Shu Wei Chou Chen

Escuela de Estadística (School of Statistics),
Centro de Investigación en Matemática Pura y Aplicada (Research Center in Pure and
Applied Mathematics – CIMPA),
Universidad de Costa Rica (University of Costa Rica),
Ciudad Universitaria Rodrigo Facio, San José, Costa Rica.

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EDUCATION

2016 – 2020 **Ph.D. in Statistics.** University of São Paulo (São Paulo, Brazil).
Thesis title: *Locally Stationary Processes with Stable and Tempered Stable Innovation.*
Advisor: Prof. Dr. Pedro A. Morettin.

2012 – 2015 **M.Sc. in Statistics.** University of Costa Rica (San José, Costa Rica).
Thesis title: *Un modelo jerárquico Bayesiano espacio-tepmoral con variable respuesta de Poisson: aplicación al caso de VIH/SIDA como enfermedad rara en Costa Rica.*
Advisor: Prof. Dr. Ricardo Alvarado.

2008 – 2012 **BS. in Statistics.** University of Costa Rica (San José, Costa Rica).

PROFESSIONAL EXPERIENCE

March 2025 – present **Full Professor.** School of Statistics, University of Costa Rica (UCR), San José, Costa Rica.

March 2026 – present **Director.** Master's Program in Statistics, UCR.

2024- February 2026 **Subdirector.** Master's Program in Statistics, UCR.

November 2023 – March 2025 **Associate Profesor.** School of Statistics, UCR.

March 2020 – present **Researcher.** Research Center in Pure and Applied Mathematics (CIMPA), UCR.

March 2022 – November 2023 **Assistant Profesor.** School of Statistics, UCR.

March 2020 – March 2022 **Invited Profesor.** School of Statistics, UCR.

2012 – 2015 **Lecturer.** School of Statistics, UCR.

TEACHING EXPERIENCE

March 2020 – present *School of Statistics, University of Costa Rica.*

- *Undergraduate level in Statistics:* Statistical Theory, Professional Practice I and II, Time Series Analysis.

- *Graduate level in Statistics and Mathematics:* Time Series Analysis, Advanced topics in Time Series, Time Series I and II.

| February 2017 – December 2019 | 🔖 *Institute of Mathematics and Statistics, University of São Paulo.* Assistant for the courses of: |

- *Statistics for other majors:* Introduction to Probability and Statistics.

- *Graduate level in Statistics:* Time Series, Spectral Analysis of Time Series, Financial Time Series Modeling.

| March 2012 – March 2015 | 🔖 *School of Statistics, University of Costa Rica.* |

- *Statistics for other majors:* Economic, Social and Biological Sciences.

- *Undergraduate level:* Probability and Statistics Theory.

- *Graduate level in Statistics:* Experimental Design, Regressions, and Statistical Methods.

EXPERIENCE IN RESEARCH PROJECTS

As Principal Investigator:

2024-present 🔖 Análisis espacio-temporal del impacto de factores climáticos y de contaminación sobre las hospitalizaciones respiratorias. *School of Statistics, University of Costa Rica (UCR).*

2023-present 🔖 Desarrollo de modelos aditivos con errores simétricos autorregresivos para series temporales: generalizaciones y los métodos de pronósticos. *Research Center in Pure and Applied Mathematics (CIMPA), UCR.*

2015-2016 🔖 Análisis espacio-temporal de VIH/SIDA en Costa Rica. *Central American Population Center (CCP), UCR.*

As Associate Researcher:

2023-present 🔖 Potencial aumento del riesgo en Costa Rica y Nicaragua por causa de ciclones tropicales en el Caribe. *Center for Geophysical Research (CIGEFI), UCR.*

🔖 El costo de una vida digna en Costa Rica. Ingreso vital y la construcción de metodologías para el cálculo de variaciones subnacionales. *Institute of Social Research (IIS), UCR.*

🔖 Uso de modelos de aprendizaje automático para el pronóstico de caudales extremos (mínimos y máximos). *CIMPA, UCR.*

🔖 Análisis de extremos espacio-temporales con modelos bayesianos jerárquicos. *CIMPA, UCR.*

🔖 El efecto de Los determinantes sociales en la propagación de enfermedades infecciosas. *CIMPA, UCR.*

2022-2023 🔖 Use of machine learning as a predictive tool for vector-borne diseases in Costa Rica. *CIMPA, UCR.*

2020-2023 🔖 Desarrollo e implementación eficiente de modelos para procesos espacio-temporales a través de la aproximación de resolución múltiple. *CIMPA, UCR.*

2014 🔖 Determinación de líneas base en indicadores para evaluar el manejo integrado de recursos marino-costeros en Costa Rica. *Center for Research in Marine and Limnological Sciences (CIMAR), UCR.*

PUBLICATIONS

Journal articles:

1 M. Camacho, A. Cedeño, L. A. Barboza, **S. W. Chou-Chen**, M. J. Gómez y H. G. Hidalgo, «Hurricane Impact Index: Capturing Direct and Indirect Cyclone Effects in Central America,» *Earth Systems and Environment*, 2026, ISSN: 2509-9434. 🔗 DOI: 10.1007/s41748-025-00999-z.

2 C. W. S. Chen, **S. W. Chou-Chen** y H.-H. Liao, «Spatio-temporal modeling of dengue counts in the Central Valley of Costa Rica,» *Epidemiology and Infection*, págs. 1-22, 2026. 🔗 DOI: 10.1017/S0950268826101204.

3 **S. W. Chou-Chen**, A. Quesada-Román y D. Vargas-Sanabria, «Statistical Modeling of Wildfire Occurrence Based on Geomorphometry in La Amistad International Park's Buffer Zone,» *Environmental Modeling & Assessment*, 2026, ISSN: 1573-2967. 🔗 DOI: 10.1007/s10666-026-10100-1.

4 H. G. Hidalgo, **S. W. Chou-Chen**, K. A. McKinnon et al., «Detection and attribution of trends of meteorological extremes in Central America,» *Climatic Change*, vol. 178, n.º 5, pág. 95, 2025, ISSN: 1573-1480. 🔗 DOI: Hidalgo2025.

5 **S. W. Chou-Chen** y L. A. Barboza, «Forecasting hospital discharges for respiratory conditions in Costa Rica using climate and pollution data,» *Mathematical Biosciences and Engineering*, vol. 21, n.º 7, págs. 6539-6558, 2024, ISSN: 1551-0018. 🔗 DOI: 10.3934/mbe.2024285.

6 **S. W. Chou-Chen**, R. A. Oliveira, I. Raicher y G. A. Paula, «Additive partial linear models with autoregressive symmetric errors and its application to the hospitalizations for respiratory diseases,» *Statistical Papers*, vol. 65, n.º 8, págs. 5145-5166, 2024, ISSN: 1613-9798. 🔗 DOI: 10.1007/s00362-024-01590-w.

7 L. A. Barboza, **S. W. Chou-Chen**, M. Alfaro Córdoba, E. J. Alfaro y H. G. Hidalgo, «Spatio-temporal downscaling emulator for regional climate models,» *Environmetrics*, vol. 34, n.º 7, e2815, 2023. 🔗 DOI: 10.1002/env.2815.

8 L. A. Barboza, **S. W. Chou-Chen**, P. Vásquez, Y. E. García, J. G. Calvo, H. G. Hidalgo y F. Sanchez, «Assessing dengue fever risk in Costa Rica by using climate variables and machine learning techniques,» *PLOS Neglected Tropical Diseases*, vol. 17, págs. 1-13, ene. de 2023. 🔗 DOI: 10.1371/journal.pntd.0011047.

9 **S. W. Chou-Chen**, L. A. Barboza, P. Vásquez, Y. E. García, J. G. Calvo, H. G. Hidalgo y F. Sanchez, «Bayesian spatio-temporal model with INLA for dengue fever risk prediction in Costa Rica,» *Environmental and Ecological Statistics*, vol. 30, n.º 4, págs. 687-713, dic. de 2023, ISSN: 1573-3009. 🔗 DOI: 10.1007/s10651-023-00580-9.

10 **S. W. Chou-Chen** y P. A. Morettin, «A two-step estimation procedure for locally stationary ARMA processes with tempered stable innovations,» *Brazilian Journal of Probability and Statistics*, vol. 37, n.º 1, págs. 155-176, 2023. 🔗 DOI: 10.1214/23-BJPS565.

11 Y. E. García, **S. W. Chou-Chen**, L. A. Barboza, M. L. Daza–Torres, J. C. Montesinos-López, P. Vásquez, J. G. Calvo, M. Nuño y F. Sanchez, «Common patterns between dengue cases, climate, and local environmental variables in Costa Rica: A wavelet approach,» *PLOS Global Public Health*, vol. 3, n.º 10, págs. 1-22, oct. de 2023. 🔗 DOI: 10.1371/journal.pgph.0002417.

12 S. Gómez-Campos, M. Cubero-Corella, M. F. Salas García y **S. W. Chou-Chen**, «Patrones de movilidad en tiempos de COVID-19: un enfoque con big data,» *Epi-SCIENCE*, vol. 1, n.º 1, jun. de 2023. 🔗 DOI: 10.15517/es.2023.55398.

13 P. Vásquez, F. Sanchez, L. A. Barboza, Y. E. García, J. G. Calvo, **S. W. Chou-Chen** y G. Mery, «Mathematical and statistical models for the control of mosquito-borne diseases: the experience of Costa Rica,» *Rev Panam Salud Publica*, vol. 113, n.º 46, 2022. 🔗 DOI: https://doi.org/10.26633/RPSP.2022.113.

14 **S. W. Chou-Chen** y P. A. Morettin, «Indirect inference for locally stationary ARMA processes with stable innovations,» *Journal of Statistical Computation and Simulation*, vol. 90, n.º 17, págs. 3106-3134, 2020. 🔗 DOI: 10.1080/00949655.2020.1797030.

15 **S. W. Chou-Chen** y R. Alvarado-Barrantes, «Un Modelo jerárquico Bayesiano espacio-temporal con variable de conteos: aplicación de VIH/SIDA en Costa Rica.,» *Comunicaciones En Estadística*, vol. 11, n.º 1, págs. 9-35, 2018. eprint: https://doi.org/10.15332/s2027-3355.2018.0001.01.

16 **S. W. Chou** y E. E. Gutiérrez-Espeleta, «Ecuación para estimar la biomasa arbórea en los bosques tropicales de Costa Rica.,» *Revista Tecnología En Marcha*, vol. 26, n.º 2, págs. 41-54, 2013. eprint: https://doi.org/10.18845/tm.v26i2.1402. 🔗 dirección: https://revistas.tec.ac.cr/index.php/tec_marcha/article/view/1402.

Conference Proceedings

1 J. P. Arroyo-Castro y **S. W. Chou-Chen**, «Unsupervised Detection of Anomaly in Public Procurement Processes,» en *Data Science, Classification, and Artificial Intelligence for Modeling Decision Making*, J. Trejos, T. Chadjipadelis, A. Grané y M. Villalobos, eds., Cham: Springer Nature Switzerland, 2025, págs. 23-32, ISBN: 978-3-031-85870-3.

Other publications:

1 **S. W. Chou-Chen** y O. Hernández, *Teaching basic statistics to blind students*, ISLP Newsletter of the International Statistical Literacy Project. https://iase-web.org/islp/documents/Newsletters/ISLP%20Newsletter%20Vol%209.2%20December%202017.pdf, dic. de 2017.

CONFERENCES

2025   🔖 **LXIII Mini-Congreso CIGEFI 2025.** Centro de Investigaciones Geofísicas, Uiversidad de Costa Rica. *"Análisis de datos funcionales sobre el impacto del clima y la contaminación en las hospitalizaciones por problemas respiratorios en Costa Rica."* **Conference, Contributed Talk**).

🔖 **Seminar**. RESEARCH CENTER IN MATHEMATICS AND APPLICATIONS Research Center in Mathematics and Applications (CIMA), University of Évora, Portugal *"Additive Partial Linear Models with Symmetric Autoregressive Errors and their Forecasting Methods."* (**Seminar, Invited Talk**).

2024   🔖 **Interim Conference of the Asian Regional Section of the International Association for Statistical Computing (IASC-ARS Interim Conference 2024).** *"Additive partial linear models with autoregressive symmetric errors and its application to the hospitalizations for respiratory diseases."* **Conference, Contributed Talk**).

🔖 **Seminar**. Department of Statistics and Institute of Data Science, National Cheng Kung University, Tainan, Taiwan. *"Additive Partial Linear Models with Autoregressive Symmetric Errors and Its Forecast Methods."* (**Seminar, Invited Talk**).

🔖 **Simposio Internacional sobre Métodos Matemáticos Aplicados a las Ciencias, SIMMAC XXIV**, Universidad de Costa Rica, Liberia, Costa Rica. *"Modelos lineales parciales aditivos con error simétrico autorregresivo para datos de series temporales."* (**Conference, Invited Talk**).

2023   🔖 **XII Foro Internacional de Estadística Aplicada.** Facultad de Estadística e Informática, Universidad Veracruzana, Xalapa-Enríquez, Veracruz, México. *"Modelos predictivos aplicados a datos climáticos y dengue: un enfoque espacio-temporal y de aprendizaje de máquinas."* (**Conference, Invited Talk**).

2022   **XV Jornadas de Análisis Estadístico**. Escuela de Estadística, UCR. *"Predicción de los riesgos de dengue en Costa Rica mediante el uso de variables climáticas y técnicas de aprendizaje automático."* (**Conference, Invited Talk**).

Workshop on cliamte change, human behavior, and vector-borne diseases. Department of Public Health Sciences, University of California, Davis, California, United States. *"Assessing dengue fever risk in Costa Rica by using climate variables and machine learning techniques."* (**Workshop, Invited Talk**).

2021   **Seminar**. Escuela de Estadística, UCR, San José, Costa Rica. *"Processos localmente estacionarios con innovaciones estables y estables temperadas."* (**Seminar, Invited Talk**).

Seminar. Universidade Federal do Rio Grande do Norte, Natal, Brasil. *"Processo $\alpha-$estável localmente estacionário."* (**Seminar, Invited Talk**).

Seminar. CIMPA-UCR, San José, Costa Rica. *"Proceso localmente estacionario con innovaciones estables"* (**Seminar, Invited Talk**).

2019   **Seminar**. Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brasil. *"Processo $\alpha-$estável localmente estacionário."* (**Seminar, Invited Talk**).

18th ESTE - Time Series and Econometrics Meeting. Gramado, Rio Grande do Sul, Brasil. *"Locally stationary ARMA processes with tempered stable innovations."* (**Conference, Contributed Talk**).

XVI EMR - Escola de Modelos de Regressão. Pirenópolis, Goiás, Brasil. *"Indirect estimation for α-stable time-varying ARMA processes."* (**Conference, Contributed Talk**).

2018   **23º SINAPE - Simpósio Nacional de Probabilidade e Estatística**. São Pedro, São Paulo, Brasil. *"Indirect estimation for alpha-stable time-varying AR(1) processes."* (**Conference, Contributed Talk**).

2017   **61st World Statistics Congress**. Marrakech, Marruecos. *"Teaching Basic Statistics to Blind Students."* (**Congress, Poster Presentation**).

XV EMR - Escola de Modelos de Regressão. Goiania, Goiás, Brasil. *"Time series analysis on the Global Mean Sea Level."* (**Conference, Poster Presentation**).

XVII Escola de Séries Temporais e Econometria. (**Conference, Passive Participation**).

2015   **RSS 2015 Annual Conference. University of Exeter.** *"A simulation study of spatio-temporal Bayesian models with Poisson response."* (**Conference, Poster Presentation**).

60th World Statistics Congress. International Statistical Institute (**Congress, Passive Participation**).

2014   **Joint Statistical Meeting**. American Statistical Asociation (**Congress, Passive Participation**).

2013   **Primer Simposio Centroamericano de Estadística Bayesiana**. Universidad de Costa Rica. *"Análisis espacial Bayesiano de tasas de homicidios cantonales en Costa Rica."* (**Symposium, Contributed Talk**).

XII Jornadas de análisis estadístico. Universidad de Costa Rica (**Conference, Passive Participation**).

2010   **XI Jornadas de análisis estadístico.** Universidad de Costa Rica (**Conference, Passive Participation**).

ADMINISTRATIVE AND ACADEMIC MANAGEMENT

2026-present   Director, Master's Program in Statistics, UCR.

2024-2025   Subdirector, Master's Program in Statistics, UCR.

2022-present   Representative of the Graduate Program in Statistics on the Advisory Council of the Research Center for Development Observatory (CIOdD), UCR.

- Representative of the Graduate Program in Statistics on the Scientific Council of CIOdD, UCR.

2020-present
- Coordinator of the Evaluation, Guidance, and Student Affairs Committee at the School of Statistics, UCR.
- Member of the Master's Program in Statistics Committee, UCR.

2020-2022
- Coordinator of the Professional Practice in the Bachelor's Program in Statistics.

AWARDS AND HONORS

- UCREA Grant for the project: *"Potencial aumento del riesgo en Costa Rica y Nicaragua por causa de ciclones tropicales en el Caribe."* Participation as an associate researcher during 2023-2025.
- UCREA Grant for the project: *"El costo de una vida digna en Costa Rica. Ingreso vital y la construcción de metodologías para el cálculo de variaciones subnacionales."* Participation as an associate researcher during 2023-2025.
- Second place for Best Thesis Award (2019-2020) from the Brazilian Statistical Association, Brazil.
- First place for the best poster titled: *"Indirect estimation for α-stable time-varying AR(1) processes"* at the 23rd SINAPE - National Symposium on Probability and Statistics in São Pedro, São Paulo, Brazil, 2019.
- Graduation with honors in the Academic Master's in Statistics, 2015. University of Costa Rica.
- Graduation with honors in the Bachelor's in Statistics, 2012. University of Costa Rica.
- Highest GPA in the Bachelor's in Statistics program, 2010. University of Costa Rica.
- Highest GPA in the Bachelor's in Statistics program, 2009. University of Costa Rica.

OTHER PROFESSIONAL ACTIVITIES

Editorial Board of Journals

2022-present.
- Member of the Editorial Board of Revista Epi-Science.

2020-present.
- Member of the Editorial Board of Revista de Matemática: Teoría y Aplicaciones.

Journal Review:

- Climate Risk Management, Plos One, Scientific Report, and Revista de Matematica: Teoria y Aplicaciones.

Workshops and Short Courses Taught

May 2023
- *Statistical Modeling and Machine Learning Applied to Climatic Data and Public Health*, Faculty of Statistics and Informatics, Universidad Veracruzana (10 hours)

January 2016
- *Data Mining*, University of Costa Rica (16 hours)

September 2014
- *Introduction to R*, University of Costa Rica (16 hours)

October 2015
- *Introduction to R*, University of Costa Rica (16 hours)

Research Stays and Academic Visits

December 2024
- Institute of Statistical Science, Academia Sinica, Taipei, Taiwan.
- Department of Statistics and Institute of Data Science, National Cheng Kung University, Tainan, Taiwan.

September 2014
- Department of Educational Psychology, University of Minnesota, United States. *Active Approach in Teaching Statistics* with Dr. Robert DelMas.

Courses and Certifications

2019 ▮ IX WWlet – Workshop in Wavelets and Applications. Gramado/RS, Brazil. *Multiscale Analysis and Wavelets: Theory, Development, and Applications.*

▮ School of Regression Models. Pirenópolis/GO, Brazil. *Count Data Regression Models: Over- and Under-dispersion.*

2018 ▮ 23rd National Symposium on Probability and Statistics – SINAPE. São Pedro/SP, Brazil:

- *Binary Regression Models: Inference and Applications.*

- *Bayesian Distributional Regression.*

2017 ▮ XVII ESTE Brazilian School of Time Series and Econometrics, São Carlos, Brazil. *Statistical Inference for Nonstationary Time Series: Functional Data Analysis and Bootstrap perspectives.*

2014 ▮ School of Statistics, University of Costa Rica. *Time Series with Financial Data.*

▮ JSM Professional Development, Joint Statistical Meeting, Boston, United States. *Hierarchical Bayesian Modeling and Analysis for Spatial Data.*

PARTICIPATION IN THESES AND GRADUATION PROJECTS

Thesis Advisor:

July 2025 ▮ *"Modelo de la influencia de los factores climáticos y la contaminación del aire en la incidencia de enfermedades respiratorias en las regiones y subregiones climáticas de Costa Rica."* Professional Master's Degree in Mathematical Methods and Application of Emmanuelle Parra Rodríguez.

June 2025 ▮ *"Modelos de cambio de régimen de Markov aplicados a temperatura del agua de ríos en el macizo Cerro de la Muerte, Costa Rica ."* Professional Master's Degree in Statistics of Paola Campos Arce.

August 2024 ▮ *"Comparación de técnicas de análisis multivariado para detección de valores extremos con técnicas no supervisadas, una aplicación al caso de anomalías en contratación de bienes en Costa Rica."* Academic Master's Degree in Statistics of Jose Pablo Arroyo Castro.

May 2024 ▮ *"Análisis de los casos de intoxicación reportados al Centro Nacional de Control de Intoxicaciones de Costa Rica durante el período de COVID-19 entre los años 2020 y 2022."* Professional Master's Degree in Statistics of Edgardo Gutiérrez Vega.

July 2022 ▮ *"Modelo bayesiano espacio-temporal predictivo acumulado de personas fallecidas de Covid-19 por cantones en Costa Rica durante el mes de mayo de 2021."* Professional Master's Degree in Statistics of Ricardo Zamora Mennigke.

January 2022 ▮ *"Nexo entre crecimiento económico y desarrollo del sistema financiero: Análisis de cointegración y series de tiempo para el caso de CR."* Professional Master's Degree in Statistics of Fabián Brenes Trejos.

SKILLS

Languages: Spanish (near-native), Mandarin (native), English (advanced), and Portuguese (advanced).
Statistical Programs: R, SPSS, JMP, STATA, CSPro, Eviews, Winsteps, OpenBUGS.