

SUMMER SCHOOL ON GLOBAL CLIMATE CHANGE AND ENVIRONMENT VULNERABILITY

July 3 - July 14, 2017
Xiamen University, China



XIAMEN UNIVERSITY
COLLEGE OF THE ENVIRONMENT & ECOLOGY
厦门大学环境与生态学院



SUMMER SCHOOL ON GLOBAL CLIMATE CHANGE AND VULNERABILITY

July 3-14, 2017

Xiamen • China

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2017 Summer School on Global Climate Change and Vulnerabilities

The Summer School on “Global Climate Change and Vulnerabilities” is jointly organized by Xiamen University (XMU), San Diego State University (SDSU), Taiwan Yunlin University of Science and Technology, Taiwan Ilan University, Fuzhou University, Fujian Normal University and The University of Milan . Based on the first MoU, College of the Environment and Ecology, Xiamen University, renewed an agreement with College of Sciences, San Diego State University in Oct. 2013, on cooperation of the academic exchange and student summer research school program. This summer school will be the sixth experience between the two institutes. About 50 students from Xiamen, Fuzhou, the USA, Italy and Taiwan will be recruited this year. Summer school combines course study with field trips as well as cultural study together. It will provide participants with quality learning, key concepts and current update in various aspects of environmental science. We are looking forward to your joining this summer.

Date: 2- 15 July, 2017 (with on-site registration on July 2 and closing ceremony on July 14)

Venue: A239, CEE Building (Xiang’an Campus), Xiamen University

Language: English

Sponsors:

Xiamen University, China

Organizing Committee:

Xiamen University: Dazhi Wang, Jinjing Luo, Qiaoguo Tan, Yuntao Zhou

San Diego State University: Samuel Shen, Chun-Tai Lai

Taiwan Yunlin University of Science and Technology: Jao-Jia Horng

Taiwan Ilan University: Chin-Jung Lin



Instructors

1. Dr. Chun-Ta Lai (Biology, SDSU), Office: PS 154, Email: chun-ta.lai@mail.sdsu.edu
2. Dr. Sam Shen (Math, SDSU), Office: GMCS 575, Email: sshen@mail.sdsu.edu
3. Dr. Alan Sweedler (Physics, SDSU)
4. Dr. Jinjing Luo (Env Sci & Eng, XMU)
5. Dr. Yuntao Zhou (Env Sci & Eng, XMU)
6. Dr. Qiao-guo Tan (Env Sci & Eng, XMU)

Course Description: Over the last century human activities have exerted a powerful influence that has profoundly changed the global climate. This course will discuss basic physics of climate change, climate data, paleoclimate records, proxies and tools for paleoclimate reconstruction, models for predicting the future climate, uncertainties associated with those data and models, causes of climate change, and how global climate change affects biogeochemical cycling of carbon, water and nutrients, human health and the spread of disease. The course will compare Global Climate Change policies, practices, and impacts in China and the United States. The course consists of 16 hours of lectures, 22 hours of activities, and 6 hours of group presentations.

Course Objectives: After taking this course, students should be able to:

- explain basic concepts and principles of climate change science
- differentiate natural and human-induced climate change
- give examples that demonstrate effects of climate change on ecosystems
- contrast effects of climate change on ecosystems in the U.S.A and China
- understand and appreciate uncertainties in climate records and models
- enhance ability of critical thinking and learn how to effectively synthesize useful information

Course organization

- Global climate change - (Sweedler) (2 hrs)
- Quantitative assessment and prediction of climate change (Shen) (2 hrs)
- Environmental proxies for paleoclimate reconstruction, paleoclimate records and abrupt climate change (Lai) (4 hrs)
- Climate change and methane cycles (Zhu X.) (2 hrs)
- Nitrogen fixation in the oceans (Luo Y.) (2 hrs)
- Mangroves as an index to study environmental vulnerability for coastal wetland ecosystem (Zhang Y.) (2 hrs)



- Global climate modulated by the ocean heat content variability (Zhang W.) (2 hrs)
- Field trips and activities (22 hrs)
- Group presentations and discussion (6 hrs)

Lecture Topics

1. Global Climate Change (Sweedler) (2 hrs)

- Basic science of climate system and climate change.
- Difference between weather and climate
- Greenhouse gases
- Global changes in average temperature
- Effect of oceans on climate change
- Global weather changes (rainfall, etc)
- Seasonal variation and major weather events (El Nino, etc)

2. Climate data analysis and climate change uncertainty quantification (Shen) (2 hrs)

- Climate models and forecasting
- Error analysis in climate change data
- Surface air temperature data measured by thermometers since 1851
- Sea surface temperature data since 1900
- Proxy temperature data in the last 1000 years
- Calculation of the global average surface air temperature
- Climate change detection: what are the causes of the climate change
- Use climate models to project the future climate
- Uncertainties in the climate change assessment, detection, and projection

3. Paleoclimate records and abrupt climate change (Lai) (2 hrs)

- Climate and global carbon cycle: ocean versus land CO₂ uptake
- How do we know what we know?
- Environmental proxies for paleoclimate reconstruction
- Putting current warming trend in perspective: is it unprecedented?
- Climate change: ecological versus geological time scales

4. Biological response and feedback in a warming climate (Lai) (2 hrs)

- Vulnerability of the Arctic ecosystem
- Accelerated warming in the Arctic. Why and its implications.
- Risk of permafrost thaw; its impact on global C cycle and climate
- Arctic landscape change in a warming climate

5. Climate change and methane cycles (Zhu X.) (2 hrs)

- Terrestrial carbon cycles: pools and fluxes
- Terrestrial methane cycles: natural wetlands



Terrestrial ecosystem models for modeling carbon fluxes (CO₂ and CH₄)

Quantifying carbon sink/source and their uncertainties

Current states of terrestrial carbon fluxes

How terrestrial carbon fluxes respond to future climate change?

6. Nitrogen fixation in the oceans (Luo Y.) (2 hrs)

Why nitrogen fixation is important for marine ecosystem?

Why nitrogen fixation is very difficult for marine organisms to conduct?

Who are doing nitrogen fixation in the ocean?

Where are nitrogen fixation happening in the ocean?

What factors possibly limit nitrogen fixation in the ocean?

How global change may impact nitrogen fixation?

7. Mangroves as an index to study environmental vulnerability for coastal wetland ecosystem (Zhang Y.) (2 hrs)

The significance of mangrove ecosystems

Climatic controls on the distribution of mangrove forests

The impact of climate change on mangrove ecosystem

Response of mangrove-salt marsh ecotone to climate change

8. Global climate modulated by the ocean heat content variability (Zhang W.) (2 hrs)

Ocean general circulation and heat transport

Global surface warming acceleration and slow-down (hiatus)

Climate change: anthropogenic forcing vs natural variability

Pacific decadal Oscillation

Ocean heat uptake

Ocean heat content changes: diabatic vs adiabatic

9. Global climate change issues in China (Field Studies and group presentations)

Final project: Students will work as a group for the topic of choice decided by the group members. A group topic can be broadly defined in climate change science. A student will research and report on an area that cohesively integrates into the group topic. Every student must present to the class with a 5-min PowerPoint presentation. As a group, students should also prepare to answer questions following the presentations. PowerPoint files and a written report should be submitted by Friday, July 15, 2016.

A 10-page, double-spaced group report includes

- title
- abstract



- introduction
- figures/data that help explain your study
- discussion/conclusion
- a list of references

Grading: Grading will be based on performances with in-class assignments and a final project. Higher grading standards are set for graduate students in written papers and class presentations.



Course Schedule (Tentative)

Week One (Jul 2 - Jul 8)

Date	Time	Program	Chair or Lecturer	Venue
Jul 2 SUN	15:00-17:00	On-site Registration & Hotel Check-in	Xiaolin Ke (Shelagh)	Lobby of Lingbo Bay Hotel
Jul 3 MON	09:00-10:30	Campus and lab tour	Qiao-guo Tan	Xiang'an Campus
	10:30-11:30	Opening ceremony and group photo	Organizing committee	CEE A239
	13:00-16:00	Campus tour	Organizing committee	Siming Campus
Jul 4 TUE	09:00-11:15	Global climate change	Alan Sweedler	CEE A239
	14:30-16:00	Climate change and methane cycles	Xudong Zhu	CEE A239
	16:00-16:45	Group discussion	Alan Sweedler Chun-Ta Lai	CEE A239
Jul 5 WED	09:00-10:30	Mangroves as an index to study environmental vulnerability for coastal wetland ecosystem	Yihui Zhang	CEE A239
	10:30-11:15	Group discussion	Chun-Ta Lai Qiao-guo Tan	CEE A239
	14:30-16:00	Paleoclimate records and abrupt climate change	Chun-Ta Lai	CEE A239
	16:00-16:45	Group discussion (final project topics)	Chun-Ta Lai Qiao-guo Tan	CEE A239
Jul 6 THU	09:00-17:00	Field trip to National Geologic Park of Strand and Volcano of Zhangzhou	Qiao-guo Tan	Gathering at CEE Café



Date	Time	Program	Chair or Lecturer	Venue
Jul 7 FRI	9:00-10:30	Climate data analysis and climate change uncertainty quantification	Sam Shen	CEE A239
	10:30-11:15	Group discussion	Chun-Ta Lai Qiao-guo Tan	CEE A239
	14:30-16:45	Group discussion	Chun-Ta Lai Qiao-guo Tan	CEE A239
	19:00	Culture Night		CEE Café

Week Two (Jul 9 - Jul 15)

Date	Time	Program	Chair or Lecturer	Venue
Jul 10 MON	09:00-10:30	Biological response and feedback in a warming climate: vulnerability of the Arctic ecosystem	Chun-Ta Lai	CEE A239
	10:30-11:15	Group discussion	Chun-Ta Lai Yuntao Zhou	CEE A239
	14:30-16:45	Group discussion	Chun-Ta Lai Yuntao Zhou	CEE A239
Jul 11 TUE	09:00-10:30	Nitrogen fixation in the oceans	Yawei Luo	CEE A239
	10:30-11:15	Group discussion	Chun-Ta Lai Yuntao Zhou	CEE A239
	14:30-16:45	Group discussion	Chun-Ta Lai Yuntao Zhou	CEE A239
Jul 12 WED	09:00-10:30	Global climate modulated by the ocean heat content variability	Weiwei Zhang	CEE A239
	10:30-11:15	Group discussion	Chun-Ta Lai Yuntao Zhou	CEE A239
	14:30-16:45	Group discussion (final project preparation)	Chun-Ta Lai Yuntao Zhou	CEE A239



Date	Time	Program	Chair or Lecturer	Venue
Jul 13 THU	09:00-14:00	Field trip to Botanical Garden of Xiamen	Qiao-guo Tan Jinjing Luo	Gathering at CEE Café
Jul 14 FRI	09:00-11:30	Student presentation	Chun-Ta Lai Yuntao Zhou Qiao-guo Tan	CEE A239
	15:00	Closing ceremony	Organizing committee	CEE A239
	18:00	Farewell dinner	Organizing committee	CEE Café

*Note:

1. As for the culture night, all SDSU&UniMi students should prepare one PPT file to introduce the customs and traditions of your country or hometown to share with all participants from “Lingfeng Summer Research School (LSRS)”. All Taiwan students can have one PPT file too, and others should jointly prepare with LSRS Chinese students.

2. As for the Farewell Party, please see the detailed information on Page 15.



Student Contact List

No.	Name	Affiliation	Email
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Students Pair List

Group No.	SDSU/ UniMi Students	Ilan/YunTech/FZU/FJNU Students	XMU Students
1	Runze Li	He-Yi Du, Shi-ting Tao	Jiawen Zhou
2	Marlette Itzmaltzin Martinez	Shang-Geng Liu	Zhimin Yao
3	Sarah Aileen McCallum	Mei-lin Chen	Yiyang Kang
4	Max Fisher Meredith	Zhi Lin	William Wang
5	Jonathan Mukendi Mukendi	An Kao	Yangxin Ou
6	Justin Stewart	Yun-Ting Luo	Mengru Ji
7	Marco Luigi Pellegrini	Jia-Jun Chen, Danlin Pan	Yang Li
8	Matteo Brochetti	Yi-Yun Li, Mengying Ni	Jie Wang
9	Elia Cammarata	Yi-Cin Yang, Wen Huang	Jinsong Zhang
10	Miriam Cinque, Aiyi Huang	Wen-Ya Liu	Xingyue Zhao
11	Guglielmo Girotti	Xin-Qian Hou	Xinrui Shen
12	Giovanna Lanzavecchia	Mei-Cih Huang	Xinzheng Mou
13	Francesco Massari	Jia-Ru Wang	Chuang Chen



Important Information for Participants

1. Registration

Date: July 2, 2017 (Sunday)

Time: 16:00-17:00pm

Venue: Lobby of Lingbo Bay Hotel

Shamei Road, Xiang'an District, Xiamen, China, 361102

(厦门市翔安区沙美路凌波湾酒店)

- You will collect your T-Shirt, name badge and e-card.
- An electronic version of handbook will be used for environmental protection.
- Please wear your badge all the time.
- Please wear the T-Shirt for the opening ceremony on 3th July and the closing ceremony on 14th July.
- **PLEASE RETURN YOUR E-CARD BEFORE YOU LEAVE XIAMEN. IF THERE IS ANY LOSS OR DAMAGE, YOU SHOULD PAY RMB20 FOR REPLACEMENT.**
- **PLEASE DON'T DRINK OR EAT IN THE CLASSROOM, EXCEPT WATER.**

2. Accommodation:

All SDSU & UniMi & Taiwan & FJNU & FZU participants will stay in Ling Bo Bay Hotel(凌波湾酒店), which is opposite the East School Gate of Xiang'an Campus, Xiamen University.

- Two participants will share one room with two beds.
- Please bring along your room key card all the time. For any loss or damage, participants will be required to pay the cost for replacement.
- The beddings, telephone, WIFI, TV set and air conditioning are available in the room.
- The hotel has coin-operated washing machines.
- The telephone number of the hotel is 0592-7762000.

3. Meals

- All SDSU & UniMi & Taiwan & FJNU & FZU Participants will be given with XMU e-cards, which is NOT refundable and can be used in CEE Café, student cafeteria and supermarket on the campus of Xiamen University.



- Different amount of cash will be deposited to students' e-card, according to different cooperation agreement with universities.
- Cash is not acceptable in most cafeterias on campus except on the 3rd floor of Jingfeng Canteen (竞丰餐厅).
- Dining on campus: there is two cafeterias on the campus, Fengting Canteen & Jingfeng Canteen with a small Muslim Canteen (清真食堂) on the 2nd floor.
- Dining off campus: several restaurants can be found opposite to the South Gate.

4. Internet access:

- Participants are suggested to bring your own **laptop** for course exercise.
- Wireless internet is accessible in public areas and classrooms in CEE Building. All rooms share the same password: 1357924680

5. Photocopy

- There is a printing shop on 2nd floor of Jingfeng Canteen, for you to print or photocopy. You can pay by cash there.

6. Library

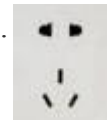
- Online service: library resources can be accessed at <http://library.xmu.edu.cn>
- All summer school participants can enter XMU Library at Xiang'an Campus by E-card, for data information but not for the borrowing and lending.

7. Shops & supermarkets

- On campus: Luyinhai Supermarket (鹭银海超市)
- Off campus: Meijiayuan Supermarket(美佳缘超市)

8. Electricity

- The standard domestic power supply in China is 220 V AC at 50 Hz. The standard sockets are two parallel lines and three lines as shown on the right photo.



9. Insurance

- No responsibility can be assured for any kind of personal accidents, sickness, theft, or property damage suffered by conference participants. Participants are advised to arrange whatever insurance they consider it necessary.

10. Weather

- Xiamen is a subtropical coastal city. The temperature in July is between 25-35°C, with an average of 28°C. The averaged precipitation in July is about 187 mm. You are recommended to have summer dress and bring umbrella with you.
- Xiamen weather Forecast:
<http://www.weather-forecast.com/locations/Xiamen/forecasts/latest>



11. Useful Numbers:

- Telephone country code: +86
- Telephone area code: 592
- Police: 110
- Fire Department: 119
- Ambulance: 120
- Local directory assistance: 114, 12580 (service in Chinese only)
- Xiamen University Clinic(校医务室): 2886120
- Xiamen Lianhua Hospital (厦门莲花医院): 3757777
- Xiamen University Hospital (厦大医院): 2186203
- Xiamen No.1 Hospital (第一医院): 2137327
- Xiamen Hospital of T.C.M (中医院): 5579686

12. Some notes for the Farewell Party

- Every group should prepare one show at least for the Farewell Party on July 14 evening. Singing, dancing, drama, fashion show, comic skit, cross talk, games or others are warmly welcomed.
- Group performance and solo performance are warmly welcomed.
- Anyone who wanna be the host of party, please tell Ms. Shelagh Ke or Mr. Qiang Niu.
- After your show is confirmed, please contact our Program Assistant, Mr. Qiang Niu at 358012185@qq.com.



Transportation

Taxi

Taxis can be hailed down with ease, except for the rush hour 17:00 to 18:00. The taxi fare charge in Xiamen is 8 RMB (9.6 RMB during the time 11 pm to 5 am) for the first 3 km and 2 RMB per km thereafter. Fares are subject to 2 RMB gas surcharge each journey.

Here is a tip for you to show the taxi driver. But if you have any problem in communicating with the taxi driver, you can call our Program Assistant, Mr. Qiang Niu at +86-18559021513.

Hello! Please take me to Ling Bo Bay Hotel, Shamei Road, Xiang'an District, Xiamen. Thank you so much. (你好! 请带我到厦门市翔安区沙美路暨厦门大学翔安校区东校门商业街4号楼, 凌波湾酒店。谢谢!)

Public Bus

Several public transport routes are available within the city. You can take No. 751 or 759 Bus outside the school gate from Xiang'an Campus to Siming Campus (Main Campus). A fare of 2 RMB must be entered into a box on entry, therefore, change is required. The city buses are equipped with air conditions.

More information about Xiamen public transportation

- **Visit TD Wireless City (in Chinese):**
<http://www.xiamentd.com/app/mybus/>
- **Visit the site from your mobile phone:**
wap.xiamentd.com
- **Download the app "MyBus"**
<http://mybus.xiamentd.com/include/downloadResult.jsp>



Contact Us

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