

# ReSAGPAPR WG Newsletter

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Soil and Groundwater Pollution of Asian and Pacific Region

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March, 2019

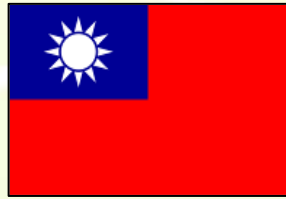
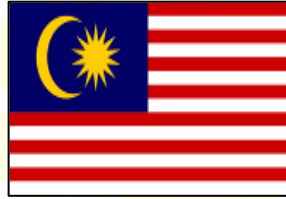
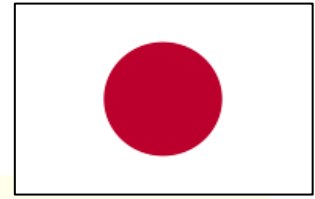
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## Member Countries

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## Main objectives of the ReSAGPAC WG

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The main objectives of the ReSAGPAC WG are proposed as:

- To establish a risk-based approach and sustainable land management network at the Asian level;
- To share the database of pollution sites, recycling use of natural resources including the sediments,
- To serve the wider context of the changing and challenging social demands, and
- To function as a rational platform for decision and policy makers to make the remediation on sites of soil and groundwater pollution.

# Program of 2019 International Training Courses on Sustainable Soil and Groundwater Protection and Remediation

Date: March 17-24, 2019

Venue: Department of Environmental Engineering, National Cheng Kung University

## DAY 1: March 17 (Sunday)

Time	Activity/Presentation Title	Presenter/Host
18:00-20:00	Reception Dinner	Prof. Tsair-Fuh Lin National Cheng Kung University

## DAY 2: March 18 (Monday)

Time	Activity/Presentation Title	Presenter/Host
08:30-09:00	Registration	Prof. Tsair-Fuh Lin Prof. Liang-Ming Whang National Cheng Kung University
09:15-10:00	<b>Opening Ceremony</b> Minister Tzi-Chin Chang, Taiwan Environmental Protection Administration The Secretary General Professor Ching-Chang Lee, NCKU Director Tsair-Fuh Lin, Tainan Hydraulics Laboratory, NCKU Chair Yee-Lin Wu, Aerosol Laboratory, NCKU	
10:00-10:10	Group Photo	
<b>Topic 1: Soil and Groundwater Protection- Current Status and Future Directions</b>		
10:10-10:20	Overview of the Workshop	Prof. Tsair-Fuh Lin National Cheng Kung University
10:20-11:10	Soil and Groundwater Protection in Asia: Status and Future Research and Practices	Prof. Tsair-Fuh Lin National Cheng Kung University
11:10-12:00	Soil and Groundwater Protection in Taiwan: Status and Future Directions	Dr. Shyh-Wei Chen Soil and Groundwater Pollution Remediation Funds, Taiwan EPA
12:00-13:30	Lunch	

# Program of 2019 International Training Courses on Sustainable Soil and Groundwater Protection and Remediation (Continued)

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## DAY 2: March 18 (Monday) (Continued)

Time	Activity/Presentation Title	Presenter/Host
13:30-15:00	Soil and Groundwater Pollution Remediation Fund	Dr. Hao-Chun Hung Soil and Groundwater Pollution Remediation Funds, Taiwan EPA
15:00-15:20	Tea Break	
15:20-16:50	Soil and Groundwater Protection in Taiwan - Policy and Regulation	Dr. Ching-Jen Ho Soil and Groundwater Pollution Remediation Funds, Taiwan EPA
18:00-20:00	Welcome Dinner	

## DAY 3: March 19 (Tuesday)

Time	Activity/Presentation Title	Presenter/Host
<b>Topic 2: Soil and Groundwater Protection- Investigation, Forensics and Risk Assessment</b>		
08:30-10:00	Application of Molecular Biology Tools for Bioremediation – An Introduction	Prof. Liang-Ming Whang National Cheng Kung University
10:00-10:20	Tea Break	
10:20-11:50	Contaminated Site Investigation: Case Studies in Taiwan	Prof. Chih-Jen Lu National Chung Hsing University
11:50-13:20	Lunch	
13:20-14:50	Contamination Site Investigation: Common Methods Employed in Taiwan	Dr. Ming-Daw Che Apollo Technology Co., Ltd.
14:50-15:20	Tea Break	
15:20-16:50	Risk Assessment for Soil and Groundwater Contamination	Dr. Chih Huang InnoFusion Environmental Management Co., Ltd
18:00-19:30	Dinner/ Social Activities	

# Program of 2019 International Training Courses on Sustainable Soil and Groundwater Protection and Remediation (Continued)

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## DAY 4: March 20 (Wednesday)

Tainan Culture Tour

## DAY 5: March 21 (Thursday)

Time	Activity/Presentation Title	Presenter/Host
<b>Topic 3: Soil and Groundwater Protection- Monitoring and Sustainable Remediation</b>		
08:30-10:00	Environmental Forensic Practices of Petroleum Hydrocarbon Contaminated Sites	Prof. Colin S. Chen National Kaohsiung Normal University
10:00-10:20	Tea Break	
10:20-11:50	Remediation of Organic Contaminated Sites: Theories and Case Studies	Prof. Jimmy C.M. Kao National Sun Yat-sen University
11:50-13:20	Lunch	
13:20-14:50	Protection of Farmland Contamination: Investigation and Risk-based Approached Remediation Technology	Prof. Zueng-Sang Chen National Taiwan University
14:50-15:20	Tea Break	
15:20-16:50	Sediment Contamination: Protection and Remediation	Prof. Shu-Chi Chang National Chung Hsing University
18:00-19:00	Dinner/Team Project Discussion	

# Program of 2019 International Training Courses on Sustainable Soil and Groundwater Protection and Remediation (Continued)

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## DAY 6: March 22 (Friday)

- Venue: Linyuan Petrochemical Plant, CPC, Kaohsiung
- Venue: Cenpro Technology Co. Ltd., Kaohsiung

Time	Activity/Presentation Title	Presenter/Host
<b>Topic 4: Soil and Groundwater Protection- Field Visits and Demonstration</b>		
09:30-11:00	Introduction to the Remediation Works at Lin-Yuan Petrochemical Plant	Mr. Bing-Nan Wang Sinotech Environmental Technology, Ltd.
11:00-12:00	Remediation Site Visits (Lin-Yuan Petrochemical Plant, CPC, Kaohsiung)	
12:00-13:30	Lunch	
13:30-15:00	Application of Geophysical and Direct Push Methods: Demonstration	Mr. Chun-Ming Tsai Cenpro Technology Co. Ltd.
15:00-16:50	Laboratory Visits	
18:00-20:00	Dinner/ Team Project Preparation and Discussion	



# Program of 2019 International Training Courses on Sustainable Soil and Groundwater Protection and Remediation (Continued)

## DAY 7: March 23 (Saturday)

Time	Activity/Presentation Title	Presenter/Host
<b>Topic 5: Soil and Groundwater Protection- Current Status and Needs for South East and South Asia</b>		
08:30-09:00	Team Project Presentations and Discussion: - Problems and Status of Soil and Groundwater Protection - Conclusions from Previous Presentations	Prof. Tsair-Fuh Lin National Cheng Kung University
09:00-10:15	Representatives from 3 Countries: Australia, South Korea, New Zealand Topics Include: Country Report and Research Needs (one Presentation per country is expected, with 20 mins presentation & 5 mins of discussion)	Prof. Tsair-Fuh Lin National Cheng Kung University  InnoFusion Environmental Management Co., Ltd
10:15-10:30	Tea Break	
10:30-11:20	Representatives from 2 Countries: Cambodia, Philippines Topics Include: Country Report and Research Needs (one Presentation per country is expected, with 20 mins presentation & 5 mins of discussion)	Prof. Tsair-Fuh Lin National Cheng Kung University  Tainan Hydraulics Laboratory, National Cheng Kung University
11:20-12:30	Representatives from 2 Countries: India, Indonesia Topics Include: Country Report and Research Needs (two Presentations per country is expected, with 30 mins presentation & 5 mins of discussion)	Prof. Tsair-Fuh Lin National Cheng Kung University  SGS Taiwan Limited
12:30-13:50	Lunch	

# Program of 2019 International Training Courses on Sustainable Soil and Groundwater Protection and Remediation (Continued)

## DAY 7: March 23 (Saturday) (Continued)

Time	Activity/Presentation Title	Presenter/Host
<b>Topic 5: Soil and Groundwater Protection- Current Status and Needs for South East and South Asia</b>		
13:50- 15:00	Representatives from 2 Countries: Malaysia, Sri Lanka Topics Include: Country Report and Research Needs(two Presentations per country is expected, with 30 mins presentation & 5 mins of discussion)	Prof. Tsair-Fuh Lin National Cheng Kung University  Sinotech Environmental Technology, Ltd.
15:00- 15:20	Tea Break	
15:20- 16:30	Representatives from 2 Countries: Thailand, Vietnam Topics Include: Country Report and Research Needs(Three Presentations per country is expected, with 30 mins presentation & 5 mins of discussion)	Prof. Tsair-Fuh Lin National Cheng Kung University  InnoFusion Environmental Management Co., Ltd
16:30- 16:50	More Discussion (including Questionnaire)	Prof. Tsair-Fuh Lin National Cheng Kung University
18:00- 20:00	Farewell Dinner	

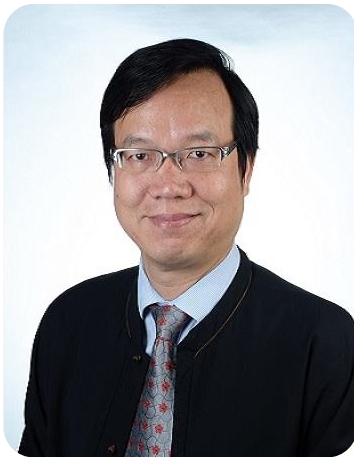
## DAY 8: March 24 (Sunday)

Departure
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# Training Course

Time: 10:20-11:10, March 18 (Monday), 2019



**Topic: Soil and Groundwater Protection in Asia: Status and Future Research and Practices**

**Prof. Tsair-Fuh Lin**

Director, Tainan Hydraulics Laboratory & Distinguished Professor, Department of Environmental Engineering, National Cheng Kung University

## Course Outline

- Soil and Groundwater Pollution in Taiwan
- International Trends
- Web of Sci and ScienceDirect
- Soil & Groundwater Research in Taiwan
- Field Applications
- Markets
- Field Experiences in Taiwan
- Idea from previous workshops
- Conclusions



# Training Course (Continued)

Time: 11:10-12:00, March 18 (Monday), 2019



**Topic: Soil and Groundwater Protection in Taiwan: Status and Future Directions**

**Dr. Shyh-Wei Chen**

Executive Director, Soil and Groundwater Remediation Fund Management Board, Environmental Protection Administration, Executive Yuan, Republic of China (Taiwan)

## Course Outline

- Background
- Contamination Investigation Policy, Remediation Standards, Remediation Order
- Taiwan Soil and Groundwater Pollution Map
- Pollution control and remediation
- The Fund
- Contaminated soil off-site treatment and reuse
- Site risk assessment and Brownfield
- International Exchange and Collaboration
- Prospect





# Training Course (Continued)

Time: 13:30-15:00, March 18 (Monday), 2019

**Topic: Soil and Groundwater Pollution Remediation Fund**



**Dr. Hao-Chun Hung**

Senior Environmental Technology Specialist, Soil and Groundwater Remediation Fund Management Board, Environmental Protection Administration, Executive Yuan, Republic of China (Taiwan)

## Course Outline

- Origin of the Soil and Groundwater Pollution Remediation Fund
- How other countries fund their remediation projects?
- Collection Policy of Soil and Groundwater Pollution Remediation Fund
- Quality Control and Quality Assurance
- Conclusion



# Training Course (Continued)

Time: 15:20-16:50, March 18 (Monday), 2019



**Topic: Soil and Groundwater Pollution Remediation Fund**

**Dr. Ching-Jen Ho**

Senior Environmental Technology Specialist,  
Soil and Groundwater Remediation Fund Management Board,  
Environmental Protection Administration, Executive Yuan,  
Republic of China (Taiwan)

## Course Outline

- Introduction
- Soil and Groundwater Pollution Remediation Fund
- Law- Soil and Groundwater Pollution Remediation Act
- Measures of SRF
- Accomplishments
- Conclusion
- Appendix





# Training Course (Continued)

Time: 08:30-10:00, March 19 (Tuesday), 2019



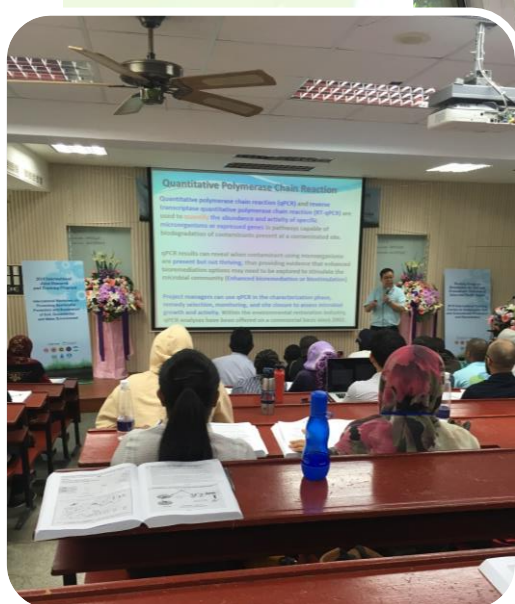
**Topic: Application of Molecular Biology Tools for Bioremediation – An Introduction**

**Prof. Liang-Ming Whang**

Director, Sustainable Environment Research Laboratories &  
Professor, Department of Environmental Engineering,  
National Cheng Kung University

## Course Outline

- Introduction of Bioremediation
  - What is Bioremediation?
  - Why Bioremediation works?
  - Contaminants amenable to Bioremediation
  - Limiting factors (why bioremediation doesn't work?)
  - Engineering strategies for Bioremediation
- Molecular Biology Tools for Bioremediation
  - Fundamentals
  - Techniques
  - Applications
- Case Study



# Training Course (Continued)



Time: 10:20-11:50, March 19 (Tuesday), 2019

**Topic: Contamination Site Investigation: Case Studies in Taiwan**

**Prof. Chih-Jen Lu**

Professor, Department of Environmental Engineering, National Chung Hsing University

## Course Outline

- Sampling Design
  - Representativeness
  - Error of Sample Heterogeneity
  - Comparability
  - Completeness
  - Conceptual Site Model
  - Source of Contaminants
- Site Investigation
  - Sampling Media
  - Historical Site Data
  - Abandoned Factories





# Training Course (Continued)



Time: 13:20-14:50, March 19 (Tuesday), 2019

**Topic: Contamination Site Investigation: Common Methods Employed in Taiwan**

**Dr. Ming-Daw Che**

Vice President, Apollo Technology Co., Ltd.

Vice Chairman, Taiwan Association of Soil and Groundwater Environmental Protection

## Course Outline

- Introduction
- Investigation Method
- Case Study - A Gas Station
- Conclusion
- Discussions



# Training Course (Continued)



Time: 15:20-16:50, March 19 (Tuesday), 2019

**Topic: Risk Assessment for Soil and Groundwater Contamination**

**Dr. Chih Huang**

General Manager, InnoFusion Environmental Management Co., Ltd

## Course Outline

- Why risk-based
- About risk assessment
- Concept and methodology
- Uncertainty analysis
- Case Study on Regulatory Standard





# Training Course (Continued)

Time: 08:30-10:00, March 21 (Thursday), 2019



**Topic: Environmental Forensic Practices of Petroleum Hydrocarbon Contaminated Sites**

**Prof. Colin S. Chen**

Professor, Department of Biotechnology, National Kaohsiung Normal University  
Chairman, Taiwan Association of Soil and Groundwater Environmental Protection

## Course Outline

- Investigation and management of gas stations and underground storage tanks (UST) in Taiwan
- Introduction of environmental forensics
- Forensic tools for petroleum hydrocarbon releases
- Case study



# Training Course (Continued)



Time: 10:20-11:50, March 21 (Thursday), 2019

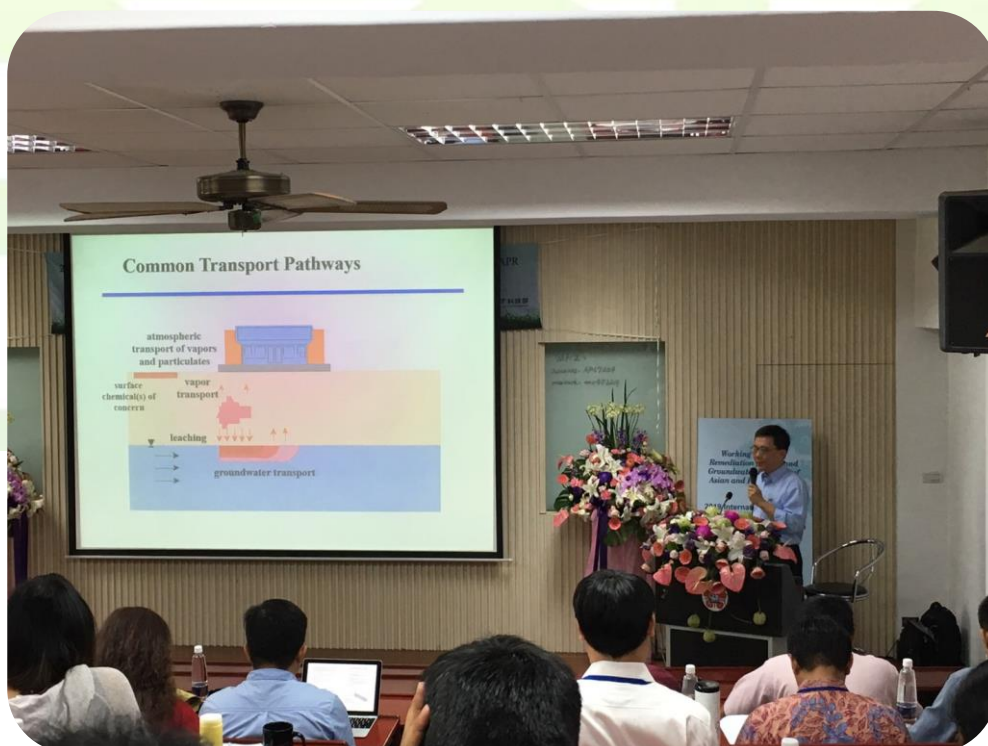
**Topic: Remediation of Organic Contaminated Sites:  
Theories and Case Studies**

**Prof. Jimmy C. M. Kao**

Chair Professor & Director, Institute of Environmental  
Engineering, National Sun Yat-Sen University

## Course Outline

- How far might contaminant travel?
- How fast might contaminant travel?
- What will concentrations be some distance away from the source area?
- How long will it take contaminants to reach a given distance?
- How often should I monitor?
- Where should I monitor?
- What chemical(s) of concern should be monitored?
- How much do I need to reduce source area concentrations to be
- sufficiently protective?





# Training Course (Continued)



Time: 13:20-14:50, March 21 (Thursday), 2019

**Topic: Protection of Farmland Contamination: Investigation and Risk-based Approached Remediation Technology**

**Prof. Zueng-Sang Chen**

Emeritus Professor, Department of Agriculture Chemistry,  
National Taiwan University

## Course Outline

- Design the soil sampling projects
- Select the soil sampling method to make the best survey report
- How to map the high risk potential polluted area based on the general soil survey reports?
- Summary of soil remediation technologies of rural soils.
- Hypothesis and case studies to explain the relationships between heavy metals concentration in brown rice and in soils
- Integrated experiences of remediation strategies by health risk assessment approaching technology for As, Cr, Ni-contaminated rural soils in Taiwan



# Training Course (Continued)



Time: 15:20-16:50, March 21 (Thursday), 2019

**Topic: Sediment Contamination: Protection and Remediation**

**Prof. Shu-Chi Chang**

Associate Professor & Chair, Department of Environmental Engineering, National Chung Hsing University

## Course Outline

- Introduction
- Sediment Protection
- Sediment contamination
- Sediment remediation
- Examples (3 cases)
- Conclusion





# Field & Laboratory Visits : Program

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March 22 (Friday), 2019

08:30-09:30      Transportation from Tainan to Kaohsiung

10:00-11:00      Welcome Remark & Introduction to the Remediation Works at Lin-Yuan Petrochemical Plant

11:00-12:00      Site Tour

12:00-12:30      Transportation

12:30-14:00      Lunch

14:00-14:30      Transportation

14:30-16:30      Laboratory Visits at Cenpro Technology Co. Ltd.

16:30-17:00      Transportation

17:00-19:00      Dinner

19:00-20:00      Back to Tainan

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# Field Visits: Lin-Yuan Petrochemical Plant



Lin-Yuan Petrochemical Plant  
(Petrochemical Business Division, Chinese Petroleum Corporation, Taiwan)



Opening Remark by CPC representative



Site introduction by Mr. Bing-Nan Wang, Sinotech Environmental Technology, Ltd.



## Interesting Sidelights

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Lunch at Nan-Bei Lou(南北樓中餐廳) Chinese Restaurant



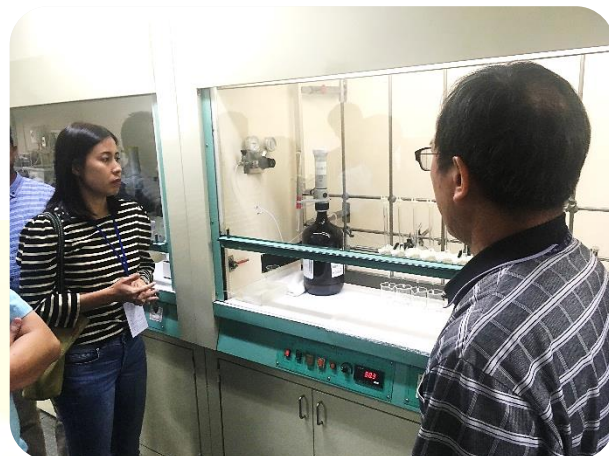


# Laboratory Visits: Cenpro Technology Co. Ltd.

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Brief Introduction by Dr. Shu-The Pan,  
Technical Manager, Cenpro Technology



Laboratory Tour



Discussion



Laboratory Tour



Laboratory Tour



Laboratory Tour



# Interesting Sidelights: Opening Ceremony

Date: 09:15-10:00, March 18 (Monday), 2019

Venue: Rm. 47118, Department of Environmental Engineering, National Cheng Kung University



Minister Tzi-Chin Chang,  
Taiwan Environmental Protection Administration



Secretary General Prof.  
Ching-Chang Lee, NCKU



Group Photo



# Interesting Sidelights: Opening Ceremony (Continued)

Date: 09:15-10:00, March 18 (Monday), 2019

Venue: Rm. 47118, Department of Environmental Engineering, National Cheng Kung University



Chairman Prof. Tsair-Fuh Lin with trainees



Chairman Prof. Tsair-Fuh Lin with trainees



NCKU, Tainan, Taiwan 2019.03.18 - 03.23

Group Photo



# Interesting Sidelights: Tainan City Tour

Date: March 20 (Wednesday), 2019

Venue: An-Ping District & West Central District, Tainan

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Fort Zeelandia / An-Ping Fort



Tait Marketing & Distribution Co., Ltd. Building



## Interesting Sidelights: Tainan City Tour (Continued)

Date: March 20 (Wednesday), 2019

Venue: An-Ping District & West Central District, Tainan

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Navy Destroyer Museum (Te-Yang Destroyer)



Navy Destroyer Museum (Te-Yang Destroyer)



## Interesting Sidelights: Tainan City Tour (Continued)

Date: March 20 (Wednesday), 2019

Venue: An-Ping District & West Central District, Tainan



An-Ping Tree House



Fort Provintia / Chih-Kan Tower



Fort Provintia / Chih-Kan Tower