TUSHAR ANDRIYAS
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EDUCATION

Ph.D., Electrical and Computer Engineering — April 2013
Utah State University, Logan, Utah, USA — 4.0/4.0 scale
Major: Space Physics
Dissertation Title: Particle dynamics and resistivity characteristics in Bifurcated Current Sheets
Major Professor: Dr. Edmund Spencer

Master of Science, Electrical Engineering — July 2009
Utah State University, Logan, Utah, USA — 3.8/4.0 scale
Thesis Title: Surface Wave Propagation in a Dielectric Waveguide Loaded with an Anisotropic, Conductive, and Spatially Dispersive Substrate
Major Professor: Dr. Edmund Spencer

Bachelor of Technology, Electronics and Communication Engineering — June 2004
United College of Engineering and Research, U.P., India — 73.5 %
Project Title: Telephone switching module for household electrical appliances

WORK EXPERIENCE

Post-Doctoral Fellow, Department of Forest Biology, — Nov 2023-
Department of Food and Pharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, Thailand
Research Title: Profiling and variations of secondary metabolites in *Buchanania siamensis* as a function of environment in Thailand

Post-Doctoral Fellow, Department of Forest Biology, — July 2021-
Faculty of Forestry, Kasetsart University, Bangkok, Thailand — July 2023
Research Title: Survey of secondary metabolites in the *Mitragyna* species in Thailand

Post-Doctoral Fellow, Department of Environmental Science, — Oct 2019-
Faculty of Science, Chulalongkorn University, Bangkok, Thailand — Oct 2020
Research Title: Assessments of vulnerability of mature and secondary forests to climatic water stress in Southeast Asia

Post-Doctoral Fellow, Center for Material Sciences, — July 2015-
Allahabad University, Allahabad, Uttar Pradesh, India — June 2018
Research Title: An autoregressive wavelet decomposition model for solar wind parameters

RESEARCH INTERESTS

- Studying space weather and processes related to heliospheric physics
- Solar wind interaction with the Earth's magnetic field
- Dissipation mechanisms in different magnetic field topologies
- Machine learning /Evolutionary algorithms techniques for geomagnetic storm prediction
- Understanding heliophysics through numerical simulations
- Working with climate models to analyze stomatal conductance and transpiration in various species
- Using soil-plant-atmosphere continuum models to study stand level dynamics
- Using software and data analysis tools to analyze data and extract communicable information
- Detailed analysis of datasets derived from diverse fields
- Learning about applied research through analysis and manuscript writing

RESEARCH EXPERIENCE

Post-Doctoral Fellow, Faculty of Pharmacy, Chulalongkorn University (Theme: Metabolomics and Species Distribution Modeling of *Buchanania siamensis*) Nov 2023–Present

- Integrated SDM with untargeted LC-MS metabolomic profiling to assess secondary metabolites in saline and non-saline environments.
- Identified 245 secondary metabolites and determined key environmental factors influencing their production.
- Suggested the species' potential for land reclamation and commercial applications.

Some other works during the PDF: Metabolomic Profiling of Thai Colored Rice Cultivars (*published*)

- Investigated the main volatile components of rice from different agricultural locations using LC-MS.

Identification of Pancreatin Inhibitors from Thai Medicinal Plants (*published*)

- Screened Thai *Piper* plants for antidiabetic and anti-obesity activities using high-performance thin-layer chromatography-bioautographic assay.

Rapid Screening of Carpaine in *Carica papaya* Leaf Products (*published*)

- Employed DART-MS for the rapid detection of bioactive compounds in papaya leaf products.

Post-Doctoral Fellow, Faculty of Forestry, Kasetsart University July 2021–July 2023
(Theme: Global Soil Salinity Mapping and Species Selection for Reclamation)

- Modeled global soil salinity using inverse distance weighted (IDW) interpolation from the WOSiS salinity database.
- Identified 243 plant species tolerant to high salinity, including 30 from Amaranthaceae and 96 species with root microbiome interaction.
- Provided recommendations for bioremediation efforts aligned with the UN-Decade of Ecosystem Restoration.

Some other works during the PDF: Seasonal Dynamics of Litterfall in Montane Forests, Thailand (*published*)

- Analyzed leaf, flower, and fruit litterfall patterns over five years using superposed epoch analysis and Granger causality tests.
- Identified key environmental drivers, including barometric pressure and temperature that influence peak litter production.
- Highlighted the lag in litter production in response to environmental changes, impacting ecosystem services.

Morphological and Ecological Study of *Arundo donax* (*published*)

- Conducted detailed morphological, anatomical, and ecological analysis of *A. donax* and identified two lectotypified synonyms.
- Provided information on distribution, phenology, stomatal density, and conservation status of the species.

Environmental Factors Affecting Alkaloid Yields in *Mitragyna speciosa* (*published*)

- Assessed mitragynine content in kratom leaves across various Thai regions.
- Found that environmental factors, including light intensity and soil moisture, significantly influence alkaloid production.

Air Pollution Tolerance and Cooling Potential of Urban Tree Species in Bangkok (*published*)

- Evaluated species for air pollution tolerance (APTI) and cooling capacity (API) in urban parks.

- Identified *Melaleuca quinquenervia*, *Albizia saman*, and *Chukrasia tabularis* as top-performing species for cooling and pollution tolerance.
- Recommended species selection strategies for urban greenspace planning in pollution-prone environments.

Post-Doctoral Fellow, Faculty of Environment, Chulalongkorn University (Theme: Tropical Forest Restoration and Urban Tree Suitability) July 2017–June 2018

- Investigated canopy conductance (Gt) and transpiration (EL) in potted saplings of *Pterocarpus indicus*, *Lagerstroemia speciosa*, and *Swietenia macrophylla* across wet and dry seasons.
- Applied Bayesian modeling using sap flux density, soil, and atmospheric data.
- Identified *L. speciosa* as suitable for climate variability, with recommendations for urban reforestation programs.

Graduate Research Assistant – Electrical Engineering and Center for Space Engineering, USU Aug 2009 – Apr 2013

- Developing a formula based synthetic solar wind driving during solar minima to use as input into the WINDMI model
- Studying surface waves at the Earth's magnetopause and the effects of thermal conduction
- Deriving collisionless resistivity by running charged particles (protons and oxygen ions) in prescribed electric and magnetic field topologies in order to investigate the time scales of geomagnetic substorm onsets

Graduate Research Assistant – Electrical Engineering and Center for Space Engineering, USU Feb 2007 – Apr 2009

- Analysis of radiation pattern of circular patch antenna.
- Studying about the radiation losses through surface waves.
- Developing a mathematical model for analyzing the dispersion relation of a surface wave in a waveguide with a given dielectric medium

Final Year Project – United College of Engineering and Research June 2004

- Fabricated hardware required for switching household electrical appliances through telephony

TRAININGS & WORKSHOPS

Heliophysics summer school, Boulder, Colorado - July 2011

- Learning about the simulation tools used in space plasma simulation

- Understanding model outputs and interpreting them against in situ and ground based measurements and respective theories
- Discussing the ramifications of different solar wind driving conditions

CEDAR/GEM workshop, Santa Fe, New Mexico- June 2011
Attended discussions related to various magnetospheric and ionospheric topics

"Getting Started as a successful proposal writer and academician" – April 2012
Organized by Office of Research and Graduate Studies, Utah State University

Bangkok Summer School on Applied Mathematics & Computational Science, Chulalongkorn University- March 2017

- Learning about the latest tools used in scientific computing
- Optimization methods
- Numerical modeling of differential equations and their practical applications

COMPUTER SKILLS

Programming Languages: FORTRAN, MATLAB, Python, R
Word Processing: LaTex, Microsoft Office
Operating Systems: Windows, Linux, MacOS
Web Development (working knowledge)

JOURNAL PUBLICATIONS (Selected)

- E. Spencer, S. Patra, T. Andriyas, C. Swenson, J. Ward, and A. Barjatya, Absolute Electron Density and Electron Neutral Collision Frequency in the Ionosphere from Plasma Impedance Probe Measurements, *J. Geophysical Research* vol. 113, A09305 doi:10.1029/2007JA013004, 2008.
- T. Andriyas, E. Spencer, A. Raj, L. Mays, and J. Sojka, Dst Prediction from CIR Events During 2008 Using Synthesized Signals Derived from SOHO and ACE Observations, *JGR Space Physics*, doi:10.1029/2011JA017018, 2012.
- T. Andriyas and E. Spencer, "Collisionless Resistivity in a Bifurcated Current Sheet", *JGR Space Physics*, doi: 10.1002/2013JA019242, 2014.
- T. Andriyas and S. Andriyas. "Relevance Vector Machines as a tool for Forecasting Geomagnetic Storms during years 1996-2007", *Journal of Atmospheric and Solar-Terrestrial Physics*, doi: 10.1016/j.jastp.2015.02.005, 2015.
- T. Andriyas. "Auroral Boundary Movement rates during substorms and their correspondence to solar wind and *AL* index", *Journal of Atmospheric and Solar-Terrestrial Physics*, doi: 10.1016/j.jastp.2016.05.015, 2016.
- T. Andriyas and S. Andriyas. "Use of multivariate relevance vector machines in forecasting multiple geomagnetic indices", *Journal of Atmospheric and Solar-Terrestrial Physics*, doi: 10.1016/j.jastp.2016.11.002, 2017.

- T. Andriyas and S. Andriyas. "Periodicities in Solar Wind-Magnetosphere Coupling Functions and Geomagnetic Activity During the past Solar Cycles", *Astrophysics and Space Science*, DOI: 10.1007/s10509-017-3141-9, 2017.
- T. Andriyas. "A comparative study of sawtooth events and substorm onsets triggered by interplanetary shocks", *Annals of Geophysics*, DOI: 10.4401/ag-7481, 2017.
- N**.** Leksungnoen, T**.** Andriyas, and S**.** Andriyas. " EC_e prediction from $EC_{1:5}$ in inland salt-affected soils collected from Khorat and Sakhon Nakhon basins, Thailand", *Journal of Communications in Soil Science and Plant Analysis*, 2018.
- T. Andriyas. "Comparison of substorm onsets during different levels of IMF *Bz*", *Pramana*, 2019.
- N**.** Leksungnoen and T**.** Andriyas. "Enhancing the salt tolerance of commercial Eucalyptus hybrid seedlings in preparation for reclamation of inland salinity areas", *European Journal of Forest Research*, DOI:10.1007/s10342-019-01204-3, 2019.
- Y. Ku-Or, N**.** Leksungnoen, C. Ngernsaengsaruay, and T**.** Andriyas. "Seed longevity of Buchanania simensis in reclaiming the salt-affected areas in Thailand", *Biodiversitas Journal of Biological Diversity*, DOI: https://doi.org/10.13057/biodiv/d210241, 2020.
- T. Andriyas, N**.** Leksungnoen, and P. Tor-ngern. "Comparison of water-use characteristics of tropical tree saplings with implications for forest restoration ", *Scientific Reports*, DOI:10.1038/s41598-021-81334-0, 2021.
- N**.** Leksungnoen, S. Uthairatsamee, and T. Andriyas. "Adaptability of Siamese Rosewood and Teak Seedlings to Varying Light Conditions", *Environment and Natural Resources Journal*, DOI:10.32526/ennrj/19/202100003, 2021.
- N**.** Leksungnoen, T. Andriyas, C. Ngernsaengsaruay, S. Uthairatsamee, P. Racharak, W. Sonjaroon, R. Kjelgren, B. Pearson, C. R. Mccurdy, and A. Sharma. "Variations in mitragynine content in the naturally growing Kratom (Mitragyna speciosa) population of Thailand", *Frontiers in Plant Science*, DOI:10.3389/fpls.2022.1028547, 2022.
- A. Yarnvudhi, N. Leksungnoen, T. Andriyas, P. Tor-Ngern, A. Premashthira, C. Wachrinrat. D. Marod, S. Hermhuk, S. Pattanakiat, T. Nakashizuka, and R. Kjelgren, "Assessing the Cooling and Air Pollution Tolerance among Urban Tree Species in a Tropical Climate", *Plants*, DOI:10.3390/plants11223074, 2022.
- Ngernsaengsaruay, C., Leksungnoen, N., Chanton, P., Andriyas, T., Thaweekun, P., Rueansri, S., Tuntianupong, R. and Hauyluek, W., 2023. Morphology, taxonomy, anatomy, and palynology of the opium poppy (*Papaver somniferum L*.) cultivation in Northern Thailand. *Plants*, *12*(11), p.2105.
- Ngernsaengsaruay, C., Puangsin, B., Leksungnoen, N., Khantayanuwong, S., Chanton, P., Thaepthup, T., Wessapak, P., Meeboonya, R., Yimlamai, P., Wanitpinyo, K. and Chitbanyong, K., 2023. Morphology, Taxonomy, Culm Internode and Leaf Anatomy, and Palynology of the Giant Reed (*Arundo donax L*.), Poaceae, Growing in Thailand. *Plants*, *12*(9), p.1850.
- D. Marod, T. Andriyas, N. Leksungnoen, R. Kjelgren, S. Thinkamphaeng, P. Chansri, L. Asanok, S. Hermhuk, P. Kachina, J. Thongsawi, W. Phumphuang, S. Uthairatsamee, P. Racharak, T. Kaewgrajang, "Potential variables forcing litterfall in a lower Montane evergreen forest using Granger and Superposed epoch analyses", *Ecosphere*, https://doi.org/10.1002/ecs2.4572, 2023.
- Sirilertpanich, P., Ekkaphan, P., Andriyas, T., Leksungnoen, N., Ruengphayak, S., Vanavichit, A., De-Eknamkul, W. and Tansawat, R., 2024. Metabolomics study on the main volatile components of Thai colored rice cultivars from different agricultural locations. *Food Chemistry*, *434*, p.137424.

- Leksungnoen, N., Andriyas, T., Ngernsaengsaruay, C., Uthairatsamee, S. and Racharak, P., 2024. On the pre-adaptation of *Mitragyna* species to urban environments of Thailand. *Écoscience*, pp.1-12.
- Khaoiam, P., Andriyas, T., Thanusuwannasak, T., Puangnil, N., Limpikirati, P.K. and Tansawat, R., 2025. Direct analysis in real time mass spectrometry (DART-MS) for rapid screening of Carpaine in Carica papaya leaf products. *Food Chemistry*, *463*, p.141155.
- Mingmuang, J., Bunwatcharaphansakun, P., Suriya, U., Pipatrattanaseree, W., Andriyas, T., Tansawat, R., Chansriniyom, C. and De-Eknamkul, W., 2024. Identification of pancreatin inhibitors from Thai medicinal Piper plants for antidiabetic and anti-obesity activities using high-performance thin-layer chromatography-bioautographic assay. *Journal of Chromatography A*, 1736, p.465358.

- Phunchaisri, T., Wachrinrat, C., Leksungnoen, N., Andriyas, T., and Panyain, N. 2025. Selection of Medium-Sized, Shade-Tolerant Trees for Urban Tropical Landscapes, Bangkok, Thailand. *Urban Forestry & Urban Greening*, 128686.
- Chongdi, S., Uthairatsamee, S., Ngernsaengsaruay, C., Andriyas, T., & Leksungnoen, N. 2025. Regional Variability in Growth and Leaf Functional Traits of Mitragyna speciosa in Thailand. *International Journal of Plant Biology*, 16(1), 24.
- Andriyas, T., Leksungnoen, N., Ngernsaengsaruay, C., and Andriyas S. 2025. "Potential Salt Tolerant Species Located in Various Parts of the World." *Land Degradation & Development*.
- Leksungnoen, N., Andriyas, T., Ku-Or, Y., Chongdi, S., Tansawat, R., Aramrak, A., Ngernsaengsaruay, C., Uthairatsamee, S., Sonjaroon, W., Thongchot, P., Ardsiri, S., & Pongchaidacha, P. 2025. The Effect of Light Intensity and Polyethylene-Glycol-Induced Water Stress on the Growth, Mitragynine Accumulation, and Total Alkaloid Content of Kratom (*Mitragyna speciosa*). *Horticulturae*, 11(3), 272.
- Leksungnoen, N., Andriyas, T., Tansawat, R., Pongchaidacha, P., Khaoiam, P., Thanusuwannasak, T., Ngernsaengsaruay, C., Thanoosing, C. and Uthairatsamee, S., 2025. Higher accumulation of mitragynine in Mitragyna speciosa (kratom) leaves affected by insect attack. *PLoS One*, 20(4), p.e0320941.
- Panyain, N., Leksungnoen, N., Andriyas, T., Sonjaroon, W., Yoojongdee, T., Channun, Y., Wongnaikot, P., Thammajit, N., Chongdi, S. and Meunpong, P., 2025. Comparative Analysis of Physiological Responses to Topping in Tropical Tree Species. *Trees, Forests and People*, 20, p.100872.
- Andriyas, T., Leksungnoen, N., Pongchaidacha, P., Uthairangsee, A., Uthairatsamee, S., Doomnil, P., Ku-Or, Y., Ngernsaengsaruay, C., Andriyas, S., Yarnvudhi, A. and Tansawat, R., 2025. Integrating spatial mapping and metabolomics: A novel platform for bioactive compound discovery and saline land reclamation. *Computational and Structural Biotechnology Journal*, 27, 1741-1753.
- Andriyas T., Sriswasdi S.,Tansawat R., Uaariyapanichkul J., Chomtho S., Visuthranukul C., 2025. Inulin supplementation modulates gut microbiota derived metabolites related to brain function in children with obesity. *Scientific Reports*, accepted.
- Ngernsaengsaruay C., Mianmit N., Leksungnoen N., Racharak P., Uthairatsamee S., Chanton P., Andriyas T., Duangjai W., 2025.Comparative vegetative morphology, distribution, ecology and utilization of the rattan genus *Korthalsia* (Arecaceae) in Thailand, *PeerJ*, accepted.

CONFERENCE PUBLICATIONS

- E. Spencer, S. Patra, T. Andriyas, C. M. Swenson, and J. Ward, Plasma impedance probe analysis with a finite difference time domain simulation, 16th IEEE-Pulsed Power Conference, 2007, doi: 10.1109/PPPS.2007.4652493.

BOOKS

- Andriyas, T. 2010. "Surface Wave Propagation: A case study for Anisotropic, Conductive, and Saptially Dispersive Substrates". LAP Lambert Academic Publishing, Germany – ISBN-13: 978-3838349268, pp. 168.

PRESENTATIONS AT PROFESSIONAL MEETINGS

- E. Spencer, L. Mays, S. Patra, T. Andriyas, W. Horton, Magnetospheric trigger conditions during isolated, storm time and periodic substorms, 39th COSPAR Scientific Assembly. 2012, Mysore, India.
- T. Andriyas, E. Spencer, W. Horton, Interplay of Kelvin Helmholtz and Tearing Mode Instability during High Speed Stream (HSS) Events, AGU Meeting Fall 2011.
- E. Spencer, T. Andriyas, J. Sojka, M.L. Mays, Dst Prediction from CIR Events During 2008 Using Synthesized Signals Derived from SOHO and ACE Observations, AGU Fall Meeting, 2011.
- T. Andriyas, E. A. Spencer, Numerical simulation of surface waves in a stratified magnetoplasma using a Plasma Fluid Finite Difference Time Domain Simulation, AGU Fall Meeting, 2009.
- T. Andriyas, S. Patra, E. Spencer, J. Ward, Aerodynamic Influence on Plasma Impedance Probe Measurements in Sounding Rocket Missions, AGU Fall Meeting, 2008.
- E. Spencer, S. Patra, T. Andriyas, C. Swenson, J. Ward, Plasma Impedance Probe Analysis with a Finite Difference Time Domain Simulation, Pulsed Power and Plasma Science Conference, July 2007.
- E. Spencer, P. Wheeler, S. Kaveri, T. Andriyas, B. Beardall, Acoustic Coupling of Drumset Cymbals, ASA Conference, June 2007.

AFFILIATIONS

- American Geophysical Union (AGU), member
- Institute of Electrical and Electronics Engineers (IEEE), member

LANGUAGES

Hindi: Native Language
English: Speaking, Reading, Writing (Excellent)
Thai: Advanced beginner knowledge

BREIF OVERVIEW OF DATA ANALYSIS IN SOME SELECTED CURRENT APPLIED RESEARCH (2019 – present)

STACC model conversion from MATLAB to R

The STACC model is a Bayesian framework originally written in R used to predict latent variables like canopy conductance and transpiration in trees by integrating sap flux density with environmental and physiological data. In this project, the STACC model was converted from R to MATLAB, to generate predictions on for three urban tree species: *Pterocarpus indicus*, *Lagerstroemia speciosa*, and *Swietenia macrophylla*. This work was published in *Nature Reports* (2021), where species-specific responses to environmental changes were examined to identify sustainable options for tropical forest restoration in Thailand. Using the Bayesian modeling framework, the model was adapted to analyze data collected over wet and dry seasons, estimating canopy conductance and transpiration based on sap flux density alongside soil moisture and atmospheric conditions. The results indicated that *L. speciosa* had a higher and more variable water use across seasons, indicating potential resilience to climate variability, while *P. indicus* and *S. macrophylla* maintained steadier water-use patterns, making them suitable for consistent growth throughout the year. This project was a great lesson about Bayesian modeling and R while emphasizing the importance of species selection in environmental management, contributing valuable insights for sustainable reforestation and urban greening initiatives.

Litterfall analysis in Khao Yai National Park

This research project, published in *Ecosphere* (2023), analyzed the environmental drivers influencing litterfall production of various species and components of these species in a lower montane evergreen forest in Thailand, employing advanced statistical techniques such as Granger causality tests and superposed epoch analysis. By examining a 5-year dataset, significant associations were identified between litterfall peaks and climate variables, including barometric pressure, temperature, humidity, and wind speed, with observed lags of up to 4 months. This project honed my expertise in time-series analysis, ecological modeling, and statistical methods, uncovering insights into how climate variability affects litterfall and, by extension, nutrient cycling and ecosystem functions in tropical forests.

Building on this work, the research was extended in a subsequent paper published in *Forests* (2023), where a long-term (28-year) dataset was analyzed from a tropical dry forest in Kanchanaburi, Thailand. Using lagged generalized additive models, the impacts of maximum temperature, soil moisture, evapotranspiration, vapor pressure deficit, and the Southern Oscillation Index were determined on litterfall components (leaves, flowers, and fruit). This

study indicated strong seasonality, with key environmental variables significantly affecting each litterfall type and highlighted how shifting climate conditions may alter nutrient recycling rates. Together, these studies advanced my expertise in time-series analysis, ecological modeling, and climate impact assessment on forest ecosystems.

Work related to Mitrgyna Speciosa

In the work published in *Frontiers in Plant Science* (2022) and *Écoscience*, we investigated various aspects of *Mitragyna* species, focusing on environmental influences on bioactive compound production and adaptability to urban settings. The *Frontiers in Plant Science* study analyzed environmental factors affecting the mitragynine (MG) content in kratom (*Mitragyna speciosa*) leaves across Thailand, finding that MG content varied from 7.5 to 26.6 mg per gram of dry leaf weight. Canonical correspondence analysis highlighted light intensity, relative humidity, soil volumetric water content, soil pH, and calcium as significant drivers of MG variability across regions. This work is foundational in identifying optimal environmental conditions to maximize alkaloid yield and quality in kratom cultivation.

Extending this research, the team published a study in *Écoscience* (2024) on the pre-adaptation of *Mitragyna* species to Thailand's urban environments. This study explored how *Mitragyna* species demonstrate resilience to urban environmental stressors, suggesting potential suitability for urban planting initiatives. Together, these studies reported on optimizing both the bioactive content and the ecological adaptability of *Mitragyna* species, supporting sustainable cultivation and urban reforestation strategies under climate change.

Screening of Carpaine in Carica papaya leaf products

In this *Food Chemistry* (2024) study, I contributed towards validating the DART-MS method to meet AOAC International standards, focusing on inclusivity, exclusivity, environmental interference, and probability of identification (POI) tests. Through inclusivity testing, carpaine's detection consistency was confirmed across various contamination levels, while exclusivity and interference tests helped differentiate carpaine from non-target compounds like cornstarch and other herbal powders. This provided proof that DART-MS approach is a valid, quick, and precise tool for quality control in papaya leaf products, supporting industry standards for bioactive ingredient verification.

Antidiabetic and Anti-Obesity Potential of Piper *Species through Enzyme Inhibition*

In a collaborative study examining the antidiabetic and anti-obesity potential of five *Piper* species, to evaluate their inhibitory activities against pancreatic enzymes involved in glucose and lipid absorption. Through principal component analysis (PCA), as well as correlation analysis of antioxidant activity and plant sample characteristics, we established that total phenolic content significantly contributed to the anti-pancreatic activity observed in *P. betle* samples. Key bioactive compounds such as caffeic acid, myricetin, genistein, piperine, and eugenol were isolated, with myricetin showing strong anti-pancreatin effects.

Light curve modeling for selection of medium sized urban tree species

This study, under review in *Urban Forestry & Urban Greening*, assessed medium-sized shade-tolerant trees to enhance urban canopy cover and mitigate heat stress in Bangkok. From a dataset of 149 species at Kasetsart University, nine were selected for light response curve analysis, examining photosynthesis rates across light intensities. A modified non-rectangular hyperbolic model with a linear term improved fit, while random forest (RF) analysis identified parameters influencing species clustering. Results categorized *Ficus benjamina*, *Sphaerocoryne lefevrei*, and *Calophyllum inophyllum* as light-dependent, while *Mimusops elengi* and *Gustavia gracillima* showed medium shade tolerance. Highly shade-tolerant species, *Diospyros decandra, Guaiacum officinale, Bauhinia purpurea*, and *Murraya paniculata*, were recommended for low-light areas, supporting strategic urban greening for resilience against ill-effects of urbanization.

Intervention study on obese kids

In this study under preparation, the impact of inulin supplementation on gut-brain axis (GBA) bioactive molecules is being assessed in obese children. Across 154 children aged 7-15, participants were assigned to inulin, placebo, or dietary fiber advice groups with monthly follow-ups for six months. LC-MS/MS analysis revealed significant shifts in the inulin group, including increases in *tyrosine* ($p = 9.584e-09$), *spermine* ($p = 1.254e-08$), and *putrescine* ($p = 0.012$)—compounds linked to GBA signaling. These findings indicate that inulin may support childhood obesity management by modulating microbial-derived bioactive molecules.

Hornbill nesting and food species

This multi-year study in Khao Yai National Park (KYNP) is investigating the emergence patterns of leaves, fruits, and flowers across multiple tree species that serve as nesting or food sources for hornbills, a keystone species in Thailand's ecosystems. By analyzing phenological data of these species, the study aims to identify environmental variables from *TerraClimate*—such as temperature, precipitation, and soil moisture etc.—that significantly influence seasonal emergence patterns. Additionally, it examines the potential impacts of El Niño and La Niña events on these phenophases, as these climatic oscillations may alter resource availability. Findings from this analysis are expected to inform how climate variability could affect the seasonal food and habitat resources critical to hornbill populations, which is essential for developing effective conservation strategies in response to changing climate conditions, ensuring the stability and resilience of hornbill populations in Thailand's forest ecosystems.

ENGLISH EDITING EXPERIENCE (2013 – present, non-exhaustive, includes both published and unpublished papers)

1. S. Andriyas and M. McKee, Recursive Partitioning Techniques for Modeling Irrigation Behavior, *Environmental Modeling and Software*, 47C:207-217, 2013.
2. S. Andriyas and M. McKee, Exploring irrigation decision behavior using hidden Markov models, *Agricultural Water Management*, 143C:48-58, 2014.
3. S. Andriyas and M. McKee, Development of a Bayesian belief network model framework for analyzing irrigation behavior, *Journal of Agricultural Science, Canada*, 7(7):1-17, 2015.
4. N. Leksungnoen, C. Takuathung, and S. Uthairatsamee. Germination Test on Native Salt Tolerant Seeds (Buchanania siamensis Miq.) Collected from Natural Saline and Non-Saline Soil, *Thai Journal of Forestry* 35(3):1 – 14, 2016.
5. Maratreenung, S., N. Leksungnoen, and S. Uthairatsamee, Evaluating inter-row light intensity and root distribution of a Hevea brasiliensis (Kunth) Mull. Arg. plantation in Chiang Rai province for selective planting of inter-row trees, *Thai Journal of Forestry* 35(3):147 – 159, 2016.
6. Leksungnoen, N., Wichan Eiadthong, and R. Kjelgren, Thailand's catastrophic flood: Bangkok tree mortality as a function of taxa, habitat, and tree size, *Urban Forestry and Urban Greening*, 22: 111 – 119, http://dx.doi.org/10.1016/j.ufug.2017.01.016, 2017.
7. Leksungnoen, N., Physiological traits contributing to carbon storage variation in Monastery bamboo and Pai Liang in northeastern Thailand, *Songklanakarin Journal of Science and Technology*. 39(2): 215 – 223, 2017.
8. Leksungnoen, N., A comparative analysis of carbon storage between Thai and Hedge bamboos due to variation in the physiological characteristics in Northeastern Thailand, *Songklanakarin Journal of Science and Technology*.
9. Leksungnoen, N., Reclaiming saline areas in Khorat Basin (northeast Thailand): soil properties, species distribution, and germination of potential tolerant species, *Arid Land Research and Management*, 31(3): 235 – 252, 2017.

10. Sovanna Ang. Estimation of crop yield loss due to meteorological drought for Sangke River Basin, Battambang province, Cambodia, *Master's thesis,* 2017.
11. Khantawan, C., K. Duangsathaporn, and P. Lumyai. A Study of the Relationship between Carbon Sequestration and Growth of Teak in Natural Forest and Plantation in the Lampang Province, (*accepted for publication*).
12. Lumyai, P., and K. Duangsathaporn. Climate Reconstruction on the Growth of Teak in Umphang Wildlife Sanctuary, Thailand, *Environment and Natural Resources Journal,* 16(1):21 – 30, 2018.
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