

第 11 屆國際水下技術研討會

2019 IEEE Underwater Technology (UT'19) Kaohsiung, Taiwan, 16-19 April, 2019

摘要

中山大學海下科技研究所和國家實驗研究院台灣海洋科技研究中心經過三年的爭取與籌備，在科技部及數個單位的支持下成功舉辦 2019 IEEE Underwater Technology (簡稱 UT'19 Kaohsiung)。會議舉辦日期為從 2019 年四月 16-19 日，共四天，研討的議程主要包括大會邀請三位專家學者進行專題演講、14 場次共 70 篇學術論文發表、9 篇學生論文海報競賽、勵進研究船參訪，學術論文發表的主題如下：

- UUVs & ROVs
- Observatories and Applications
- Vehicle AI Control
- Instrumentation and Sensors
- AUV Design & Development
- AUV Navigation
- Sonar Signal Processing
- AUV Control
- Acoustic Signal Processing
- AUV Application & Investigation
- Vehicle Tracking & Path Planning

IEEE Underwater Technology 國際研討會每兩年舉辦一次，由日本東京和幾個亞洲都市輪流舉辦。台北在 2004 年也曾經舉辦過，所以睽違了 15 年後又回到台灣舉辦，也正逢台灣推動海洋離岸風力發電的重要能源政策，舉辦這個重要的水下科技研討會意義更為特別。因為建置離岸風力場所需要配合的工程技術有絕大的部分都需要依靠水下技術，例如聲納探測水深、地質、掌握海域流速、無人載具海底施工、佈放維修電纜等，這些議題都是 Underwater Technology 國際研討會長期關注的焦點。這一次我們在科技部的支持下，很成功地吸引來自十八個國家、約一百五十個專家學者與會，除了交換意見與學術新知外，也讓他們了解台灣積極發展綠能的決心，以及台灣在與海洋綠能相關的科技發展現狀。整體來說除了 IEEE 總會代表非常滿意此一研討會的舉辦成效，所有與會來賓也非常期待另一個更大的 IEEE Oceans 千人以上參與的國際海洋科技研討會也能在高雄舉辦。讓我們拭目以待。

The IEEE OES international symposium on Underwater Technology 2019 (UT'19) organized by IEEE Oceanic Engineering Society (IEEE/OES), IEEE/OES Japan Chapter, IEEE/OES Taipei, Taiwan Chapter, Taiwan Ocean Research Institute, and National Sun Yat-sen University, was held during 16-19 April 2019 at the International Building of National Sun Yat-sen University (NSYSU) in Kaohsiung. The venue is on the fifth and sixth floors of the building where the beautiful Sizihwan beach can be overseen.

There were 146 researchers, students and professionals from 18 countries coming for this important gathering for underwater technology community. In the symposium, two and one plenary talks were given on 17th and 18th mornings respectively. Two parallel sessions were arranged for the 70 talks such that the attendees could have the best coverage of participation at their own interest. In the exhibition hall, nine student posters drew the attendees' attention about the young talents for the ocean, while seven booths demonstrated their up to date products and information for new solutions. This exhibition hall and several social corners were the places for refreshing old friendship and establishing new connections. The overture of UT'19 started with an Ice Breaker and Reception at the balcony of NSYSU Alumni Hall where delicious food and astonishing sunset entertained every guest. At the opening, Prof. Tamaki Ura, General Co-Chair of UT'19, and Dr. Yeong-Her Wang, Technical Program Committee General Chair of UT'19 and President of NARLabs, gave welcome messages to greet the guests, followed by Mr. Robert Wernli, former OES Vice President for Professional Activities, briefing on the 20-year history of Underwater Technology Symposium.



Fig. 1: Ice Breaker and Reception at NSYSU Alumni Hall.



Fig. 2: At the opening ceremony, Prof. Tamaki Ura (left) and Dr. Yeong-Her Wang (center) gave welcome messages; Mr. Robert Wernli (right) briefed on the 20-year history of UT symposium.



Fig. 3: Group photo taken after the plenary session on April 17.

Plenary Session

Dr. Katsuyoshi Kawaguchi, the Director of Engineering Department, Institute for Marine-Earth Exploration and Engineering, gave the first plenary talk on 17th morning. Dr. Kawaguchi speech is on the development history of Japan seafloor observatory, and how this infrastructure helps Japan to endeavor for early warning time for mitigating disaster, such as tsunami. The second talk was given by Dr. Chi-Ming Peng, the CEO of WeatherRisk Explore Inc., Taiwan. He elaborated on the importance of “Open Data”, and how an open data structure can enhance the values of data collected by government agencies and private sectors. He also pointed out how new business can be created by opening and sharing data. The last plenary talk was on 18th, given by Dr. Ban-Yuan Kuo, Research Fellow of Institute of Earth Sciences, Academia Sinica, Taiwan. He has been studying the tectonic plate structure and dynamics for more than two decades. In his talk, he mentioned that scientists strive to extract the secrets beneath the Earth surface with different tools overcoming all kinds of difficulties. On

land, geologists climb up and down the mountains to collect rock samples. For the vast ocean covered seafloor, the evidences can only be retrieved with the help of underwater technology. All these three talks gave the attendees insight into what the underwater technology can contribute to the society.



Fig. 4: Dr. Katsuyoshi Kawaguchi gave a plenary speech entitled “Submarine cabled real time observation and digital twin of tectonic plate boundary - The future of earthquake and tsunami prediction”.



Fig. 5: Dr. Chi-Ming Peng gave a plenary speech entitled “Making the weather and ocean data ecosystem through the public-private engagement”.



Fig. 6: Dr. Ban-Yuan Kuo gave a plenary speech entitled “Underwater technology and the solid-earth science: bypassing the ocean”.

Technical Sessions

Professor Chau-Chang Wang chaired the technical program committee. The submitted abstracts were peer-reviewed, and 70 papers and 9 posters were selected by the technical committee for presentation categorized into the following topics:

- UUVs & ROVs
- Observatories and Applications
- Vehicle AI Control
- Instrumentation and Sensors
- AUV Design & Development
- AUV Navigation
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We can see that the topics related to the AUV are the focal point of this symposium. This also serves as an indicator that autonomous agent technology is getting mature in solving many difficult marine and underwater challenges.



Fig. 7: Technical sessions on April 17.



Fig. 8: Technical sessions on April 18.



Fig. 9: Technical sessions on April 19.

Student Poster Competition

The student posters were put on stands for the attendees to visit on 16th in the exhibition hall where many attendees walked around and chatted for new ideas. On 18th noon time, the judge group visited every poster, and listened to the authors and inspired them with the potential applications or insights of their work. After careful evaluation and discussion of their work, the first place was won by Miss Jenny Walker on “The effect of physics based corrections and data augmentation on transfer learning for segmentation of benthic imagery”. The second place goes to Mr. Anton Tolstonogov on “The compact ROV with variable center of gravity and its control”. The third place goes to Mr. Adrian Chan on “A belt transect fish abundance survey methodology using an underwater vehicle”. Two excellences go to Mr. Jing-Heng Huang on “Adaptation of a commercially available laser Raman spectrometer for underwater chemical sensing” and Mr. Junwoo Jang on “Dynamic grid adaptation for panel-based bathymetric SLAM”, respectively.



Fig. 10: Exhibition booths and student posters.

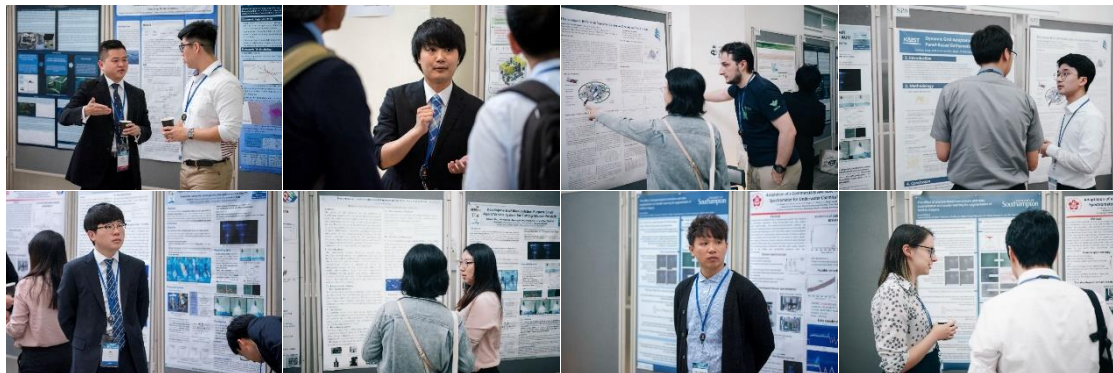


Fig. 11: Student poster presenters.



Fig. 12: Student poster competition winners (from left to right): Ms. Jenny Walker, Mr. Anton Tolstonogov, Mr. Adrian Chan, Mr. Jing-Heng Huang, and Mr. Junwoo Jang.

Exhibition and Social Event

There were six local and international companies setting booths for promotion. They are: Awareocean Technology Co., Ltd., Kongsberg Maritime Pte Ltd., Nijin Environmental Technology Co., Ltd., Sonardyne Asia Pte Ltd., AiTRIX GUAN HUNG TECHNOLOGY CO., LTD., and NORBIT SUBSEA. The organizing committee of OCEANS 2020 Singapore also joined us for promoting the event.

The Gala dinner to greet all the participants and their accompanied family and friends was held on Sizihwan Beach on 18th evening. An NSYSU student band “Dreamers Quartet” played traditional Taiwanese melody and Jazz for the guests to enjoy the food and the unforgettable beautiful sunset. Professor Ura and Mr. Wenli gave farewell address prior to the announcement of the student poster awards winners. The party ended with a traditional Taiwanese Glove Puppet show by the Master Rong-Chang Wu to demonstrate the richness of Taiwanese culture.

Thank you all for helping UT’19 symposium such that everyone enjoyed a wonder gathering of “academic friends”, as Mr. Wenli said. Looking forward to seeing you at UT’21 Tokyo.

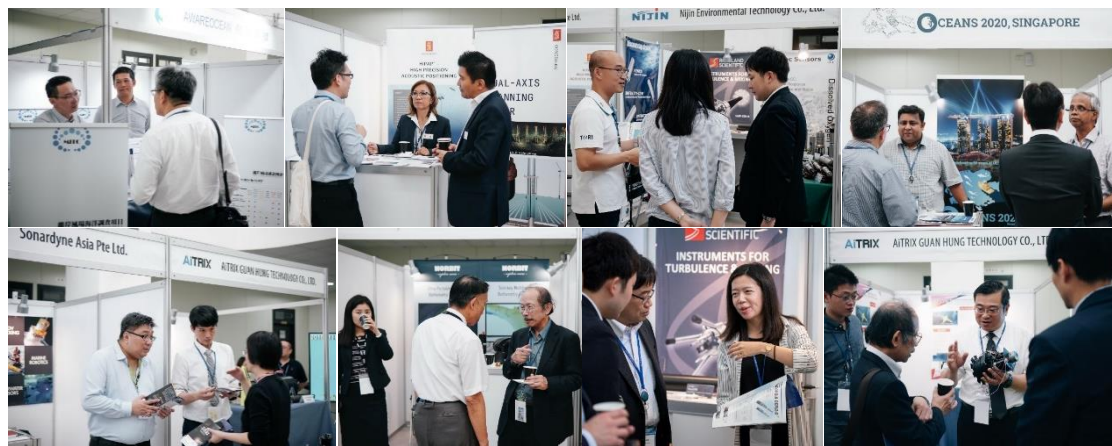


Fig. 13: Local and international exhibitors.



Fig. 14: Gala dinner on Siziwan Beach.