



Republic of the Philippines  
**SOUTHERN LUZON STATE UNIVERSITY**  
Lucban, Quezon

# OUTSTANDING RESEARCH AWARD

(Applied/Product Research Category)

is hereby given to

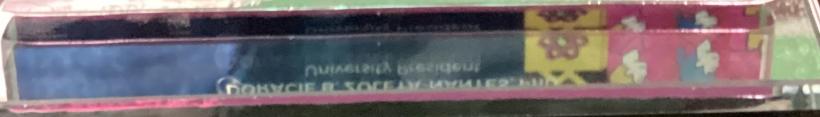
**Renato R. Maaliw, III, DIT  
Engr. Julie Ann B. Susa**

For the paper entitled  
**A Deep Learning Approach for  
Automatic Scoliosis Cobb Angle Identification**

presented during the **1st Research Congress** of the  
Southern Luzon State University with the theme:  
"Sustaining Gender Inclusive R&D Initiatives in the University".  
held on October 24-25, 2022 at SLSU, Lucban, Quezon.

Given on the 7th day of November 2022.

  
**DORACIE B. ZOLETA-NANTES, PhD**  
University President

  
DURABILIS BLOOMING  
**DORACIE B. ZOLETA-NANTES, PhD**



SLSU Office of Research Services & SLSU Gender and Development Office

# 1ST RESEARCH CONGRESS

## Sustaining gender inclusive R&D initiatives in the University

# PROCEEDINGS



**SOUTHERN LUZON STATE UNIVERSITY  
2022 RESEARCH CONGRESS PROCEEDINGS**

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SLSU Office of Research Services & SLSU Gender and Development Office

# 1ST RESEARCH CONGRESS

# PROCEEDINGS





## 1st Research Congress 2022

As part of the SLSU's 2022 Science and technology Week celebration, the Office of Research Services, in partnership with the Gender and Development Office, conducted the **1st Research Congress** in October 24-25, 2022, with the theme "**Sustaining gender inclusive R&D initiatives in the University**".

The following research were presented:

- Acceptability of Donor Breast Milk Banking in Quezon Province
- Community- Based Enterprise Development in the AMIA (Adaptation and Mitigation Initiative in Agriculture) Villages in San Francisco, Quezon Philippines
- Positionings of the dead and the living: The political economy of death in two memorial parks in a Philippine City
- A Deep Learning Approach for Automatic Scoliosis Cobb Angle Identification
- Acceptability Level of Mangrove Biomass, Carbon Stocks, and Carbon Dioxide Equivalent (MBioCarDE) Calculator Mobile Application
- Analysis of 2021 CMCI Survey of CALABARZON: Highlighting the Competitiveness of Quezon Province in the Region
- Online Learning and Mental Health of College Students during the Covid- 19 Pandemic
- Scenario Development for Sustainable Coastal Resource Management
- Automated Coconut Bagasse Drying and Milling Machine for Coconut By- Product Processing
- The Southern Luzon State University- Catanauan Journey of Development
- Mangrove Crab (*Scylla serrata* Foskal) Production in Alabat Island, Quezon Province Using an Aquasilviculture System
- Development, Validation and Evaluation of Psychological Wellness Modules for College Students
- A Meta- Analysis Study Association of *Enterobius vermicularis* and Appendicitis in Human Development Index (HDI)
- Land suitability and limitations assessment for sugarcane cultivation in Quezon Province using geographical information system

The following evaluators were invited:



**Dr. LORETO A. NOVICIO**

Chief Science Research Specialist,  
Technology Innovation Division, DOST-  
FPRDI



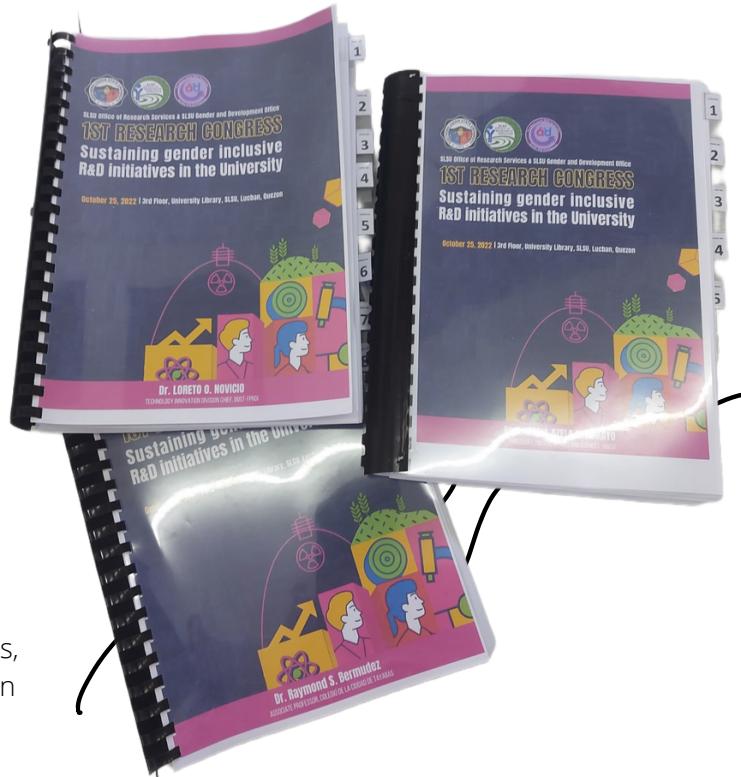
**Dr. RAYMOND BERMUDEZ**

Associate Professor II and Head of the  
ICT Section,  
Colegio de la Ciudad de Tayabas



**Dr. MARIA AZELA L. TAMAYO**

Professor I & Department Chair of the  
Department of Languages and  
Humanities, College of Arts and Sciences,  
Manuel S. Enverga University Foundation



The criteria for evaluation are as follows:

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**PURE/BASIC RESEARCH**

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**a. Significance of Findings (60%)**

- Contribution to knowledge/S&T advancement
- Relevance to national/regional development

**b. Manuscript/Write-up (30%)**

- Creativity, originality, and quality of work
- Accuracy of figures and language
- Clarity and style
- Cogency and logic

**c. Presentation (10%)**

- Clarity of presentation
- Mastery of topic
- Response to inquiries

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**APPLIED/PRODUCT RESEARCH**

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**a. Significance of Findings (60%)**

- Social acceptability
- Technical feasibility
- Financial/economic viability
- Environmental soundness
- Political acceptability

**b. Manuscript/Write-up (30%)**

- Creativity, originality, and quality of work
- Accuracy of figures and language
- Clarity and style
- Cogency and logic

**c. Presentation (10%)**

- Clarity of presentation
- Mastery of topic
- Response to inquiries

At the end of the Research Congress, the ORS Secretariat consolidated the scores of the evaluators to determine the awardees. The awardees were announced during the closing ceremonies of the S&T Week Celebration. They were awarded the following cash prizes as stipulated in the REPDI Manual of Operations approved via BOR Resolution 53, s. 2021:

- **Most Outstanding Research – 50,000**
- **Outstanding for the Research Category – 30,000**
- **Outstanding for the Development Category – 30,000**
- **Commendable Research – 20,000**

In addition, awardees will receive plaques that will be awarded during the upcoming PRAISE ceremony.

Also, during the same closing ceremonies, a special recognition was also awarded to the **Most GAD-Responsive Research** among the presented projects in the Research Congress based on the evaluation of the SLSU GAD Office. The recognized research team received a **20,000php + Plaque + Commemoratives**.

Each participant also received a Certificate of Recognition.



The awarded papers during the closing ceremonies were as follows:

 **MOST OUTSTANDING RESEARCH**

Development, Validation and Evaluation of Psychological Wellness Modules for College Students  
*Helene D. Daya, Gino A. Cabrera, Noreen P. Echague*

 **OUTSTANDING FOR RESEARCH CATEGORY**

Mangrove Crab (*Scylla serrata Foskal*) Production in Alabat Island, Quezon Province Using an Aquasilviculture System  
*Delia R. Babilonia, Sarah Joy Zoleta, Jobert Lomboy*

 **OUTSTANDING FOR DEVELOPMENT CATEGORY**

Deep Learning Approach for Automatic Scoliosis Cobb Angle Identification  
*Renato R. Maaliw III, Julie Ann B. Susa*

 **COMMENDABLE RESEARCH**

Online Learning and Mental Health of College Students during the Covid- 19 Pandemic  
*Helene D. Daya*

 **MOST GAD RESPONSIVE RESEARCH**

Acceptability of Donor Breast Milk Banking in Quezon Province  
*Susana A. Salvacion, Lorna L. Cano, Lilibeth A. Dator*



# **ABSTRACTS OF PRESENTED RESEARCH**

- Acceptability of Donor Breast Milk Banking in Quezon Province
- Community- Based Enterprise Development in the AMIA (Adaptation and Mitigation Initiative in Agriculture) Villages in San Francisco, Quezon Philippines
- Positionings of the dead and the living: The political economy of death in two memorial parks in a Philippine City
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- Land suitability and limitations assessment for sugarcane cultivation in Quezon Province using geographical information system

# A Deep Learning Approach for Automatic Scoliosis Cobb Angle Identification

Renato R. Maaliw III, Julie Ann B. Susa, Alvin S. Alon, Ace C. Lagman, Shaneth C. Ambat,  
Manuel B. Garcia, Keno C. Piad, and Ma. Corazon Fernando – Raguro

## ABSTRACT

Efficient and reliable medical image analysis is indispensable in modern healthcare settings. The conventional approaches in diagnostics and evaluations from a mere picture are complex. It often leads to subjectivity due to experts' various experiences and expertise. Using convolutional neural networks, we proposed an end-to-end pipeline for automatic Cobb angle measurement to pinpoint scoliosis severity. Our results show that the Residual U-Net architecture provides vertebrae average segmentation accuracy of 92.95% based on Dice and Jaccard similarity coefficients. Furthermore, a comparative benchmark between physician's measurement and our machine-driven approach produces an acceptable mean deviation of 1.57 degrees and a T-test p-value of 0.9028, indicating no significant difference. This study has the potential to help doctors in prompt scoliosis magnitude assessments.

**Keywords:** computer vision, image processing, neural network, machine learning, medical diagnosis, x-ray

# Automated Coconut Bagasse Drying and Milling Machine for Coconut By-Product Processing

Aubree Mahusay , Efren D. Villaverde, Maurino N. Abuel

## ABSTRACT

The purpose of this study is to create an automated drying and milling machine prototype for coconut bagasse for processing into coconut by-products. The researchers gathered the necessary materials and devices that will be needed for the study and for the fabrication of the prototype. After fabricating the prototype, the researchers employed the use of experimental design to determine the efficiency of the prototype. Through the use of experimental design, the researcher also observed the cause-effect relationship between the variables. Experimental set-ups were implemented to be able to gather the data needed for the study. After gathering the needed data, the researchers concluded that the drying chamber of the prototype is far more expeditious than the sun drying method, the researchers found out that the best setting to dry coconut bagasse is at 70° C for 60 minutes, and differences between the traditional method and the prototype are very statistically significant and rejecting the null hypothesis. The researchers recommend improving the aesthetic of the prototype if it will be used for commercial purposes. They also recommend the future researchers to improve the system and automate the loading of the coconut bagasse to the drying chamber and use other types of heating elements. Furthermore, it is also recommended that the prototype will undergo further expansion to be able to hold more than 3 kilograms of coconut bagasse.

**Keywords:** coconut bagasse, drying, milling, ceramic heater, temperature sensor, humidity sensor

# **Acceptability Level of Mangrove Biomass, Carbon Stocks, and Carbon Dioxide Equivalent (MBioCarDE) Calculator Mobile Application**

Jobert G. Lomboy, PhD, Roberto L. Sulit, MT, Lyn V. Tapan, MAEd, Manuel S. Valderama

## **ABSTRACT**

Calculation of mangrove biomass, carbon stocks, and carbon dioxide equivalent can be done off-site and is mostly tedious in encoding the necessary data to produce the expected results. This study was conducted to develop a mobile application that will calculate the biomass, carbon stocks, and carbon dioxide equivalent of mangroves on-site and determine its level of acceptance among potential users. Acceptability of the application was determined by 40 respondents consisting of 16 IT experts and 26 possible end-users. Results showed that both IT experts and end-users agreed that the mangrove calculator is very acceptable, with 3.59 and 3.43 average weighted mean, respectively. Inclusion of other mangrove species in the Philippines must be incorporated in the application. Calculation of the Important Value Index (IVI) should be added to the calculator, in order to determine a species' dominance in a given location and to formulate management strategies based on its ecological importance. Encourage environmental personnel of municipalities to use MBioCarDE as an auxiliary tool in monitoring mangrove areas for biomass, carbon stocks, and carbon dioxide.

**Keywords:** Biomass Calculator, Carbon Dioxide, Carbon Stocks, Mangrove, Mobile Application

# Southern Luzon State University

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**Southern Luzon State University (SLSU; Filipino: Pamantasang Pampamahalaan ng Timog Luzon<sup>[5]</sup>)**, formerly known as Southern Luzon Polytechnic College (SLPC), is the premier, state-funded higher education institution in Quezon Province in the Philippines operating by virtue of Republic Act 9395.<sup>[6]</sup> It is composed of 11 campuses in the province of Quezon, with the main campus situated in the Municipality of Lucban.

SLSU is mandated to provide advanced education, professional, technological instruction in the fields of allied medicine, education, engineering, agriculture, fisheries, forestry, environment, arts and sciences, accountancy, cooperative, business and entrepreneurship, technology and other relevant fields of study in the Province of Quezon and in Region IV-A CALABARZON. It is also mandated to undertake research and extension services and provide progressive leadership in its areas of specialization.<sup>[7]</sup> By virtue of Republic Act 10931 or the Universal Access to Quality Tertiary Education Act signed by President Rodrigo Duterte, SLSU will no longer be collecting tuition fees from its local, first degree undergraduate students.<sup>[8]</sup>

## History [edit]

Southern Luzon State University (SLSU) started as Lucban Municipal Junior High School by virtue of Municipal Resolution No. 5 passed in April 1964. Through the initiative of its founding president, Dr. Angelo Peña, a letter signed by 257 petitioners seeking the establishment of a Municipal Junior High School was favorably received and recommended by the Municipal Council and then Mayor Hobart Dator. The permit to operate was bestowed by Assistant Secretary of Education, Hon. Miguel Gaffud in July 1964. Since then, the Municipal Council allocated funds for its operations. Due to its expanding student population, Municipal Resolution No. 18 series of 1966 effectively expropriated about 4.9 ha of land in Barrio Kulapi - a site which the Council initially allocated for the establishment of a public market - in favor of the Municipal High School.<sup>[9]</sup> This would then become the present site of the main campus of the university.

In May 1965, Municipal Resolution No. 86 was passed requesting the change of name to Lucban Municipal High School to accommodate students into the third and fourth year levels. The Director of Public Schools at the time approved the resolution in August 1965. On June 14, 1968, the Lucban Community College was created and was made part of Lucban Municipal Junior School as an adjunct institution for its School of Education, despite resistance from then Municipal and Provincial Councils for the school to operate as a college. The Municipal and Provincial Councils deemed it to be outside their authority to enact a law that would ensure the continued operation of the Community College.<sup>[10]</sup>

The Lucban School for Philippine Craftsmen formally started in July 1970. By virtue of Republic Act 4345 also known as the merger law, the Lucban Municipal High School and Lucban School of Philippine Craftsmen became the Lucban National High School in July 1972 (with the continuous operation of Lucban Community College).

On August 30, 1977, President Ferdinand Marcos approved the conversion of the Lucban National High School and Lucban Community College into Lucban National College (LNC). This was in line with his administration's approach to countryside development by bringing Colleges and Universities to the provinces and rural areas. At the time, the LNC was the only government-run and funded College in the Southern Tagalog region.<sup>[11]</sup>

In 1981, 20 Assemblymen of the Southern Tagalog Region sponsored the Parliamentary Bill No. 173 for the conversion of Lucban National College into Southern Luzon Polytechnic College (SLPC). The bill was approved in December 1981 and was signed into law known as Batas Pambansa No. 145 by President Marcos.

Since then, SLPC grew to establish seven satellite campuses located in various parts of the province of Quezon. The first satellite campus was inaugurated in Alabat in July 1991. In 1991, SLPC-Polillo was created by virtue of Board Resolution No. 19, Series of 1992. In the following year, two additional campuses were established: SLPC-Sampaloc in Brgy. Caldong, Sampaloc, Quezon (BOT Res. No. 33, series of 1993) and SLPC-Infanta. In 1996, another campus, the SLPC-Lucena Dual Training and Livelihood Center, was established under Board Resolution No. 130, series of 1996. Judge Guillermo Eleazar Polytechnic College was integrated in February 2002 under Board Resolution No. 352, series of 2002.

## Judge Guillermo Eleazar Polytechnic College [edit]

**Judge Guillermo Eleazar Polytechnic College** was the former name of the college's satellite campus in Tagkawayan, Quezon. The satellite started as the Tagkawayan School of Fisheries under the Commission on Fisheries by virtue of Republic Act No. 4290 passed by the legislature on June 19, 1965.<sup>[12]</sup> After 12 years, the school name was changed to Judge Guillermo Eleazar Memorial School of Fisheries by Presidential Decree No. 1273 issued by then president Ferdinand E. Marcos on December 27, 1977.<sup>[13]</sup> Eventually, with the passage of Republic Act No. 8728, the school was converted into a state college known as Judge Guillermo Eleazar Polytechnic College.<sup>[14]</sup> On March 17, 2007, through Republic Act No. 9395, it became part of the Southern Luzon State University.<sup>[15]</sup>

## Awards and Recognitions [edit]

SLSU is the Commission on Higher Education (CHED) Center of Development in Teacher Education<sup>[16]</sup> and Forestry.<sup>[17][18]</sup> It is also an accredited "Dark Green School", which means that SLSU's instruction, research, and extension activities are geared towards environmental awareness and protection.

In 2018, the university is assessed as a Level III State University by the CHED, a level higher than in the 2007 evaluation.<sup>[19]</sup> Based on the CHED-Department of Budget and Management Joint Circular, a Level III SUC is "very good in undertaking the functions of a state university/college".<sup>[20]</sup> That is, instruction, research, and extension. In 2018, the AACUP recognized SLSU as a top ranking SUC in the Philippines in terms of number of degree programs accredited.<sup>[21]</sup>

Southern Luzon State University	
Pamatansang Pampamahalaan ng Timog Luzon	
Other names	SLSU
Former name	Southern Luzon Polytechnic College (1982-2007) Lucban National College (1972-1982) Lucban Community College (1968-1972) Lucban Municipal Junior High School (1965-1968) Lucban Municipal High School (1964-1965)
Motto	Aspire, Achieve, Serve
Type	State University
Established	August 4, 1964
Budget	Php 501,414,000 (2022) <sup>[1]</sup> Php 401,263,000 (2021) <sup>[2]</sup> Php 287,633,000 (2020) <sup>[3]</sup> Php 471,844,000 (2019) <sup>[4]</sup>
Chairperson	Marita R. Canapi, PhD
President	Doracie B. Zoleta-Nantes, Ph.D.
Vice-president	Gondelina Radovan, PhD (Academics) Frederick T. Villa, DIT (Admin. & Finance) Marissa Cadao-Espural, PhD (REPD)
Location	Brgy. Kulapi, Lucban, Quezon (Main Campus), Philippines
Campus	11 campuses (Lucban, Lucena, Tayabas, Taal, Tagkawayan, Polillo, Infanta, Alabat, Catanauan, Gumaca, Calauag)
Language	English, Filipino
Colors	 Green and White
Nickname	Green Rangers
Sporting affiliations	SCUAA, PASUC
Website	<a href="http://www.slsu.edu.ph">www.slsu.edu.ph</a>