COURSE SPECIFICATION

Name of higher education institution : Mahidol University

Campus/Faculty/Department : Faculty of Environment and Resource Studies

Section 1 General information

1. **Code and course name:** ENTM 898 Dissertation
2. **Number of credits:** 48 (0-144-0) credit (lecturer-practices-self-study)
3. **Courses and course types:** Doctor of Philosophy Program in Environment and Resource Studies (International Program)
4. **Teachers in charge of courses and instructors:** Doctor of Philosophy Program in Environment and Resource Studies (International Program) Committee and Program instructors
5. **Semester/year:** 1st semester, 1st year
6. **Date of last preparation or update of course details:** July 16, 2021

Section 2 Goals and Objectives

1. **Objectives of the Program**

   The objectives of the program are;

   1.1 Demonstrate moral ethics with academic honesty and reliability as a professional in the field of environment and natural resource research;

   1.2 Knowledgeably and comprehensively understand the principles and theories related to the fields of environment and resource management and conduct self-directed learning and follow the advances in academics and technology in those fields;

   1.3 Analyze and criticize research and conduct research of the environment and resources based on professional morals and using correct procedures of research;

   1.4 Work cooperatively with leadership and high responsibility for assigned work;

   1.5 Apply information technology to mathematical and statistical analysis, compilation and discussion for conducting research, research presentation and dissemination

2. The purpose of developing or improving the program

The development of the world's unstable economy and the irresponsible development affecting the overall ecology and environment are the main causes of environmental imbalances in many places, particularly in Southeast Asian Nations (ASEAN). ASEAN, which consists of 10 ASEAN countries. One of the pillars of the ASEAN Community is "economic". The connections in that region make Thailand have to prepare and handle the economy without borders. Furthermore, climate change is occurring and has impacts in many areas around the world. It has a huge impact on the economic development of every country. These issues cause the system of education to undergo a paradigm shift by focusing on modern knowledge and skills in order to manage natural resources and sustainable environments.

The issue of sustainable development goals is one of the major challenges not only for Asian countries but the whole world. Therefore, the emphasis on education and new skills should be combined with the use of modern technology and be fully suitable for extensive areas. It will be a way to drive the world toward solving sustainability problems and be able to achieve sustainable development goals at all levels and in all areas. In addition, technological advances and rapidly-distributed information allow the world population to consume both accurate and incorrect information and may result in behavior modifications in many ways. Educational institutions must therefore participate urgently by providing the correct knowledge as well as the correct and appropriate economic development of each level to reduce the gap in society at all levels. The urgent issue that educational institutions must support is to enable society and communities to build immunity for themselves against intrinsic internal and external factors, including adhering to and maintaining a unique culture and good traditions.

The new phrase "new normality" coincides with the outbreak of the virus COVID-19. The new disease causes humanity on this planet to adapt at an unprecedented level. "New normality" has been forced upon societies due to this pandemic. The new normality that has emerged may affect humankind for a long time. Therefore, education and research, coupled with the great change of human behavior, will have to be aware of local and global changes. The educational and research institutions should provide support for humanity to live in this world as peaceful and healthy societies that can manage global threats including emerging diseases.

Section 3
Course Description and Implementation

Credits (lecture – practice – self-study)

ENID 898 Dissertation 48 (0-192-0)

สวคร 898 วิทยานิพนธ์

Research design; proposal presentation; research ethics; data and information classification; data analysis; research result synthesis and discussion; compilation of research result and dissertation writing; dissertation presentation, research dissemination; research paper publication and presentation; research dissemination ethics.

การออกแบบการวิจัย การเสนอโครงร่าง จริยธรรมการวิจัย การจำแนกข้อมูลและข่าวสาร การวิเคราะห์ข้อมูล การสังเคราะห์และการอภิปรายผลการวิจัย การรวบรวมผลการวิจัยและการเขียนวิทยานิพนธ์ การนำเสนอวิทยานิพนธ์ การเผยแพร่ผลงานวิจัย การตีพิมพ์และนำเสนอผลงานวิจัย จริยธรรมในการเผยแพร่ผลงานวิจัย

Section 4 Development of Student Learning Outcomes

1. Moralities and Ethics

1.1 Moralities and Ethics that need to be developed.

1) A provider, a selfless, honest behavior, taking into account social and environmental.
2) Have morals and ethics of environmentalists

1.2 Processes or activities to improve learning outcomes.

1) Organize an orientation for students on moral and ethical discipline
2) Incorporating morals and ethics to students at all times
3) Continuously evaluate and inform students periodically so that students have the opportunity to improve and develop themselves.

1.3 Methods for evaluating learning outcomes.

1) Observe and assess student behavior from the performance evaluation in research progress by the program committee and advisors.

2. Knowledge

2.1 Knowledge that must be gained

1) Have knowledge and understanding of the content related to the environment and natural resources.
2) Search for new knowledge from various sources of knowledge related to the environment and natural resources.
3) Able to integrate knowledge to lead to solving research problems for sustainable environmental management or creating new innovations

2.2 Processes or activities to improve leaning outcomes

1) The program provides workshops for students and each semester, students are required to report on their progress and hold a seminar on environment and natural resources.

2.3 Methods for evaluating learning outcomes

1) Students can assess the workshops using the assessment form provided by the program.
2) Student progress reports and academic forum are assessed by the program committee and the major advisor.

3. Intellectual skills

3.1 Intellectual skills to be developed

1) Have the ability to think critically in a systematic way
2) Competent in data analysis and data synthesis, problem solving and decision making.

3.2 Processes or activities to improve leaning outcomes

1) In organizing a workshop, students may work in groups.
2) Qualification examination
3) Proposal defense
4) Dissertation defense
5) Research manuscript

3.3 Methods for evaluating learning outcomes

1) Scores for the Qualification Examination
2) Evaluate forms according to the issues identified to the students.

4. Interpersonal Skills and Responsibilities

4.1 Interpersonal skills and hands-on responsibilities should be developed.

1) Able to work in a team, has the patience to know one's role and others can be a good leader and follower.
2) Able to plan self-learning and take responsibility for others

4.2 Processes or activities to improve leaning outcomes

1) The program provides students with an orientation to understand interpersonal and responsibilities, as well as to create activities for harmony and teamwork.
2) In organizing a workshop, students may work in groups.

4.3 Methods for evaluating learning outcomes

1) Assessed by observing behavior, listening, expressing opinions and responding in presentations.

5. Numerical analysis skills, communication and information technology.

5.1 Numerical analysis, communication and information technology skills that should be developed.

1) Ability to perform numerical analysis
2) Ability to communicate in English, speaking, listening, reading and writing correctly, through international conferences, thesis writing and writing articles
3) Able to choose the right technology and suitable for various conditions

5.2 Processes or activities to improve leaning outcomes

1) The process of collecting both primary and secondary data, analysis and synthesis from the dissertation.

5.3 Methods for evaluating learning outcomes

1) Assessed using forms for academic forum, proposal defense, and dissertation defense.

Section 5 Lesson plans and assessments

1. **Lesson Plans**

Details for 4 workshops provided by the Program are in an appendix

Year	Subject	Teaching activities	Instructors
1	Semester 1		
	1.1.1 Workshop 1: Natural Resources Management	- Lecture - Group discussion - Presentation	Program committee
	1.1.2 Workshop 2: Technology of Environmental Pollution Management	- Lecture - Group discussion	Program committee
	1.1.3 Progress report (2 times)	Presentation	Program committee and major advisor
	1.1.4 Academic forum	Presentation	Program committee and major advisor
	1.1.5 Qualification examination	Presentation and oral examination	Program committee and major advisor
1	**Semester 2**		
	1.2.1 Workshop 3: Research Methodology and Academic Writing	- Lecture - Practices - Presentation	Program committee
	1.2.2 Workshop 4: Advanced Statistics	- Lecture - Practices	Program committee
	1.2.3 Progress report (2 times)	Presentation	Program committee and Major advisor
	1.2.4 Academic forum	Presentation	Program committee and major advisor
	1.2.5 Proposal defense	Presentation	Dissertation comittee
	1.2.6 Dissertation activities	Revised the proposal	Major advisor, dissertation committee

2	**Semester 1**		
	2.1.1 Progress report (2 times)	Presentation	Program committee and major advisor
	2.1.2 Academic forum	Presentation	Program committee and major advisor
	2.1.3 dissertation activities	Data collection	Major advisor, dissertation committee
2	**Semester 2**		
	2.2.1 Progress report (2 times)	Presentation	Program committee and major advisor
	2.2.2 Academic forum	Presentation	Program committee and Major Advisor
	2.2.3 Dissertation activities	Data evaluation	Major advisor, dissertation committee
	2.2.4 1st manuscript	Manuscript writing and submission	Major advisor, dissertation committee
3	**Semester 1**		
	3.1.1 Progress report (2 times)	Presentation	Program committee and major advisor
	3.1.2 Academic forum	Presentation	Program committee and major advisor
	3.1.3 Dissertation activities	Results writing	Major advisor, dissertation committee
3	**Semester 2**		
	3.2.1 Progress report (2 times)	Presentation	Program committee and major advisor
	3.2.2 Academic forum	Presentation	Program committee and major advisor
	3.2.3 2nd manuscript	Manuscript writing and submission	Major advisor, dissertation committee

	3.2.4 Dissertation defense	Presentation	Major advisor, dissertation committee

5. Assessment

PLOs *	Activities	Assessments	Semester
1	1.1.2, 1.2.2, 2.1.2, 2.2.2, 3.1.1, 3.2.1	Progress report evaluation assessed by the program committee and the major advisor	1, 2, 3, 4
2	1.1.1, 1.2.1, 2.1.1, 2.2.1	Workshop evaluation	1, 2, 3, 4, 5, 6
3	1.1.3, 1.2.3, 2.1.3, 2.2.3, 3.1.2, 3.2.2	Academic forum evaluation assessed by the program committee and the major advisor	1, 2, 3, 4, 5, 6
4	1.2.5, 2.1.4, 2.2.4, 3.1.3	Dissertation advisor evaluation	2, 3, 4, 5, 6
5	1.1.4, 1.2.4, 2.2.5, 3.2.3, 3.2.4	1. Scores for the Qualification Examination 2. Proposal defense, and dissertation defense evaluation.	1, 2, 4, 6

* Reference the Program learning outcomes in appendix

Section 6 Assessment and improvement of the program operations

1. Strategies for evaluating the effectiveness of each activity by students.

To evaluate the effectiveness of this activity, the program will be assessed both during the event and, when finished, is composed.

1.1 Group discussion between teachers and learners

1.2 Observation from learners' behavior

1.3 Instructor assessment form and individual activity assessment form

2. Conducting a review and planning to improve the effectiveness of the activities from the results of the assessment of the activities achievement and effectiveness have planned to improve teaching and activities details in order to increase the quality as follows:

2.1 Improve activities every 3 years or as student’s suggestion and comments

2.2 Change or switch instructors who conduct activities to give students perspectives on applying this knowledge to problems arising from instructors' research.

Appendix

Program Learning Outcomes (PLOs)

1. Demonstrate moral ethics as a professional in the field of environment and natural resource research
2. Analyze the complex relationships between natural and human systems
3. Solve environmental problems using accurate information, technology and modern tools
4. Integrate facts, concepts, and methods from multidisciplinary approaches to make ethical and informed judgments on complex environmental issues
5. Create novel interdisciplinary research studies for sustainable development at the state, national and regional level in terms of publication and innovation.

Table Relationship between Courses of the Program and Program Learning Outcomes

Code	Name	Credits	PLOs				
			1	2	3	4	5
ENID898	Dissertation	48	M	M	M	M	M

I = ELO is introduced & assessed R = ELO is reinforced & assessed

P = ELO is practiced & assessed M = Level of Mastery is assessed

Appendix G

Research projects

Name: Assoc.Prof.Dr.Cheerawit Rattanapan

No.	Name of research project	Research concept	Funding	Period
1	An examination of the factors that influence young drivers' willingness to speed and text while driving for sustainable encouragement of safety driving in Thailand.	The purpose of this study was to examine young drivers' beliefs, perceptions, and decision- making processes that may determine their willingness to engage in four risky driving behaviours: texting while driving, texting while stopped, high level speeding and low level speeding. The predict factor of young drivers' (non-intentional) willingness to engage in these aforementioned on road behaviours was investigated for proposing the sustainable prevention of traffic injury in Thailand.	Mitsui Sumitomo Insurance Welfare Foundation	1 year (2018-2019)
2	Appropriate Model for Plastic Waste Management in Coastal Province toward Stakeholder integration and Sustainability : a Case Study of Trang Province.	The objective of this research was to develop the appropriate model for plastic waste management in the coastal province toward stakeholder integration and sustainability for Trang province. The volume and situation of plastic waste management, the plastic reduction behavior among tourists and household, the strategic analysis of the coastal area for plastic waste management	National Research Council of Thailand (NRCT))	1 year (2019-2020)

No.	Name of research project	Research concept	Funding	Period
		by SWOT matrix were collected. Then, the collection data were prioritized by the in- depth interview technique. Finally, the developed model was approved by the workshop with the stakeholders.		
3	Sustainable Supply Chain Management of the Tire Industry in Thailand by Enhancing Green Productivity with Value Chain Analysis	The objective of this research was to develop the sustainable approach for supply chain management of tire supply chain in Thailand by green productivity with value chain analysis. The performance of tire supply chain was collected and analyzed in the pattern of value chain analysis. Then, the enhancement approach of tire supply chain was developed by clean technology. Finally, the green productivity, supply chain value and environmental impact were analyzed for reducing the cost operation of developed approach.	National Research Council of Thailand (NRCT))	1 year (2020-2021)

Name: Assoc.Prof.Dr.Jaruwan Wongthanate

No.	Name of research project	Research concept	Funding	Period
1	Biohythane and biobriquette production from agricultural and industrial wastes	Thailand is an agricultural land, so biowaste from agricultural sector and agro-industrial process can be applied for bioenergy that is the biowaste management.	National Research Council of Thailand (NRCT)	2 years (2019-2021)

		The objectives of this study are: (1) to investigate the potential biohythane and biobriquette production from agro-industrial waste and (2) to generate the bioenergy from biohythane and biobriquette production from agro-industrial waste. This study contributed useful information to enhance the waste-to-energy in the agricultural and industrial sectors.		
2	Biofuel production from organic wastes by thermal and biological conversion processes	An energy crisis can be a big problem and severely impact the development of a country. Hence, the energy from biomass is an alternative energy source and it can be used as biofuel that is readily available and inexpensive. The objectives of this study are: (1) technical feasibility of biofuel from water hyacinth mixed with cassava starch sediment by biological and physical conversion processes and (2) comparison of the gross electricity production in these processes. This study contributed significant information to promotion of energy efficiency in the community.	The Energy Conservation Promotion Fund, Energy Policy and Planning Office, Ministry of Energy, Thailand.	2 years (2016-2018)

Name: Assoc.Prof.Dr.Kanchana Nakhapakorn

No.	Name of research project	Research concept	Funding	Period
1	Thai Coast: Coastal Vulnerability, Resilience and Adaptation in Thailand	The goal of the Thai-coast project is to improve scientific understanding of the vulnerability of Thailand's shoreline and coastal communities to hydro-meteorological hazards, including storms, floods and coastal erosion, under future climate change scenarios.	The Natural Environment Research Council (NERC), the Economic and Social Research Council (ESRC) and the Thailand Research Fund, funded through the Newton Fund in Thailand.	2018-2021
2	Examining practices of community-driven Disaster Risk Reduction (DRR) entrepreneurship in response to new knowledge of climate-change risk, Thailand	Predictions suggest that ¾ of the world's population will live within 60 km of the coastline by 2020, with rising sea-levels and coastal erosion threatening coastal populations. This project focuses on one of the most vulnerable coastal countries, Thailand, where 11 million people, 17% of the population, live in coastal communities. These	GCRF through Edge Hill University	2020-2021

No.	Name of research project	Research concept	Funding	Period
		communities are vulnerable to climate change-induced hazards, including storms, floods and coastal erosion. Potential sea-level rise of 1 metre in the next 40 years, poses an unprecedented challenge to Thai planning agencies and government organisations who face coastal flooding and erosion costs of up to £70 million by 2100. Such patterns raise urgent questions about how governments and communities can come to terms with how increased climate risk might work alongside, or within, other risk-reduction initiatives. Recent work has acknowledged the current inefficiency of government and institutional arrangements in responding to increased climate risk – and emerging research is beginning to chart the novel, entrepreneurial forms of Disaster Risk Reduction (DRR) practice that community organisations are employing in order to respond to increased knowledge of new threats (Dickinson, 2019; Mikulewicz, 2018)		
3	Climate Change, Coastal Erosion and Risks of Flooding to Low-	Thailand is categorised as Upper Middle-Income Countries by the DAC (list of ODA Recipients). The specific development tissue addressed by the project is building	GCRF through Edge Hill University	2019-2020

No.	Name of research project	Research concept	Funding	Period
	Lying Coastlines Subject to Tropical Storms, Thailand	resilience against coastal erosion and flooding. The project's aim is to quantify links between climate change, coastal erosion and flooding in populated areas exposed to tropical storms. This addresses the UN Sustainable Development Goal 13 ('To take urgent action to combat climate change and its impacts).		
4	Assessing the Health Impacts of Air Pollution in Thailand (TAPHIA)	Using monitored data obtained from PCD permanent stations to illustrate the distribution of air pollution (PM10 and/or PM2.5) to estimate the health impact	The Thailand Research Fund, funded through the Newton Fund in Thailand.	2017-2020

Name: Assoc. Prof. Dr. Nathsuda Pumijumnong

No.	Name of research project	Research concept	Funding	Period
1	Paleoenvironmental reconstruction in the log coffin culture	The ongoing interactions between humans and the environment reflect the complex dynamics of both natural and inter-dynamic mechanisms of human systems. Changes in environmental conditions, especially climate, are important for the adaptation of various organisms. In Thailand, changes in the environment and climate at many periods still lack clear information, especially one prehistoric period that spans 2,600 - 1,100 years ago and is important to the settlement of people in Thailand is “Coffin Culture”. The coffin culture is a dominant death culture in the highlands of Thailand and this culture is evident in many parts of Thailand including Southeast Asia. Previous studies have not been able to solve the mystery of environmental conditions, climate and environmental changes over the length of the coffin culture period that may be important factors regarding the coffin community/social culture. Therefore, this research aims to create a clear projection of the environment in the coffin	National Research council (Intermediate Research Fellowships)	2019-2021

No.	Name of research project	Research concept	Funding	Period
		culture era in Thailand and to connect those images together as a driving factor to create a social picture in the coffin culture era and trying to connect the coffin culture in Thailand and other regions where evidence remains. In addition, the environment during the period will be compared with the global context to see differences or similarities and find the drivers of the changes. The study will use wood samples from explored archaeological sites and additional collection of some of the sites. The dendrochronology method, archaeological wood is used to create a dendrochronology index, and the stable oxygen isotopes of the tree rind width are used to create a projection of the past environment in the log coffin culture. The result of this research is a projection of environmental conditions along the length of the coffin culture covering time and space. The wooden coffin socio-cultural simulations are based on variations in the environment and climate as well as archeological data. Comparing the environmental conditions during the coffin culture in Thailand and the global context, these data will		

No.	Name of research project	Research concept	Funding	Period
		be useful both for the academic community at the macro level and for a deeper understanding at the micro and local level where evidence is found.		

Name: Assoc. Prof. Dr. Nuanchan Singkran

No.	Name of research project	Research concept	Funding	Period
1	Determination of carbon sequestration and oxygen production of trees in public parks of Bangkok Metropolis for sustainable urban development and reduction of CO_2 emission into the atmosphere	Determination of carbon sequestration and oxygen production of trees in public parks of Bangkok Metropolis for sustainable urban development and reduction of carbon dioxide (CO_2) emission into the atmosphere is a research project to support the sustainable development goals (SDGs) of the United Nation (United Nations Thailand 2015) under the context of green area research for human sake and sustainability of all living creatures. The research project reponds to the SDG 11 (Sustainable cities and communities) and SDG 13 (Climate action). These are to achieve the quality of life of urban population and alleviate the BMA's environmental problems that occur together with the economic expansion, so that Bangkok continues its growth with friendly environment, is a sustainable metropolis and low carbon society, and reduce the effect of climate change.	The Korea Foundation for Advanced Studies' Asia Research Center of Chulalongkorn University	1 year (2020-2021)

Name: Assoc. Prof. Prapeut Kerdsueb

No.	Name of research project	Research concept	Funding	Period
1	ASEAN Flyway Network Waterbird Census and Wetland Assessments 2019: Krabi Estuary And Bay, Pak Tale Laem Phak Bia And Khok Kham Wetlands	Thailand is a partner of the East Asian-Australasian Flyway Partnership (EAAFP) since 2010. It has three designated coastal flyway network sites namely Krabi Estuary and Bay (EAAF 084/ 21,299 ha), Pak Tale Laem Phak Bia (EAAF 121/ 86,66 ha), and Khok Kham (EAAF 122/ 7,561 ha). The sites are designated under the specifications of the Partnership. Among the many species supported by Thai wetlands, the region has been recognised for its numerous sightings of non-breeding Spoon-billed Sandpipers, a Critically Endangered shorebird that migrates along the EAAF. Krabi Estuary and Bay, Pak Tale Laem Phak Bia, and Khok Kham support 173,114 waterbirds, 44,712 waterbirds, and 216,978 waterbirds, respectively. There 3 first IUCN global Red List of Threatened Animals such as the Spoon-billed Sandpiper (CR), Great Knot (EN), Red Knot (EN), Spotted Greenshank (EN), Chinese Egret (VU). During this study, there were no more than 20 participants. Initially, there may be obstacles in the survey as understanding the forms of data recording	Asian Center for Biodiversity	1 year (2019)

No.	Name of research project	Research concept	Funding	Period
		and surveying and counting bird populations, which are regarded as the strengths of a long and continuous survey team. The challenging issues encountered in this work are: 1) understanding communication between the database management team and the survey team and 2) the management guidelines for future habitat and ecosystems.		
2	ASEAN Flyway Network Waterbird Census and Wetland Assessments 2019: Don Hoi Lot-Ban Khlongkhone Wetland (New Se)	Thailand is a partner of the East Asian-Australasian Flyway Partnership (EAAFP) since 2010. Don Hoi Lot-Ban Khlongkhone or Don Hoi Lot Ramsar site is to be submitted as a new EAAFP Flyway Network site in 2020. The sites are designated under the specifications of the Partnership. Among the many species supported by Thai wetlands, the region has been recognized for its numerous sightings of non-breeding Spoon-billed Sandpipers, a Critically Endangered shorebird that migrates along the EAAF. Don Hoi Lot-Ban Khlongkhone supports 133,599 waterbirds. There are 13 species of globally threatened and near threatened species as per the IUCN global Red List of Threatened Animals such as Great Knot (EN), Black-tailed Godwit (NT), Asian Dowitcher (NT), Eurasian Curlew (NT), and Painted	Asian Center for Biodiversity	1 year (2019)

No.	Name of research project	Research concept	Funding	Period
		Stork (NT), etc. In conducting this study, there were no more than 20 participants. Initially, there may be obstacles in the survey as understanding the forms of data recording and surveying and counting bird populations, which are regarded as the strengths of a long and continuous survey team. The challenging issues encountered in this work are: 1) understanding communication between the database management team and the survey team, and 2) the management guidelines for future habitat and ecosystems.		
3	Review and Update on the Status of Key Invasive Alien Species in Wetlands of The Lower Mekong Basin	The project will conduct a review of existing information regarding the status of key IAS in their wetland sites (Kaper Estuary/Laemson Marine National Park/Kraburi Estuary Ramsar site, Bang Prakong River and Songkram River Ramsar Site). Information to collect include all published scientific articles, technical reports, country policy and management documents regarding IAS and the focal species. The project will then carry out field surveys and community interviews to collect new data about IAS. We will focus our study on four key invasive alien species: Giant mimosa (Mimosa pigra), Water hyacinth (Eichhornia crassipes), Golden apple snail	IUCN Asia under the Mekong WET Program	1 year (2021)

No.	Name of research project	Research concept	Funding	Period
		(Pomacea canaliculata) and Suckermouth catfish (Hypostomus plecostomus). In addition to these focus species, through field surveys the country teams will identify other IAS that are important at each wetland site. Field observations and new data collection will focus on the following topics: 1) Status of invasion, including distribution maps for IAS, only qualitative assessment of abundance and trends based on interviews with local people are included since quantitative assessment of abundance and distribution mapping for these two species are impossible to achieve within the time frame of the study, 2) Current IAS management practices being implemented at each wetland site, 3) Technical capacity of the wetland sites regarding IAS control and management, 4) Impacts of IAS on the livelihoods of local communities (both negative and positive), 5) Presence of other IAS that are important at each wetland site, 6) Climate-related issues with regard to IAS management, and 7) Consultations with wetland managers and government agencies responsible for IAS control.		

Name: Assoc. Prof. Dr. Sura Pattanakiat

No.	Name of research project	Research concept	Funding	Period
1 (*Upcoming*)	Food Security Assessment based on Land Cover and Land Use Change Situation in Mae Chang Watershed, Lampang Province	Space technologies and geo-informatics application to evaluate the food security under land cover and land use change (LCLUC) situation in Mae Chang watershed through the following issues: 1. Land cover/ Land use assessment and change prediction as well as crop intensity, particular 3 economic crops such as rice, corn, and casava. 2. Evaluate the annual water yield 3. Evaluate soil erosion, sediment, and nutrient export 4. Economic crop suitability assessment 5. Food security assessment based on LCLUC	Agricultural Research Development Agency (ARDA)	Initiate ≈ October 2021 (1 year)
2 (*Upcoming*)	Drought Impact Assessment on Agricultural Security in Mae Chang Watershed Lampang Province	The application of space technologies and geo-informatics to evaluate drought impact on agricultural land in Mae Chang watershed through the following issues: 1. Land cover/ Land use assessment and change prediction 2. Simulate future climate scenario under IPCC	Agricultural Research Development Agency (ARDA)	Initiate ≈ July or August 2021 (1 year)

No.	Name of research project	Research concept	Funding	Period
		3. Specify the drought situation by using Standardized Precipitation Index (SPI) 4. Evaluate water yield and water scarcity 5. Agricultural land suitability under drought situation		
3	Development of Particulate Matter 2.5 Forecast and Warning System in Lampang Province	Space technologies and geo-informatics application to assess PM2.5 distribution and develop the geospatial model of PM2.5 concentration in Lampang Province by combining several geospatial information incorporated with ground station data	National Research Council of Thailand (NRCT)	21 April 2021 - 20 October 2022
4	Ecosystem Services Assessment for Urban Green Space Management, Kanchanaburi Province	The application of space technologies and geo-informatics to evaluate the urban ecosystem services within 3 districts of Kanchanaburi province, including Mueang Kanchanaburi, Tha Muang, and Tha Maka by interpreting and classifying land use /land cover and change prediction couple with the value transfer method	Geo-Informatics and Space Technology Development Agency (Public Organization) - GISTDA	1 October 2020 - 30 September 2021
5	The Economic Trend and Potential of Economic Plants List in Thailand	The observation and gathering of the primary and secondary data about the byproduct's utilization from the economic plants and for analyzation economic plants' potentiality and market demand	Biodiversity-based Economy Development Office (Public	2 June 2020 - 28 January 2021

No.	Name of research project	Research concept	Funding	Period
			Organization) - BEDO	
6	Geo-informatics to Assess and Predict Floods and Droughts in Nam Mae Sai – Nam Ruak Watershed	Space technologies and geo-informatics application for transboundary watershed management of Thailand and Myanmar in Sai-Ruak watershed by following objectives: 1. To identify the state of land cover / land use changes in Mae Sai - Nam Ruak watershed in 2000, 2010 and 2020, and predict future land use in 2030 through the use of geo-informatics technology 2. To classify land suitability in Mae Sai - Nam Ruak watershed 3. To establish flood and drought risk area mapping using geo-informatics technology 4. To propose land use planning for sustainable watershed management	- Mae Fah Luang University - Office of the National Water Resources (ONWR) - Lancang-Mekong Cooperation Special Fund	28 February 2020 - 1 January 2022
7	Geo-informatics Technology for Green Space Assessment in Nonthaburi Province	Space technologies and geo-informatics application for interpreting and classifying land use land cover and green space in Nonthaburi province, including green space as public service, utility, road median, economic, nature, and fallow. Furthermore, urban green space	Geo-Informatics and Space Technology Development Agency (Public	1 October 2019 - 30 September 2020

No.	Name of research project	Research concept	Funding	Period
		index (UGSI), per capita green space (PCGS), as well as green space accessibility, have been analyzed.	Organization) - GISTDA	
8	Geo-informatics Application to Monitoring Land Cover/ Land Use Change in Nakhon Pathom Province	Space technologies and geo-informatics application for interpreting and classifying land use land cover changes and predicting the future LULC under the Business as Usual (BAU) scenario in Nakhon Pathom Province	Geo-Informatics and Space Technology Development Agency (Public Organization) - GISTDA	1 October 2019 - 30 September 2020
9	Water and Ecosystem Security in Lower Part of Mae Nam Phetchaburi Subbasin	The application of geo-informatics to evaluate the water and ecosystem security in Lower Part of Mae Nam Phetchaburi Subbasin by following objectives: 1. To classify and predict land use changes in the Lower Part of Mae Nam Phetchaburi subbasin by using geo-informatics technology 2. To assess the water balance caused by land use changes in the Lower Part of Mae Nam Phetchaburi subbasin 3. To assess the biodiversity in the Lower Part of Mae Nam Phetchaburi subbasin.	Agricultural Research Development Agency (ARDA)	21 December 2018 - 20 December 2019

Name: Assistant Prof.Dr.Gunn Panprayun

No.	Name of research project	Research concept	Funding	Period
1	Solar Powered Boat to Promote Sustainable Tourism Policy	To deploy Solar Powered Boat to Mak island, Trat province, to promote sustainable tourism and to collect boating data for policy suggestions.	NRCT	March 2021 – Feb 2022

Name: Asst.Prof.Dr.Kritana Prueksakorn

No.	Name of research project	Research concept	Funding	Period
1	Performance evaluation of CMIP6 GCMs to simulate historical temperature and precipitation over Southeast Asia	This research aims to identify the most suitable Global Climate Models (GCMs) to simulate climate in the past in Southeast Asia (SEA) to obtain a group of GCMs with the highest potentials for accurately simulating future climate. This will be useful in making decisions and preparing for prevention and mitigation of damage and potential impacts from climate change, probably happening in the next 10-20 years in countries in SEA.	-	December 2021 – November 2024
2	Social life cycle assessment of a tourist island – a case study of Phuket	As one of the most popular tourist destinations in Thailand, Phuket has attracted an increasingly large number of visitors every year. Not only being a great contributor to the gross provincial product (GPP), Phuket tourism also has fostered better opportunities for residents' careers and other industries' development. However, the more tourists Phuket receives, the heavier the social burden to local people this island carries on. Therefore, it is necessary to evaluate the social impacts that tourism has brought about for Phuket and take the	-	December 2021 – November 2024

No.	Name of research project	Research concept	Funding	Period
		damage caused into the economic accounting of this island. This study aims to evaluate social impacts for Phuket using life cycle assessment (LCA). The results of this study could be used as supportive information about destructive influences caused by tourism to introduce an appropriate policy to ameliorate the performance of tourism.		
3	Agri-tourism based energy model for mitigation of global warming	This research aims to develop a pilot project for community enterprise by integrating the principle of circular economy together with an idea about agriculture tourism, which is proved that it can help to sustainably develop agricultural provinces. The target is to help increase the local people's income, to encourage food production in tourist area itself, and to help reduce open burning from agricultural practices. The success of this project can be a new model for development of Thailand for many provinces without high cost of investment.	-	December 2021 – November 2024

Name: Asst.Prof.Kulvadee Kansuntisukmongkol

No.	Name of research project	Research concept	Funding	Period
1	The Pilot Project to Develop School Based Curriculum of Local Ecological Knowledge for Educational Institutes around Wang Chan Forest Project	The pilot project to develop school-based curriculum of local ecological knowledge for educational institutes around Wang Chan Forest Project has its aim to build a learning package to study local ecosystems. The tools can be integrated into official curriculum scheme of both school-based and non-formal curriculums. Wang Chan Forest Project of PTT Reforestation Institute and local communities have participated in building the curriculum. The curriculum building has yielded learning experiences among the teamwork and organized learning network among people who are working with the youth in the area. The end products are teaching plan handbooks for teachers and books for students. The objectives of curriculum building project are to (1) apply research findings from the previous research project regarding natural resources and communities in Pah Yup Nai Sub-district together with the capacity of Wang Chan Forest project of PTT Reforestation Institute to develop school-based curriculum of local ecological knowledge for educational institutes around Wang Chan Forest Project,	PTT Reforestation Institute	1 year (2018)

		(2) make use of the capacity of Wang Chan Forest project of PTT Reforestation Institute by providing learning area of local resource base with participation of various sectors, and (3) develop guidelines for future activities in line with Sustainability and Co-Benefit concepts.		

Name: Asst.Prof. Dr. Monthira Yuttitham

No.	Name of research project	Research concept	Funding	Period
1	Greenhouse gases emissions and potential of carbon stock in rubber tree plantations in Eastern Thailand	Thailand Rubber tree plantations and product is the large scale product in the World. Based on global Rubber tree plantations is high potential to stock carbon and can be mitigation greenhouse gases emissions. Thus, these research aims to study the Greenhouse gases emissions and potential of carbon stock in rubber tree plantations in Eastern Thailand. The objectives are 1) To estimated soil carbon stock in Rubber tree planation, 2) To estimated carbon stock from above ground biomass using UAV, 3) To estimated potential of carbon stock in rubber tree plantations, 4) To estimated greenhouse gas emission and recommendation mitigation options from Rubber tree planation to farmer. In addition, the develop methodology and equations from UAV, carbon stock from soil and above ground biomass can be databased of Thailand for Thailand Voluntary Emission Reduction Program: T-VER in agriculture and forest sector. Moreover, the mitigations	National Research Council of Thailand (NRCT))	1 year (2021-2022)

		options from rubber tree plantations should be recommended to framer and related organization.		

Name: Assist. Prof. Dr. Noppol Arunrat

No.	Name of research project	Research concept	Funding	Period
1	Alternative evaluation on land use management to cope with climate change: a case study in Phichit Province	The objectives of this study are: 1) to find a model of cropping system in the area that is not suitable for growing rice; 2) to assess the carbon footprint and the economic value of the crop system; 3) to assess the impact of climate change on farmers' adaptation approaches; and 4) to suggest effective adaptation approaches to support decision-making on land use modifications. The findings will help to improve the understanding for the future policy making on adaptation strategies to cope with the impact of climate change in the future.	Mahidol University	1 year (2021-2022)
2	Knowledge management for rice varieties and network management of Young Smart Farmer to cope with climate variability	The objectives of this study are: 1) to transfer and disseminate the learning process, knowledge of farmers in rice variety management; 2) transfer and disseminate the process of creating and managing the Young Smart Farmer's network with; and 3) prepare manuals and infographic media summarizing the rice variety management knowledge to support environmental change and use in public policy through community participation process.	National Research Council of Thailand (NRCT)	1 year (2019-2020)

No.	Name of research project	Research concept	Funding	Period
3	Evaluation and comparison of environmental, economic and management aspects between individual and large scale farmers to alternative mitigation options	A large-scale agricultural extension program in Thailand is established under the economy of scale concept. The objectives of this study are: 1) to evaluate and compare between individual and large-scale farming in the environmental aspect by using the life cycle assessment of greenhouse gas emission and water footprint assessment. Moreover, costs and return, and cost and benefit ratio were used to evaluate the economic aspect; and 2) to investigate the role of communication, participation, and management of both farming. This study contributed valuable information not only for farmers by offering opportunities to adopt farm practices that could mitigate GHG emissions, water footprint, and increase farm income, but also for policymakers regarding the identification of key options for sustainable farming and climate change mitigation in Thailand's agricultural sector.	National Research Council of Thailand (NRCT)	1 year (2018-2019)

Name: Asst. Prof. Dr. Piyakarn Teartisup

No.	Name of research project	Research concept	Funding	Period
1	ASEAN Flyway Network Waterbird Census and Wetland Assessments 2019: Krabi Estuary And Bay, Pak Tale Laem Phak Bia And Khok Kham Wetlands	Thailand is a partner of the East Asian-Australasian Flyway Partnership (EAAFP) since 2010. It has three designated coastal flyway network sites namely Krabi Estuary and Bay (EAAF 084/ 21,299 ha), Pak Tale Laem Phak Bia (EAAF 121/ 86,66 ha), and Khok Kham (EAAF 122/ 7,561 ha). The sites are designated under the specifications of the Partnership. Among the many species supported by Thai wetlands, the region has been recognised for its numerous sightings of non-breeding Spoon-billed Sandpipers, a Critically Endangered shorebird that migrates along the EAAF. Krabi Estuary and Bay, Pak Tale Laem Phak Bia, and Khok Kham support 173,114 waterbirds, 44,712 waterbirds, and 216,978 waterbirds, respectively. There 3 first IUCN global Red List of Threatened Animals such as the Spoon-billed Sandpiper (CR), Great Knot (EN), Red Knot (EN), Spotted Greenshank (EN), Chinese Egret (VU). During this study, there were no more than 20 participants. Initially, there may be obstacles in the survey as understanding the forms of data recording and surveying and counting bird populations, which are regarded as the strengths of a long and continuous survey	Asian Center for Biodiversity	1 year (2019)

No.	Name of research project	Research concept	Funding	Period
		team. The challenging issues encountered in this work are: 1) understanding communication between the database management team and the survey team and 2) the management guidelines for future habitat and ecosystems.		
2	ASEAN Flyway Network Waterbird Census and Wetland Assessments 2019: Don Hoi Lot-Ban Khlongkhone Wetland (New Se)	Thailand is a partner of the East Asian-Australasian Flyway Partnership (EAAFP) since 2010. Don Hoi Lot-Ban Khlongkhone or Don Hoi Lot Ramsar site is to be submitted as a new EAAFP Flyway Network site in 2020. The sites are designated under the specifications of the Partnership. Among the many species supported by Thai wetlands, the region has been recognized for its numerous sightings of non-breeding Spoon-billed Sandpipers, a Critically Endangered shorebird that migrates along the EAAF. Don Hoi Lot-Ban Khlongkhone supports 133,599 waterbirds. There are 13 species of globally threatened and near threatened species as per the IUCN global Red List of Threatened Animals such as Great Knot (EN), Black-tailed Godwit (NT), Asian Dowitcher (NT), Eurasian Curlew (NT), and Painted Stork (NT), etc. In conducting this study, there were no more than 20 participants. Initially, there may be obstacles in the	Asian Center for Biodiversity	1 year (2019)

No.	Name of research project	Research concept	Funding	Period
		survey as understanding the forms of data recording and surveying and counting bird populations, which are regarded as the strengths of a long and continuous survey team. The challenging issues encountered in this work are: 1) understanding communication between the database management team and the survey team, and 2) the management guidelines for future habitat and ecosystems.		
3	Review and Update on the Status of Key Invasive Alien Species in Wetlands of The Lower Mekong Basin	The project will conduct a review of existing information regarding the status of key IAS in their wetland sites (Kaper Estuary/Laemson Marine National Park/Kraburi Estuary Ramsar site, Bang Prakong River and Songkram River Ramsar Site). Information to collect include all published scientific articles, technical reports, country policy and management documents regarding IAS and the focal species. The project will then carry out field surveys and community interviews to collect new data about IAS. We will focus our study on four key invasive alien species: Giant mimosa (Mimosa pigra), Water hyacinth (Eichhornia crassipes), Golden apple snail (Pomacea canaliculata) and Suckermouth catfish (Hypostomus plecostomus). In addition to these focus	IUCN Asia under the Mekong WET Program	1 year (2021)

No.	Name of research project	Research concept	Funding	Period
		species, through field surveys the country teams will identify other IAS that are important at each wetland site. Field observations and new data collection will focus on the following topics: 1) Status of invasion, including distribution maps for IAS, only qualitative assessment of abundance and trends based on interviews with local people are included since quantitative assessment of abundance and distribution mapping for these two species are impossible to achieve within the time frame of the study, 2) Current IAS management practices being implemented at each wetland site, 3) Technical capacity of the wetland sites regarding IAS control and management, 4) Impacts of IAS on the livelihoods of local communities (both negative and positive), 5) Presence of other IAS that are important at each wetland site, 6) Climate-related issues with regard to IAS management, and 7) Consultations with wetland managers and government agencies responsible for IAS control.		

Name: Asst.Prof.Dr. Sukanya Sereenonchai

No.	Name of research project	Research concept	Funding	Period
1	Communication for the coexistence of communities facing haze pollution	This research aimed to develop a way of coexistence in the community between people who burn and do not burn agricultural residues, and figure out communication methods developed from the practical community way under the concept of participatory communication. Mixed research approaches in terms of psychology, economics and communication were employed based on the communities' ways of life and culture to understand people's thoughts and factors affecting their behaviors. Through the survey of public risk perception, awareness and willingness to pay (WTP) for haze management in Chiang Mai Province, including participatory communication intervention at Ban Thap and Pang Hin Fon Sub-Districts, Mae Chaem District, Chiang Mai Province to manage the haze problem, to synthesize and propose a communication model for haze management that is consistent with the community context.	Thailand Science Research and Innovation (TSRI) and the Office of the Higher Education Commission (OHEC)	2 years (Mar.2019-Feb.2021)

No.	Name of research project	Research concept	Funding	Period
2	Integrating Stakeholders on Solid Waste and Wastewater Management Plan Development in Sa Kaeo Special Economic Zone and Adjacent Districts	The objectives of this study are to: (1) study the solid waste and wastewater (SW-WW) management plan integration between local government officials in Sa Kaeo Special Economic Zone (SEZ) and adjacent districts; and (2) develop cooperation SW-WW management plan. This study has collected and analyzed the SW-WW management plan from central and local governmental offices and study their linkage. The researchers develop a SW-WW management plan with participation from local community leaders, local government officials, entrepreneurs and professionals. Creating a participatory integrated SW-WW management plan for all sectors consisting of four steps: Step 1 Building an understanding of policy and plan requirements; Step 2 Collect policy data and related roadmaps; Step 3 Plan development with participatory process, through participatory action research process having methods for plan analyzing by applying Objectives and Key Results (OKRs), SWOT Analysis, TOWS Matrix, Eisenhower Method, Risk Assessment, Check List, as well as information from local surveys; and Step 4	Thailand Science Research and Innovation (TSRI)	1 year 73 days (Aug.2019-Nov.2020)

No.	Name of research project	Research concept	Funding	Period
		Integrated SW-WW management plan was proposed to the stakeholders to achieve the practical plan.		
3	Behavioral insights of farmers and surrounded people to develop a zero-burn agricultural community	This research focuses on: 1) finding alternatives and assessing the cost-return in utilization of rice straw; 2) assessing exposure to air pollution; 3) assessing the willingness to pay for non-burning straw management and the willingness to receive compensation for a behavior change toward non-burning straw management; 4) analyzing factors affecting rice straw management behavior; 5) communicating alternatives and cost-returns for utilizing rice straw, including communicating the results of soil physical and chemical properties analysis; and 6) analyzing lessons-learned, success factors and synthesizing policy advocacy to drive the zero-burning agricultural community in conjunction with the agricultural way of Thai society.	Mahidol University (Fundamental Fund: Basic research)	1 year (Oct.2020-Sep.2021)

Name: Asst.Prof.Dr.Sureewan Sittijunda

No.	Name of research project	Research concept	Funding	Period
1	2,3 Butanediol and succinic acid productions from sugar industrial wastes and prototype of synthesis and properties of Poly(butylene succinate) by melt polycondensation	The objective of this study was to isolate the succinic acid-producing bacteria from rumen fluid. Rumen fluid was collected by stomach tube technique. Then transfer to serum bottle, capped with a rubber stopper. The initial pH of the rumen fluid was 6.80. The rumen fluid was kept at room temperature before using it as the inoculum source. The experiment was conducted using a serum bottle. Five ml of rumen fluid was added into the enrichment medium that contained 20 g/L glucose, 3 g/L K_2HPO_4, 5 g/L yeast extract, 2 g/L NaCl, 2 g/L $(NH_4)_2 SO_4$, 0.2 g/L $CaCl_2.2H_2O$, 0.4 g/L $MgCl_2.6H_2O$, and 15 g/L $MgCO_3$ (Lee et al., 2005). Flushing with nitrogen gas to create an anaerobic condition and shake at 150 rpm at 37 °C. After 72 h, 50 μL of samples were spread onto an enrichment agar. Plates were incubated at 37 °C for 72 h under anaerobic conditions. Single colonies were selected, streaked on enrichment agar, and incubated in the same condition as previously stated. Subsequently, single colonies were picked and transferred	National Research Council of Thailand (NRCT))	1 year (2020-2021)

		to a screening medium for succinic acid production. Isolates with succinic acid-producing ability, as evidenced by a clear zone around the colony, were selected. The isolate that gave the highest clear zone was selected to identified species using 16s rDNA.		

Name: Lect.Dr. Boonlue Kachenchart

No.	Name of research project	Research concept	Funding	Period
1	Precision system of water resource management and yield estimation for sugarcane cultivation	This research is an integrated approach to precisely study the efficient use of water in sugarcane production. Research conceptual framework consist of the study of evapotranspiration and single/dual crop efficiency by weighting lysimeters and energy balance Bowen ratio (EBBR) method and the development of crop growth model and to estimate sugarcane yield of Khon Kaen 3 (KK3) cultivar by using high-resolution unmanned aerial vehicle (UAV). The results of such basic research, it will lead to the development of a precision water management model that finds optimization between a plant's water demand and yield response. The output of research is water irrigation schedule function obtained from relationship among plant water status, soil water status and climate. The ultimate goals are enhancing water productivity and eco-efficiency of water resources for support supply chain in cane and sugar industry.	National Research Council of Thailand (NRCT))	3 year (2019-2021)

2	Blue carbon net sequestration in seagrass ecosystem for sustainable management base on blue economy of east coast Thailand	The objective of research is to account greenhouse gas in seagrass ecosystem. All various carbon pools i.e.biomass, sediment, and greenhouse gas flux will be collected and analyzed what is source and sink. The ecological services and economic value, blue economy also evaluate. The ultimate goal is achievement sustainable development by gain co-benefits and balance between resources use and conservation in blue carbon habitats.	National Research Council of Thailand (NRCT))	1 year (2021--2022)

Name: Lect.Dr.Narin Boontanon

No.	Name of research project	Research concept	Funding	Period
1	Instrument for measurement and monitor algae contamination in raw water of water treatment process	In trap water treatment process, algae and diatom are the unexpecting problems on treatment process cause of odor and toxicity of the water as well as the treatment device. Thus, fast and accuracy device for measuring and monitoring of those algae and diatom in raw water is needed in term of prevention. Using optical sensors and microcontroller are allowed for measuring and warning simultaneously which appropriate for protecting the system and treated water quality.	Metropolitan Waterworks Authority (MWA)	1 Year (2018-2019)
2	The development of household organic waste digester for commercialize	Organic waste from household is the largest portion of the community waste. According to the limiting of waste management, it can cause of the contagion, environment and so on. Thus, the idea of treat at source was use for manage the household organic waste using automatic waste degradation. The project was focus on the development of the prototype and turn to the commercial ready to launch the market and environmentally friendly device.	Pre-Seed Fund, Mahidol University	1 Year (2019-2020)

No.	Name of research project	Research concept	Funding	Period
3	Research and development of innovation for reduce and utilize greenhouse gas (CO_2) in the biological matrices	The research was focused on design and create a portable photosynthetic sensor using many processing sensors as were required in the influential plant photosynthesis factors. The sensor was designed to display real- time value all parameters and the net photosynthesis via LCD monitor. In evaluating, the study compared the value from each sensor with standard gases and commercial tools then analyzed with statistical methods. The net photosynthesis obtained from the sensor was compared to the reference data collected using a commercial instrument in the same plants. The results of analysis shown that all sensors and the portable photosynthetic sensor had a high precision and accuracy similar to commercial instrument. Moreover, this invention can be taking place an expensive commercial instrument and can be used as a tool for reduce an atmosphere CO_2 effectively.	National Research Council of Thailand (NRCT)	1.5 Year (2021-2022)
4	Prototype innovation of grease trap for FOG (fat, oil and grease)	The residual of fat, oil and grease (FOG) from cooking and food preparing is a source of environmental problems. Although, the grease trap is an optional for	Agricultural Research Development Agency (Public Organization)	2 Years (2021-2023)

No.	Name of research project	Research concept	Funding	Period
	elimination from food processing and food waste	prevent those impact, however, its need to maintenance frequently to keep its functional. The prototype innovation of grease trap will let the user worry free for taking care or maintenance using self-degradation assist by mechanical and biological processes.	(ARDA)	
5	Development of modernize electric generator for sustainable energy	The modernize electric generator is a state-of-the art of generator which can reduce the impact of human health, cost of energy and environment from the energy production. Furthermore, this device can be use as the energy conservation from the waste of wind from agriculture and industrial sectors.	National Research Council of Thailand (NRCT)	1 Year (2021-2022)

Name: Lect.Dr. Piangjai Peerakiatkhajohn

No.	Name of research project	Research concept	Funding	Period
1	Development of Metal Oxide Nanomaterials for Hydrogen Production from Wastewater in Artificial Photosynthesis	Hydrogen can be an alternative renewable energy source to address such global energy and environmental issues owing to the features of zero greenhouse gas emission and high energy density when using as the energy carrier. Among various approaches for hydrogen production, a photoelectrochemical (PEC) system is a promising process that directly splits water into hydrogen and oxygen using renewable solar energy. Nevertheless, limited studies have reported the bifunctional PEC concept, driven by simultaneously processing hydrogen production and organic pollutant degradation in wastewater. This research aims to develop novel metal oxide photoelectrodes in artificial photosynthesis system which can successfully degrade pollutant in	- Mahidol University, Thailand - National Nanotechnology Center (NANOTEC), Thailand - Australian Research Council (ARC), Australia	3 years (2021-2023)

		wastewater, and simultaneously generate hydrogen under the self-bias condition.		

Name: Lect.Dr.Witchaya Rongsayamanont

No.	Name of research project	Research concept	Funding	Period
1	Formulating bio-based dispersant for oil spill removal in seawater	The bio-based dispersant formulating from the biological substance name biosurfactant. The biosurfactant is promising as a novel substance which had more advantages over the chemical substance. It had low toxicity, more compatible, tolerance at extreme conditions. The research aims to formulate the dispersant without using the chemical solvent. The surfactant formulating concept bring to use as a formulation tool. Moreover, the 3D box experiment will perform to stimulate the real application of the oil spill remediation.	-	-