Meeting Point.
2. The bus fare is **\$10** (10 Euros, 1,000 Yens or 10,000 Wons) per each person.
3. Professor Sung Sook Kim (a member of LOC of both ICME-12 and HPM 2012) will be waiting for you at the New Meeting Point and guide you to board on the bus.





# ICME-12 Daily Newsletter

The 12th International Congress on Mathematical Education

## Today's Highlight

· Plenary Panel Discussion: Math Education in East Asia - Korea, China, and Japan (Frederick Leung, Hong Kong; Binyan Xu, China; Kyungmee Park, Korea; Yoshinori Shimizu, Japan), 09:00-10:30, Hall D2

## Announcements

- Changes of Schedule (See page 4)
- For Participants of HPM2012 (See page 4)
- Contents of KOREA National Presentations are available on the ICME-12 website (<http://www.icme12.org>).

## Key Speakers of ICME-12

### Werner Blum

Werner Blum got his Diploma in mathematics in 1969 and his Ph.D. (Dr. rer. nat.) in pure mathematics in 1970, both from the University of Karlsruhe. Since 1975 he has been a full professor of Mathematics Education (secondary school level) at the University of Kassel. From 1995 to 2001 he served as the President of the GDM, the maths education society of the German speaking countries. In 2006, he received the Archimedes Award of the MNU. His current research areas include empirical investigations into the teaching and learning of mathematics, for instance on self-regulated mathematics learning (project DISUM) or on classroom assessment (project Co<sup>2</sup>CA), and empirical investigations into mathematics teachers' competencies (project COACTIV). A main focus of his work is on quality development in mathematics teaching; among other things, he is engaged in the development of national standards and tests in mathematics for the lower secondary level in Germany. He has done a lot

of work particularly in the area of modelling and applications in mathematics education, among other things as a continuing editor of the ICTMA Proceedings and as the editor-in-chief of ICMI Study 14. Proofs and Proving in mathematics education belong to his areas of interest, too. Since 2000, he has been a member of the international PISA Mathematics Expert Group. He has been a member of the German and the international Istron group from the beginning in 1990. His publications comprise more than thirty books that he has written, edited or co-edited, with a main focus on modelling and applications, and more than 200 articles in books or journals. Among his most recent co-edited books are the Proceedings of ICTMA-14, the results of the COACTIV project and the Festschrift for Gabriele Kaiser's 60th birthday.

**When & Where to find: Room 403 from 10:30 to 11:30 on Sunday**



### Jinfa Cai

Professor Jinfa Cai was born and raised in Hangzhou, China. He received a B.S. in Mathematics from Hangzhou Normal University, a M.Ed. in Mathematics Education from Beijing Normal University, and a Ph.D. in Cognitive Studies in Mathematics Education from the University of Pittsburgh. Currently, he is a professor of Mathematics and Education at the University of Delaware. In the past decade, he has been involved in three lines of research, including longitudinal investigation of curriculum reform on student learning, mathematical problem solving and problem posing, and cross-national studies in mathematics. Dr. Cai has received over \$5 million grants to support his research from various funding agencies, such as USA National Science Foundation, USA Department of Education, and Spencer Foundation. So far, he has published over 100 journal articles and book chapters. In addition, Dr. Cai has authored or co-edited eight books. The most recent book is *Early Algebraization*, published by Springer. Dr. Cai has been a visiting professor in various institutions, including Harvard University and Beijing Normal University. He has served as a Program Director at the Division of Research on Learning, the USA National Science Foundation. He has just completed a 2-year term as the Chair of American Educational Research Association's Special Interest Group for Research in

Mathematics Education. He served on the Editorial Boards of the Journal for Research in Mathematics Education (USA), Mathematics Education Research Journal (Australia), and Zentralblatt fuer Didaktik der Mathematik (Germany). He is an Editor-in-Chief for a new Research in Mathematics Education Monograph Series by Springer.

He has received various awards, including an Outstanding Dissertation Award from the University of Pittsburgh, a Spencer Fellowship from National Academy of Education, an International Research Award and a Teaching Excellence Award from the University of Delaware, and a Fellowship from American Council on Education.

In the past decade, Jinfa had the honor to visit and give presentations in various countries or regions, including Brazil, Canada, China, Czech Republic, Denmark, Finland, Hong Kong, Japan, Latvia, Macau, Mexico, Singapore, South Africa, South Korea, Taiwan and the United States.

**Lecture Title: Curriculum reform and mathematics learning: Evidence from two longitudinal studies**

**When & Where to find: Room 317 from 13:30 to 14:30 on Friday**

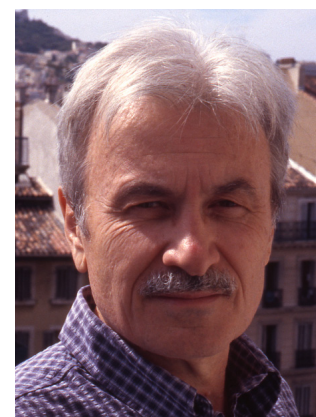
### Yves Chevallard

Yves Chevallard studied at the École normale supérieure in Paris (1967-1971). He has served on a number of posts in the academic community, mainly in France. With a background in mathematical logic he turned his attention towards issues of mathematics education, greatly stimulated by the work of Guy Brousseau. Yves Chevallard was the director of the Institut de recherches sur l'enseignement des mathématiques in Marseille (1984-1991) and was then appointed full university professor at the newly created IUFM (Institut universitaire de formation des maîtres). Starting with the 1970's, he developed the theory of didactic transposition, which earned him widespread fame in France and elsewhere and was the first step in the construction of the more encompassing theory known today as the Anthropological Theory of the Didactic (ATD). All this was carried out during a period of over three decades, as a means to tackle and possibly solve crucial research problems raised by mathematics teaching and mathematics teachers' education. Yves Chevallard's main field of interest has long been the didactics of algebra, from which, together with Marianna Bosch, he derived the key concept of an "ostensive", which allowed him to extend his most important ideas to mathematics as a whole. His main

interests are now, on one side, the study of the ongoing emergence of the new didactic paradigm of "questioning the world" (as opposed to the still dominant paradigm of "visiting mathematical works") and the correlative creation of a "pedagogy of inquiry"; and, on the other side, the study of the conditions under which non-mathematical domains of activity that can, however, be regarded as potential users of mathematics come to terms with the problem of becoming actual users. Yves Chevallard continues to collaborate with colleagues in France and Spain. His work has had a great impact internationally, and not the least so in Latin America.

**Lecture Title: What can teaching mathematics in tomorrow's society mean? The import of an investigative, procognitive view of knowledge and ignorance**

**When & Where to find: Room 401 from 13:30 to 14:30 on Friday**



## MERGA BOOK LAUNCH FRIDAY AFTERNOON

The Mathematics Education Research Group of Australasia (MERGA) invites all ICME-12 delegates to a book launch on Friday afternoon at 5pm in Hall E6. MERGA is the professional association for mathematics education researchers in the Australasian and Southeast Asian region and is the newest ICMI Affiliated Organisation.

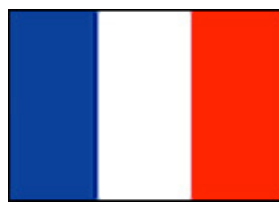
Every four years to coincide with ICME, MERGA publishes "Research in Mathematics Education in Australasia", an edited book that provides comprehensive and critical reviews of research conducted in Australasia, by Australasians, in the previous four years (in this case, 2008-2011). This book is an excellent resource for researchers and graduate students alike. We are delighted that Gilah Leder, MERGA Life Member and past President and winner

of the 2009 ICMI Felix Klein Medal, will be launching the book. Chapter authors will also be present to provide an overview of their respective review chapters. Samples of the book will be available for inspection and orders can be placed while you are here at the conference (conference special price AUD 29.00 + postage).

This is a great opportunity to meet mathematics education researchers from Australasia and learn more about MERGA's activities. We hope to see you there.

Merrilyn Goos  
MERGA President

# Mathematics Education All Around the World



France

## Curriculum Revision

We have a national curriculum. Revisions are quite frequent, at least every ten years with very often smaller changes in between. The process of curriculum change is quite complex and offers variation along time. The writing of a new syllabus is taken in charge by a commission including generally university mathematicians, teachers,

inspectors, and didacticians (but not systematically) nominated by the competent services of the ministry of education. The driving force also varies according to the time. For instance, in the senior high school reform of 2000, there was a clear desire of reinforcing the teaching of statistics and the connection between scientific disciplines. In the current reform, the importance of probability and statistics is confirmed and algorithmic is introduced while geometry is reduced. Moreover the math curriculum must adapt to more global changes, as for instance the distribution of hours between the different disciplines, the increasing emphasis put on inquiry-based practices supported by the use of digital technology, and the introduction of a common basis of competences to be mastered by all students at the end of compulsory schooling ("Socle commun").



USA

Education in the United States is under the jurisdiction of each individual state and not subject to the federal government in most respects. Because states control the education of their children, policies and educational structures vary considerably from state to state. For example, although every state is accountable to the Federal No Child Left Behind Law (2001) that mandates assessing

student achievement in mathematics each year for grades 3-8 and once in high school, the standards governing the assessments, the design of the assessments, and determining the standard for proficiency vary a great deal by state. The recent Common Core State Standards (CCSS) in Mathematics (2010) is an attempt by the state Governors to unify standards across the states in response to the recognized disparity among state standards and what is characterized as adequate progress and proficiency in mathematics. Forty-six states and the District of Columbia have signed on to these standards and the accompanying assessments, which are intended to be in place in the 2014/15 school-year. But even with the CCSS, states are drawing up individual implementation plans, interpreting the standards in their own terms, and financing the efforts in different ways, which will lead to less that is common across the United States.

## Curriculum Revision

Curriculum until the advent of the CCSS has been very much the choice of districts and in a few cases such as Texas, of the state itself. Large publishing companies produce a series of texts, often marketing to several audiences with a "reform, problem based" series and another more procedural focused series. The publishers revise their textbooks about every five years, but the revision is usually a matter of copyright and minor changes. The development of a few textbook series has been supported by the National Science Foundation, and these are likely to reflect recent trends and also the input of a large amount of trialing before the books are released (Connected Mathematics; Mathematics in Context, Investigations in Mathematics). Given the financial constraints under which most districts in the US operate, districts do not buy new texts frequently, often going as long as 10 years or more before replacing textbooks.

The driving force behind revision for most of the mainstream series is the advent of some new

If you look at the ICMI website, there is now a new project, the ICMI Database where you can find links for obtaining all French mathematics curricula. If you look at the website of the CFEM, the French sub-commission of ICMI, you can also access an English description of the French educational system (<http://www.cfem.asso.fr/syseden.html>). It was prepared for ICME-10 but many parts are still of actuality.

## Gifted Education:

A priori, we do not have specific education for gifted students. This being said, even if there is a national syllabus, mathematics education is not the same in all secondary schools, and parents can use different strategies, including the choice of specific options for having their children moving to another school or to a class in the same school where students are expected to have a higher level. It is also worth noticing that in France the scientific section (from grade 11) is considered as the elite section. We also have a lot of enriching activities (see the website of the association Animath: [www.animath.fr/](http://www.animath.fr/)) but the spirit of most of these is rather inclusive.

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feature in the state standards – such as problem solving or communication. With the CCSS, most companies will release revised versions of their texts that pay at least some attention to the shifts called for in the new standards. They will be advertised as CCSS aligned but in reality many of them will only match the words not the spirit or intent of the CCSS.

## Gifted Education

The nature of the gifted and talented programs varies across districts and states. These include pull out programs, where students are pulled out of the regular classroom for instruction, enrichment activities that take part during class, after school programs, summer programs and are offered through private and public institutions. In many places, parents push for their children to be in such programs, sometimes to the detriment of the child. The focus of these programs is usually on getting students into an elite college and not on preparing students for the Olympiads, although the Math Association of America does offer camps and support for students who score well on the preliminary exams. Special high schools include a variety of formats such as the state sponsored North Carolina School for Math and Science, the District sponsored Rufus King International Baccalaureate High School or STEM schools that concentrate on preparing students for careers in science, technology, engineering and mathematics. The admissions policies vary, sometimes requiring a rigorous interview process, achievement scores, or a lottery to be sure to provide equal access for students from different backgrounds.

## Differentiated Class

The time and frequency of mathematics classes varies across the nation from 40 minutes per day to three 90-minute blocks per week in middle and secondary schools and in elementary schools is dependent on the classroom teacher, who is typically not a mathematics specialist. Some differentiation takes place within classes as designed by the teacher; some lower performing schools have built differentiated programs into the school day, with an extra period for struggling students or a support teacher who is designated to work with certain students. The criteria for grouping students is not constant but usually would include lower performance on achievement tests and/or attendance.

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## Hosts



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# New Figures of ICMI



## President of the ICMI Executive Committee : Ferdinando Arzarello (Italy)

Q) What are your thoughts on being elected President?

A) I am actually a bit worried about the whole lot of work I'll need to handle, but I know that I'm not going to be working alone, since I'll have many people supporting me. I will have to learn from the experienced members.

Q) What do you hope to achieve as President?

A) The continuity of the previous works and achievements done by the past president, Bill Barton, is of utmost importance. I believe it is necessary to uphold what

went on in the past, as well as build on it and make some improvement. Other than that, the collaboration between professional mathematicians and math educators must be strengthened; communication is essential between the two so the learners of mathematics can get the best out of it. There needs to be a strong synergy between the two. Moreover, we at ICME need to initiate a stronger connection with underdeveloped countries. The issue raised today at the General Assembly, of increasing the participation of classroom teachers, should also be addressed throughout this term. Lastly, we should use new technology to our advantage to accommodate mathematical and other issues discussed above.

Q) Do you have any comments on this year's ICME being held in Korea?

A) I'm very impressed at how nicely they organized the whole event. Remarkable modern buildings seem to represent the Korean spirit, in terms of mathematics as well. Like they say, "the grass is greener on the other side," and it seems like it is so in Korea!

## Secretary-General of the ICMI Executive Committee : Abraham Arcavi (Israel)

Q) What are your thoughts on being elected Secretary-General?

A) Very strange...but seriously, I am honored but I also feel a lot of responsibility for what I have to do now, since ICME is the largest organization in mathematical education. It is crucial to live up to its high stature. Of course, to be a Secretary-General is a very busy and influential position, and I hope I can give as much influence!

Q) What do you hope to achieve as Secretary-General?

A) I cannot really say right now. Since I am a newly elected member, I am still on the learning stage, and I need to learn about my duties until I start my official position in January 2013. Still, I think it is absolutely necessary and crucial to continue listening to different opinions from diverse cultures.

Q) Do you have any comments on this year's ICME being held in Korea?

A) I think it is a very good opportunity for Korea that the 12th ICME is held here. As you know, ICME is held in countries around the world to give the people in local communities a chance to participate in and learn about various views on mathematical education. This chance is given to Korea, but I feel we have a lot to learn from them as well. I looked over Korean exams here, and saw Koreans are doing so well in national mathematical exams with very demanding questions; I believe we will be able to learn from each other.



## Member-at-Large of the ICMI Executive Committee : Catherine P. Vistro-Yu (Philippines)

Q) What are your thoughts on being elected as one of the five Members-at-Large?

A) I wasn't expecting to be elected! I am the only Asian member of the Executive Committee, so I am grateful that I was elected as a representative of the East Asian community.

Q) What do you hope to achieve as a Member-at-Large?

A) I believe it is time for East Asia to formally organize a

council, or a cooperation of some sort, just as South Asia has a council of their own. It would help strengthen networking in East Asia, as it is essential for us to narrow the gap between developed and underdeveloped countries. The Association of South East Asian Nations (ASEAN) is also soon to undergo important changes in creating a borderless society among its nations, by 2015; I am optimistic in what this holds for a shared mathematics learning among East Asian societies in the future, too.

Q) Do you have any comments on this year's ICME being held in Korea?

A) I think we have all realized that we have a lot to learn from Korea, not just in terms of mathematics, but also in other ways, like culturally, etc. We have definitely not been disappointed at all; every conference has its limitations, but Korea seems to have gone past expectations. I hope the diverse mathematical communities gathered here can benefit the Korean people as well—we all have something to learn from one another. Oh, and Korean food is particularly delicious!

