



THE HONG KONG  
POLYTECHNIC UNIVERSITY  
香港理工大學



Croucher Foundation  
裘槎基金會

# **Croucher Summer Course 2023**

## **GPS/Beidou/GNSS Satellite Positioning and Navigation and Earth Observation**

**Hong Kong Polytechnic University  
Hong Kong, P. R. China  
28 May (Sunday) to 3 June (Saturday), 2023**



THE HONG KONG  
POLYTECHNIC UNIVERSITY  
香港理工大學



DEPARTMENT OF  
LAND SURVEYING AND GEO-INFORMATICS  
土地測量及地理資訊學系



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### **Call for Participation**

Change is the only constant phenomenon on this Planet. The ecosystems of this planet where we are living undergo constantly changes in temporal and spatial domains. The ecosystems become more fragile than before as evidenced by the occurrence and observation of many more unusual phenomena such as global warming, sea level rising, extreme weather, Earthquakes and natural disasters. The ecosystems changes and dynamics of our planet need to be closely and precisely measured and monitored.

The modern GPS/BeiDou/GNSS and Earth Observation Systems (EOS) offer an unprecedented level of capability to deliver PNaVT (Positioning, Navigation, Velocity and Timing) and observation information, which can be used to precisely measure and record this planet's dynamic change in a well defined space and time reference system, from both ground-based and space-satellite-based viewpoints.

The 7-day Croucher Summer Course 2023 will provide an excellent opportunity for summer course participants to learn the latest research outcomes from internationally distinguished scholars. It will be an ideal place for all participants to broaden their horizon, diversify research interests, enhance their scholarly communications, and reach out social network. Postgraduate (MSc and PhD) students, Postdoc, and young faculty at universities and research organizations from all over the world who are interested in this Croucher Summer Course 2023 can register and become participant.



The Department of Land Surveying & Geo-Informatics (LSGI), at the Hong Kong Polytechnic University (PolyU), Hong Kong, P.R. China, has the great honor to partner with the Croucher Foundation, Hong Kong, to host this Croucher Summer Course 2023 on the campus of PolyU. The Hong Kong Polytechnic University, celebrating her proud history of 85 years of excellence in 2022, is ranked the 26th in the QS University Rankings: Asia for 2023; the 65th in the QS World University Rankings for 2023.

The Department of Land Surveying & Geo-Informatics (LSGI), supported by a strong team of research and teaching faculty, enjoys a long history offering a variety of geomatics programs in Geodesy, Satellite Navigation, Land Surveying, Geographic Information Science (GIS), Photogrammetry, Remote Sensing, and Underground Utility Surveying and Management. The high quality research work conducted at LSGI is widely recognized in the international geomatics community and the Science Citation Index (SCI) of LSGI has been consistently ranked at the top in the world over the past many years. In terms of scientific publications, the number of science citation indexed (SCI) papers published by each faculty member of Department of LSGI during 2000-2017 was ranked No. 2 among the peer geomatics Departments worldwide. The average number of citations per faculty member at LSGI was ranked No. 3 worldwide. The LSGI will proudly celebrate its 39th anniversary in 2023.






## **Organization Committee**

	
<p><b><u>Director:</u></b> Dr. George Zhizhao Liu Professor &amp; Associate Head Department of Land Surveying &amp; Geo- Informatics (LSGI), The Hong Kong Polytechnic University (PolyU), 181 Chatham Road South, Hung Hom, Kowloon, Hong Kong, P.R. China Tel. (852)2766 5961 Fax: (852)2330 2994 E-mail: <a href="mailto:lszzliu@polyu.edu.hk">lszzliu@polyu.edu.hk</a> <a href="http://www.lsgi.polyu.edu.hk">http://www.lsgi.polyu.edu.hk</a></p>	<p><b><u>Co-Director:</u></b> Dr. Yang Gao, Professor Department of Geomatics Engineering The University of Calgary Calgary, Alberta, Canada T2N 1N4 Tel: (403) 220-6174 Fax: (403) 284-1980 E-mail: <a href="mailto:ygao@ucalgary.ca">ygao@ucalgary.ca</a> <a href="http://www.geomatics.ucalgary.ca/">http://www.geomatics.ucalgary.ca/</a></p>
	
<p>Prof. Xiaoli Ding, Chair Professor Department of Land Surveying &amp; Geo- Informatics (LSGI), The Hong Kong Polytechnic University (PolyU), 181 Chatham Road South, Hung Hom, Kowloon, Hong Kong, P.R. China Tel. (852)2766 5965 Fax: (852)2330 2994 E-mail: <a href="mailto:xl.ding@polyu.edu.hk">xl.ding@polyu.edu.hk</a></p>	<p>Prof. Wu Chen, Professor &amp; Head Department of Land Surveying &amp; Geo- Informatics (LSGI), The Hong Kong Polytechnic University (PolyU), 181 Chatham Road South, Hung Hom, Kowloon, Hong Kong, P.R. China Tel. (852)2766 5969 Fax: (852)2330 2994 E-mail: <a href="mailto:lswuchen@polyu.edu.hk">lswuchen@polyu.edu.hk</a></p>



**Invited Lecturers**

	
<p>Zen Mariani, Ph.D. Research Scientist Meteorological Research Division Environment and Climate Change Canada Government of Canada 4905 Dufferin St., Toronto, ON; M3H-5T4 t: 416-843-0642 email: <a href="mailto:zen.mariani@ec.gc.ca">zen.mariani@ec.gc.ca</a></p>	<p>Dr. Roger Saunders Met Office Fellow (retired) Met Office, Fitzroy Rd, Exeter, EX1 3PB, United Kingdom Tel: +44-1404-841636 Tel: +44-7742-920627 Email: <a href="mailto:sat.metman@gmail.com">sat.metman@gmail.com</a> <a href="http://www.metoffice.gov.uk/research/people/roger-saunders">http://www.metoffice.gov.uk/research/people/roger-saunders</a></p>
	<p>To be confirmed!</p>
<p>Prof. Baocheng Zhang Current address: West No.30 Xiao Hong Shan, Wuhan 430071, China Tel: +86 27 6888 1389 E-mail: <a href="mailto:B.Zhang@whigg.ac.cn">B.Zhang@whigg.ac.cn</a> <a href="http://www.apm.cas.cn/sourcedb_apm_cas/zw/rck/zgj_rck/202103/">http://www.apm.cas.cn/sourcedb_apm_cas/zw/rck/zgj_rck/202103/</a></p>	<p>To be confirmed!</p>



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<p>Prof. Dr. Jens Wickert Section 1.1: Space Geodetic Techniques Department of Geodesy Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences Potsdam, Germany Tel: +49 331 288-1758 Fax: +49 331 288-1111 Email: <a href="mailto:jens.wickert@gfz-potsdam.de">jens.wickert@gfz-potsdam.de</a></p>	<p>Dr. Naser El-Sheimy, PEng, CRC Professor Department of Geomatics Engineering, The University of Calgary 2500 University Dr. N.W. Calgary, Alberta, Canada T2N 1N4 Tel: (403) 220 7587, Fax : (403) 284 1980 E-mail: <a href="mailto:elsheimy@ucalgary.ca">elsheimy@ucalgary.ca</a> Web : <a href="http://mms.geomatics.ucalgary.ca/">http://mms.geomatics.ucalgary.ca/</a></p>
To be confirmed!	To be confirmed!
To be confirmed!	To be confirmed!



## **Lecture Schedule**

<b>Day 0: 28 May 2023, Sunday</b>		
<b>All the participants check in hotel.</b>		
<b>Day 1: 29 May 2023, Monday</b>		
<b>Time: 8:00 – 20:30</b>		
<b>Time</b>	<b>Length</b>	<b>Session</b>
08:00 – 08:30 AM	30 mins	On-site registration
08:30 – 09:00 AM	30 mins	Welcome Speeches and Group Photo Taking
09:00 – 09:30 AM	30 mins	Morning Tea/Coffee & Social Networking
09:30 – 11:00 AM	1.5 hours	<b>Lecture &amp; Discussion</b>
11:00 – 11:30 AM	30 mins	Morning Tea/Coffee & Social Networking
11:30 – 13:00 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
<i>13:00 – 14:30 PM</i>	<i>1.5 hours</i>	<i>Social Networking &amp; Free Lunch for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
14:30 – 16:00 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
16:00 – 16:30 PM	30 mins	Afternoon Tea/Coffee & Social Networking
16:30 – 18:00 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
<i>18:00 – 20:30 PM</i>	<i>2.5 hours</i>	<i>Social Networking &amp; Free Dinner for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
<b>Day 2: 30 May 2023, Tuesday</b>		
<b>Time: 9:00 – 21:30</b>		
09:00 AM – 10:30 AM	1.5 hours	<b>Lecture &amp; Discussion</b>
10:30 AM – 11:00 AM	30 mins	Morning Tea/Coffee & Social Networking
11:00 AM – 12:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
<i>12:30 – 14:00 PM</i>	<i>1.5 hours</i>	<i>Social Networking &amp; Free Lunch for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
14:00 – 15:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
15:30 – 16:00 PM	30 mins	Afternoon Tea/Coffee & Social Networking
16:00 – 17:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
<i>17:30–21:30 PM</i>	<i>3 hours</i>	<i>Croucher Summer Course <b>Reception Dinner and Social Networking</b> at the Hoi Yat Heen Restaurant, 2/F, Harbor Grand Kowloon, 20 Tak Fung Street, Hung Hom, Kowloon</i>
<b>Day 3: 31 May 2023, Wednesday</b>		
<b>Time: 9:00 – 22:00</b>		
09:00 – 10:30 AM	1.5 hours	<b>Lecture &amp; Discussion</b>
10:30 – 11:00 AM	30 mins	Morning Tea/Coffee & Social Networking
11:00 – 12:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
<i>12:30 – 14:00 PM</i>	<i>1.5 hours</i>	<i>Social Networking &amp; Free Lunch for registrants</i>



		<i>Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
14:00 – 15:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
15:30 – 16:00 PM	30 mins	Afternoon Tea/Coffee & Social Networking
16:00 – 17:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
17:30 – 20:00 PM	2.5 hours	<i>Social Networking &amp; Free Dinner for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
20:00 – 22:00 PM	2 hours	<i>Laboratory Calculation, Experiment, Exercise and Presentation</i>
<b>Day 4: 01 June 2023, Thursday</b> <b>Time: 9:00 – 22:00</b>		
09:00 – 10:30 AM	1.5 hours	<b>Lecture &amp; Discussion</b>
10:30 – 11:00 AM	30 mins	Morning Tea/Coffee & Social Networking
11:00 – 12:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
12:30 – 14:00 PM	1.5 hours	<i>Social Networking &amp; Free Lunch for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
14:00 – 15:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
15:30 – 16:00 PM	30 mins	Afternoon Tea/Coffee & Social Networking
16:00 – 17:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
17:30–20:00 PM	2.5 hours	<i>Social Networking &amp; Free Dinner for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
20:00 – 22:00 PM	2 hours	<i>Laboratory Calculation, Experiment, Exercise and Presentation</i>
<b>Day 5: 2 June 2023, Friday</b> <b>Time: 9:00 – 22:00</b>		
09:00 – 10:30 AM	1.5 hours	<b>Lecture &amp; Discussion</b>
10:30 – 11:00 AM	30 mins	Morning Tea/Coffee & Social Networking
11:00 – 12:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
12:30 – 14:00 PM	1.5 hours	<i>Social Networking &amp; Free Lunch for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
14:00 – 15:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
15:30 – 16:00 PM	30 mins	Afternoon Tea/Coffee & Social Networking
16:00 – 17:30 PM	1.5 hours	<b>Lecture &amp; Discussion</b>
17:30–20:00 PM	2.5 hours	<i>Social Networking &amp; Free Dinner for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
20:00 – 22:00 PM	2 hours	<i>Laboratory Calculation, Experiment, Exercise and Presentation</i>
<b>Day 6: 3 June 2023, Saturday</b> <b>Time: 9:00 – 15:00</b>		



09:00 – 10:30 AM	1.5 hours	<b>Student Presentations</b>
10:30 – 11:00 AM	30 mins	Morning Tea/Coffee & Social Networking
11:00 – 12:30 PM	1.5 hours	<b>Student Presentations</b>
12:30 – 14:00 PM	1.5 hours	<i>Social Networking &amp; Free Lunch for registrants Communal Building, 4<sup>th</sup> Floor, Staff Restaurant, PolyU Campus</i>
14:00 – 15:00 PM	1.0 hour	<b>Closing Ceremony</b>
15:00 – 19:00 PM	4.0 hours	<b>City Tour</b>
19:00 – 22:00 PM	3.0 hours	<b>Farewell Dinner</b>
<b>Day 7: 4 June 2023, Sunday</b>		
<b>All the participants check out hotel in the morning after breakfast.</b>		

## **Lecture Venue and Hotel Reservation**

All the lectures will be conducted at one classroom in the 4<sup>th</sup> floor of the Building Z, on the campus of the Hong Kong Polytechnic University (PolyU). Street address is: 181 Chatham Road South, Hung Hom, Kowloon, Hong Kong, P.R. China. The exact classroom number will be announced at an appropriate time ahead of the start of the course.

All the summer course participants including lecturers, students, and the Director Prof. Zhizhao (George) Liu, will live at the same hotel. The hotel address is:

Harbour Plaza Metropolis Limited  
7 Metropolis Drive, Hung Hom,  
Kowloon, Hong Kong  
Tel +852 3160 6888 Fax +852 3160 6999  
[www.harbour-plaza.com/hpme](http://www.harbour-plaza.com/hpme)

The Summer Course Director Prof. Liu will book the hotel rooms for all the participants at an appropriate time ahead of the start of the course, after confirming the actual number of participants. **Both Lecturers and Students do NOT need to book hotel rooms by themselves except they wish to live in a hotel room booked by their own. In this case, they are required to book the same hotel (as shown above) as all the other participants.** For student participants, two people of the same gender will share one double-bed room. Single room for one individual student participant normally will not be considered by the Summer Course Director, except in extremely unique circumstance.

## **Budget Plan for the Croucher Summer Course 2023**

Please refer to attached PDF file.





## PolyU Campus Map



- The Hong Kong Polytechnic University (PolyU) has the street address of 11 Yuk Choi Road, Hung Hom, Kowloon, Hong Kong.
- The Department of Land Surveying & Geo-Informatics (LSGI) is located at the ZS621, South Tower of Block Z (highlighted in red box), PolyU campus. Its street address is: 181 Chatham Road South, Hung Hom, Kowloon, Hong Kong.
- Lecture venue: PolyU Campus

## Transportation Information

### Hong Kong International Airport to the Hong Kong Polytechnic University (PolyU)

- (1) PolyU address: 11 Yuk Choi Road, Hung hom, Kowloon, Hong Kong (5 minutes walking to the Hung Hom MTR (mass transportation railway) train station)
- (2) From HK airport, you may take a taxi directly to the PolyU campus. The total taxi cost should be about HK\$300 (about US\$40)
- (3) If you want to experience the Hong Kong's Airport Express, you can take the Airport Express Railway at Airport. The ticket can be purchased at the Airport at a price of HK\$90. The Airport Express train stops at several stations. Your destination station is called "Kowloon station". From Airport to Kowloon station, the train takes about 21 minutes. After you get off the train at Kowloon station, you can then take a taxi to the PolyU. The taxi will be about HK\$50 and about 15-20 minute driving.

From Airport to Kowloon station, the first Airport Express train departs airport at 05:54 AM. The last Airport Express train departs airport at 00:48AM.



From Kowloon station to Airport, the first Airport Express train departs Kowloon station at 05:53 AM. The last Airport Express train departs Kowloon station at 00:52AM.

### **Some Important Reminders**

- (1) Many countries' visitors to Hong Kong do not need a visa. You are suggested to contact your country's consulate in Hong Kong to know whether or not you need a visa to Hong Kong. However a visa is often required to enter into Mainland China.
- (2) Hong Kong uses 220-V electricity. Time zone of Hong Kong is UTC+8 hrs.
- (3) Hong Kong weather information from the Hong Kong Government can be checked at Hong Kong Observatory website: <http://www.hko.gov.hk/>

### **Supporting and Funding Organizations**

The Croucher Summer Course 2023 is hosted and supported by:



THE HONG KONG  
POLYTECHNIC UNIVERSITY  
香港理工大學

**Department of Land Surveying & Geo-Informatics  
(LSGI)**



DEPARTMENT OF  
LAND SURVEYING AND GEO-INFORMATICS  
土地測量及地理資訊學系

**Faculty of Construction and Environment (FCE)  
The Hong Kong Polytechnic University (PolyU)  
Hong Kong, China**

The Croucher Summer Course 2023 is financially funded and supported by:



Croucher Foundation  
裘槎基金會

**Croucher Foundation, Hong Kong**

The Croucher Summer Course 2023 is sponsored and supported by:



**International Association of Chinese Professionals  
in Global Positioning Systems (CPGPS)**

### **Registration**

**Please note, a few Travel Grants will be awarded to participants and their registration fees are waived.** The registration fee of Travel Grant winners will be fully refunded after they complete all the lectures of the Croucher Summer Course 2023. To be eligible for being awarded Travel Grants, you must register and pay the full registration fee first and send Travel Grant application and your CV to state why you need this Travel Grant (please send Travel Grant application and registration reply to Dr. George Liu: [lszzliu@polyu.edu.hk](mailto:lszzliu@polyu.edu.hk)). The Committee of the Croucher Summer Course 2023 has the final right to select the Travel Grants winners based on the applications received.



The full registration fee of the Croucher Summer Course 2023 is HK\$3,000.00 per person. The registration fee includes free 4-star hotel rooms for 7 nights and free meals (breakfast/lunch/dinner and coffee breaks) for 6 days, thanks to the great support from Croucher Foundation! However international flight or other costs (e.g. traveling insurance costs) are the responsibility of the participants themselves. Partial registration is not accepted. Registration fee is not refundable at all cases. The number of seats is very limited in order to have the best lecturing and learning quality. You are highly encouraged to register As Soon As Possible before the Croucher Summer Course 2023 is fully registered.



## Registration Form For The Croucher Summer Course 2023

My option is	<input type="checkbox"/> Yes, I will attend the Croucher Summer Course 2023. <input type="checkbox"/> Not sure now, I will very likely attend the Croucher Summer Course 2023. <input type="checkbox"/> No, I will not attend the Croucher Summer Course 2023 for the reason that		
Last Name in English		First/Middle Name in English	
Name in Chinese (if any)		Gender	
Office Tel. (include country/area code)		Mobile Phone (include country/area code)	
Name of my supervisor/manager in English		Name of my supervisor/manager in Chinese (if any)	
Supervisor/manager Office Tel. (include country/area code)		Supervisor/manager Mobile Phone (include country/area code)	
My current post	<input type="checkbox"/> MSc graduate student since _____ (year) <input type="checkbox"/> PhD graduate student since _____ (year) <input type="checkbox"/> Postdoc Fellow since _____ (year) <input type="checkbox"/> Engineer/researcher since _____ (year) <input type="checkbox"/> Faculty member (assistant/associate/full professors) since _____ (year) <input type="checkbox"/> Other positions. Please specify: _____ since _____ (year)		
Please choose one	<input type="checkbox"/> Yes, I want to obtain a participant certificate after successful completion of this Croucher Summer Course 2023 but this is not required by my supervisor. <input type="checkbox"/> Yes, I want to obtain a participant certificate after successful completion of this Croucher Summer Course 2023 and this is required by my supervisor.		



	<input type="checkbox"/> No, I do not need a participant certificate, nor is required by my supervisor.
Full Affiliation	
Detailed Address	
Fill this if you are a MSc student	<input type="checkbox"/> I plan to work for the GNSS and related industry immediately after my MSc program <input type="checkbox"/> I plan to continue my PhD program at my current university immediately after my MSc program <input type="checkbox"/> I plan to continue my PhD program at an overseas (not Hong Kong) university immediately after my MSc program <input type="checkbox"/> I plan to continue my PhD program at PolyU/LSGI immediately after my MSc program <input type="checkbox"/> Others. Please specify: _____
Please choose one or more choices	<input type="checkbox"/> No, my supervisor or department does not know my participation in this Croucher Summer Course 2023 <input type="checkbox"/> Yes, my supervisor or department knows my participation in this Croucher Summer Course 2023 but my supervisor or department does not financially support me <input type="checkbox"/> Yes, my supervisor or department knows my participation in this Croucher Summer Course 2023 and my supervisor or department financially supports me
Please choose one or more choices	<input type="checkbox"/> Yes, I participated in the 2 <sup>nd</sup> Croucher Summer Course organized in 2018 by Dr. George Liu <input type="checkbox"/> Yes, I participated in the 1 <sup>st</sup> Croucher Summer Course organized in 2014 by Dr. George Liu <input type="checkbox"/> Yes, I participated in the 1 <sup>st</sup> nGATEo Summer School organized in 2012 by Dr. George Liu <input type="checkbox"/> Yes, I participated in the other Summer Course organized by PolyU/LSGI Please specify details: _____ <input type="checkbox"/> No, I didn't participate in any Summer Course organized by PolyU/LSGI before.
Registration fee	NOTE. <b>Please do NOT pay the registration fee now.</b> Please fill in this form first and submit to registration website of this event



	<p>We will notify you to pay the registration fee once you are selected to participate in this event.</p> <p><input type="checkbox"/> I will pay HK\$3,000.00 via the registration website after my application is confirmed.</p> <p><input type="checkbox"/> I will participate in this the Croucher Summer Course 2023 but will not pay HK\$3,000.00.</p>
<p><b><u>Declaration:</u></b> I declare that all the information provided above is true, complete and accurate at the moment of the signing date. I understand that my supervisor or department may be contacted to verify the information supplied above.</p> <p>Name (print clearly): _____</p> <p>Signature: _____</p> <p>Signing on the Date: _____</p> <p>Signing at the Location: _____</p>	

**Contact Information**

For technical questions, please feel free to contact the Director of the Croucher Summer Course 2023.

Dr. George Zhizhao LIU, Professor & Associate Head  
Faculty of Construction and Environment (FCE)  
The Hong Kong Polytechnic University (PolyU)  
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Tel: (852) 2766 5961 (office), 5178-3176 (mobile) Fax: (852) 2330 2994

For non-technical questions, please feel free to contact:

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181 Chatham Road South, Hung Hom, Kowloon, Hong Kong  
E-mail: [anna.choi@polyu.edu.hk](mailto:anna.choi@polyu.edu.hk)  
Tel: (852)3400 8158, Fax: (852) 2330 2994  
Homepage: <http://www.lsgi.polyu.edu.hk>