

# IMO POST 2015

THE 56<sup>TH</sup> INTERNATIONAL MATHEMATICAL OLYMPIAD  
JULY 4-16, 2015 IN CHIANG MAI, THAILAND





# A Brief Guide to CHIANG MAI UNIVERSITY

## COVER STORY

The opening and closing ceremonies of IMO 2015 will be held at Chiang Mai University (Main Campus), an important landmark in this beautiful, historic city.

A public research university founded in 1964, Chiang Mai University (CMU) is the first institution of higher learning in Northern Thailand and the country's first regional university. Today, it has over 35,000 students enrolled in bachelor's, master's and doctoral degree programs on four campuses. The Department of Mathematics, located on the Main Campus, is one of the largest in Thailand and offers programs of study at undergraduate and graduate levels.

The Main Campus is located at the foot of Doi Suthep Mountain, about 5 km west of the city center, and occupies an area of 615 acres (249 hectares). It is bounded on three sides by main shopping streets and on the fourth by the Chiang Mai Zoo. Together with the nearby Suan Dok Campus, which houses the Health Sciences complex, it makes up a small, self-contained city with housing for students, faculty and staff, a hospital (the largest teaching hospital in Northern Thailand), sports facilities and even its own waterworks. An attractive feature of the Main Campus is Ang Kaew Reservoir, which provides the university with a water supply and also serves as a popular recreational area for campus residents and the local community.

In the 1960s, when construction began on the Main Campus, the area was still forested. In the interest of conservation, the university buildings were constructed between the trees, with the result that the campus still retains much of its original setting.

The Mae Hea Campus, about 5 km south of the Main Campus, is home to the Faculties of Veterinary Medicine and Agro-Industry and the university's energy research facilities. The 1,890-acre Si Bua Ban Campus, located in Lamphun Province, some 55 km south of Chiang Mai, provides additional training and research facilities.

In recent years, CMU's Main Campus has become a tourist hot spot after being featured in the Chinese blockbuster film *Lost in Thailand*. It is a pleasant place to visit, with lots of trees, a picturesque lake, photogenic buildings, small roads shared by motorcyclists, bicyclists, joggers and motorists, an art gallery and many coffee shops and coffee stands where you can enjoy a leisurely cup of your favorite drink or grab one to go.



As most of CMU's student body is still on summer vacation this month, the campus is much quieter than during the academic year. This makes it a good time to take a look around and perhaps take photos to share with friends and family back home. The temple-like Sala Dham Hall (top right) is one of the most popular photo spots on campus, rivaled only by Ang Kaew Reservoir (below left). Drop by both places if you have time.

The area around the Main Campus is very popular with tourists. The trendy Nimmanhaemin Road is a haven for shoppers and creative types, with lots of chic boutiques, coffee shops and hotels along its 1 km length. If you are looking for local color, however, we would recommend the "back of campus" area along Suthep Road, which has some of the best street food in Chiang Mai. For more information about Chiang Mai University, go to [www.cmu.ac.th](http://www.cmu.ac.th).

## Sawaddee ka.

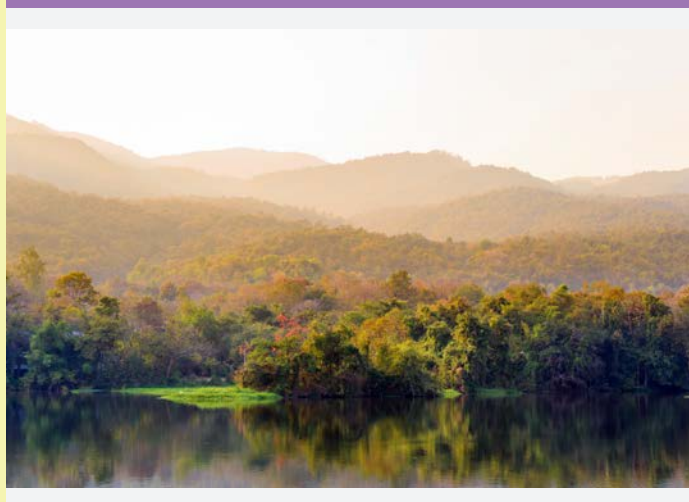
We are excited to welcome you to the 56<sup>th</sup> International Mathematical Olympiad, jointly hosted by Thailand's Institute for the Promotion of Teaching Science and Technology (IPST), Chiang Mai University, the Mathematical Association of Thailand and the Promotion of Academic Olympiad and Development of Science Education Foundation (POSN).

Thailand is proud to serve as a first-time IMO host. From the very first competition in 1959 in Romania, the IMO has grown steadily and impressively, and this year, we are happy to have young math aces from 107 countries around the world taking part in the competition, with representatives from 5 other countries attending as observers.

Your daily IMO 2015 Newsletter brings you the latest news about the competition plus information to help make your stay in Chiang Mai a smooth and happy one. In this issue's Cover Story, we present a look at Chiang Mai University (CMU), where the opening and closing ceremonies will be held. The premier education institution in Northern Thailand and one of the country's largest institutions of higher learning, CMU is also a popular stop for tourists visiting Chiang Mai. "A Brief Guide to Chiang Mai University" tells you why.

We hope that everyone will have a chance to get to know each other over the next several days and that our visitors will make time to see Chiang Mai outside of the contest venue! Chiang Mai is a beautiful city with a rich cultural heritage and friendly people are friendly and welcoming. Besides the memories you will be making during the contest, we hope that you will take home a good memory of this city as well.

We wish you all great success and lots of wonderful experiences.





## THAILAND

### Greetings from Bosnia and Herzegovina

This year the honor to represent, Bosnia and Herzegovina on the IMO has been given to 6 contestants: Milica Djukic, Demir Pasic, Salko Zlatko Lagumdžija, Neira Kurtovic, Adisa Bolic and Mirza Arnaut. Although we are from different parts of Bosnia and Herzegovina, we often meet, enjoy math, solve tasks together and spend time with each other. This makes our team very unique. Our leader is Dina Kamber and our deputy leader is Marko Citic, they are both Masters of Science and great mathematicians. Admir Besirevic, who is the team's observer, is one of our teachers with the greatest contribution to our placement on the IMO. Math is our common interest but besides this passion, our team members are also doing sports, playing several music instruments, reading, acting...



We all look forward to meeting other contestants from all around the world. We also hope to get to explore Thailand and experience Thailand's culture. Bosnia and Herzegovina is a beautiful country and we hope you will come to visit sometime in the future.

## BOSNIA AND HERZEGOVINA

Hello everyone,

We would like to welcome you to this year's IMO in Chiang Mai! We are Team Thailand and we are very proud to be the host of IMO 2015. Our team is quite well-balanced with both old-timers and newcomers. And we also have many "wild" contestants.

First is Suchan, the "elephant", since his nickname is "Chang" which means elephant. Furthermore, we also have Win, the "gorilla". Well, you won't probably see a gorilla in Chiang Mai but you will probably see a lot of elephants, and there is actually an excursion to an elephant camp where you will get the chance to see elephants up close! Chiang Mai also has plenty of other tourist spots including grand temples and night markets. We hope you have a good time and we get to know each other here in Chiang Mai!



A big "G'Day!" to everyone.

We are looking forward to seeing Thailand and meeting you all from around the world. And of course we can't wait to have a go at some inspiring maths problems.

## AUSTRALIA



From Team Leader Takahiko Fujita

From the 31<sup>st</sup> meeting of IMO 1990, Japan participated 26<sup>th</sup> times. Last year our result was 5<sup>th</sup> place among all countries with 4 gold medals, 1 silver medal, 1 bronze medal. This year our team are 3 third graders(twelfth grader), 1 second grader (eleventh grader), 1 first grader (tenth grader) and all are boys. We the team Japan has been working hard since last year. We will do our best and hope to stay at least within 10<sup>th</sup> place and want to enjoy International Mathematical Olympiad in Thai!

## JAPAN





# IMO POST 2015 NEWS



## Welcome to Chiang Mai

On July 3 and 4, participants began to arrive in Chiang Mai. All were met by our Airport Meet & Greet team and transported to their hotel. Welcome to Chiang Mai, everyone!



Maria Gaspar was all smiles on her arrival from Spain.



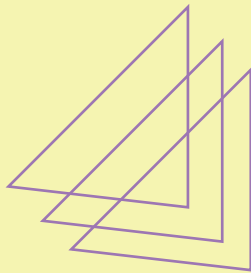
**All arriving participants were given a Thai-style welcome by our staff and presented with a garland of jasmine flowers, a symbol of Thailand.**



Excitement began to rise as the first groups of participants arrived in Chiang Mai from over 30 countries. Our airport coordination staff worked round the clock to ensure a smooth transfer from airport to hotel for everyone.



Team Croatia, led by Deputy Leader Kristina Ana Škreb, landed at Chiang Mai International Airport just before 4 pm on July 7. "This is my second IMO but it still feels very exciting to me," said Petar Orlac, the team's youngest member.



Thai coordinators arrived looking relaxed on the afternoon of July 3.



Mexico's Leonardo Ignacio Martinez Sandoval greeted a fellow early-arrival.



Arrived with confidence! The Peruvian and Luvian team looked ready to conquer the world.

Chiang Mai University's Asst. Prof. Dr. Thanasak Mouktonglang was on hand to welcome the early arrivals.





Dear IMO participants,

*I am writing to you in the capacity of an IMO alumnus.*



It has been a quarter of a century since I participated in the IMO. During that period, I have been wondering whether the IMO experience helped shape my career as a mathematician. To tell the truth, I did not find it easy to adjust myself to higher mathematics in the university, as I had been exposed to so little of it in my growing up in an underdeveloped country. I did not find higher mathematics as challenging, as "spicy", as the olympiad problems that I got used to. In higher mathematics, the emphasis seems lie on formulating abstract concepts instead of solving concrete problems.

With more time and experience, my perception grows more nuanced. I now believe that doing mathematics, higher or not, is about formulating and solving beautiful problems. Abstract concepts would be useless if they do not help us formulate and prove beautiful theorems.

I share with you this testimony for I hope some of you will later continue the fantastic human endeavor of pursuing mathematical truth. There will be excellent universities around the world to offer you a guiding hand, should you want to become a mathematician. The University of Chicago, where I teach, is one of them.

I wish you the best success in this IMO organized in Thailand. Enjoy the legendary hospitality of the host country.

...

*Ngo Bao Chau*

*Recipient of the Fields Medal 2010*

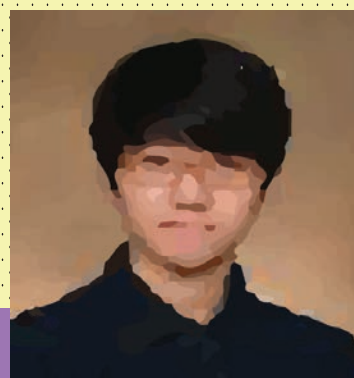
*Francis and Rose Yuen Distinguished Service*

*Professor of Mathematics at the University of Chicago*

## HAPPY BIRTHDAY



Given Name: Mads Bach  
Family Name: Villadsen  
Country: Denmark (DEN)  
Date of Birth: 09/07/1996  
IMO role: Contestant



Given Name: Sehun  
Family Name: Kim  
Country: Republic of Korea (KOR)  
Date of Birth: 09/07/1999  
IMO role: Contestant

## ANNOUNCING THE IMO 2015

# FRIENDSHIP PRIZE!

IMO 2015 brings together participants from around the world. To encourage everyone to get to know each other, we hereby invite all to nominate your favorite new friend for **THE FIRST-EVER FRIENDSHIP PRIZE**. Each participant can nominate 1 person, the only condition being that your nominee **CANNOT BE YOUR OWN TEAMMATE**. The person who receives the most votes will be our Friendship Prize Winner. We also have prizes for 3 lucky voters (to be decided by a lucky draw). Nominate your favorite new friend by email to [IMO2015newsletter@gmail.com](mailto:IMO2015newsletter@gmail.com) by July 13. Be sure to include your nominee's name and country. The list of winners will be published in the July 15 Issue.

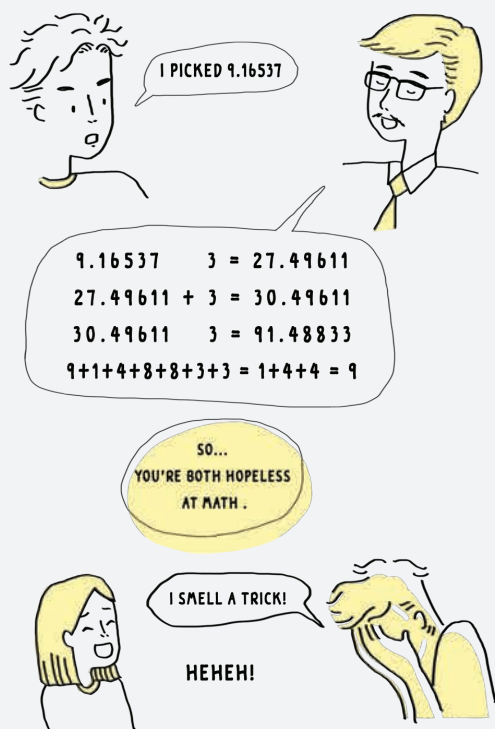
If you have an announcement to make, we'll be happy to print it. It can be about a program of study, an important day in your country, or anything else that you think will be of interest to other readers. Email your announcement to [IMO2015newsletter@gmail.com](mailto:IMO2015newsletter@gmail.com). We reserve the right to edit your submission for length and style.

## MATHEMATICS GAMES

?

		4					
	7		2			5	9
	6			3	5		1
		9					7
		6				2	
	1					9	
5			4	9			1
	4	2			3		6
						4	

## MAGIC OF NUMBERS.



END.

## MATH IS FUN

If the three points  $(a, b)$ ,  $(a+k \cos \alpha, b+k \sin \alpha)$  and  $(a+k \cos \beta, b+k \sin \beta)$  are the vertices of an equilateral triangle, then which of the following is true and why ?

(i)  $|\alpha - \beta| = \pi/4$  (ii)  $|\alpha - \beta| = \pi/2$

(iii)  $|\alpha - \beta| = \pi/6$  (iv)  $|\alpha - \beta| = \pi/3$

Email your answer to [imo2015newsletter@gmail.com](mailto:imo2015newsletter@gmail.com).  
You'll be eligible to win a fabulous prize!

## QUOTE FROM GREAT MATHEMATICIANS

# #1

"A mathematician is a person who can find analogies between theorems; a better mathematician is one who can see analogies between proofs and the best mathematician can notice analogies between theories."

Stefan Banach (1892-1945), a Polish mathematician and one of the founders of modern functional analysis.

WE ARE ON THE WEB, TWITTER AND FACEBOOK!

To get the latest IMO 2015 news and updates, go to our website: <http://www.imo2015.org/>  
follow us on Twitter: <https://twitter.com/imo2015thailand>  
or Like us on Facebook: <https://www.facebook.com/IMO2015ChiangMaiThailand>

## MATHEMATICS IN EVERYDAY LIFE

### WHEN MATH MEETS FASHION

Mathematics is an integral part of our life. Just take a quick look around and you will see plenty of evidence of this -- in the geometric designs of the clothes and accessories. we wear and the appliances we use for example.

Mathematics is embedded in the art of weaving. This has been the case throughout history and across cultures. Weaving is a method of fabric production in which two distinct sets of yarns are intertwined to create a fabric or cloth. When you visit different parts of the world, you will see that the colors and patterns of local textiles vary from one region to the next. But all the world's textile traditions have something in common: Weavers use counting numbers in different variations to create patterns which show symmetry and transformation.

Shown here are three examples: (a) Dayak Ikat weaving from Indonesia; (b) Kente, a royal and sacred cloth of the Akan people of South Ghana; and (c) a traditional Northern Thai weaving pattern.

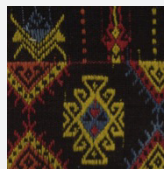
Mathematics has inspired jewelry design as well. The necklace shown in (d) is designed by award-winning industrial designer Marc Newson. It is highly mathematical in that it represents the geometrical shape known as a Julia Fractal, named after French mathematician Gaston Julia, which can be endlessly divided into smaller parts.



a



b



c

Basic geometric patterns have long been part of everyday fashion. In recent years, advanced mathematics, too, has taken the runway by storm. Designer Dai Fujiwara's designs for Issey Miyake's Fall/Winter 2010-11 ready-to-wear collection, for example, were inspired by a complicated geometry by mathematician William Thurston.

Picture (e) shows one of Thurston's geometric structures side by side with Fujiwara's topology-inspired designs on the Miyake runway. Thurston, a pioneer in the field of low-dimensional topology and the 1982 Fields Medal winner, is a professor of mathematics and computer science at Cornell University.



d



e

Photo sources

[http://www.prcfoundation.org/gallery/dayak-ikat-weaving-sintang/Asante paramount chief Nana Akyanfuoh Akowuah Dateh II, Kumasi, Ghana.](http://www.prcfoundation.org/gallery/dayak-ikat-weaving-sintang/Asante%20paramount%20chief%20Nana%20Akyanfuoh%20Akwuah%20Dateh%20II,%20Kumasi,%20Ghana)

<https://africa.si.edu/collections/media/view/People/1396/25192?t:state:flow=716f3ee8-ec66-4741-b81b-ed0d66cded8f>

<http://elitechoice.org/wp-content/uploads/2009/07/jewelry.jpg>

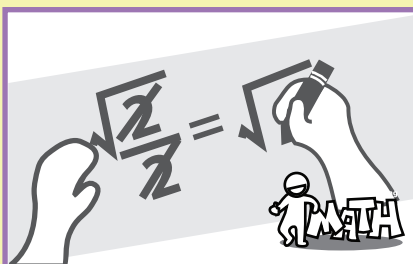
<http://www.ams.org/news/ams-news-releases/thurston-miyake>

#### AGENDA DAY 1, THURSDAY JULY 9

	LEADERS	DEPUTY LEADERS AND CONTESTANTS
06:00 am	Breakfast	Breakfast
07:00 am	Departure to Opening Ceremony	Departure to Opening Ceremony
10:00-12:00 am	Opening Ceremony	Opening Ceremony
12:30 pm	Lunch	Lunch
05.30 pm	Dinner	Dinner

Once upon a day...

$$\sqrt{\frac{2}{2}} =$$



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