



**Mathematics Education Research –
Learning, Instruction, Outcomes & Nexus?**

41st Annual Meeting of the International Group for the Psychology of
Mathematics Education (PME 41)

Singapore, 17 – 22 July, 2017

math.nie.edu.sg/pme41

Second Announcement



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1 Welcome

The Local Organizing Committee of the 41st Annual Meeting of the International Group for the Psychology of Mathematics Education is pleased to invite you to attend the conference to be held in Singapore from July 17 to July 22, 2017.

“**Mathematics Education Research – Learning, Instruction, Outcomes & Nexus?**” has been chosen as the theme of the conference. The theme offers opportunities to reflect about what we have learned in the past, investigate the present issues, and more importantly, project the future directions in mathematics education research. The theme is inspired by the iconic Singapore mascot, MERLION, which reflects the past and the present. The “Mer” or fish part indicates Singapore’s origin as a fishing village; while the “Lion” part comes from the word “Singapura”, which means Lion city.

Mathematics Education is a relatively young field of research. Over the last century researchers have progressively adopted multiple and integrated perspectives of *learning*, *instruction* and *outcomes* in mathematics. This theme is apt as it provides opportunities for the community to take stock of our past and present perspectives while exploring new ones in the theory-practice nexus of mathematics education.

Our goal is to make the 2017 meeting scientifically and socially successful. We hope that your visit and stay in Singapore will be exciting, informative, and inspiring. We look forward to welcoming you to the conference in July, 2017.

1.1 Your Hosts

PME 41 in 2017 is being hosted by the National Institute of Education (NIE), Singapore. You can find information about the institute at www.nie.edu.sg. It is supported by the Association of Mathematics Educators (AME) and you can also find information about the Association at math.nie.edu.sg/ame.

The National Institute of Education is an institute of the Nanyang Technological University in Singapore. It is the nation’s only institute dedicated to teacher education. Working closely with the Ministry of Education and the schools, it ensures that teacher education programmes are relevant and delivered with rigour. The institute’s engagement in cutting-edge educational research also provides an important voice to inform the policy formulation and practice of education in Singapore.



The National Institute of Education, Singapore

1.1.1 Amenities and Services around NIE campus

NIE is located next to the North Spine Plaza of the Nanyang Technological University (NTU) where you can have easy access to a wide range of amenities, services, food and beverage establishments:

Prime Supermarket (Opens from 7 am to 9 pm)



BUZZ Convenience Shop (Mon to Fri: 9am - 9pm; Sat: 9am - 1pm; Sun & PH: Closed)



Food and Beverages

There is a wide variety of food and beverage options at the North Spine Plaza. They include Pen & Inc (create your own healthy meal), Peach Garden (Chinese), Paik's Bibim (Korean), Food Court (Asian cuisine), Subway, McDonald's, KFC, Pizza Hut, and Starbucks. For more details, please refer to <http://www.ntu.edu.sg/has/FnB/Pages/NorthSpine.aspx>

Other services

Besides food and beverages, there are also banking, medical, and other retail outlets at or near NIE. Please refer to <http://www.ntu.edu.sg/has/Serv/Pages/default.aspx> for more information.

1.2 About Singapore

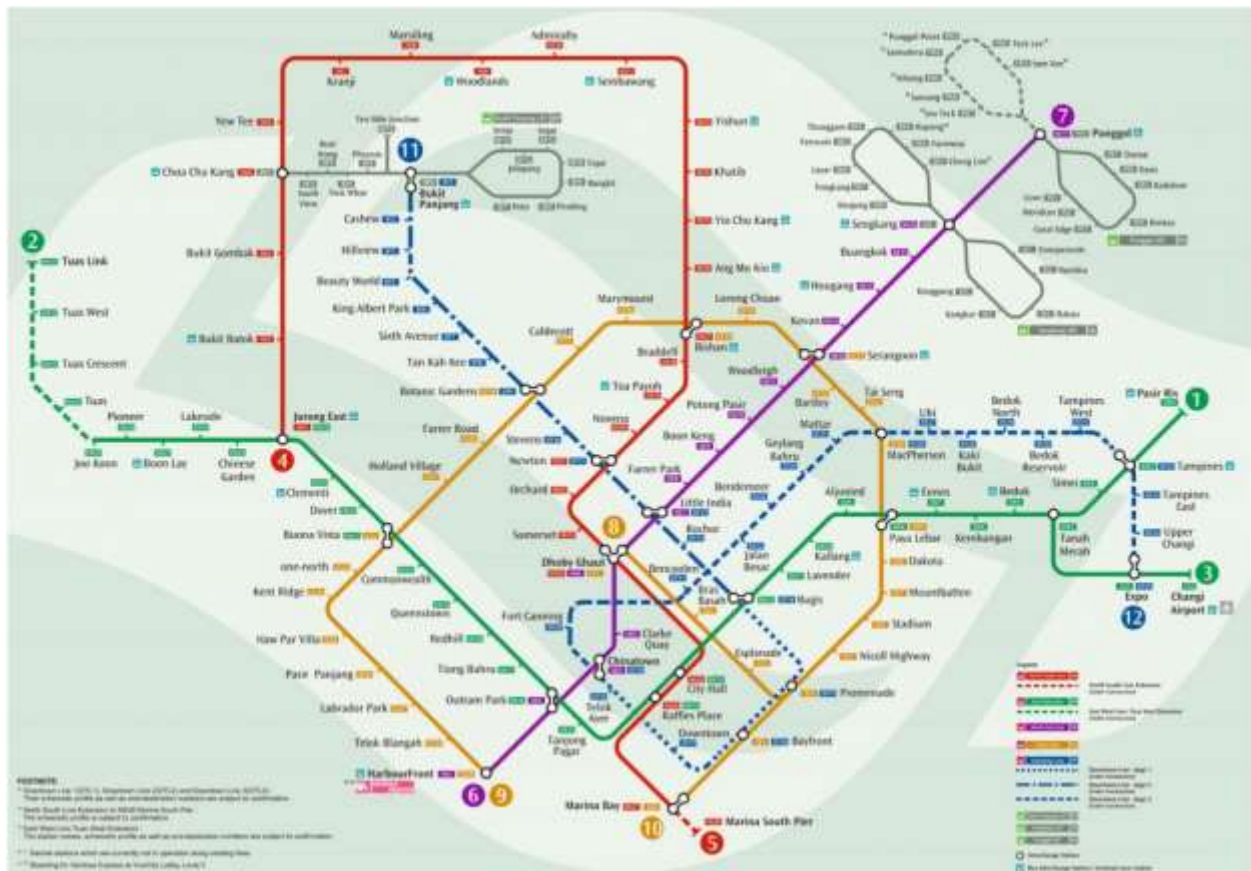
Singapore is a small urbanized island city-state in Southeast Asia. It is one degree north of the equator and has tropical rainforest climate with no distinct seasons. Like most of Southeast Asia, Singapore is generally hot and humid year round, with the temperature almost never dropping below 20°C (68°F), even at night, and usually climbing to 30°C (86°F) during the day. It is an air traffic hub serviced by international airlines from across the world. Singapore's Changi Airport in the east of the island is well connected to all parts of the island by its integrated and efficient transport system. For more information about tourism in Singapore please visit <http://www.yoursingapore.com>

1.2.1 Getting around Singapore

Singapore’s public transport system is efficient and you should be able to get to most places without much fuss. There are three main forms of public transport.

Train (MRT and LRT)

Singapore’s MRT (Mass Rapid Transit) system is probably the fastest way to travel around the city. The extensive rail network means that many of Singapore’s main attractions are within walking distance from an MRT station. Some parts of Singapore are also served by a network of Light Rail Transit (LRT).



Singapore MRT System Map

You can buy tickets for single trips, but if you intend to use the MRT, LRT, and basic bus services frequently during your visit, you can buy a Singapore Tourist Pass, a special EZ-Link stored-value card which will allow you unlimited travel for one day (SGD10), two days (SGD16) or three days (SGD20). The cards can be bought at the TransitLink Ticket Office at the following MRT stations: Changi Airport, Orchard, Chinatown, City Hall, Raffles Place, Ang Mo Kio, HarbourFront, Bugis, Lavender and Bayfront.



Singapore Tourist Pass (1 Day: SGD10, 2 Day: SGD16 or 3 Day: SGD20)

Standard EZ-Link cards can also be used for less frequent travel. Similar to the Singapore Tourist Pass, this card allows you to travel by train and bus by simply swiping it over sensors as you enter and leave a station or bus.



Left: EZ-Link card



Right: Sensors on bus

EZ-link cards can be purchased from the customer service counters at MRT stations for SGD12 (which includes a SGD nonrefundable deposit). The card can also be bought at 7-Elevens for SGD10 (which also includes a SGD5 nonrefundable deposit). Cards can be topped up with cash or by ATM cards at station ticket machines. The minimum top-up value is SGD10 while the maximum stored value allowed on your card is SGD 500.



Left: Customer service counter



Right: 7-Elevens



Left: Top up machine / Right: Station ticket machine

Singapore's trains and stations are accessible to wheel chair users and the visually impaired, as well as families with strollers.

Here are some links that may be useful for you.

Getting your ezlink card

<http://home.ezlink.com.sg/get-your-ez-link-card/where-the-cards-are-sold>

MRT and LRT System Map

<https://www.lta.gov.sg/content/ltaweb/en/public-transport/mrt-and-lrt-trains/train-system-map.html>

Train trip planner and fare calculator

<https://www.mytransport.sg/content/mytransport/home/commuting/trainmap.html>

Bus

Singapore's bus system has an extensive network of routes covering most places in Singapore and is the most economical way to get around. As most buses are air-conditioned, travelling by buses is comfortable and certainly one of the most scenic ways to move around Singapore.

You can pay your bus fare using an EZ-Link stored-value card or the Singapore Tourist Pass, which you tap on the card reader located next to the driver as you board. Do remember to tap your card again, on the reader located at the rear exit, when you alight. You can also pay in cash but you need to have exact change.

Bus trip planner

<https://www.mytransport.sg/content/mytransport/home/commuting/busservices.html>

Taxis

Taxis are comfortable and especially handy if you want to go to places not accessible by the bus or MRT. Taxis here are metered, but there may be surcharges depending on when, where and which company's taxi you board. To get a rough idea of the final fare, check with the driver on the surcharges and ask for a receipt at the end of the trip. You can hail a taxi by the roadside at most places, or by queuing for one at taxi stands found at most shopping malls, hotels and tourist attractions. If you wish to book a taxi, you can call a common taxi booking number, 6-DIAL CAB (6342-5222), and your

call will be routed to an available taxi company's call centre. Alternatively, you may want to book or “grab” a private-hired taxi service.

Taxi Charges

<https://www.mytransport.sg/content/mytransport/home/commuting/taxi.html#Charges & Seating Capacity>

(Source: <http://www.yoursingapore.com/travel-guide-tips/getting-around.html>)

2 Committees of PME 41 (2017)

2.1 The International Program Committee (IPC)

Oh Nam Kwon	PME	Seoul National University, Rep of Korea
Peter Liljedahl	PME	Simon Fraser University, British Columbia
Lovisa Sumpter	PME	Stockholm University, Sweden
Kai-Lin Yang	PME	National Taiwan Normal University, Taiwan
Ban Heng Choy	LOC	National Institute of Education, Singapore
Weng Kin Ho	LOC	National Institute of Education, Singapore
Berinderjeet Kaur	LOC	National Institute of Education, Singapore
Tin Lam Toh	LOC	National Institute of Education, Singapore

2.2 The Local Organising Committee (LOC)

National Institute of Education, Singapore

Advisor:	Tay Eng Guan (Head, Mathematics and Mathematics Education)
Co-chairs:	Berinderjeet Kaur & Ho Weng Kin
Secretary:	Choy Ban Heng
Treasurer:	Toh Tin Lam
Members:	Ang Keng Cheng; Chan Chun Ming Eric; Cheang Wai Kwong; Cheng Lu Pien; Chua Boon Liang; Dindyal Jaguthsing; Dong Fengming; Koay Phong Lee; Lee Ngan Hoe; Leong Yew Hoong; Lim Li Gek Pearlyn; Ng Kit Ee Dawn; Ng Swee Fong; Ng Wee Leng; Paul M. E. Shutler; Teo Beng Chong; Teo Kok Ming; Toh Pee Choon; Wong Lai Fong; Yap Sook Fwe; Yeo Boon Wooi Joseph; Yeo Kai Kow, Joseph; Zhao Dongsheng; Zhu Ying; Low Chwee Tee; Michelle Quek Siew Eng; Ngo Hong Tat; Mohamed Fadzli Ibrahim; Rodziah Abdul Rahman.

Association of Mathematics Educators

Members:	Low-Ee Huei Wuan; Hang Kim Hoo
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3 PME Conference Secretariat

3.1 Secretariat Email Addresses

For any questions regarding PME 41, please contact one of the following three conference secretariats:

- Conference Scientific Secretariat
For matters related to scientific issues of the conference (program, presentations, equipment, etc.), please contact scientific.pme41@nie.edu.sg
- Conference Registration Secretariat
For matters related to registration and payment, please contact registration.pme41@nie.edu.sg
- Conference Administrative Secretariat
For matters related to administrative issues of the conference (accommodation, excursions, travel, etc.), please contact admin.pme41@nie.edu.sg

3.2 Conference Website

The conference website is <http://math.nie.edu.sg/pme41> where you can find up-to-date information on matters contained within this First Announcement. General information is also available on the website of the International Group for the Psychology of Mathematics Education (IGPME) at <http://www.igpme.org>

4 About IGPME

The International Group for the Psychology of Mathematics Education (IGPME) is an autonomous body, governed as provided for in its constitution. It is an official subgroup of the International Commission for Mathematical Instruction (ICMI) and came into existence at the Third International Congress on Mathematics Education (ICME-3) held in Karlsruhe, Germany in 1976. The conference in 2017 is the 41st annual meeting of the International Group for the Psychology of Mathematics Education (PME 41).

4.1 The Constitution of IGPME

The constitution of PME was adopted at the Annual General Meeting (AGM) on August 17, 1980 and changed at the AGM on July 24, 1987, on August 10, 1992, on August 2, 1994, on July 18, 1997, on July 14, 2005 and on July 21, 2012. The major goals of the group are:

- to promote international contact and exchange of scientific information in the field of mathematical education;
- to promote and stimulate interdisciplinary research in the aforesaid area; and

- to further a deeper and more correct understanding of the psychological and other aspects of teaching and learning mathematics and the implications thereof.

All information concerning PME and its constitution can be found at the PME website <http://www.igpme.org>.

4.2 Honorary Members of IGPME

Efraim Fischbein (deceased), Hans Freudenthal (deceased), and Joop Van Dormolen (retired).

4.3 International Committee of IGPME (IC)

Peter Liljedahl (President, Canada)

Anke Lindmeier (Vice-President, Germany)

Michal Tabach (Secretary, Israel)

Cris Edmonds-Wathen (Treasurer, Australia)

Kim Beswick (Australia)

Yiming Cao (China)

Csaba Csíkos (Hungary)

Keith Jones (United Kingdom)

David M. Gomez (Chile)

Mellony Graven (South Africa)

Einat Heyd Metzuyanin (Israel)

Berinderjeet Kaur (Singapore) Oh Nam Kwon (South Korea) Miguel Ribeiro (Brazil)

Stanislas Schukajlow-Wasjutinski (Germany)

Lovisa Sumpter (Sweden)

Kai-Lin Yang (Taiwan)

4.4 IGPME Administrative Manager

Bettina Rösken-Winter Humboldt Universität, Berlin

Postal address: Unter den Linden 6 D-10099 Berlin, Germany

Tel: +49 (0) 30 2093-5857

Email: info@igpme.org

5 The Scientific Programme

The theme of the 41st PME conference is:

Mathematics Education Research – Learning, Instruction, Outcomes & Nexus?

The conference language is English. Papers for the proceedings must be written and presented in English. However, colleagues, including the presenters, are welcome to contribute to discussions and questions in their first languages, following a Research Report or an Oral Communication, if translation is provided by someone in the session. The scientific program includes the following activities that are explained in more detail below. Please note the inclusion of Colloquia for just the third time in 2017.

Plenary sessions

- Plenary Lectures
- Plenary Panel

Personal presentations

- Research Reports (RR)
- Colloquia (CQ)
- Oral Communications (OC)
- Poster Presentations (PP)

Group activities

- Research Forums (RF)
- Discussion Groups (DG)
- Working Sessions (WS)
- Ad Hoc Meetings (AH)
- National Presentation (NP)
- Seminars (SE)

5.1 Plenary Sessions**5.1.1 Plenary Lectures**

There will be four plenary addresses from invited speakers, each lasting 60 minutes. Each plenary address will respond to the theme of the conference from a different perspective.

The plenary speakers for PME41 are:

Yong Chiang Tay (Singapore)	<i>Mathematical Thinking in Computing</i>
David Clarke (Australia)	<i>Using Cross-Cultural Comparison to Interrogate the Logic of Classroom Research in Mathematics Education</i>
Jarmila Novotna (Czech Republic)	<i>Problem Solving Through Heuristic as a Way of Making All Pupils Engaged</i>
Olive Chapman (Canada)	<i>Mathematics Teachers' Perspectives of Turning Points in their Teaching</i>

5.1.2 Plenary Panel

The plenary panel will be held according to the Oxford-Style debate protocol on a topic related to the theme of the conference. The chair and panel members at PME41 are:

- Ruhama Even – Chair (Israel)
- Michael Askew (South Africa)
- Roberta Hunter (New Zealand)
- Yew Hoong Leong (Singapore)

Guri A. Nortvedt (Norway)

5.2 Personal Presentations

5.2.1 Restrictions on number of contributions

All presentations have to promote the major goals of the IGPME (refer to Section 4.1). In addition, please note that there are restrictions on the number of possible contributions.

Restrictions on presenting authorship:

You are allowed to be presenting author of either a Research Report (including those bundled within a Colloquium) or an Oral Communication presentation. Further, you can be presenting author of a Poster Presentation, Research Forum, Working Session and Discussion Group in addition.

Restrictions on (co-)authorship:

Each conference participant may have his/her name on not more than **four** conference contributions in total. Additionally each conference participant may act as organizer of at most one Colloquium.

Notifications of decisions of the International Program Committee to accept or reject proposals are made available in April 2017. The detailed reviews for Research Reports are made available in the ConfTool system at www.conftool.com/pme41

In order for an accepted proposal to appear in the proceedings, the presenting author(s) must pay the full Conference fee no later than May 15, 2017. The conference deposit already paid by the presenting author(s) for pre-registration is non-refundable and will be deducted from the full conference fee. Presentation guidelines prepared by the International Committee (IC) will be available on the PME 2017 website.

5.2.2 Research Report (RR)

Concept and main idea

Research Reports are intended to present empirical or theoretical research findings on topics that relates to the main goals of PME:

- to promote international contacts and exchange of scientific information in the field of mathematics education;
- to promote and stimulate interdisciplinary research in the aforesaid area; and
- to further a deeper understanding of the psychological and other aspects of teaching and learning mathematics and the implications thereof.

Research Reports should state what is new in the research, how the study builds on past research, and/or how it has developed new directions and pathways. Some level of critique must exist in all papers.

The deadline for submission of RR proposals was January 15, 2017. The number of submitted RR proposals was 234, and 124 of them were accepted. Of those rejected as RR proposals, 72 were invited to be resubmitted as OC, and 35 as PP. Re-submitted OCs and PPs will undergo the same review process as the OC and PP submissions that were submitted directly.

Decisions on OC and PP submissions will be provided no later than April 25, 2017.

Publication and Presentation

Accepted papers will be included in the proceedings only if the full conference registration fee has been paid in time. Each RR presentation will be allotted a total of 40 minutes: 20 minutes for the oral presentation and 20 minutes for questions and comments. A chairperson will be assigned to each RR session. He/she will introduce the presenters, make a comment regarding photographing, audio- and video-taping the session, monitor timing of the session, and moderate the discussion.

5.2.3 Colloquium (CQ)

Concept and main idea

The goal of a Colloquium is to provide the opportunity to present a set of three Research Reports that are interrelated (e.g. they are connected through related or contrasting theoretical stances, use identical instruments or methods, or focus on closely related research questions), and to initiate a discussion with the audience on the interrelated set.

A Colloquium proposal:

- consists of a set of exactly three research reports, to be presented by members from at least two different countries;
- includes, in addition, a one page summary by an organizer (one person), indicating a specific pre-determined focus that is common to each research report; and
- involves a presentation of the three research reports, and a discussion with the audience that is initiated by the contribution of a discussant (one person, indicated in the author line of the one-page summary) who is appointed at submission.

The deadline for submission of Colloquium proposals was January 15, 2017. There was one proposal submitted for a colloquium but the proposal was not successful as one of the three papers was not accepted as a Research Report.

5.2.4 Oral Communication (OC)

Concept and main idea

Oral Communications are intended to present smaller studies and research that is best communicated by means of a shorter oral presentation instead of a full Research Report. They should describe which past research the study is built on; give a concise overview of the new results attained, and what the main implications of these results are.

The deadline for submission of OC proposals was March 6, 2017. The number of submitted OC proposals was 127, and 95 of them were accepted. Of those rejected as OC proposals, 24 were invited

to be resubmitted as PP. Re-submitted PPs will undergo the same review process as PP submissions that were submitted directly.

Publication and Presentation

The one-page summary for each accepted OC will be included in the proceedings **only if the full conference registration fee has been paid in time**. The IPC will group three OCs according to the distinctive themes in order to provide opportunities for a common discussion period at the end of each group of OC session. A chairperson will be assigned to each OC session. He/she will introduce the presenters, make a comment regarding photographing, audio- and video-taping the session, monitor timing of the session, and moderate the discussion.

In OC sessions, 10 minutes are allowed for each presentation which include the time it takes for preparation. However, the remaining 30 minutes of discussion time can be organized in different ways. For OC sessions, the chairperson assigned will recommend one of the two timing options depending on whether the presentations are closely related or not. Decisions will be made based on the chairperson's reading of the OC summaries, and after consultation with the three presenters before the start of the session. The two options are:

1. Joint discussion at the end for presentations with closely related themes:
After each presentation, there will be opportunities to clarify immediate questions for at most 5 minutes. The remaining 15 minutes of discussion on the theme will take place at the end of the session.
2. Separate discussions for presentations with separate themes:
The chairperson will moderate 10 minutes of questions and discussions directly after each 10-minute OC presentation.

5.2.5 *Poster Presentation (PP)*

Concept and main idea

Poster Presentations are intended for research that is best communicated in a visual form rather than an oral presentation. There is no formal oral presentation associated with Poster Presentations, although there is time allotted during which presenters will be available by their posters for discussion with conference participants.

Posters should describe the research context of the study presented, the study itself, and its implications, with a particular focus on the visual aspects of the presentation.

The deadline for submission of PP proposals was March 6, 2017. The number of submitted PP proposals was 66, and 53 of them were accepted.

Publication and Presentation

The one-page summary for each accepted PP will be included in the proceedings only if the full conference registration fee has been paid in time. A total of 60 minutes will be allocated to Poster Presentation sessions during the conference. Note that the poster presentations run concurrent with the coffee breaks. Authors should avail themselves at their poster during this session for discussion

with conference participants. The maximum size limit of a poster is A0. **The preferred size is A1**, due to space constraint for display of posters. Please use the portrait format for the poster.

5.3 Group Activities

Group activities are intended to provide attendees with the opportunity to exchange information and ideas related to the PME. Conference participants will need to select which sessions they would prefer to attend and indicate this in their registration. Group activities will take place during parallel time allotments, and will have limited space.

The deadline for submission of Research Forum papers was January 15, 2017 and the deadline for submission of the other Group Activity proposals was March 6, 2017. Accepted proposals will be included in the conference proceedings only if the full conference fee for the coordinators is paid by 15 May, 2017.

According to the conference schedule, there will be 2 x 90 minutes slots for these group activities. Discussion Groups and Working Sessions will be held on Wednesday (July 19) and Friday (July 21), while Research Forums and Seminars will be held on Tuesday (July 18) and Thursday (July 20).

5.3.1 Research Forum (RF)

The goal of a Research Forum is to create dialogue and discussion by offering PME members more elaborate presentations, reactions, and discussions on topics on which substantial research has been undertaken in the last 5-10 years and which continue to hold the active interest of a large subgroup of PME. A Research Forum is not supposed to be a collection of presentations but instead is meant to convey an overview of an area of research and its main current questions, thus highlighting contemporary debates and perspectives in the field.

Two 90-minute slots will be allocated to each Research Forum. There are two RF proposals accepted this year:

RF 1: *Perspectives on (future) teachers' professional competencies*

Coordinators: Gabriele Kaiser & Yeping Li

RF 2: *Researching and Using Learning Progressions (Trajectories)*

Coordinators: Dianne Siemon & Marj Horne

5.3.2 Discussion Group (DG)

The objective of a Discussion Group is to provide attendees with the opportunity to discuss a specific research topic of shared interest. The idea for a Discussion Group may be the result of an Ad Hoc Meeting or an intensive discussion of a Research Report during the previous conference. Discussion Groups may begin with short synopses of research work, or a set of pressing questions. A Discussion Group is exploratory in nature, and is especially suitable for topics which are not appropriate for

collaborative work in a Working Session because they are not yet elaborate enough or because a coherent research strategy has not been identified. A successful Discussion Group may result in an application for a Working Session one year later.

Two 90-minute sessions will be allocated to Discussion Groups. After the conference, coordinators of each Discussion Group are required to send a report of its activities to the PME Administrative Manager (info@igpme.org). This report may be included in the PME newsletter. This report is due by the end of September 2017.

The deadline for submission of DG proposals was March 6, 2017. Seven DG proposals were submitted. 1 was subsequently withdrawn, 4 were accepted, 1 was invited to be resubmitted as a PP and 1 was rejected. The accepted Discussion Groups for PME 2017 are:

DG1: *How to research cultural-societal factors influencing mathematics education?*

Coordinators: Aiso Heinze & Kai-Lin Yang

DG2: *Stem education research and practice: What is the role of mathematics education?*

Coordinators: Judy Anderson & Yeping Li

DG3: *Perspectives on multimodality and embodiment in the teaching and learning of mathematics*

Coordinators: Christina M Krause & Laurie D Edwards

DG4: *Mathematics in different languages*

Coordinators: Cris Edmonds-Wathen & Alexander Schuler-Meyer

5.3.3 Working Sessions

The aim of Working Sessions is that PME participants collaborate in joint activities on a research topic. For this research topic, there must be a clear research framework or research strategy and precise goals so that a coherent collaborative activity is ensured. Ideas for a Working Session can result from Discussion Group sessions of previous conferences where a topic was elaborated upon and a research framework or strategy was developed. Each Working Session should be complementary to the aims of PME and ensure maximum involvement of each participant.

Two 90-minute sessions will be allocated to Working Sessions. After the conference, coordinators of each Working Session are required to send a report of its activities to the PME Administrative Manager (info@igpme.org). This report may be included in the PME newsletter. This report is due by the end of September 2017. The deadline for submission of WS proposals was March 6, 2017. Four proposals were submitted and all were accepted. The accepted Working Sessions for PME 2017 are:

WS1: *Textbook signatures: Exploration and analysis of mathematics textbooks worldwide*

Coordinators: Angel Mizzi, Ban Heng Choy & Mi Yeon Lee

WS2: *What does “socio-cultural-historical views of teaching and learning of mathematics” mean to us?*

Coordinators: Yasmine Abtahi, Mellony Graven, Richard Barwell & Steve Lerman

WS3: *Comparing different frameworks for discussing classroom video in mathematics professional development programs*

Coordinators: Ronnie Karsenty, Alf Coles & Hilary Hollingsworth

WS4: *Videos in teacher professional development: Fostering an international community of practice*

Coordinators: Greg Oates, Kim Beswick, Mary Beisiegel, Tanya Evans & Deborah King

5.3.4 Ad Hoc Meeting (AH)

Ad Hoc Meetings are a form of conference activity approved in 2010. During the conference, PME provides time slots and rooms for meetings of ‘ad hoc’ groups. The idea is that researchers can meet and discuss research topics that spontaneously came up during discussions of previous presentations at the conference. The Ad Hoc Meetings are reserved only for discussions; presentations or a continuation of a Research Report or Oral Communication are not allowed. To organize an Ad Hoc Meeting, at least two persons should prepare an announcement with a short and precise description of the topic, the names of the organizers, and the preferred time slot, and deliver it to the PME Administrative Manager info@igpme.org. The Administrative Manager will then assign times and rooms. Since there are only a few time slots and rooms, proposals will be accepted on a first-come, first-served basis.

5.3.5 Seminar (SE)

The goal of a Seminar is the professional development of PME participants, especially new researchers and/or first comers, in different topics related to scientific PME activities. This encompasses, for example, aspects like research methods, academic writing or reviewing. A Seminar is not intended to be only a presentation but should involve the participants actively. PME can give a certificate of attendance to participants of the Seminar. Facilitating a seminar will not count as a contribution for the existing restrictions on conference contributions.

The two-page proposals of accepted Seminars will be included in the Conference Proceedings. Two 90-minute sessions will be allocated to Seminars. After the conference, coordinators of each Seminar are required to send a report of its activities to the PME Administrative Manager (info@igpme.org). This report may be included in the PME newsletter. This report is due by the end of September 2017.

The accepted Seminar for PME 2017 is:

SE1: *Reviewing for the PME – A primer for (new) reviewers*

Coordinators: Anke Lindmeier, Anika Dreher & Michal Tabach

5.4 Early Researchers’ Day

For the fourth time, PME is pleased to offer a special day (Early Researchers’ Day, ERD) for early career researchers who are also attending the PME conference. The Early Researchers’ Day will

directly precede the main PME conference and will consist of presentations, working groups and other kinds of sessions planned to be of value to those new to research in mathematics education. Based on the experiences with the ERDs of PME 38, PME 39, and PME 40, the ERD proved to be of interest and value and therefore such an event may become a permanent feature of PME activity.

The aim of the ERD is to provide early career researchers with opportunities to develop their research skills in various fields, establish new contacts, build networks among themselves and with respect to future PME conferences, and meet and work with international experts in the field.

The 2017 ERD will be held on the afternoon of Sunday July 16, 2017 and the morning of Monday July 17, 2017 at the Nanyang Executive Centre and the campus of the National Institute of Education respectively. The ERD is being organized by Chua Boon Liang (LOC member) and Wim van Dooren (PME representative). It will also include a social program to provide opportunities for informal exchange and further networking. Updated information will be posted on the conference website.

Since the programme will consist of intensive workshops on several topics (refer to the programme on PME41 website), we will accept 50 applications on a first come, first served basis. There is no registration fee for ERD. Dinner on Sunday, lunch on Monday, and two coffee breaks are complimentary. Applicants who had responded to an earlier call for expression of interest in participating in the ERD would have received a notification of their application by now. To confirm their participation in the ERD, they are required to register for the ERD, as part of their registration for the conference by 10th May 2017. Failing which, their place will be offered to others on the waiting list.

6 PME Pre-Submission Support

The PME pre-submission support for Research Reports and Oral Communications is intended for novice or inexperienced researchers who have limited access to expert advice and who would like to receive guidance from more experienced PME researchers. Applicants should submit their paper to the coordinator who is appointed by the International Committee. The coordinator will then assign the paper to an appropriate mentor and ensure that the communication between the mentor and novice researcher proceeds smoothly.

The PME pre-submission support coordinator is David Wagner (Canada), dwagner@unb.ca.

Authors who wish to have a mentor to compose a Research Report or Oral Communication should contact the coordinator as early as possible, but no later than November 1st 2017.

The pre-submission support papers should be accompanied by a statement in which the authors describe

- their limited experience in writing research reports (or journal articles) and
- their limited access to expert advice.

Mentors will correspond with the applicants and help strengthen their submitted papers. Please note that this procedure is meant to provide feedback on written reports. It is not meant as support for conducting research. This mentoring does not guarantee acceptance, as all submitted papers will still undergo the regular PME reviewing procedures.

7 Registration and Payment

7.1 Conference Registration

Registration for PME 41 is carried out using the ConfTool Conference registration system, at www.conftool.com/pme41. Before registering for the conference or paying the membership fee, you will need to register in the PME ConfTool system.

a) If you are a **new user** of the PME ConfTool system:

- Please create a new account and register in the system.
- You will need to provide your personal information and account information in order to build your own data base in the system.
- After filling in these details and submitting all information needed, you will be able to continue with your conference registration.

b) If you **have been a user** of the PME ConfTool system:

- Please log in by entering your username and password and select the option “Register as Participant”. If you have forgotten your password, ConfTool will help you to retrieve it.

If you have any problems with registration, please contact the conference registration secretariat at registration.pme41@nie.edu.sg

7.2 IGPME Membership Only

If you have been an IGPME member in the past, but will not be attending PME 41, or you want to become a new IGPME member who will not attend PME 41, pay the annual membership fee for PME through ConfTool. This is necessary for maintaining or getting membership.

a) As a new member of IGPME:

- Please create a new account and register in the system.
- You will need to provide your personal information and account information in order to build your own data base in the system.
- After filling in these details and submitting all information needed, you will have to select the option “Register as Participant” before you are able to select the option “*Membership ONLY*”.

b) As a member of IGPME who wants to renew membership:

- Please log in by entering your username and password and you will have to select the option “Register as Participant” before you are able to select the option “*Membership ONLY*”.

After checking your personal details and choosing “Pay PME membership fee ONLY” in the following step, the system will automatically take you to the payment form where you can get information on payment options for the membership fee.

If you choose online payment, the system will connect you with a secure page for you to complete your payment. If you have any problems with payment of the membership fee, please contact the conference registration secretariat at registration.pme41@nie.edu.sg

7.3 Registration Fees

The final registration fee for PME 41 is SGD 650 (see below for details)

7.3.1 Total Registration Fee

The total registration fee covers:

- PME membership for the year 2017 of SGD 60;
- A compulsory Skemp Fund donation of SGD 15;
- a set of printed conference proceedings (see below) and access to an electronic version of the proceedings;
- 4 lunches and 8 coffee breaks;
- opening reception (Monday July 17, 2017)
- conference dinner;
- excursion
- the costs of venue, administrative work, and facilities needed for the organization of the conference.

You have the option to choose if you want to receive printed proceedings or not. As with previous conferences, the default option includes both printed and electronic proceedings. During the final registration process via the ConfTool system, participants can choose the alternative option that includes only electronic proceedings. If you choose only electronic proceedings, the registration fee will be reduced by SGD 60.

7.3.2 Accompanying Person Fee

We welcome accompanying persons. Accompanying persons participate in the social program but **not in the scientific program** of the conference. The fee for accompanying persons is SGD 200 per person.

The fee covers:

- opening reception (Monday, July 17);
- excursion; and
- conference dinner.

There is no fee for accompanying children 13 years or less of age.

Accompanying persons should be registered together with the regular participant in the registration process. It is not possible to register as accompanying person only. If you have any questions, please contact the administrative secretary at admin.pme41@nie.edu.sg

7.3.3 *Late Registration Fees*

An additional charge of SGD75 will be applied for registrations made after May 31, 2017.

7.4 Payment Options

All participants can make their payment by credit card, or wire transfer. If you use a **credit card**, the process will be carried out online. The ConfTool system will connect you to a secure payment site (PayPal) within the accounting system. There you will enter your credit card information and will receive a receipt for your transaction.

If you choose to pay by **bank wire transfer** you will need to transfer the funds to the account designated on the website. **Make sure that the bank transfer fees are not charged to PME 41.** To finish the payment process, please print the confirmation of bank transfer and send it by email with your full name to registration.pme41@nie.edu.sg

Your pre-registration will only be finalized when the payment process is complete.

If you have any questions regarding your payment, please contact registration.pme41@nie.edu.sg

7.5 Donations to Skemp Fund

The Richard Skemp Memorial Support Fund is a fund that was established to support academics from under-represented or economically weak countries in attending the annual conference (see section 7.7). The spirit of the fund is to help academics who normally would not have access to the PME conference. As such, where applicants are from, where they are living, where they are working, where they are currently studying, as well as the conditions of their employment and studies are important factors when adjudicating the applications.

The Skemp Fund plays an increasingly important role in making the PME annual conference more accessible to mathematics educators who would not otherwise be able to attend the conference. The extent to which we can give this financial assistance depends to a large degree on the generosity of the PME community. For this reason, a compulsory donation of SGD 15 is included in the pre-registration fee for the conference. In addition, the International Committee calls on members to make an additional donation, however small, to the Skemp Fund when paying membership fees or registering for annual conferences.

7.6 Cancellation Policy

7.6.1 For Registered Participants

Participation in the conference is conditional upon registration and payment of all fees. All cancellations and changes regarding the conference registration must be made in written form to the conference registration secretariat by sending an email to registration.pme41@nie.edu.sg. In all cases, **the conference deposit will not be refunded**; however, the deposit will cover one year of membership as well as access to the electronic conference proceedings.

If a cancellation for conference participation is made after the full registration fee has been paid:

Before June 10, 2017, the refund will be the amount of the full registration fee minus the conference deposit and the fees that the bank charges for transferring the refund.
 Refund = (registration fee – conference deposit) – bank fees.

After June 10, 2017, the refund will be 50% of the full registration fee minus the conference deposit, and then subtracting the fees that the bank charges for transferring the refund.
 Refund = 50% of (registration fee – conference deposit) – bank fees

7.6.2 For Accompanying Persons

If a cancellation for accompanying person is made after the full registration fee has been paid:

Before June 10, 2017, the refund will be the amount paid minus the fees that the bank charges for transferring the refund will be refunded. (Refund = accompanying person fee – bank fees.)

After June 10, 2017, the refund will be 50% of the amount, subtracting the fees that the bank charges for transferring the refund. (Refund = 50% of accompanying person fee – bank fees.)

7.6.3 General Information

- Participation is not guaranteed until full payment of the registration fee is received.
- The conference program may be subject to changes (based on decisions by the International Program Committee).
- In the case of unforeseeable events, it is up to the International Program Committee and the International Committee of PME to decide on changes or even the cancellation of the conference and the amount of refund of payments. If the conference is cancelled, the remaining funds will be paid back to the participants and no further liability of the local organizers or PME will be accepted towards the client.

7.7 Richard Skemp Memorial Support Fund and Application for Support

The Richard Skemp Memorial Support Fund is a fund that was established to support academics from under-represented or economically weak countries in attending the annual conference. The spirit of the fund is to help academics who normally would not have access to the PME conference.

A limited amount of financial support is available to researchers who experience difficulty in obtaining financial support to attend a PME conference. **Applicants for a grant from the Fund must submit an individual contribution (RR, OC, PP) and pay the non-refundable conference deposit, prior to the applicant's proposal being reviewed.** A grantee must have at least one proposal (RR, OC, PP) accepted.

In general:

- only one of the authors of a particular proposal will be eligible to apply for a grant;
- those who have already received a grant on two prior occasions will not receive an additional grant; and
- for applicants who have already received a grant in a previous year, priority will go to those who have an accepted Research Report rather than an Oral Communication or Poster Presentation.

The number and size of grants each year depends on the amount available as well as the number of applicants and the relative merits of each application. The Richard Skemp Memorial Support Fund Committee met during the second International Program Committee meeting, in early April, 2017, and had made its recommendations. No more applications can be accepted this year. The PME Administration Manager had already contacted applicants to inform them of the decision on their application for a Richard Skemp Memorial Support Fund grant.

8 Important Dates for 2017 (PME 41)

8.1 Scientific Program

For all accepted proposals the deadline of final registration for **the presenting authors is May 15, 2017**. Contributions will not be included into the proceedings, if final registration including the payment of the total registration fee is not completed by that date.

8.2 Registration

Pre-registration (complete with payment)	Necessary to submit proposals and also for proposals to be reviewed	Started on December 1, 2016
Full registration	Presenting authors *Necessary for inclusion of all types presentations in the PME Proceedings	By May 15, 2017
Full registration	For all participants	By May 31, 2017
Late registration	For any participant	From June 1, 2017 until the end of the conference

8.3 Deadlines for PME 42 (2018) in Umeå, Sweden

Research Forums for PME 42 to be held in Umeå should be submitted before November 1, 2017, to the Administrative Manager (info@igpme.org).

The PME Pre-Submission Support for contributions to PME 42 in Sweden is November 1, 2017. Please refer to www.igpme.org/index.php/annual-conference/pre-submission-support for further information.

The deadline for the Skemp Fund application for PME 42 is March 1, 2018. Please refer to www.igpme.org/index.php/annual-conference/skemp-fund-support for further information.

9 Further Information

9.1 Extra Copies of Conference Proceedings

PME 2017 participants may purchase extra copies of the printed conference proceedings at a special price when they register online, provided they order and pay for them no later than May 15, 2017. The price is SGD 60 for the hard-copy set. The proceedings must be picked up at the conference either personally or by asking a colleague to do it. Printed copies of the Proceedings will not be mailed. If you wish for them to be mailed to you, please use the print-on-demand option. Printed proceedings will also be available by a print-on-demand publisher where participants can order online for a price set by the selling company plus shipping costs. The hyperlink will be announced on the conference homepage and the IGPME homepage as soon as it is available.

9.2 Name Badges

Participants and accompanying persons will receive a name badge. Everyone is requested to wear this badge during the conference to have access to all conference activities.

9.3 Internet Facilities

Wireless internet access will be available at the conference sites. The easiest way to connect to the internet is to use Eduroam (www.eduroam.org) which is available at the National Institute of Education. So, if you work at a university where Eduroam is available, it is advisable to make sure that you have an account at your home institution before the conference. This will ensure that you can use your own account during the conference. For all other participants, you can access the wireless internet by logging in as a visitor to Wi-Fi@NIE, agreeing to the terms and conditions as stipulated by the National Institute of Education. Wi-Fi@NIE offers visitors one-hour of internet access and this can be renewed every hour.

9.4 Food During the Conference

Coffee, tea, water, and some light snacks will be provided at the conference venue during the coffee breaks. For lunch, we will provide bento boxes with Halal and Kosha/Vegetarian options. The ConfTool registration system allows you to specify your dietary restrictions.

10 Travel Information

10.1 Getting to Singapore

By Air

Flying to Singapore is easy as our award-winning Changi Airport, one of the busiest and best connected in the world, handles over 100 airlines flying to some 300 cities. There are also local carriers, including the world-renowned Singapore Airlines and budget airlines Tiger Airways and Scoot.

By Sea

Singapore, one of the world's busiest cruise centres, is a leading homeport in the heart of Asia. There are a host of cruise operators, covering luxury, premium, and contemporary offerings, ready to whisk you from around the region to one of the city's terminals.

By Land

Driving into Singapore from West Malaysia is a relaxing and scenic way of getting here. Singapore has two land checkpoints, at Tuas in the west and Woodlands in the north, that operate 24 hours a day.

10.2 About Singapore

10.2.1 Language

Singapore's official working language is English. You will be able to speak English to Singaporeans, most of whom are fluent in it. Many Singaporeans also speak an additional language, usually Mandarin Chinese, Malay or Tamil.

10.2.2 Visa

Most visitors coming into Singapore do not require a visa for entry and may be given social visit passes. However, visitors holding travel documents issued by some countries/regions will require a visa to enter Singapore. Please refer to the Immigration and Checkpoints Authority website (https://www.ica.gov.sg/services_centre_overview.aspx?pageid=252&secid=165) for details.

10.2.3 Letter of Invitation

After registering for the conference, you may download a letter of invitation that details your participation in the conference. The letter states explicitly that the registration fees, travel, living and accommodation expenses will not be supported by the conference organizers.

10.2.4 Currency

The Singapore dollar is used here and notes come in denominations of SGD 2, SGD 5, SGD 10, SGD 50, SGD 100, and SGD 1,000. Coins come in 5, 10, 20 and 50 cents and SGD1. For exchange rates please check the official homepage of the Monetary Authority of Singapore.

(<https://secure.mas.gov.sg/msb/ExchangeRates.aspx>)

10.2.5 Power Plug

The standard electrical current used in Singapore is 220-240 volts AC (50 cycles) and you can use power plugs (Type G) with three square prongs here. The Type G electrical plug has three rectangular blades in a triangular pattern and has an incorporated fuse (usually a 3 amps fuse for smaller appliances such as a computer and a 13 amps one for heavy duty appliances such as heaters).



(Source: www.iec.ch/worldplugs/typeG.htm)

10.2.6 Time zone

Singapore is 8 hours ahead of GMT.

10.2.7 Telephone Code and useful telephone numbers

Singapore's country code is 65. Some useful telephone numbers are: Police (999), Ambulance & Fire Brigade (995), and Flight Information (1800 542 4422).

10.2.8 Weather

Singapore is hot and humid all year-round, with temperatures usually reaching over 30°C. You should be prepared for rain, which can be torrential but brief.

10.3 Liability and Insurance

Please check the validity of your insurance before you travel. The Local Organising Committee does not accept any liability for personal injuries, or for the loss or damage to property belonging to conference participants (or their accompanying persons) either during or as a result of the conference.

10.4 Accommodation

There are a variety of accommodation options available in Singapore. Participants must arrange their own accommodation. It is easy to contact hotels in Singapore, as they are used to communicate in English. Some suggested accommodation options (with room rates in Singapore Dollars (SGD) as of October 2016 subject to change without prior notice) are as follows.

Nanyang Executive Centre (<http://www.ntu.edu.sg/nec/Pages/default.aspx>)

[Note: This centre is located on the campus of the university]

Deluxe Single (1 person max)	SGD 160 per room per night with breakfast
Deluxe Queen/Twin (2 persons max)	SGD 180 per room per night with breakfast
Junior Suite (3 persons max)	SGD 240 per room per night with breakfast
Executive Suite (4 persons max)	SGD 290 per room per night with breakfast

All room rates are subject to 10% service charge and 7% GST

Park Hotel (Alexandra) (www.parkhotelgroup.com)

Superior Room (Single/Twin):	SGD 170++ per room per night without breakfast
Deluxe Room (Single/Twin):	SGD 180++ per room per night without breakfast
Premier Room (Single/Twin):	SGD 240++ per room per night without breakfast
Crystal Club Room (Single) With Crystal Club Rooms benefits	SGD 260++ per room per night
Crystal Club Room (Twin) With Crystal Club Rooms benefits	SGD 290++ per room per night

Room rate for superior, deluxe and premier room is inclusive of internet use; additional breakfast us at an extra charge of SGD 10++ per person per day.

Room rates are subject to 10% service charge and 7% GST.

Genting Hotel (Jurong)

<http://www.rwsentosa.com/Homepage/HotelsAndSpa/GentingHotelJurong>

Superior Room (King/Queen/Twin: 2 persons max):	SGD 201.27 per room per night without breakfast
	SGD 236.58 per room per night with breakfast
Deluxe Room (King/Twin: 3 persons max):	SGD 264.83 per room per night without breakfast
	SGD 300.14 per room per night with breakfast

Grand Hyatt Singapore (<https://singapore.grand.hyatt.com/hyatt>)

Grand (Twin/King)	SGD 409 per room per night with breakfast
Grand (Deluxe King/Twin)	SGD 469 per room per night with breakfast

Lotus Hostel (Singapore Backpacker Hostel)

<http://www.hostelbookers.com/hostels/singapore/singapore/87629>

Accommodation rates range from SGD 26 – SGD 86 depending on the type of shared rooms.

NTU Campus (Student Accommodation)* [This accommodation is on campus]

Student rate	SGD 25.00 per room per night
Non-student rate	SGD 40.00 per room per night

*Air-conditioned rooms but availability is still pending because of Student Orientation Programme that starts on 15 July 2017.

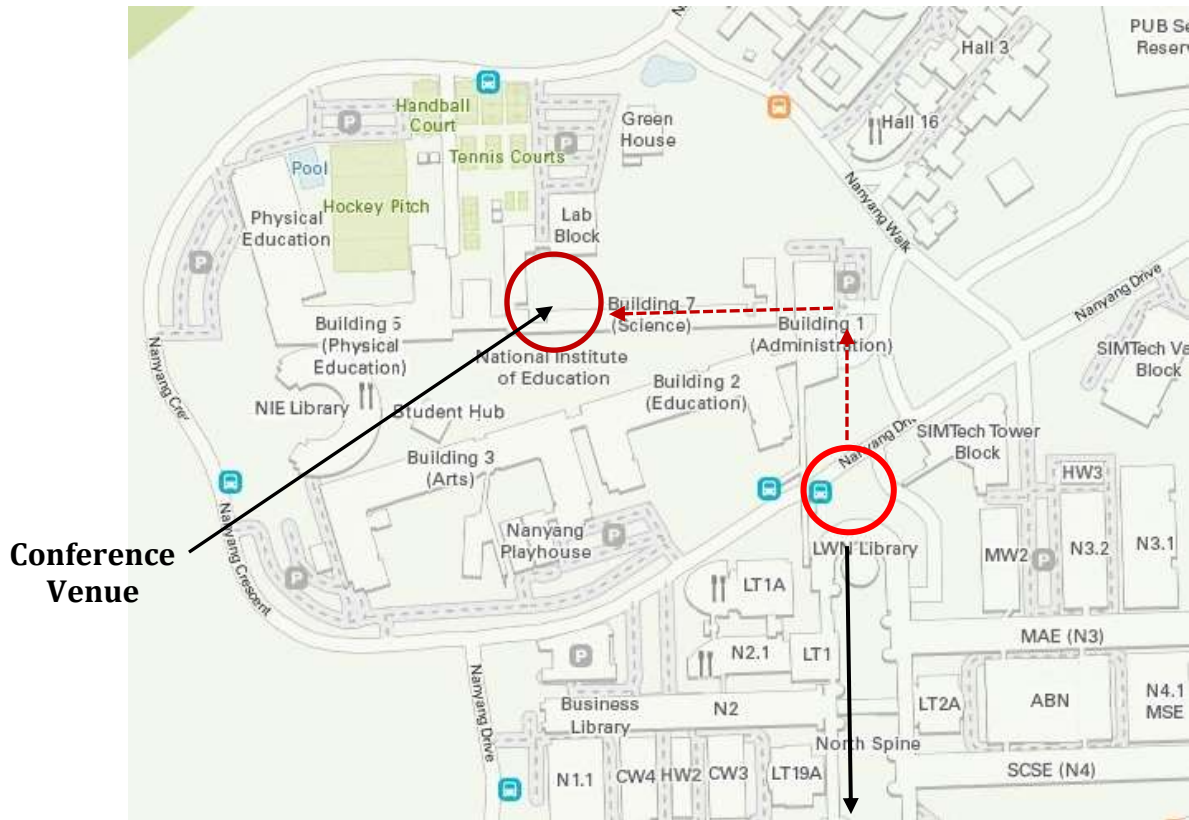
10.5 Getting to the Conference Venue

The conference will be held at the National Institute of Education (NIE), Nanyang Technological University (NTU). Singapore has a world-class public transport system, consisting of the Mass Rapid Transport (MRT), Light Rail Transport (LRT) and a comprehensive bus network. The conference venue is also accessible by two major expressways, PIE and AYE.

10.5.1 By public transport

Take a train and alight at Boon Lay MRT Station (EW27) that lies on the East West Line. From there, you can take SBS Transit Bus Service 179/179A or 199 from Boon Lay Bus Interchange, which is next to the MRT Station. The frequency of buses reduces after 7pm. You can alight at the Lee Wee Nam Library (Bus Stop 27211), which is at the foot of the overhead bridge between the NIE and NTU campus. There will be PME Volunteers, i.e., students carrying signboards that read “PME 41”

stationed at the bus-stop, to guide you to the registration counter at NIE. An express Bus service 179A, operates from Boon Lay Bus Interchange during weekday morning peak hours only. There is no operation for Bus service 179A on Saturdays, Sundays, Public Holidays & university holidays. For more information, please visit www.transitlink.com.sg



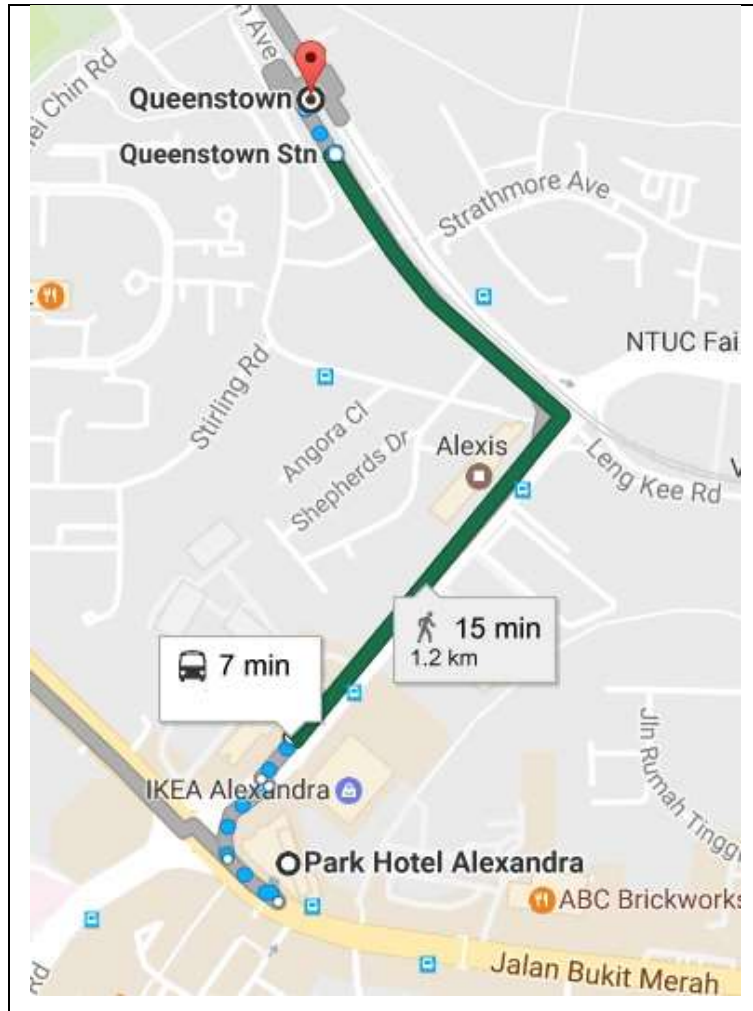
Bus service 179 and 179A

Alight at Lee Wee Nam Library (Bus Stop 27211) and walk along the path (----->)

10.5.2 Getting to NIE from the recommended Hotels

The fastest way to get to NIE from these hotels will be by taxis. If you prefer to take the trains, we have listed some directions for your convenience.

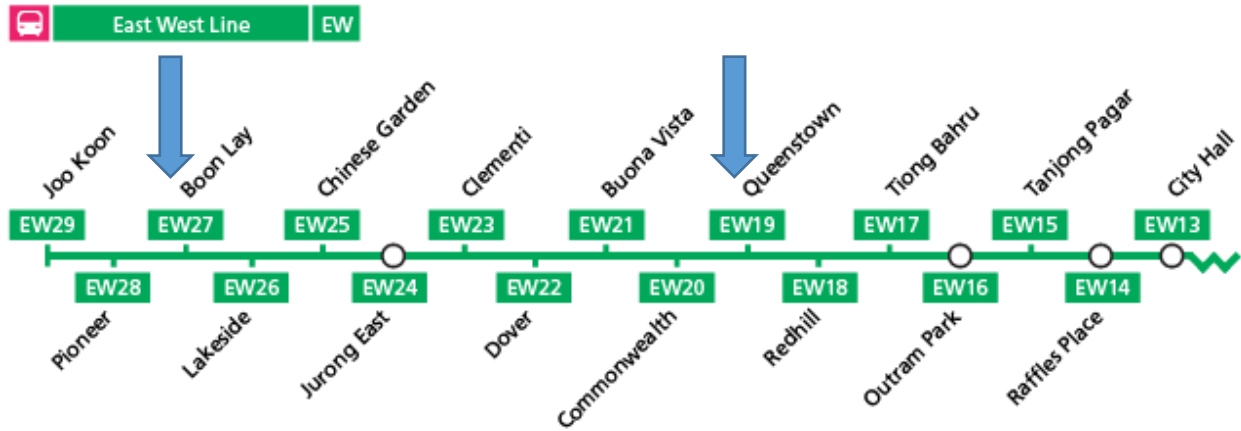
From Park Hotel (Alexandra) to National Institute of Education



Park Hotel to Queenstown MRT Station (EW19)

From Park Hotel (Alexandra) to NIE (Conference Venue) [estimated travel time = 60 mins]

- cross the Alexandra Road to the Bus Stop outside The Anchorage
- take Bus 195 and alight three stops (not inclusive) after The Anchorage, next to Queenstown MRT Station (EW19)
- alternatively you may walk from the Park Hotel to the Queenstown MRT Station (EW19) (approximately 15 mins)
- take the MRT from Queenstown MRT Station to Boon Lay MRT Station
- take Bus 179/179A or 199 from Boon Lay Bus Interchange to NIE



MRT East West Line

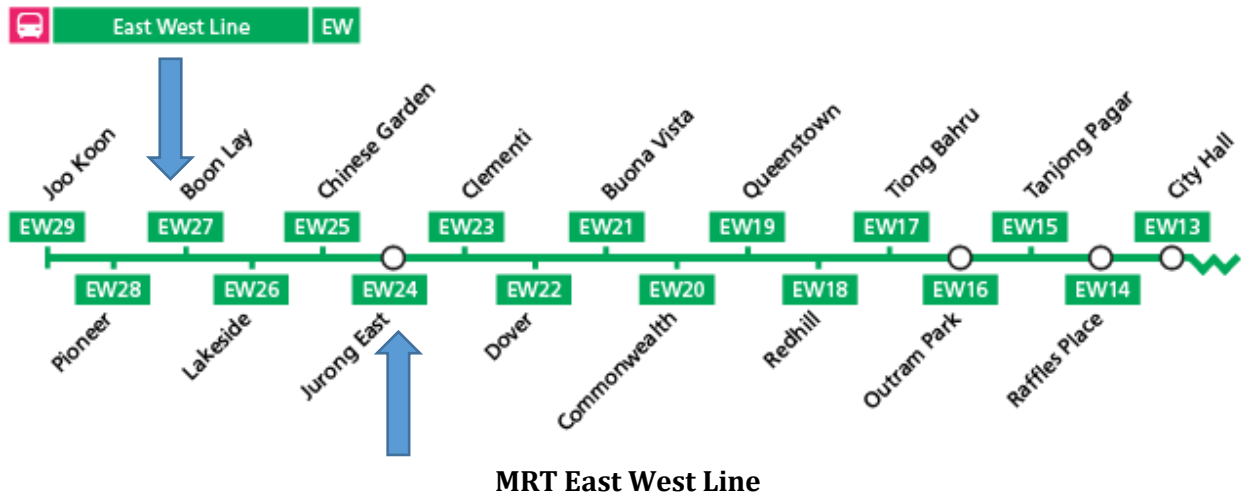
From Genting Hotel (Jurong) to National Institute of Education



Genting Hotel (Jurong) to Jurong East MRT Station (EW24)

From Genting Hotel (Jurong) to NIE (Conference Venue) [estimated travel time = 40 mins]

- cross the road and go along Gateway Link, heading towards Jurong Gateway Road
- take the MRT from Jurong East MRT Station (EW24) to Boon Lay MRT Station (EW27)
- take Bus 179/179A or 199 from Boon Lay Bus Interchange to NIE



10.5.3 Getting to NIE by car

From PIE (towards Tuas), take Exit 36

Turn right onto Jalan Bahar. You will see a sign directing you to NIE/NTU.

Turn left into Nanyang Avenue and drive approximately 1.5km until you reach the main entrance of NTU.

From the PIE (towards City/Changi), take Exit 38

Turn left off the slipway. You will see a sign directing you to NIE/NTU.

Follow the road on the left then turn right onto Nanyang Drive.

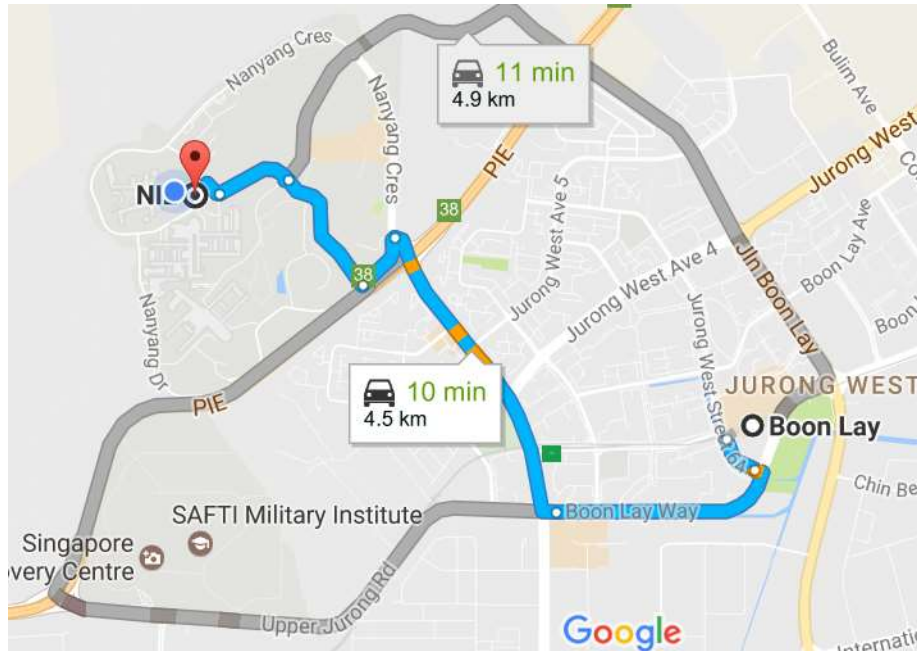
Continue to drive along Nanyang Drive, past Nanyang Terrace staff housing and go over the crossroads with Nanyang Avenue.

Approximately 1km after the crossroads you will see an overhead bridge over the road; to the right is NIE campus and to the left is NTU campus.

From AYE (towards Jalan Boon Lay), take Exit 17 (signposted Jurong Bird Park)

Follow the sign to Jalan Boon Lay. Approximately 2km along this road, you will see a sign directing you to NIE/NTU.

Turn left into Nanyang Avenue and drive approximately 1.5km until you reach the main entrance of NTU.



Map showing Boon Lay Train Station and NIE

11 Conference Excursion

In addition to the scientific programme, there will be an excursion afternoon with several options for participants. A key feature of the excursion tours will be that they will all end at Marina Bay so that participants can enjoy a relaxing evening at the bay and be entertained by a light and sound show. There are many restaurants and eateries around Marina Bay and the vicinity is well connected by public transport. We encourage all PME participants to meet up and dine at one of the local restaurants or eateries at the end of the excursion tours. Details of the excursion tours are listed below. Please refer to <http://math.nie.edu.sg/pme41> for more details.

11.1 SG-1: Gardens by the Bay + Marina Barrage + Merlion Park Tour + River Cruise



Gardens by the Bay

Gardens by the Bay brings to life the National Parks Board Singapore's vision of creating a City in a Garden. The Gardens captures the essence of Singapore as the premier tropical Garden City with the perfect environment in which to live and work – making Singapore a leading global city of the 21st century. Gardens by the Bay broke ground in November 2007, signaling the commencement of the Gardens' development. Subsequently, development of Bay East Garden also commenced. It was

developed as an interim garden to be used as a staging site for some of the rowing and canoeing events of the Youth Olympic Games (YOG) in August 2010. Following the YOG, Bay East underwent reinstatement works and was open to the public in October 2011.

Marina Barrage

Build across the mouth of Marina Channel, Marina Barrage (MB) creates Singapore's 15th reservoir, and the first in the heart of the city. With a catchment area of 10,000 hectares or one-sixth of Singapore, Marina catchment is the island's largest and most urbanized catchment. Together with two other reservoirs, Marina Reservoir has increased Singapore's water catchment from half to two-thirds of the country's land area. Marina Barrage is the vision of the late Mr. Lee Kuan Yew (the first Prime Minister of Singapore) more than two decades ago when he envisaged damming the mouth of the Marina Channel to create a freshwater reservoir.

See <http://math.nie.edu.sg/pme41/excursions/SG1.pdf> for details.

11.2 SG-2: Culture & Heritage Tour + River Cruise

The Heritage-rich, kitschy tourist-chic spot has pretty much everything you can think of, from fascinating temples and souvenir shops to local food hawker stalls and cool bars.



Chinatown Food Street

Get your hands on signature local dishes in one spot at Chinatown Food Street. Try chicken rice, char kway teow (Stir fried rice noodles) and roti Prata (South Indian flat bread)

Sri Mariamman Temple

Singapore's oldest Hindu temple – Sri Mariamman Hindu Temple built in 1827 and now a national monument, is a beautiful sight to behold. It's dedicated to the goddess Mariamman, whose power is to cure illness and disease.

Jamae Muslim Mosque

Also known as Masjid Chulia, Jamae Mosque is one of Singapore's oldest mosques and a prominent landmark in Chinatown since the 1820s. With its distinctive front gate and minarets, Jamae Mosque may seem like a curious oddity in its predominantly Chinese location in Chinatown. But, along with its neighbor, Sri Mariamman Temple, Jamae Mosque has been a prominent landmark and often appearing in early illustrations, photographs and postcards.

Buddha Tooth Relic Buddhist Temple

This Tang-styled Chinese Buddhist temple in Chinatown gets its name from what the Buddhists regard as the Sacred Buddha Tooth Relic. Built in 2007, the Buddha Tooth Relic Temple & Museum may be a recent addition to the historic Chinatown district. Yet the temple is definitely worth a visit, with its rich features and exhibits on Buddhist art and culture.

Lee Kong Chian Natural History Museum

Opened in April 2015, the museum inherits much of its natural history collection from its predecessor, the Raffles Museum of Biodiversity Research (RMBR), whose collection of course stems from the original Raffles Museum that was renamed the National Museum of Singapore in 1965. Come and be enthralled by the myriad of colors and forms of plants and animals in 16 different thematic zones from Plants and Amphibians to Mammals and Dinosaurs.

See <http://math.nie.edu.sg/pme41/excursions/SG2.pdf> for details.

11.3 SG-3: Nature & Museum Tour + River Cruise

Pockets of amazing natural wonders can be found throughout Singapore, providing a welcome respite from the bustle of the city. Singapore's arts scene is a colorful brew of local works made more diverse with internationally renowned players performing throughout the year.



National Museum of Singapore

Singapore's oldest museum is a progressive showcase of the country's history and culture. With its history dating back to 1887, the National Museum is the nation's oldest and one of the city's architectural icons. Its permanent offerings, the Singapore History and Living Galleries, piece together the past and present in a compelling narrative.

Fort Canning Park

Whether you're a history buff, music fan or nature lover, this historic landmark on a hill is full of surprise. The park was originally known as Bukit Larangan, or 'Forbidden Hill' in Malay. Today, the 18 hectare space is chock full of attractions – from ancient artefacts for history buffs to outdoor lawns for concert and of course, greenery for nature lovers.

Merlion Park

Meet the myth Half-fish and half-lion, the iconic Merlion resides at the waterfront Merlion Park. The body symbolizes Singapore's humble beginnings as a fishing village when it was called Temasek, meaning 'sea town' in Old Javanese. Its head represents Singapore's original name, Singapura or 'lion city' in Malay.

Fullerton Hotel

The magnificent Fullerton Building is a grand Neo-classical landmark built in 1928. Gazetted in Dec 2015 as a National Monument, it was once home to Singapore's General Post Office, the Exchange Room and Exchange Reference Library and the prestigious Singapore Club. For nearly a century, it has played a pivotal role in Singapore's rich history. Today, it has been transformed into a stunning 400-room heritage hotel.

See <http://math.nie.edu.sg/pme41/excursions/SG3.pdf> for details.

11.4 SG-4: UNESCO World Heritage Tour + River Cruise



Singapore Botanic Garden

This year, Singapore's oldest garden adds another accolade to its illustrious history by becoming the country's first UNESCO World Heritage Site. It would not be an exaggeration to say that Southeast Asia would be a very different region without the Singapore Botanic Gardens. In 1877, rubber seedlings were brought to Singapore from London's Kew Gardens, where they were cultivated in the gardens.

'VIP' – Very Important Plants at the National Orchid Garden. You will get to rub shoulders with VIPs such as the Vanda William Catherine and the Paravanda Nelson Mandela. It is a longstanding tradition for Singapore to name orchids after visiting dignitaries and celebrities who have contributed significantly to society. This unique hall of fame includes one of a kind orchids named after the Duke and Duchess of Cambridge, William and Catherine, as well as special guests such as Nelson Mandela and celebrities like Jackie Chan and Shah Rukh Khan. With over 200 VIP orchids on display, let's see how many names you can recognize.

Raffles Hotel

Hark back to a golden age of elegant refinement and gracious living at Raffles Singapore, where the past reawakens to glorious life. Easily the most famous hotel in Singapore, no other establishment epitomizes the island's colonial history better than Raffles Singapore. Named after Singapore's founder, Sir Stamford Raffles, the hotel was built by the Sarkies Brothers, responsible for other luxury hotels in the region during the colonial era. Although Raffles Singapore opened in 1887, its layout continued to be changed, with hotel wings, suites and other facilities added over the years.

See <http://math.nie.edu.sg/pme41/excursions/SG4.pdf> for details.

11.5 SG-5: Kaleidoscope of Culture Tour + River Cruise



Arab Street / Kampong Glam

Discover Kampong Glam's rich history, living traditions, excellent eateries and trendy shops in this vibrant neighborhood. Kampong Glam has its origins as a fishing village at the mouth of Rochor River. The Malay word 'kampong' means village, and the area was known for the gelam tree (Paperbark Tree) that grew here and was used for building ships. In 1822, Sir Stamford Raffles, allocated the area to the Malay Sultan Hussain Mohammed Shah and others in the Muslim community, including Arab and Bugis traders.

The Malay Heritage Centre

A must to visit if you're keen on learning about the rich heritage and culture of Singapore's Malay community. Built 160 years ago by Sultan Ali, the son of Sultan Hussein Shah, Istana Kampong Glam was once the royal seat of the Malay sultans in Singapore. Beautifully restored to its former glory, the Malay Heritage Centre sits within these well-preserved grounds and is a must visit for anyone interested in understanding the history of Singapore's Malay community.

Indian Heritage Museum

The Indian Heritage Centre (IHC), under the management of the National Heritage Board and with support from the Indian community, traces the history of the Indian and South Asian communities in the Southeast Asian region. The architectural design for the facade of IHC is inspired by the "baoli" (or Indian stepwell), and seeks to create an urban forum for the celebration and appreciation of Indian culture. It houses five permanent galleries, small scale museum facilities, a museum shop as well as programming and activity spaces.

National Gallery Singapore

Extensive Singapore and Southeast Asian art: the Gallery draws more than 8,000 pieces from Singapore's National Collection, making it one of the world's largest and most invaluable public collections of Singapore and Southeast Asian modern art from the 19th century to the present day. The focus of the National Gallery Singapore is to provide a unique experience of art and to inspire international appreciation of our rich history and heritage.

See <http://math.nie.edu.sg/pme41/excursions/SG5.pdf> for details.

11.6 SG-6: MacRitchie Soft Adventure + ArtScience Museum Tour + River Cruise

Note: This excursion is only recommended for those who are physically fit and enjoy exploring nature in the tropics.



Walking trail at the Tree Top Walk at MacRitchie Reservoir

The attractions around MacRitchie Reservoir is a playground of nature for those who love the outdoors. Take an exhilarating walk around the 11km nature trail loop known as MacRitchie Trails, located within the tropical rainforest of Central Catchment Nature Reserve. You'll likely bump into long-tailed macaque monkeys, squirrels and monitor lizards. If you're lucky, you may even encounter colugos (flying lemurs) or owls! The highlight must be this walking trail that takes you to the Tree Top Walk, a 250m long freestanding suspension bridge between the two highest points in the Central Catchment Nature Reserve (MacRitchie) and the first of its kind in Singapore. From the suspension bridge, you can delight in having a bird's eye view of the forest canopy and try to spot different wildlife in their natural habitat. You can also enjoy panoramic views of the verdant greenery of the Central Catchment Nature reserve and the placid waters of the Upper Peirce Reservoir.

ArtScience Museum at Marina Bay Sands

As the name suggests, ArtScience Museum at Marina Bay Sands beautifully fuses art and science to tell fascinating stories. This premier venue houses a constantly changing line-up of major international touring exhibitions, brought in through collaborations with organizations such as the American Museum of Natural History, the Smithsonian Institute and world renowned furniture designer Herman Miller. Not only does the museum push boundaries with its retinue of world-class exhibitions, its design architecture is equally as iconic. The museum's structure is meant to symbolize the welcoming hand of Singapore with 10 fingers. The tip of each 'finger' filters in natural light to showcase exhibits in the best light. There are 21 galleries spread over three stories with a total floor space of about 50,000 sq. ft.

See <http://math.nie.edu.sg/pme41/excursions/SG6.pdf> for details.

11.7 SG-7: Sentosa (An Island of Fun) Tour + River Cruise



S.E.A. Aquarium

Begin the journey by travelling back in time to discover Asia's maritime heritage at The Maritime Experiential Museum™. Then enter and explore the marine realm of S.E.A. Aquarium™, home to more than 100,000 marine animals of over 800 species, across into 49 different habitats, each one as fascinating as the next. It's an experience you won't forget.

Sentosa Nature Discovery

Embark on a hands-on journey of discovery and sharpen your detective skills. At Sentosa Nature Discovery, nature and fun go hand-in-hand. The exploration starts with a fascinating gallery of interactive exhibits at the Gallery to brush up your Science Process Skills: Observe, Classify, Compare and Infer. Equipped with these skills, step out into the jungle and explore a wilderness teeming with birds, insects, other wildlife and plants in all manner of different habitats. There are eight different types of habitat found on Sentosa, including some of the rarest: coastal rainforests, rocky seashores and wetland. The Magpie Robin is an endangered species but it is commonly seen on Sentosa due to its highly suitable habitat. Sentosa is home to over 30 Heritage Trees, as well as insect-eating plants, migratory birds and stunning butterflies.

Fort Siloso

In the 19th century, Singapore became an important sea trading port for the British. To defend the island from sea invasion, Fort Siloso was once one of the three forts that were built on Sentosa Island. During World War II, the Japanese troops Singapore from the north through peninsula Malaya and the guns in Fort Siloso were turned landwards to support the ground troops. Today, being the only preserved coastal fort in Singapore, Fort Siloso is a historical attraction with a rich memorabilia of pre-WWII and WWII-era guns and remains of fortified military structure and tunnels.

Surrender Chambers

The gallery features the British and Japanese surrender waxworks which marked two significant surrender ceremonies in Singapore during WWII. The Surrender Chambers feature commentaries and exhibitions which bring you through the history of Singapore, from the British Surrender to the Independence of our nation. Go back in time and experience these surrenders with our guided commentary.

Fort Siloso Skywalk

The 11-storey, 181 meters long skywalk trail provides guests a scenic trek among the treetops en-route to Fort Siloso.

See <http://math.nie.edu.sg/pme41/excursions/SG7.pdf> for details.

11.8 SG-8: Food Trail – Local Food Sampling Tour + River Cruise



Ya-Kun Kaya Toast

Kickstart the day as the locals would with a quintessential Singaporean breakfast at Ya Kun Kaya Toast. Watch the Central business district of Singapore come to life while sipping on some strong local coffee accompanied with Kaya Toast. The rich texture of kaya, coconut jam combined with an indulgent slab of butter, contrasts delightfully with the thin slices of fresh bread that are charred on a charcoal fire.

Katong Laksa

There are various types of laksa in Singapore – from the tamarind-tang of Penang Laksa to the curry-like Sarawak Laksa. But none is more famous than the home-grown Katong Laksa. Katong Laksa is inspired by the Peranakans (Straits Chinese) who live in the Katong area. It has a spicy soup stock the colour of a flaming sunset, flavoured with coconut milk and dried shrimp and topped with ingredients like cockles, prawns and fishcake.

Roti Prata

This Indian specialty is pleasing to the palate and the eye. Watch the prata-maker stretch the dough by slapping and swinging it in one skillful motion. Crispy on the outside, soft on the inside, roti prata hits the spot every time. A South-Indian flat bread made by frying stretched dough flavored with ghee (Indian clarified butter), it is usually served with fish or mutton curry. Roti means bread, and prata means flat in Hindi language. Some believe the dish evolved from original pancake recipes from Punjab in India, but across the causeway in Malaysia, the flat bread is called 'roti canai', which some say is a nod to its origins from Chennai.

Satay at Lao Pa Sat

Built in the 19th century, Lau Pa Sat or Telok Ayer Market has long dominated the local landscape with its striking presence. A true Singapore landmark, it was gazetted as a national monument in 1973. Satays are wonderful skewered candied meat that you can gnaw on all day and not feel guilty because of its bite-sized portions. Originated from Java, Indonesia, the snack is an adaptation of India Kebabs, but it is now leaner and less filling, finding its way to the heart of Singapore too.

See <http://math.nie.edu.sg/pme41/excursions/SG8.pdf> for details.

12 Credits

12.1 PME Logo Design

The PME logo is designed by Mohamed Fadzli Ibrahim who is a staff of the National Institute of Education, Singapore.

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