



GO₂NE SS2019

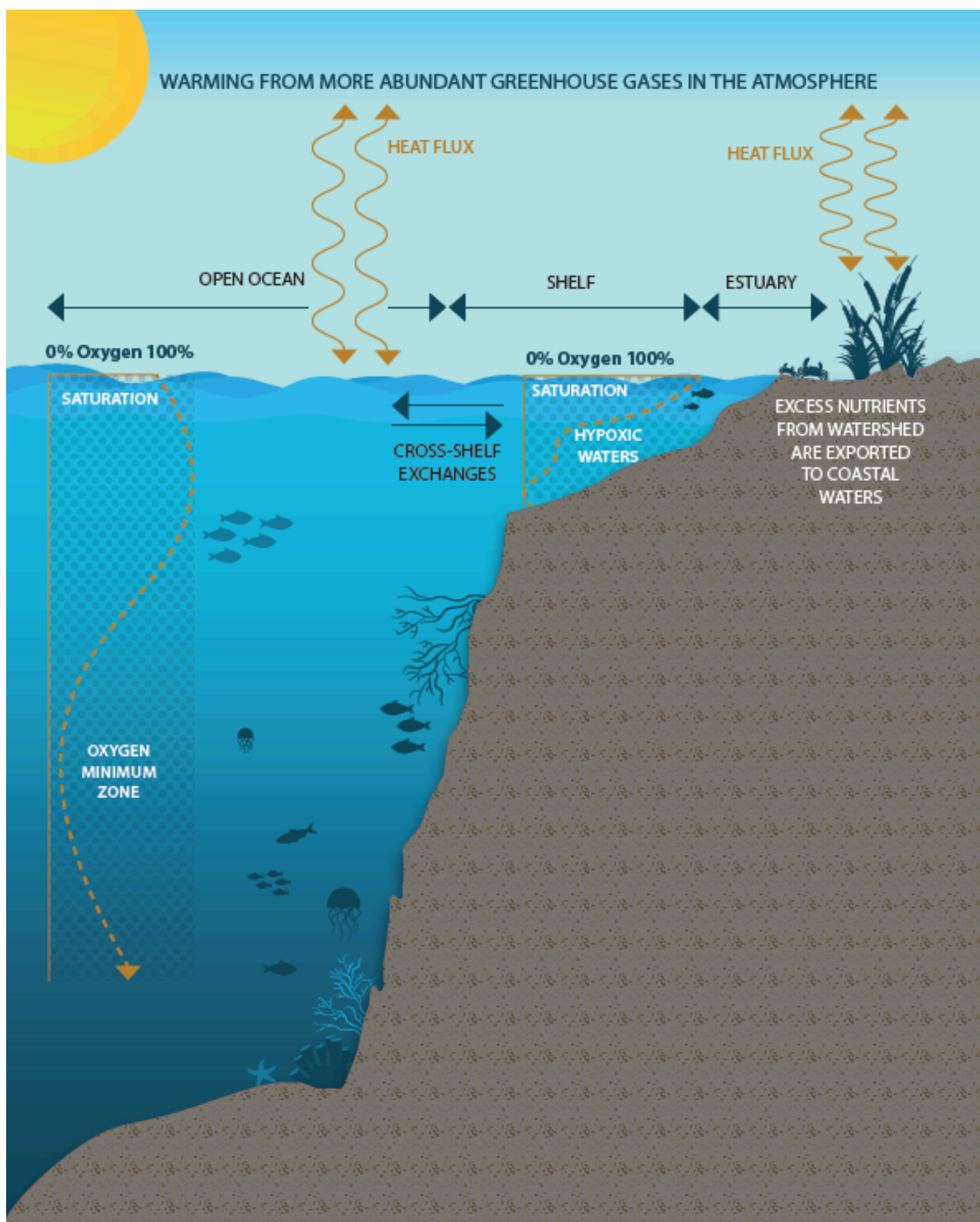
GO₂NE Summer School



**First International GO₂NE Summer
School**

2-8 September, 2019

**Co-organized by IOC-UNESCO and
Xiamen University**



WELCOME

Dear GO₂NE International Summer School 2019 participants, Welcome to Xiamen! We hope you all found your way seamlessly and are enjoying the weather and sunshine.

It is our pleasure to greet you for this 1st first version of the GO₂NE Summer School. We hope that your coming week will certainly be filled with much learning, fun, surprises, and a network that will last over your entire career. So please learn and enjoy!

The school is comprised of a mixture of lectures, hands-on practicals, and your own poster and talk presentations, as well as number of opportunities to talk science (and other things...) with some renowned scientists worldwide. We hope you take full advantage of all the program has to offer and experience the breadth of GO₂NE science at the dawn of the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

During this coming week, we also hope you gain a broader context to your own research and find ways to engage in the future of GO₂NE. Be sure to talk to your peers and find ways to connect that extend beyond your disciplinary and national boundaries since science is in essence multi-disciplinary and international.

Never forget that “if you can’t breathe, nothing else matters”.
Never forget, that you are the future for ensuring a clean, safe, healthy, predictable, sustainable and transparent ocean, in other words the future of our planet Earth!



So again enjoy and learn a lot,

Véronique Garçon, Marilaure Grégoire and Gil Jacinto, co-directors of the School

Directors:

Marilaure Grégoire, University of Liège, Belgium

Gil Jacinto, University of the Philippines Diliman, Philippines

Véronique Garçon, CNRS/LEGOS, France

Scientific Committee:

Marilaure Grégoire, Gil Jacinto, Véronique Garçon, Denise Breitburg, Jing Zhang, Brad Seibel, Minhan Dai

Organizing Committee:

Jing Zhang, Minhan Dai, Gil Jacinto, Kirsten Isensee, Marilaure Grégoire, Véronique Garçon, Boris Dewitte

Local Secretariat

Vera Shi, Lun Cai, Yan Yang

Dear participant,

Oxygen is critical to the health of the planet. It affects the cycles of carbon, nitrogen and other key elements, and is a fundamental requirement for marine life from the seashore to the greatest depths of the ocean. Nevertheless, deoxygenation is worsening in the coastal and open ocean. This is mainly the result of human activities that are increasing global temperatures (CO₂-induced warming) and increasing loads of nutrients from agriculture, sewage, and industrial waste, including pollution from power generation from fossil fuels and biomass.

Through the participation of high-level scientists from across the world, the IOC expert group, the Global Ocean Oxygen Network GO₂NE is committed to providing a global and multidisciplinary view of deoxygenation, with a focus on understanding its multiple aspects and impacts. The network offers scientific advice to policy makers to counter this concerning trend and to preserve marine resources in the presence of deoxygenation. We at IOC-UNESCO are therefore happy to see the next generation of scientists working in this field – **YOU**. The upcoming UN Decade of Ocean Science for Sustainable Development 2021-2030 needs you and we hope you will benefit from the unique experiences offered by the first international GO₂NE Summer School 2-8 September, Xiamen, China.

Vladimir Ryabinin

Executive Secretary of the Intergovernmental Oceanographic Commission of UNESCO

Dear participants,

On behalf of the local host, I would like to warmly welcome everyone of you to Xiamen to attend the GO₂NE Summer School 2019.

This unique summer school will offer you full of opportunities to be connected to world leading scientists in the field and learn skills and knowledge towards researching on and understanding of how the ocean's oxygen is functioning and changing.

As a premier institution on ocean science in China, the State Key Laboratory of Marine Environmental Science (MEL, <https://mel.xmu.edu.cn>) is honored to host this summer school and will do everything possible to ensure your experience in Xiamen fruitful and enjoyable.

Respectfully,

Minhan Dai

Director

State Key Laboratory of Marine Environmental Science
Xiamen University

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1. Logistics and Local Information

1. Venue

A3-206 Lecture Hall, Zhou Long Quan Building
State Key Laboratory of Marine Environmental Science (Xiamen University)
Xiang'an Campus of, 4221 Xiang'an South Road, Xiang'an District, Xiamen, China

2. Registration

Sep 01 Sunday, 9:00 – 18:00 Lobby of Zhou Long Quan Building
Sep 02 Monday, 8:00 – 9:00 Lobby of Zhou Long Quan Building

Please pick up the handbook, a name-tag, and a summer school bag. Please wear the name-tag during the week and show it to the campus gate security guard if needed.

* We encourage you to recycle the name-tag and return it at the end of the week.

3. Accommodation

Nan Cun Dian Building
Tel: (+86) 0592- 2882888 / 2880366/ 2880377
Address: East Side Gate, 3 minutes walking distance from the summer school venue

Room type	Price (CNY)	Breakfast
Standard room (2 beds)	298 RMB	1 breakfast
	330 RMB	2 breakfasts

2 students per dorm room (for all participants)

Registration fee covers accommodation from 1st September night to 8th September night. Participants should pay the room fare if extra accommodation needed. Please note that the extra fee needs to be paid by cash (in CNY/RMB) or with a bank card when you leave.

4. Food

(1) Meals on campus

The hotel room fare contains breakfast. The organizing committee provide free buffet lunch and dinner for all GO₂NE SS participants as below:

Date	Event	Time	Venue
2019-9-1	Lunch	11:30-13:30	Café in the lobby of Zhou Long Quan Bldg
	Icebreaker	18:00-21:00	Nan Cun Dian Bldg
2019-9-2	Health Break	10:30-11:00	Zhou Long Quan Bldg (2nd floor)
	Lunch	12:00-13:30	Zhou Long Quan Bldg (1st floor)
	Health Break	15:30-16:00	Zhou Long Quan Bldg /(2nd floor)
	Poster Session (Dinner)	18:00-19:30	Exhibition Hall (1st floor)
2019-9-3	Health Break	10:30-11:00	Zhou Long Quan Bldg (2nd floor)
	Lunch	12:00-13:30	Zhou Long Quan Bldg (1st floor)
	Health Break	15:00-15:30	Zhou Long Quan Bldg (2nd floor)
	Poster Session (Dinner)	18:00-19:30	Exhibition Hall (1st floor)
2019-9-4	Lunch	12:00-13:30	R/V
	Dinner	19:00-20:00	Nan Cun Dian Bldg
2019-9-5	Lunch	12:00-13:30	R/V
	Dinner	19:00-20:00	Nan Cun Dian Bldg
2019-9-6	Lunch	12:30-14:00	Restaurant in Dongshan
	Dinner	18:30-19:30	Nan Cun Dian Bldg
2019-9-7	Health Break	11:00-11:30	Zhou Long Quan Bldg (2nd floor)
	Lunch	12:30-14:30	Zhou Long Quan Bldg (1st floor)
	Health Break	16:00-16:30	Zhou Long Quan Bldg (2nd floor)
	Dinner	19:00-20:00	Nan Cun Dian Bldg
2019-9-8	Health Break	11:30-12:00	Zhou Long Quan Bldg (2nd floor)
	Lunch	13:00-14:30	Zhou Long Quan Bldg (1st floor)
	School Banquet	19:00-21:30	Restaurant in Xiamen downtown
2019-9-9	Lunch	11:30-13:30	Café in the lobby of Zhou Long Quan Bldg

(2) Other options (by cash)

Café on 1st Floor of Zhou Long Quan Building
East Gate Street
Hong Run Fu Supermarket

(3) Beverage

We provide water, coffee and tea during breaks. We encourage participants to **bring your own water bottle to reduce the use of plastic bottles/cups.**

5. Internet

- Public area Wi-Fi accounts in Zhou Long Quan Building:
 - Wi-Fi ID: conference 1/2/3/4 / or MEL-Password
 - Password: melmel888
- Wi-Fi is available in the hotels, please ask the hotel reception for details.
- Please note that Google, Facebook, Twitter and YouTube are not accessible. If you need to access to these websites, please use a VPN.

6. 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:



7. Transportation

Xiamen University Xiang'an Campus is about 29 km from Xiamen Gaoqi International Airport, 29 km from Xiamen Train Station, and 33km from Xiamen North Train Station. We will arrange cars to pick up and drop off participants from/to the airport.

(1) Transfers from airport/station to hotel

We provide airport pickup for participants from Xiamen Gaoqi International Airport to Nan Cun Dian Bldg. Please look for the volunteers with a placard "GO₂NE SS" at the airport arrival hall.

(2) Transfers from hotel to airport/station

Transfers to the airport will be scheduled times as follows, however the schedule is subject minor changes and will be confirmed during the last 2 days of the summer school:

Date	DepartureTime	Departure Place
2019-9-8	21:30	Restaurant downtown
2019-9-9	05:00	Nan Cun Dian Bldg
2019-9-9	08:00	Nan Cun Dian Bldg
2019-9-9	09:00	Nan Cun Dian Bldg
2019-9-9	15:00	Nan Cun Dian Bldg
2019-9-9	17:00	Nan Cun Dian Bldg
2019-9-10	05:00	Nan Cun Dian Bldg

(3) Taxi

In case you want to arrange the transportation on your own, please show the hotel address (above #3 Accommodation), or the card below to the driver. It usually takes 40 minutes from Xiamen Airport and the fare is about 80 Yuan.

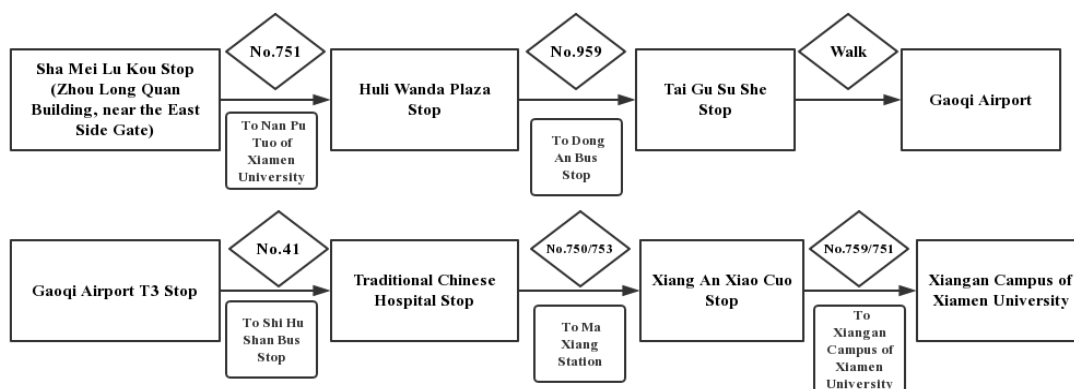
Please drive me to the Nan Cun Dian Building in Xiangan Campus of Xiamen University. If you can't find the location, please call the hotel reception at 0592- 2882888. Thank you!

请送我到厦门大学翔安校区南存钿楼，如找不到，麻烦帮忙打南存钿楼电话：0592-2882888, 谢谢！

Please drive me to the Xiamen Gaoqi airport Terminal T3/T4.
Thank you!

请送我到厦门高崎机场T3/T4航站楼，谢谢！

(4) Bus



8. Currency and Banking

The local currency is Ren Min Bi (RMB)/China Yuan (CNY).

If you need to withdraw cash in CNY, **ATMs (instead of banks)** are available at the airport and on the campus (15 minutes walking distance from the Zhou Long Quan Building):

- Construction Bank of China: No. 204-205 Student Canteen
- Bank of China (ATM): No. 206 Student Canteen
- Industrial and Commercial Bank of China (ATM): No. 207 Student Canteen
- Bank of Communications (ATM): No.202 Student Canteen
- China Citic Bank (ATM): No.201 Student Canteen

9. Contact Us

Lun Cai 蔡伦, cailun@xmu.edu.cn, Tel: (+86) 0592-2186039, mobile: (+86) 18850311805 (overall coordination)

Yan Yang 杨艳, yangyan@xmu.edu.cn, mobile: (+86) 13806028054 (for practical assistance)

Ying Huang 黄迎, hymel@xmu.edu.cn, Tel: (+86) 0592-2181571, mobile: (+86) 18650137781 (for food and transportation)

Website: <https://mel.xmu.edu.cn/summerschool/go2ne/index.asp>

Kirsten Isensee, mobile: (+33) 648292146

Véronique Garçon, mobile (+33) 679048581

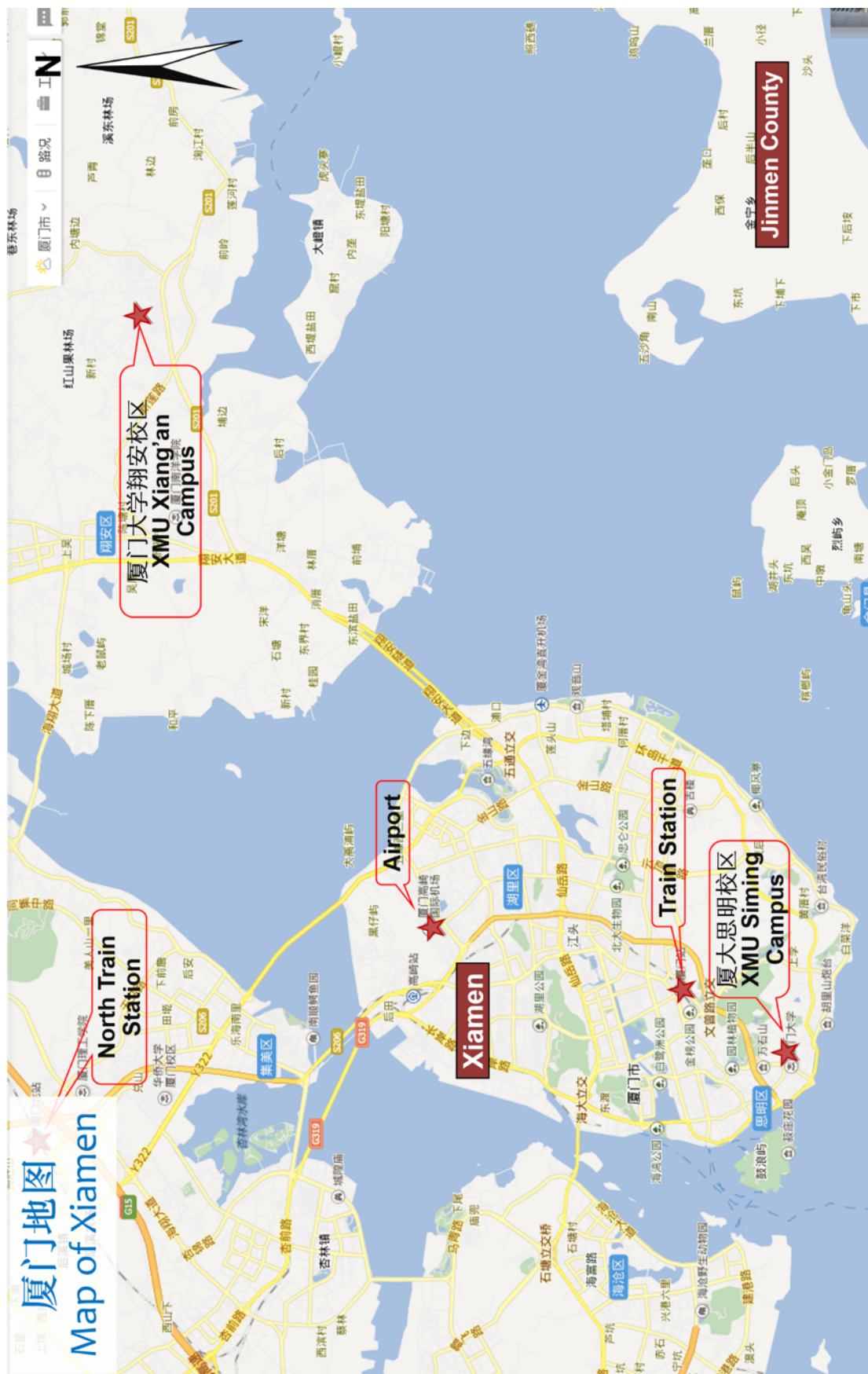
10. For Instant messages

We encourage you to download app “Wechat” on your phone and sign up in advance. All the participants can scan the QR code to join us when register.



GO2NE SS 2019 participants







2. Schedule

September 1 (Sunday)		
Arrival and registration		
September 2 (Monday) Room A3-203		
9:00	Welcome from Xiamen University, State Key lab of Marine Environmental Science	Dalin Shi
9:10	Welcome by the Summer School Directors	Marilaure Grégoire
9:20	Welcome from GO ₂ NE	Kirsten Isensee
9:30	Coastal waters and closed seas deoxygenation: nutrient enrichment and climate change in coastal waters	Denise Breitburg
10:30	Health break	
11:00	Open ocean deoxygenation	Ivonne Montes
12:00	Lunch	
13:30	Introduction to Ecosystem modelling	Marilaure Grégoire
14:30	Introduction to the practical workshops	Véronique Garçon
15:00	Posters snapshots	Participants
15:30	Health break	
16:00	Communication Group 1 (Multifunctional Hall Floor 1)	Participants Group 1
18:00	Posters I (Groups 3 and 4 presenting)	All Participants
19:30	End	

September 3 (Tuesday) Room A3-203		
8:30	Ocean Observing system design in relation to the deoxygenation issue	Véronique Garçon and Maciej Telszewski
9:30	Introduction to ocean modelling (physics and biogeochemistry)	Boris Dewitte and Marilaure Grégoire
10:30	Health Break	
11:00	Data management, and broader picture of oceanographic observations/data from local, regional up to the international/global perspective	Maciej Telszewski
12:00	Lunch	
13:30	Effects of ocean deoxygenation including biological responses	Brad Seibel
14:30	Posters snapshots	Participants
15:00	Health Break	
15:30	Communication Group 2 (Multifunctional Hall Floor 1)	Participants Group 2
17:30	Posters II (Groups 1 and 2 presenting)	All participants
19:30	End	

September 4 and 5 (Wednesday and Thursday)		
Practicals (see Tables below)		

September 6 (Friday)		
8:00	Xiamen (Xiang'an Campus, hotel) to Dongshan Island (2.5 hrs driving distance one way), two buses	Emily King Lun Cai
	Quick introduction to the day, logistics (on the bus)	Students helpers
10:30-	Abalone aquaculture farm visit (divided into 2 groups)	Weiwei You Student helpers
12:00	Abalone aquaculture farm to local restaurant, two buses	
12:30	Lunch at a local restaurant	Xinya Xu to help
14:00	General introduction to the aquaculture in Dongshan and local region	
14:30	Interaction with stakeholders (local government officials and farmers)	Weiwei You
16:00	Short tour to the D-SMART	Shengyao Sun Xinya Xu
16:20	Back to Xiang'an Campus	

September 7 (Saturday)

9:00	Multiple stressors, biogeochemistry	Wajih Naqvi
10:00	Predicting future ocean oxygen	Andreas Oschlies
11:00	Health break	
11:30	Reducing deoxygenation and its negative effects	Gil Jacinto
12:30	Lunch	
14:30	Science communication: How to interact with press, social media, and NGOs	Véronique Garçon, Marilaure Gregoire, Kirsten Isensee, Denise Breitburg
16:00	Health break	
16:30	Student oral presentations	All participants
19:00	End	

September 8 (Sunday) Room A3-203

9:30	How to connect individual measurements / studies / experiments to international efforts / networks	Kirsten Isensee
10:30	Spatial marine planning and deoxygenation	Kirsten Isensee
11:30	Health break	
12:00	Ethics in Science	Véronique Garçon
13:00	Lunch	
14:30	Student oral presentations	All participants
17:00	Feedback/closure	Véronique Garçon and Minhan Dai
18:00	End	
19:30	School banquet	

September 9 (Monday)

Departure

Schedules for practicals

	Mon 16:00	Tues 15:30	Wed 9:00	Wed 14:00	Wed 17:30	Thur 9:00	Thur 14:00	Thur 17:30
Group 1	Comm	OFF	Lab	Model	OFF	Ship	Ship	OFF
Group 2	OFF	Comm	Model	Lab	OFF	Ship	Ship	OFF
Group 3	OFF	OFF	Ship	Ship	Comm	Lab	Model	OFF
Group 4	OFF	OFF	Ship	Ship	OFF	Model	Lab	Comm

Legend and lecturers for practicals

Model	Modelling (B405 Building 4)	Boris Dewitte, Marilaure Grégoire, Ivonne Montes
Lab	Laboratory	Denise Breitburg, Wajih Naqvi, Brad Seibel
Comm	Communication (Multifunctional Hall Floor 1)	Véronique Garçon, Kirsten Isensee, Andreas Oschlies
Ship	Research Cruise	Sergey Borisov, Emilio Garcia Robledo, Gil Jacinto, Anders Tengberg, etc.

Notes:

- Posters I: Groups 3 and 4
Posters II: Groups 1 and 2
Each group consists of 10 people
- 20 students for cruise each day
For Group 3: Cruise should finish at 5 pm
- Lab and model practicals will be 3 hours each and communication practical 2 hours
- All participants attend the stakeholder day.

Poster session 1: Monday September 2nd

Groups 3 and 4 (see section 3 below for group composition)

Poster session 2: Tuesday September 3rd

Groups 1 and 2 (see section 3 below)

Orals session 1: Saturday September 7

Groups 3 and 4 (see section 3 below)

Orals session 2: Sunday September 8

Groups 1 and 2 (see section 3 below)

3. Practical Working Groups

Group 1	10 participants		
Cervania	Ahron	USA/Canada	Environmental Resources Engineering
Chennuri	Kartheek	India	Hg distribution in coastal sediments
Lengier	Monika	Poland	Marine chemistry
Leissing	Frederick	Chile	Oceanography
Mashifane	Thulwaneng	South Africa	Ocean Biogeochemical Modelling
Meulders	Catherine	Belgium	Oceanography
Ngatia	John	Kenya	Coastal Ecology and Dynamics
Uthaipan	Khanittha	Thailand/ China	Chemical Oceanography
Wang	Kai	China	Carbon cycle in the ocean
Valliyodan	Sudheesh	India	Marine chemistry: upwelling, hypoxia/anoxia

Group 2	10 participants		
Fernandes	Geneviève	India	General microbiology
Hamzah	Faisal	Indonesia	Oceanography, marine biology, remote sensing
Kittu	Leila	Kenya/ Germany	Marine biogeochemistry
Kamvi	Blessing	Namibia	Oceanography: Monitoring of the Namibian marine environment
Lankowicz	Katie	USA	Coastal Deoxygenation – Fish Ecology
Menezes	Larissa	India	Microbiology, oceanography
Oliva Mendez	Norma Lidia	Mexico	Temporal Variability of the Aragonite Saturation Horizon in the Pacific region off Baja California peninsula, Mexico
Ricour	Florian	Belgium	Oceanography, Black Sea, global oxygen climatological atlas
Sun	Jiazhen	China	Marine biology, responses of phytoplankton to ocean deoxygenation
Uddin	Mazbah Mohammad	Bangladesh/ China	Environment and Ecology

Group 3	10 participants		
Bhatrasatapongkul	Tachanat	Thailand/USA	Oceanography
Khammeri	Yosra	Tunisia	Biological Oceanography
Moualek	Fella	Algeria	Science of the sea: Environment
Marquez	Amaru	Costa Rica/Mexico	Spatial and temporal variability of frontal structures in the Gulf of California and its impacts on fish larvae distribution
Onyango	Christine	Kenya/South Africa	Ecological and molecular responses of hard corals of South Africa to increased sea surface water temperatures
Sahoo	Deepika	India	Geology, geochemistry
Schmidt	Henrike	Germany	Oxygen dynamics in the Indian Ocean
Shen	Yawei	China	Marine environmental chemistry
Trucco Pignata	Pablo Nicolas	Mexico/ Argentina/UK	Coastal Oceanography: CO ₂ dynamics in the oxygen minimum zone of the tropical Pacific of central Mexico
Zhao	Yanan	China/ Germany	Marine Chemistry

Group 4	10 participants		
Cretusi Mtonga	Joseph	Tanzania/ Belgium	Marine and Lacustrine Science and Management (Oceans and Lakes)
Jayachandran	Saranya	India	Hydrochemistry
Luo	Hao	China	Microbial oceanography: Investigating the molecular and physiological mechanisms responsible for massive Noctiluca bloom outbreaks
Maier	Michaela	Germany/ Canada	Deoxygenation in the Pacific North East, as OxyNet
Mili	Israt Jahan	Bangladesh	Oceanography
Moser	Annabell	Germany/UK	Impact of the sea urchin Echinocardium cordatum (Pennant 1777) on oxygen distribution in sediments and its biogeochemical consequences
Sotto	Lara Patricia	Philippines	Dynamics of Hypoxia and eutrophication in Manila Bay, Philippines
Srisaard	Suparat	Thailand	Chemical Oceanography which study biogeochemical processes including fate and cycling of elements, especially in the tropical coastal area
Stokowski	Marcin	Poland	Chemistry, Ecotoxicology
Xie	Xingwei	China	Redox chemistry in marine sediments, coastal ocean hypoxia

4. Description of Practicals

Modelling

Lectures : Boris Dewitte, Marilaure Grégoire, Ivonne Montes

The modeling part of the GO₂NE summer school will introduce basic concepts and general overview of physical, biogeochemical and coupled numerical modelling, where students will learn the different processes at play in the biological and solubility pumps (physical versus biogeochemical processes) in selected study areas. In practical session, students will work with simple biogeochemical models (NPZ type models in 0D) to understand the potential sensitivity of the biological and biogeochemical response and processes to changes in parameter values or parameterizations. By using a high-resolution coupled physical-biogeochemical model, students will also learn about the sensitivity of oxygen distribution to physics (OBC) given a fixed biogeochemistry. In addition, students will compute terms and statistics from the outputs of the aforementioned models to evaluate accuracy in numerical schemes and highlight key processes. They will also manipulate various indices and fields from a state-of-the-art global Earth System Model (ESM) in order to evaluate the relationship between climate modes and oxygen. The classes are intended to provide an overview of approaches and the hierarchy of tools that are used for investigating the key role of O₂ in the biological pump.

Laboratory practicals

Lectures : Denise Breitburg, Wajih Naqvi, Brad Seibel

This lab practical will include demonstrations, discussions and hands-on activities to familiarize students with methods used to measure oxygen and to quantify responses of animals to low-oxygen exposure. Students will learn the technique for Winkler titrations and consider patterns of oxygen fluctuations in shallow water environments. Demonstrations and hands-on exercises will help students learn respirometry methods for measuring resting metabolic rates and critical oxygen levels in small marine animals. Students will learn the basic considerations that influence the accuracy and precision of oxygen consumption measurements, such as temperature, metabolite accumulation (including acidification), animal body size, avoidance of boundary layers, accounting for animal activity, experimental duration and background microbial. Finally, students will measure behavioral and ecologically important responses of animals to low oxygen exposure. Responses examined will include the effect of declining oxygen on gill ventilation rates and use of aquatic surface respiration by fish, and clearance rates by oysters. Different responses of highly mobile animals and sessile benthic species will be discussed.

Communication practicals

Lectures : Véronique Garçon, Kirsten Isensee, Andreas Oschlies

In the 2 hours science communication workshop 'oral and written communication', we will provide students, organized per group of around 10, with guidance on how to efficiently present their research via posters and oral presentations in scientific conferences. After a brief introduction of the basics of making a successful presentation for both types of communication, students will practice in critically and constructively commenting their own posters (see 'Student Duty' school webpage within our 'Programme' menu). Students will also make a short presentation of their work to a small group and then discuss their strengths and weaknesses. If time allows, strategies for efficient scientific writing will also be discussed.

Shipboard practicals

Lectures : Sergey Borisov, Emilio Garcia Robledo, Gil Jacinto, Anders Tengberg, etc.

The purpose of this activity is to get students discover what a CTD station is, sampling from Niskin bottles, performing Winkler titrations on board, deploying and recovering oxygen sensors attached to the ship CTD or as stand-alone instruments, downloading and analyzing data.

Oxygen concentration and its distribution along the water column provide key information about the studied environment. During on board meetings we will discuss about several aspects related to the oxygen measurements in aquatic environments going from the analytical aspects of the measurements (methodologies, types of sensors, best calibration practices) and relevant technical aspects (handling of sensors, frequency of measurements, interactions and sampling artifacts...) to the data acquisition, evaluation and interpretation.

The correct interpretation of oxygen data also requires the knowledge of several biological, chemical and physical processes that affect its distribution in the water column and sediment. Discussions about these aspects will be performed on board, dealing with relevant questions such as: What affects oxygen concentration? consumption and production processes in aquatic ecosystems and oxygen conditions in confined areas.

During each day of the ship activities, we will measure oxygen distribution in the water column by using analytical techniques (Winkler method) as well as several of the most up to date sensors. Each day, the group of 20 students will be divided into 4 groups. Each group will take responsibility for one of the following instruments:

- SeaGuard-II multiparameter (Aanderaa Data Instruments AS)
- EXO2 multiparameter (YSI Incorporated)
- FireStingO2 (Pyroscience) and TU Graz Optodes
- Field DataLogger Mini (Unisense AS) equipped with STOX sensor

In addition, a CastAway CDT (SonTek) and a ProSolo hand held (YSI Incorporated) oxygen sensor will be used.

Students will be trained for the use of the different equipment, being able to setup the sensors, deploy the instruments, download and analyze the data. On board activities will also include measurements performed by classical water sample collection and oxygen determination by Winkler method. Data obtained from the different sensors and techniques will be compared and the results will be discussed.

5. Summer School Participants



Ahron Alexander Cervania

My undergraduate degree is in Environmental Resources Engineering. Within the program, I chose to work on projects related to river restoration engineering, water treatment and reuse systems, and renewable energy power systems. I also participated in two summer research projects studying the interactions between fluid dynamics and biology or the physical environment. Currently, I'm working on using O₂ data collected by Argo floats in the NE Pacific to analyze mechanisms of natural variability. This requires careful calibration of the oxygen sensors, which exhibit a drift that is not yet fully characterized. With the additional spatial and temporal resolution of observations that can be gained from the Argo floats, I will study high frequency or sporadic events that impact dissolved oxygen levels which cannot be analyzed with the current paucity of shipboard measurements. This information will be useful in interpreting the deoxygenation trend in the region.

Poster: Getting a Clearer Picture: Synthesizing BGC-Argo and Shipboard O₂ Measurements to Interpret Deoxygenation in the NE Pacific.



Amaru Márquez Artavia

Amaru is a marine biologist interested in the effects of ocean dynamics over the vertical distribution of phytoplankton and chlorophyll-a. His PhD research is concerned about the formation and temporal variability of chlorophyll maximum layers occurring within the oxygen minimum zone of the Eastern Tropical North Pacific. Previously, he worked at the physical oceanography lab at Universidad Nacional in Costa Rica, and he also collaborated with cetacean surveys and conservation projects in Golfo Dulce, Costa Rica. He is also interested in remote sensing tools and autonomous platforms to monitor the phytoplankton communities of the Eastern Tropical North Pacific.

Poster: The effects of Rossby waves on the persistent chlorophyll maxima of the Eastern Tropical North Pacific.



Annabell Moser

Annabell Moser is a marine biologist PhD student at the Lyell centre of Heriot-Watt University, Edinburgh, UK. Annabell received her M.Sc degree in Marine Biology (2017) from the University Rostock. Her Master thesis was conducted in cooperation with Ronnie Glud, Nordcee group, Syddansk University, Odense, Denmark and Stefan Forster, University Rostock, Germany. Currently she is studying the sediment profile imaging (SPI) camera system. This system is used to rapidly quantify environmental conditions (e.g., O₂ conc.) in sediments. A number of artefacts exist with this technique, namely sediment smearing caused by the insertion of the system into the sediment, which can complicate interpretations about bioturbation depth and the depth of the apparent redox potential discontinuity layer. Surprisingly, no assessment of the smearing artefact on these interpretations has ever been undertaken. The aim of her PhD project is to detect the weaknesses of the SPI camera system with the goal of improving and developing the next generation SPI systems.

Poster: Does Smearing Matter? Quantifying data quality acquired by sediment profile imaging (SPI) camera."



Blessing Kamwi

I am currently working for the Ministry of Fisheries and Marine Resources, in Namibia. I am in the Environment Subdivision, Physical and Chemical Oceanography section. I have a back ground in physical and chemical oceanography. I obtained my MSc in Applied Marine Science at the University of Cape Town in South Africa. My main task or functions are to monitor the seasonal and interannual variability of the physical and chemical marine environment with emphasis on those processes and parameters most likely to influence the commercially important fish resources of Namibia. I am currently looking for opportunities so that I can pursue my PhD.

Poster: Environmental Monitoring along the Namibian Coast.



Catherine Anneliese L. Meulders

My name is Catherine Meulders, from Belgium. Until September 2017, I worked as an anesthetist. Becoming more and more aware of all the problems linked to climate change and knowing the huge importance of the ocean in the climate regulation, I made a change in my career to study oceanography. My aim is now to work in the climate change field, and more specifically to study the links between O₂ and other biogeochemical cycles. My master thesis, “Modelling Nitrogen dynamics in the Black Sea”, aims to add N-fixers in an existing model of the Black Sea, known to be one of the most deoxygenated basins in the world. This work should be followed by a PhD thesis, that would try to answer the following questions: Is nitrogen fixation able to compensate the loss of fixed nitrogen by denitrification? How does this balance evolve in conditions of deoxygenation?

Poster: Modelling Nitrogen dynamics in the Black Sea.



Christine Akinyi Onyango

Christine Akinyi Onyango is a determined, enthusiastic and dependable scientist. She is a Lecturer in Masinde Muliro University of Science and Technology, Kenya and a PhD candidate at the University of KwaZulu-Natal, South Africa. She has always been fascinated by nature and has undertaken research and published on ecology of aquatic ecosystems. Her career objective is to get to learn more in the growing scientific research sector and to contribute to the development of knowledge. Her educational background includes an Msc. in Environmental Biology and a B.Ed. Science (Biology Major, Chemistry) from Masinde Muliro University of Science and Technology, Kenya. Current research interests include determining the impacts of sea surface water temperatures increase on hard corals. Specifically, she is employing genomic tools to unravel corals' transcriptomic responses to the current global warming. This would help identify vulnerable and resilient coral species to heat stress hence inform future intervention and conservation strategies.

Poster: RNA/ DNA ratios distinguishes between thermotolerant and thermosensitive coral species.



Deepika Sahoo

Myself Ms. Deepika Sahoo, a Senior Research Fellow in Physical Research Laboratory, Ahmedabad, India. My research interest encompasses biogeochemical cycles of carbon, nitrogen in the ocean and atmosphere. Currently I am pursuing my Ph.D. on "C:N:P stoichiometry in the Indian Ocean", to understand the variation of C:N:P in organic and inorganic marine reservoirs, effect of various biogeochemical processes on this ratio. The Indian Ocean is geographically unique and receives seasonal reversal of monsoonal winds attributes to the prevalence of important physical processes such as summer upwelling, winter convection. Whereas the concurrent occurrence of nitrogen fixation and denitrification, extensive deoxygenation in the Arabian Sea and surface stratification in the Bay of Bengal turns the ocean into a natural laboratory to understand the biogeochemical processes and their effect on stoichiometry. I have participated in two cruise expedition to the Bay of Bengal in two different seasons, to understand the seasonal variation the C:N:P stoichiometry.

Poster: C:N:P stoichiometry in the Bay of Bengal



Faisal Hamzah

Faisal Hanzah is a master-doctoral student in Marine Chemistry, Xiamen University, China. He received bachelor in Marine Science (Chemical Oceanography), Faculty of Fisheries and Marine Science, Bogor Agricultural University (IPB University), Indonesia. His research interests include trace element, nutrients and ocean carbon cycling. His Ph.D project is focusing on the dynamics of marine carbonate chemistry in the Indonesian Seas within study area at the main inflow and outflow passages of the Indonesian throughflow.

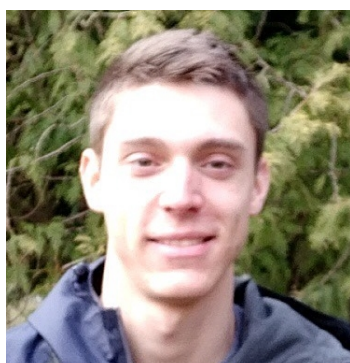
Poster title: Dynamics of marine carbonate chemistry along the main routes of the Indonesian throughflow.



Fella Moualek

Fella Moualek, Marine Environment engineer, passionate by marine life and the scuba diving since my childhood. Graduated from the National High School of Marine Sciences and Coastal Management (Algiers, 2017), I work for the Researcher Center of Aquaculture and Fisheries since February 2018. My main tasks are the pre-expertise of technical and economic of aquaculture studies and the creation of databases on geographic information system. I integrated recently the team of ecosystem aquatic research where I got the opportunity to work on multiples thematics, in particular: the study of the ocean acidification on the Algerian coast, environmental biomonitoring etc. In 2019 I participated in an oceanographic campaign. I was in charge on the sorting and the taxonomic identification of benthic species and the macro waste collecting. I am also a member of an environmental NGO named Marenostum, where I animate the Underwater trail.

Poster: Contribution to the study of chemical pollution and the vital parameters of the marine magneliophyta *Posidonia oceanica* in Bou Ismail bay.



Florian Ricour

My studies began with a bachelor in Civil Engineering with a focus in physics, electricity and electronics. Then, I moved to the field of Oceanography where the objective of my master's thesis was to study the formation and dynamics of the deep chlorophyll maximum using data from ARGO floats. I was therefore lucky to go on a cruise in the Black Sea followed by three months at the Villefranche-sur-Mer Oceanographic Laboratory (France). Last summer, I spent two month in Lebanon at the American University of Beirut to work on a project related to the water quality. Back to Belgium (University of Liège), I am now focusing on a revised climatology of the oxygen for the global ocean using complex data interpolation tools and trying to incorporate quality controlled oxygen data from ARGO floats.

Poster: A revised climatology of the oxygen for the global ocean.



Frederick Leissing

I am an Oceanography Ph.D. student, at the University of Concepción. My work has been focused on biological oceanography, with emphasis on ecology and physiology of planktonic organisms, mainly in studying the effect of changes in physical-chemical conditions on the physiology of zooplankton populations and communities inhabiting the coastal upwelling zone off Chile. During my master, I studied the mesozooplankton respiration and the effect of changes in community structure and implication for the oceanic carbon flux. Currently, my Ph.D. is focused on the effect of deoxygenation in coastal upwelling systems and adaptive molecular response to hypoxia in zooplankton. Facing the scenario of expanding oxygen minimum zones in the ocean, I hope that my results can significantly contribute understand the functioning of the coastal upwelling zones and how the zooplankton communities may cope with environmental variations caused by climate change, and its effect on the productivity and functioning of these marine ecosystems.

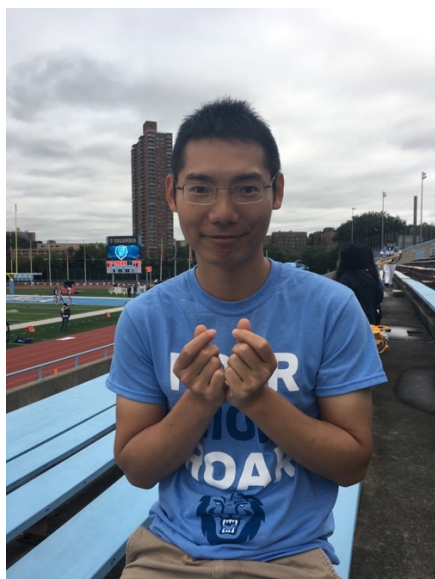
Poster: Deoxygenation of coastal upwelling systems and the adaptive molecular response in zooplankton

Genevieve Lazarina Fernandes



Genevieve L. Fernandes is a Project Assistant-turned-PhD scholar at the CSIR- National Institute of Oceanography, Goa India. As a doctorate student, her work is focused specifically on the bacterial diversity that plays a role in Nitrogen and Sulphur cycles in the oxygen minimum zones of the Indian Ocean (the Arabian Sea and Bay of Bengal), using culture-based and culture-independent approaches. She has been an active researcher in marine biology since her masters by being a part of many projects and participated in research cruises. She shows immense interest in diversity and taxonomy of marine bacteria from Open Ocean and deep sea along with planning microcosm experiments and working with conventional and modern molecular techniques.

Poster : Diversity and the functions of Microbial community in the oxygen minimum zone of the north Indian Ocean.



Hao Luo

My major research interests are dinoflagellates and the harmful blooms triggered by them. Harmful algae blooms (HABs) are now worldwide issues as its frequency and intensity have increased because of climate change and eutrophication mainly resulting from human activity. For my studies, physiological and molecular approaches are used to evaluate the pathway and efficiency of nutrients utilization in the laboratory by the HABs species, like *Karenia mikimotoi*, a very typical toxin-produced dinoflagellate which appears annually in East China Sea. With the help of modern metatranscriptomic techniques, bloom samples in the field will be analyzed to uncover the mysterious mechanisms of HAB formation. Also, I am studying the effects of oxygen, nutrients on another dinoflagellate *Noctiluca scintillans* using multiply techniques. In the past decades, the north Arabic Sea has witnessed the massive outbreak of green *Noctiluca* as global warming and nutrient inputs have led to the changes of local marine ecosystem.

Poster: Dynamics of nutrient cycling and phytoplankton species succession during the evolution of *Noctiluca* blooms along the coast of Oman.



Henrike Schmidt

I currently work as a doctoral candidate of Andreas Oschlies at the Division of Biogeochemical Modelling, GEOMAR Helmholtz Centre for Ocean Research Kiel. I am a physical oceanographer by training, interested in defining and quantifying the processes causing the OMZ in the northern Indian Ocean and how these are represented in coupled biogeochemical circulation models. Studying in Kiel at the Christian Albrechts University, I already had the opportunity to write my Master Thesis on ventilation pathways and dynamics of the Arabian Sea OMZ at GEOMAR. More recently I compared the CMIP5 models on their performance concerning oxygen in the IO and tried to find out their major issues.

Poster: Critical comparison of CMIP5 model performance with regard to the Indian Ocean OMZ.



Israt Jahan Mili

I am Israt Jahan Mili, lecturer, Department of Oceanography and Hydrography, BSMR Maritime University, Dhaka, Bangladesh. I am graduated in Fisheries and Post-graduation in Oceanography. I completed my MS thesis research with the title of 'Estimation of Primary Productivity Using VGPM Model Along with Spatio-temporal Distribution of Chlorophyll-a and Nutrients in the North-eastern part of Bay of Bengal'. I have participated in several Ocean Science related training, seminar and workshop. Some of these includes: Biogeo-chemical cycling, Ecological Modeling, Biological Oceanography, Nutrient cycling in the Bay of Bengal, Upper Ocean production, food web dynamics & ecosystem characteristics, Sedimentary process etc. I also participated in cruises to survey in Bay of Bengal (Indian Ocean) with Bangladesh navy ship "BNS Turag". Now, I am planning to continue my higher study soon. Currently, I am interested in doing research with dynamics of nutrients cycling, ocean productivity modeling and OMZ.

Poster: Productivity of Bay of Bengal.



Jiazhen Sun

Jia-Zhen Sun, a PhD student of Xiamen University, Bachelor's degree of agriculture was received from Jiangsu Ocean University. Researches focused on the effects of ocean deoxygenation on marine primary production. Through field investigation, mesocosm and laboratory experiments, the responses and mechanisms of nature phytoplankton assemblages and a diatom to deoxygenation were researched. Deoxygenation is not isolated alone, which is usually accompanied by the acidification and warming. Further works will focus on the effects of multiple drivers of global ocean change on primary production and food web to get a comprehensive understanding about ocean deoxygenation and its potential effects on marine environment.

Poster: Enhanced diatom growth and phytoplankton productivity caused by ocean deoxygenation is moderated by rising CO₂.



John Ngatia

Mr. Ngatia holds an MSc. in Biology (specializing in Human Ecology) from the Free University of Brussels, and a BSc. (Environmental Conservation & Natural Resource Management) from University of Nairobi. He has worked with two for-non-profit organizations: Aquaya Institute, as a GIS & Mapping Assistant and Local Ocean Conservation, as the Science & Data Coordinator. He enjoys applying diverse tools and approaches including; Socio-ecological System Models, Geographical Information Systems (GIS), multivariate models and Impact Assessment to understand / solve modern-day environmental and conservation challenges. His ultimate goal is to combine indigenous and scientific knowledge in empowering local communities to sustainably manage their own natural resources.

Poster: Social-Ecological Implications of Freshwater Quality-Modifications in Estuarine Environments



Joseph Mtonga Cretusi

Cretusi is in the final year of his Master studies at Vrije Universiteit Brussels in Belgium studying master's in Marine and Lacustrine Sciences and Management. In 2016 he founded Aqua-Farms Organization (AFO) a non-governmental organization based in Tanzania that aims to support conservation of aquatic ecosystems. Since its establishment Organization has conducted several activities such as mangroves restoration, beach cleaning and the awareness campaigns like the last largest World Oceans Day with IOC-UNESCO. From 2017 Cretusi managed successfully a Community-Based Mangroves restoration in Tanzania that resulted to replanting of more than 10,000 seedlings over 5 hectares of coastal area. The project has empowered women through establishing a beekeeping activity as an alternative sustainable use of mangroves. His current research aimed at investigating the role of mangroves in oxygenation of sediments, factors for successful mangroves restoration and potential of mangroves restoration in mitigating the effect of climate change.

Poster: Have Mangroves restoration worked? Investigating factors for success and potential for Community-based mangroves Restoration in Mitigating the effect of climate change.



Kai Wang

Kai Wang, was born on 13 February, 1987, graduated in July 2009 from Nanjing University of Information, Science and Technology and began Ph.D. study in October 2018 in Beijing Normal University. In the past years, my main research is focused on Ocean Science (carbon cycle), Weather Forecast, and Atmospheric Science (artificial weather modification). At present, my Ph.D. project involves modeling and understanding the oxygen cycle in the Tropical Pacific Ocean. I have a strong interest and enthusiasm in model numerical simulation and assimilation of meteorological satellite data. Recently, I have finished a paper about Modeling the oxygen cycle in the tropical Pacific Ocean: A basin-scale study. I am looking forward to learning with the vast researchers from different fields in GO₂NE summer school.

Poster: Modeling the oxygen cycle in the tropical Pacific Ocean: A basin-scale study



Kartheek Chennuri

Kartheek Chennuri joined CSIR-National Institute of Oceanography(CSIR-NIO), India in late 2011 as a research scholar. He finished post-graduation studies in Organic Chemistry from VSM college (Andhra University, India). He carried out his doctoral research in CSIR-NIO with Dr. P. Chakraborty as his research guide. His doctoral study mainly focused on mercury distribution and speciation in the marine environment around India. His research deals with how the heterogeneity of organic carbon ligands alters metal dynamics in an environment. He uses model solutions as surrogates to the natural environment and tried to understand the interactions between metal-natural ligands and Metal biogeochemical cycling in the marine environment.

Currently, his research area focuses on metal speciation in environmental (water, sediment and biological) samples by using active/passive sampling techniques and understanding the complexation of metal- natural ligands to unravel the secrets of Mercury (and other trace-metals) biogeochemical cycling.

Poster: Effect of dissolve oxygen concentration on mercury distribution in water column of the Arabian Sea.



Katelynn Marie Lankowicz

Katie Lankowicz is a PhD student with Dr. Hongsheng Bi at the University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory in the United States. She uses cutting edge technology to study the population dynamics and demographics of low-trophic level organisms in systems as varied as the Bering Sea to the Chesapeake Bay. Her dissertation research focuses on using sonar imaging systems to examine the distribution of forage fish in shallow estuarine tributaries. She hopes to use empirical data collected in her research to create individual-based models of fish behavior to examine how fish move in response to changing environmental conditions like dissolved oxygen concentration, chlorophyll-a concentration, temperature, salinity, and turbidity.

Poster: Use of sonar imaging surveys to fill data gaps in forage fish populations in a shallow estuarine tributary.



Khanittha Uthaipan

Khanittha Uthaipan is a Ph.D. student of Ocean Carbon Group, Xiamen University. She is working on hypoxia in the estuary and coastal. She graduated from Chulalongkorn University, Thailand, with a master degree of Science in Chemical Oceanography in 2015, and bachelor's degree of Science in Technology for Marine and Coastal Resources Management at Walailak University, Thailand in 2012. She was a researcher in collaboration project "Eutrophication in the coastal water of Southeast Asia", which supported by Nano, NF-POGO alumni network for oceans. She is currently researching with a collaboration project "Diagnosis and prognosis of intensifying eutrophication, hypoxia and the ecosystem consequences around Hong Kong waters: coupled physical-biogeochemical-pollution studies".

Poster: Dynamic of Dissolved Oxygen and Nutrients in the Pearl River Estuary.



Lara Patricia Sotto

My undergraduate was in chemistry from the University of the Philippines – Diliman working on natural products, particularly seaweed chemistry. From there I went into Marine Science looking at water quality (nutrients, oxygen, and chlorophyll-a) in both offshore, oligotrophic areas and coastal areas affected by various anthropogenic activities. My research then expanded into the physical and chemical processes behind the occurrence of hypoxia, eutrophication, harmful algal blooms, and fish kills. I've also had the chance to work on nutrient loading from watersheds as well as hydrodynamic and water quality modelling. My dissertation is on the dynamics of hypoxia and eutrophication in Manila Bay, Philippines.

Poster: Spatiotemporal variability of hypoxia and eutrophication in Manila Bay, Philippines.



Larissa Menezes

With a keen inclination towards biology, I opted for Microbiology at Bachelors and Masters degree. During my BSc, I worked with marine bacterial isolates that produced amylase, and then, isolation of *Listeria* from houseflies during my MSc, wherein serotyping-PCR was used and a single pathogenic serotype of *L. monocytogenes* was obtained. As a Project Assistant at CSIR-NIO, I participated in three research expeditions to the Arabian Sea and Bay of Bengal. I sampled water and sediment, plated on different media, isolated, purified and identified bacteria and fungi. I carried out CARD-FISH analyses of PFA fixed samples, and lyophilisation of cultures. During my doct. studies on chemolithotrophic bacteria, various minimal media were used for enrichment. Functional genes like *soxB*, *nir* were amplified using degenerate primers. Bacterial isolates were screened for sulphur oxidation and nitrate reduction using biochem. tests. My current research interest involves applications of sulphur oxidising bacteria and ecosystem modelling.

Poster: Sulphur oxidizing and nitrate-reducing chemolithotrophic bacteria of the north Indian Ocean.



Leila Richards Kittu

My name is Leila Kittu. I have a bachelor's degree in Fisheries and Aquatic science and a master's degree in Biological Oceanography. Broadly, I am interested in ocean change biology such as deoxygenation and how this impacts pelagic ecology and biogeochemistry. Currently, I am in the first year of my PhD in Marine biogeochemistry at GEOMAR Helmholtz Centre for Ocean Research, Germany. My research focus is to investigate the ecological and biogeochemical tipping points of nitrogen fixation in the Humboldt upwelling system off Peru. I am interested in how ocean deoxygenation and upwelling dynamics in this region impacts nutrient supply and stoichiometry and the consequences this may have on supply of nitrogen to the system by nitrogen fixers. My study is a step forward towards experimentally determining whether the Humboldt Upwelling system is an important source of fixed nitrogen as it has often been predicted through models.

Poster: Does OMZ influenced nutrient stoichiometry stimulate N₂ fixation? - A Mesocosm study off Peru



Marcin Stokowski

I am an environmental chemist by education – my MSc thesis was titled “Ecotoxicity evaluation of selected anticancer drugs and their transformation products in the aquatic environment”. Because of my great penchant for the Baltic Sea I turned my scientific interest from aquatic chemistry to marine biogeochemistry. In October 2016 I started PhD study course at the Institute of Oceanology of the Polish Academy of Sciences in the field of Marine Biogeochemistry. The goal of my PhD study is to improve the knowledge on the structure and functioning of the CO₂/O₂ system in the coastal zone of the Baltic Sea. Coastal areas and especially estuaries are important regions for the global carbon and oxygen cycles. However, studies on both carbon and oxygen cycling focus mostly in the open waters of the Baltic Sea, while estuaries, including those of big continental rivers, are still poorly investigated in this respect.

Poster: Transformations of the carbonate system in the estuary of the Odra and Vistula rivers (the Baltic Sea).



Mazbah Mohammad Uddin

I am Mohammad Mazbah Uddin from Bangladesh. I have been graduated Bachelor of Science with honors from the University of Chittagong, Bangladesh. After that, I have completed Master of Science in Tropical Biodiversity and Ecosystems from the Vrije Universiteit Brussel, Belgium. At present, I am a Ph.D. student in the College of the Environment and Ecology at Xiamen University in China. My research interest on the accumulation, speciation and ecological risk of heavy metals in the sediment and water in the coastal areas and Lagoons.

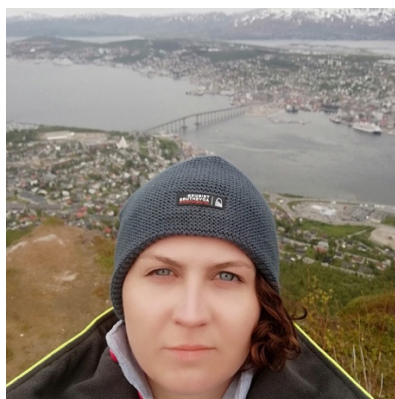
Poster: Spatial distribution, speciation and ecological risk of heavy metals in sediment of Yundang Lagoon catchment at Xiamen in China.



Michaela Maier

My name is Michaela Maier and I am an engineer – turned – oceanographer currently at the very beginning of a PhD program at the University of Victoria, Canada. I completed my undergraduate in the UK and have now moved oceans from the Atlantic to the Pacific, where I look into the deoxygenation problem off the Vancouver Island Coast. I'm focussing on the different water masses that appear on and off our shelf and their properties, as well as the long-time changes of their contributions and Oxygen content. For now, I'm analysing past cruise data to try and detect and quantify changes in the observations between 1980 and 2010; in the future I will be using models to get the 'bigger picture' and discern the drivers for these variabilities.

Poster: Initial oxygen observations on the $\sigma_\theta = 26.5$ isopycnal off the Vancouver Island coast.



Monika Aleksandra Lengier

My name is Monika Lengier. I am a second-year PhD student at the Institute of Oceanology Polish Academy of Sciences, in the Marine Chemistry and Biochemistry Department. In my study I focus on the qualitative and quantitative characteristics of dissolved organic matter, in respect to the deoxygenation of deeper depositional areas of the Baltic Sea. Within the framework of my research I study the return fluxes of dissolved organic matter from the marine sediments and assess mineralisation rates of dissolved organic matter, oxygen consumption and dissolved inorganic carbon, namely carbon dioxide, production in the Baltic Sea.

Poster: Sediments of the Baltic Sea as a source of C, N, P.



Norma Lidia Oliva Mendez

I belong to a group of young researchers in Mexico who have a special interest in the study of biogeochemical variables that have an impact on climate change. My first contribution has been to conform the line based on the study of variables of the CO₂ system in the northern coastal waters of Baja California. In 2018 I obtained my PhD and I am currently compiling the information of the oxygen database of the Mexican research program of the California Current (IMECOCAL). At the end of 2019 I'll be focused on gathering, correcting and modeling this oxygen database of ~ 20 years (1999-2016), to be able to identify the changes that have been presented and that have been registered with the realization of the cruises carried out by IMECCAL. I have a special interest in acquiring the tools for the communication of science and continuous monitoring programs.

Poster: Temporal variability of the dissolved oxygen in the southern California current system.



Pablo Nicolas Trucco Pignata

I am a postgraduate research student within Ocean and Earth Science, National Oceanography Centre Southampton at the University of Southampton. Currently, I am doing my PhD studying the seasonal cycle of the carbonate chemistry and dissolved oxygen in the eastern Pacific sector of the Southern Ocean, as part of the CUSTARD project. We are using mainly mooring and glider data from biogeochemical sensors, and constructing parametrization of pH and TA to integrate a time series on this site. From that, we will explore which are the processes controlling the variability of these two systems.

My background is in oceanography and I completed in 2017 a Master in Coastal Oceanography in the Instituto de Investigaciones Oceanológicas in Ensenada, México. Realised the dissertation and published a paper on the influence of the 2015-2016 ENSO event in the biogeochemistry of the Tropical Pacific of Mexico's Oxygen Minimum Zone.

Poster: Local ventilation of the Oxygen Minimum Zone.



Saranya Jayachandran

Saranya Jayachandran is a doctoral research student at the Indian Institute of Technology, Kharagpur, India. Her research deals with speciation and dynamics of Mercury in low oxygen environment in the eastern Arabian Sea. A major concern has aroused recently in India, a leading producer of Mercury, related to the bio-accumulation of Mercury and Methyl Mercury. She propose to investigate how the variability in the intensity and extent of the oxygen minimum zone in the Arabian Sea, driven by natural climate modes (such as El Nino and Asian monsoon), influence the Mercury dynamics.

Poster: Mercury and Chromium speciation in perennial Oxygen Minimum Zone (OMZ) in the Arabian Sea.



Sudheesh Valliyodan

I completed my Ph.D. in Marine Sciences from Cochin University of Science and Technology, India in December 2018. My Ph.D. thesis evaluated the biogeochemical processes over the continental shelf of south-eastern Arabian Sea by studying the seasonal upwelling, hypoxia and associated nutrient biogeochemistry, and influence of these processes on cycling and fluxes of greenhouse gases (N_2O , CH_4 , and CO_2). During my research career, I have participated in 20 multi-disciplinary oceanographic cruises and spent more than 250 days at sea. In 2016, I was selected for the NF-POGO Centre of Excellence training programme in observational oceanography. To date, I have 12 publications. My current research focused on the oxygen dynamics of the eastern Arabian Sea (EAS) basin, well-known for seasonal hypoxic/anoxic events. My research interests include the impact of deoxygenation and ocean acidification on the biogeochemical cycling of nitrogen and carbon.

Poster: Impact of seasonal oxygen deficiency on greenhouse gases (N_2O , CH_4 , and CO_2) over the southwestern continental shelf of India.



Suparat Srisaard

Miss Suparat Srisaard is a PhD student from the Department of Marine Science, Faculty of Science, Chulalongkorn University, Thailand. She is studying in chemical oceanography. Her current study is related to both inorganic and organic form of carbon and nutrient input into the Inner Gulf of Thailand. The input of this material is directly related to deoxygenation and hypoxia commonly found in the coastal zone. During her PhD study, she had also gained her experiences in shipboard training from working with SEAFDEC (Southeast Asian Fisheries Development Center) from August to September 2018. Participating in GO₂NE summer school provided her with a good chance to learn how to interpret oceanographic data properly and how global organization manage deoxygenation problems.

Poster: Dissolved Organic Carbon and Dissolved Nitrogen Input from Chaophraya and Thachin River to the Inner Gulf of Thailand in Southwest Monsoon Season.



Tachanat Bhatrasataponkul

Dr. Tachanat Bhatrasataponkul obtained his Ph.D. in Physical Oceanography at Florida State University (FSU). He worked at the FSU Center for Ocean-Atmospheric Prediction Studies (COAPS) and Department of Earth, Ocean and Atmospheric Science (EOAS) under the supervision of Professors Eric Chassignet and Mark Bourassa. He is currently an academic faculty at the School of Marine Technology, Burapha University, Thailand. His research interests include ocean and climate variability, ocean mixed layer dynamics, ocean remote sensing, and polar-lower latitude linkage.

Poster: The Ocean Spiciness in a Warming Climate.



Thulwaneng Brilliant Mashifane

Thulwaneng is a Postdoctoral Research Fellow at the South African Environmental Observation Network (SAEON) specializing in biogeochemical modelling. His current research applies high performance computing (HPC) to improve biogeochemical representation in coastal ocean models. He is currently developing a high resolution, coupled NEMO-PISCES configuration of Southern Africa which is used to simulate key biogeochemical variables including oxygen and nitrogen in the Benguela upwelling system. The St Helena Bay region which is an important nursery ground for fish larvae and juveniles but also the main generation zone of low oxygen is the main focus of this research. This research also aims to improve knowledge, response to climate change and the socio-economic implications of the biogeochemistry in this region.

Poster: Comparative study of model nitrous oxide and observations in St Helena Bay.



Xingwei Xie

Xie Xingwei got a bachelor degree in Shandong University, majoring in marine resources and environment. She has acquired a master's degree from the Institute of Oceanology, Chinese Academy of Sciences. In the period of master, she was mainly engaged in studying redox sensitive elements in marine sediments on hypoxic condition of the East China Sea as the environmental change indicators. And now she is studying for a doctor's degree at Xiamen University. In recent years, the hypoxia problem in offshore waters has become more and more serious, which is in close contact with eutrophication and acidification, so her current research direction will continue on the hypoxia in coastal area deeply, and understand the divers and consequences of the hypoxia.

Poster: Redox sensitive elements (RSE) as the environmental change indicators in hypoxic waters of the East China Sea.



Yanan Zhao

Currently, I am working as a Ph.D. Researcher in the GEOMAR Helmholtz Center for Ocean Research Kiel, my research interest is the annual and seasonal variability of the production of sulfur compounds in relation to biological activity by time series method at the Boknis Eck (BE) station. BE station is located in the southwestern Baltic Sea with a water depth of 28m and started to get samples since 1957. It is affected by both natural variabilities as well as changes triggered by anthropogenic activities. Pronounced phytoplankton blooms generally occur in early spring and in autumn, minor blooms occasionally occur during summer. Vertical mixing is restricted and bacterial decomposition of organic material in the deep layer causes pronounced hypoxia and sporadically occurring anoxia during late summer. The frequency of water column hypoxia in Eckernförde Bay has increased recently. Under this situation, how the phytoplankton composition will change and if it will affect the sulfur cycle attract me a lot.

Poster: Seasonal changes along with the coastal surface ocean DMS/DMSP concentrations.



Yawei Shen

My name is Shen Yawei aka Yvaine, a graduate student pursuing a doctorate in marine biology at Xiamen University, where I received bachelor's and master's degrees in marine science.

Our lab is engaged in basic research and applied research on marine benthic shellfish including abalone, oyster and some other clams. My research focuses on "how synergistic process of deoxygenation and warming will impact marine shellfish" and "the acclimatization and adaptation of marine shellfish". At present, I particularly investigate the metabolic activity, immune response of abalone under hypoxia and thermal stress using biochemical, physiological and molecular biological techniques.

Poster: Will abalone survive safely under hypoxia and thermal stress?



Yosra Khammeri

I am a PhD student at the National Institute of Marine Sciences and Technologies (INSTM) Carthage Salambo. During my master's, I had the opportunity to benefit from a joint fellowship from the Nippon Foundation (NF) and the Partnership for Observation of the Global Ocean (POGO) to follow training programme at the Bermuda Institute of Ocean Sciences (BIOS). I am particularly interested by the work addressing the impact of desert dust deposit on phytoplankton. At this stage, I was involved in using flow cytometry to investigate at the single cell level, the response of phytoplankton to atmospheric dust deposition. I have participated to scientific expeditions in the Mediterranean Sea and the Atlantic Ocean, and participated to international conferences and meetings. I have strong field and laboratory skills. I can also speak fluently French and English.

Poster : Dynamics of phytoplankton community composition in relation to environmental factors.

6. Lecturers & Local Organizing Committee



Anders Tengberg

Associate professor at Univ. of Gothenburg, SWEDEN (Marine Sciences) & Chalmers Univ. of Technology (Mechanics and Maritime Sciences). Scientific Advisor & Product Manager at Aanderaa/Xylem, NORWAY; e-mail: anderste@chem.gu.se & anders.tengberg@xyleminc.com

Research:

- Autonomous underwater observatories (observatories, landers, floats, gliders, ferry boxes, buoys)
- Sensor technology (optical O₂, pH, pCO₂, Chl, Turb, acoustic and electrochemical)
- Oxygen/CO₂/pH dynamics in marine environments and the technology to measure it
- Benthic and pelagic mineralization processes
- Carbon and nutrient turn-over in sediments and in the water column



Andreas Oschlies

Andreas Oschlies studied Theoretical Physics at Heidelberg and Cambridge, received his PhD in Oceanography from Kiel University and, after positions held in Toulouse and Southampton, is now Professor of Marine Biogeochemical Modelling at GEOMAR and the University of Kiel, Germany. His research interests include the global carbon, nitrogen and oxygen cycles, their sensitivities to environmental change, and the development and quality assessment of numerical models appropriate to investigate these. He currently coordinates the Collaborative Research Centre "Climate-Biogeochemistry Interactions in the Tropical Ocean" (SFB754) and the German Priority Program "Climate Engineering: Risks, Challenges, Opportunities?" (SPP1689), both funded by the German Research Foundation.



Boris Dewitte

Dr. Boris Dewitte is a climate scientist with over 100 publications in peer-reviewed journals. His research areas include tropical climate variability, ocean and climate, climate change, air-sea interaction, multi-model analysis, regional biogeochemical coupled model development. He has been involved in numerous projects dedicated to the study of the Humboldt (Peru/Chile) current system, in particular dealing with the physical forcing of Oxygen Minimum Zone in the South Eastern Pacific. He is affiliated since 2015 to CEAZA (Centre of Advanced Studies in Aride), an interdisciplinary research centre located in La Serena off central Chile and that promotes scientific and technological developments and advanced interdisciplinary earth and biological sciences. Boris Dewitte is currently a member of the CLIVAR scientific committee, a full member of the SCOR Working group on Eastern Boundary system dynamics and the co-chair of the Eastern Pacific Task Team of the TPOS2020 program.



Brad Seibel

My research employs a unique suite of field and laboratory techniques and approaches to assess the ecological consequences of climate change, including ocean acidification, deoxygenation and warming, and the role of animal energetics in ecosystem dynamics. I carry out broad comparative physiology studies to determine the limits to evolution and ecology. Physiological mechanism provides a foundation upon which ecosystem responses to climate change and consequences for biogeochemical cycles can be understood. My studies compare organisms across size, depth, latitudinal and phylogenetic lines, from microzooplankton to macronekton, ctenophores to fishes, from the poles to the equator and from the abyssal plains to the ocean surface. We strive to integrate across levels of organization, from mitochondria to ecosystems. I focus on the physiology of individual species and what this can teach us about their origin, behavior, ecology, diversity and the ecosystems in which they live.



Denise Breitburg

Denise Breitburg is a Senior Scientist Emerita at the Smithsonian Environmental Research Center. Her research focuses on the effects of low oxygen on organisms ranging from fish to jellyfish and oysters, including effects on food webs, fisheries, and disease. She has also worked on the issue of multiple stressors in marine systems for over 20 years and has led or participated in several large, collaborative programs linking land use, nutrients and upper trophic level organisms in coastal systems. Her recent research explores the combined effects of hypoxia and acidification in temperate estuaries and tropical mangrove systems. Denise is co-chair of GO₂NE – the IOC-UNESCO Global Ocean Oxygen Network, and led the working group's recent Science review on the problem of ocean deoxygenation in the open ocean and coastal waters. She has also served on the governing boards of the Association for the Sciences of Limnology and Oceanography (ASLO) and the Coastal and Estuarine Research Federation (CERF). Denise holds a PhD in Marine Ecology and Ichthyology from the University of California, Santa Barbara, as well as a BSc in Biology from Arizona State University.



Emilio Garcia-Robledo

Emilio Garcia-Robledo graduated in Marine Sciences-Oceanography at the University of Cadiz (Spain) and obtained his PhD from the same University in 2011. His PhD investigated the biogeochemical effects of massive growing macroalgae by using microsenors and stable isotopes for the study of microbial processes. In 2012, he moved to Aarhus University to develop and use electrochemical and optical sensors for the study of oxygen distribution and metabolism in Oxygen Minimum Zones and other aquatic environments in combination with other techniques. Since 2017, he is back to the University of Cadiz and continues with his research in the study of microbial metabolism with sensors and isotopes in shallow areas and open ocean environments such as OMZs.



Gil Jacinto

Gil S. Jacinto earned his Ph.D. in marine chemistry in 1988 from the University of Liverpool, England and is currently a Professor at the Marine Science Institute of the University of the Philippines Diliman. His work and publications on eutrophication and hypoxia in Manila Bay, one of the pollution hotspots in East Asia, provides a benchmark against which impacts of management interventions on a watershed scale in tropical country can be evaluated. He was co-principal investigator for the development of regional models of coastal effects focusing on Manila Bay for the GEF/UNEP Global Foundations for Reducing Nutrient Enrichment and Oxygen Depletion from Land Based Pollution. In 2016, Dr. Jacinto was invited to join the UNESCO-IOC Global Ocean Oxygen Network (GO₂NE). To highlight and encourage work on deoxygenation in East Asia, he proposed and coordinates an IOC-WESTPAC technical working group, the Western Pacific Ocean Oxygen Network (WESTPAC O₂NE).



Ivonne Montes

Her work involved the application of a Regional Ocean Model System and Lagrangian approaches to fill gaps in in-situ observations of current systems in the Southeastern Tropical Pacific. During her Postdoc, she carried pioneered studies on coupled physical-biogeochemical regional modeling applied to the Eastern boundary current system (Mexico and Peru/Chile) to investigate the processes maintaining the Oxygen Minimum Zone, especially off Peru. Currently, she is a research scientist at IGP (Instituto Geofísico del Perú), on charge of the Geophysical Fluid Dynamics Laboratory of IGP, being focus on study the role of the oceans in climate, the impact of remote and local air-sea interactions over the upwelling systems, and climate change associated processes.



Kirsten Isensee

Kirsten Isensee is a Programme Specialist at the Intergovernmental Oceanographic Commission of UNESCO since 2012. Her work focuses on Ocean Carbon Sources and Sinks, trying to distinguish the natural and anthropogenic influences on the marine environment in support of the 2030 Agenda for Sustainable Development. She provides technical assistance to activities promoting women in ocean science and facilitates collaboration between scientists, policymakers and stakeholders, via networks such as the Global Ocean Acidification Observing Network (GO₂NE), the International Blue Carbon Initiative and the Global Ocean Oxygen Network. She received her diploma and her PhD in Marine Biology at the University of Rostock, Germany.



Maciej Telszewski

Maciej Telszewski holds a PhD in Marine Biogeochemistry from the University of East Anglia (Norwich, UK), where he worked with surface ocean carbon data to develop an efficient neural network algorithm allowing basin scale mapping of this parameter in the North Atlantic. He then moved to Japan, where he joined a research group at the National Institute for Environmental Studies (Tsukuba) to further improve the statistical computing approach. His work resulted in successful mapping of surface carbon and nutrients fields in the North Pacific accompanied by fluxes estimates included in the RECCAP synthesis. Throughout his research carrier he was actively involved in field campaigns, contributing surface measurements to the Surface Ocean CO₂ Observing Network (SOCONET) and ocean interior measurements to the Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP). In 2011 Maciej joined the Intergovernmental Oceanographic Commission of UNESCO (Paris, France) initially as a Deputy Director of the International Ocean Carbon Coordination Project and since mid-2012 as IOCCP's Project Director (and Global Ocean Observing System (GOOS) Biogeochemistry Expert Panel Executive Officer). In this role he coordinates the highly diverse set of ocean carbon and biogeochemistry activities through extensive collaboration and dialogue with the scientific community via national and international organizations, scientific steering committees, scientific workshops, and expert meetings.



Marilaure Grégoire

Marilaure Grégoire is graduated in physical engineering and has a PhD in Applied Sciences on the development of three-dimensional numerical models that couple the physics and biogeochemistry. She works on the development of modelling approaches targeted towards the understanding and prediction of the impact of human activities on health of the marine environment, with a particular focus on low oxygen environments. She is teaching various lectures on mathematical environment modelling at the Liege University and is leading the Modelling for Aquatic Systems (MAST) research group.



Professor Minhan Dai

Minhan Dai is a Cheung Kong Chair Professor of Marine Biogeochemistry at Xiamen University, China. He currently serves as the Director of the State Key Laboratory of Marine Environmental Science. Minhan Dai's research interests include ocean biogeochemistry of carbon and nutrients and geochemistry of radioactive elements in surface and ground waters. He was elected as an Academician of the Chinese Academy of Sciences in 2017. He has served on many national and international committees.



Sergey Borisov

Dr. Sergey M. Borisov is an expert in the field of luminescent dyes and optical sensors. He obtained his PhD from Herzen State University (St. Petersburg, Russia) in 2003, and was a postdoc in the group of Prof. O. S. Wolfbeis in Regensburg in 2004-2006. He joined the Institute of Analytical Chemistry and Food Chemistry of Graz University of Technology (Austria) in 2006. Currently he is an Associate Professor in the same Institute and co-leader of the group dedicated to development of optical sensor materials. Prof. Borisov is a (co)author of 140 publications in peer reviewed journals, 3 book chapters and has 6 patents/patent applications. The work attracted more than 5400 citations and the h-index of Dr. Sergey M. Borisov is 42 (Scopus, August 2019).



Véronique Garçon

Dr Véronique Garçon is currently a member of IOCCP SSG and of the GBC-GOOS panel. She graduated from University of Paris VII in Environmental Sciences and then became a post-doc fellow at MIT (Cambridge, USA). Recruited as an Early Career scientist at Centre National de la Recherche Scientifique (CNRS) in 1985, she worked at 'Institut de Physique du Globe de Paris' then moved down to Toulouse with a sabbatical stay at Princeton University in 1995 - 1996. Her research themes aim towards understanding and quantifying processes governing fluxes of carbon, oxygen and associated biogeochemical elements in the ocean, using in situ tracers observations, remotely sensed data, coupled physical biogeochemical modeling and data assimilation technics. She is also deeply involved in oceanic biogeochemical climatic monitoring via electrochemical sensors development. She served in the JGOFS SSC, member of the French IFREMER Scientific Committee for 10 years, and in many national (CNRS, National Navy), European (ESF, EC, EGU, ERC..) and international scientific instances. She has been acting as co-director of the International SOLAS Summer Schools in 2003, 2005, 2007 with C. Le Quéré and in 2013 with M. Dai and Director in 2009 and 2011. She is a member of the Global Ocean Oxygen Network (GO₂NE) initiated by IOC-UNESCO. She was awarded in 2017 the IOC UNESCO Anton Bruun medal.



Dr Wajih Naqvi

Dr Wajih Naqvi worked at Goa-based National Institute of Oceanography for over four decades, heading it from 2012 to 2016. He has also been associated with Lamont-Doherty Earth Observatory of Columbia University, Nagoya University, and Center for Tropical Marine Ecology & Max-Planck Institute for Marine Microbiology, Bremen. An Adjunct Scientist at Woods Hole Oceanographic Institution during 2007-2017, Dr. Naqvi is presently a Distinguished Scientist in the Council of Scientific & Industrial Research, New Delhi. Specializing on biogeochemistry (particularly nitrogen cycling) of oxygen-depleted marine systems, Dr. Naqvi has co-authored nearly 200 publications including four books/monographs. Dr. Naqvi has received numerous awards including fellowships of all science academies in India and the Academy of Sciences for the Developing World. Dr. Naqvi served as a member of numerous national and international committees and expert panels. He is currently an Associate Editor of Marine Biology and Aquatic Biology, and an Executive Editor of Biogeosciences.



Vera Shi (Xiamen University,
Secretary)



Lun Cai (Secretary, Xiamen University)



Yan Yang (Xiamen University,
Research Assistant)

7. Sponsors

The Directors and co-organizers would like to thank all the sponsors and individuals behind! **THANK YOU!**



A special thanks however goes to Xiamen University, Prof. Minhan Dai, Vera Shi, Lun Cai, Yan Ying, and all the people helping preparing this Summer School!





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NOTES:

