

## Dr. Chih-Li Sung

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Experience	<b>Assistant Professor</b> 2018 - Present Department of Statistics and Probability, Michigan State University, U.S.A.
	<b>Visiting Assistant Professor</b> May - July, 2022 Department of Statistics, National Cheng Kung University, Taiwan
	<b>Graduate Research Assistant</b> 2014 - 2018 Georgia Institute of Technology, U.S.A.
	<b>Research Assistant</b> 2013 - 2014 Academia Sinica, Taiwan
	<b>Statistical Engineer</b> 2010 - 2013 Walsin Lihwa Corp., Taiwan
Education	<b>Ph.D. in Industrial Engineering</b> 2014 - 2018 Major in Statistics, Minor in Computer Science Georgia Institute of Technology, U.S.A. Thesis title: <i>Contributions to binary-output computer experiments and large-scale computer experiments</i> Advisors: Profs. C. F. Jeff Wu and Benjamin Haaland
	<b>M.S. in Statistics</b> 2008 - 2010 National Tsing Hua University, Taiwan
	<b>B.S. in Applied Mathematics</b> 2004 - 2008 National Tsing Hua University, Taiwan
Research Interests	Computer Experiments, Experimental Designs, Uncertainty Quantification, Machine Learning, Big Data, and Applications of Statistics in Engineering
Grants	<ul style="list-style-type: none"><li>NSF DMS 2113407 (<b>PI</b>, 07/01/2021 - 06/30/2024, \$142,009), <i>Collaborative Research: Efficient Bayesian Global Optimization with Applications to Deep Learning and Computer Experiments</i>. This project is in collaboration with Dr. Ying Hung at Rutgers University.</li></ul>
Publications	<ol style="list-style-type: none"><li><b>Sung, C.-L.</b> and Hung, Y. (2023+). Efficient calibration for imperfect epidemic models with applications to the analysis of COVID-19, <i>Journal of the Royal Statistical Society: Series C</i>, accepted.</li><li><b>Sung, C.-L.</b><sup>†</sup>, Wang, W.<sup>†</sup>, Cakoni, F., Harris, I., and Hung, Y. (2024). Functional-input Gaussian processes with applications to inverse scattering problems. <i>Statistica Sinica</i>, accepted.</li><li>Zhou, M., Chen, W., Su, X., <b>Sung, C.-L.</b>, Wang, X., and Ren, Z. (2023). Data-driven modeling of general fluid density under subcritical and supercritical conditions. <i>AIAA Journal</i>, 61(4), 1519-1531.</li></ol>

<sup>†</sup> Joint first authors

10. **Sung, C.-L.**, Haaland, B., Hwang, Y., and Lu, S. (2023). A clustered Gaussian process model for computer experiments. *Statistica Sinica*, 33(2), 893-918.
9. **Sung, C.-L.**, Barber, B. D., and Walker, B. J. (2022). Calibration of inexact computer models with heteroscedastic errors, *SIAM/ASA Journal on Uncertainty Quantification*, 10(4), 1733-1752.
8. **Sung, C.-L.** (2022). Estimating functional parameters for understanding the impact of weather and government interventions on COVID-19 outbreak. *Annals of Applied Statistics*, 16(4), 2505-2522.
7. **Sung, C.-L.**<sup>†</sup>, Hung, Y.<sup>†</sup>, Rittase, W., Zhu, C., and Wu, C. F. J. (2020). Calibration for computer experiments with binary responses and application to cell adhesion study. *Journal of the American Statistical Association*, 115(532), 1664-1674.
6. **Sung, C.-L.**<sup>†</sup>, Hung, Y.<sup>†</sup>, Rittase, W., Zhu, C., and Wu, C. F. J. (2020). A generalized Gaussian process model for computer experiments with binary time series. *Journal of the American Statistical Association*. 115(530), 945-956.
5. **Sung, C.-L.**<sup>†</sup>, Wang, W.<sup>†</sup>, Plumlee, M., and Haaland, B. (2020). Multi-resolution functional ANOVA for large-scale, many-input computer experiments. *Journal of the American Statistical Association*. 115(530) 908-919.
4. Chang, Y.-H., Zhang, L., Wang, X., Yeh, S.-T., Mak, S., **Sung, C.-L.**, Wu, C. F. J., and Yang, V. (2019). Kernel-smoothed proper orthogonal decomposition-based emulation for spatiotemporally evolving flow dynamics prediction. *AIAA Journal*, 57(12), 5269-5280.
3. Mak, S.<sup>†</sup>, **Sung, C.-L.**<sup>†</sup>, Yeh, S.-T., Wang, X., Chang, Y.-C., Joseph, V. R., Yang, V., and Wu, C. F. J. (2018). An efficient surrogate model for emulation and physics extraction of large eddy simulations. *Journal of the American Statistical Association*, 113(524):1443-1456. (**SPES Award from ASA in 2019**)
2. Yeh, S.-T., Wang, X., **Sung, C.-L.**, Mak, S., Chang, Y.-H., Wu, C. F. J., and Yang, V. (2018). Data-driven analysis and mean flow prediction using a physics-based surrogate model for design exploration. *AIAA Journal*, 56(6):2429-2442.
1. **Sung, C.-L.**, Gramacy, R. B., and Haaland, B. (2018). Potentially predictive variance reducing subsample locations in local Gaussian process regression. *Statistica Sinica*, 28(2):577-600.

#### Submitted Papers

<sup>†</sup> Joint first authors

4. **Sung, C.-L.**, Song, Y., and Hung, Y. (2023). Advancing inverse scattering with surrogate modeling and Bayesian inference for functional inputs, submitted.
3. **Sung, C.-L.**, Wang, W., Ding, L., and Wang, X. (2023). Mesh-clustered Gaussian process emulator for partial differential equation systems, submitted.
2. **Sung, C.-L.**, Ji, Y., Tang, T., and Mak, S. (2022). Stacking designs: designing multi-fidelity computer experiments with target predictive accuracy, submitted.
1. Lin, W.-A.<sup>†</sup>, **Sung, C.-L.**<sup>†</sup>, and Chen, R.-B. (2022). Category tree Gaussian process for computer experiments with many-category qualitative factors and application to cooling system design, revision submitted. (**C. Z. Wei Memorial Award from CIPS in 2022**)

#### Conference Proceedings

3. Li, Y., Wang, X., Mak, S., **Sung, C.-L.**, Wu, C. F. J., and Yang, Y. (2018). Novel perspectives of spatial flame transfer function identification and thermo-acoustic instability analysis. In *Proceedings of the 2018 AIAA Propulsion and Energy Forum*.

2. Li, Y., Wang, X., Mak, S., **Sung, C.-L.**, Wu, C. F. J., and Yang, Y. (2018). Uncertainty quantification of flame transfer function under a Bayesian framework. In *Proceedings of the 2018 AIAA Aerospace Sciences Meeting*.
1. Chang, Y.-H., Zhang, L., Wang, X., Yeh, S.-T., Mak, S., **Sung, C.-L.**, Wu, C. F. J., and Yang, Y. (2017). Spatial-temporal flow dynamics prediction with large design space via data-driven analysis and LES-based surrogate model. In *ILASS-Americas 29th Annual Conference on Liquid Atomization and Spray Systems*.

## Editorial Services

### • Associate Editor

- Technometrics 2022 - present
- Computational Statistics & Data Analysis 2021 - present

## Teaching

### • Instructor, Michigan State University

- **STT481: Capstone in Statistics** 2018, 2019, 2020, 2021, 2022, 2023  
Student evaluation (average of SIRS form; 1 is the best and 5 is the worst):

2018 Fall	2019 Spring	2019 Fall	2020 Spring	2020 Fall
1.638	1.537	1.680	1.665	1.612
2021 Spring	2021 Fall	2022 Spring	2022 Fall	2023 Spring
1.598	1.713	1.392	1.919	1.560

- **STT801: Design of Experiments** 2021, 2022, 2023  
Student evaluation (average of SIRS form; 1 is the best and 5 is the worst):

2021 Spring	2022 Spring	2023 Spring
1.340	1.498	1.205

### • Graduate Teaching Assistant, Georgia Institute of Technology

- ISYE6413: Design and Analysis of Experiments January 2017
- ISYE3770: Statistics and Applications August 2015

## Mentorship

STT: Department of  
Statistics and  
Probability at MSU

### • Ph.D. Students

- Romain Boutelet (*STT*) 2023-present
- Chun-Yi Chang (*STT*) 2022-present
- Junoh Heo (*STT*) 2021-present
- Wei-Ann Lin (*NCKU*, primary advisor: Prof. Ray-Bing Chen) 2019-present

### • Masters-level Students

- Haojun Yang (*STT*) 2021-2022
- Chun-Yi Chang (*STT*, Current position: Ph.D. student at MSU) 2021-2022
- Kun Xia (*STT*) 2021-2022
- Wei Chen (*Florida Tech*, Primary advisor: Prof. Xingjian Wang) 2020-2021
- Ashton Pallottini (*STT*, Current position: Ph.D. student at U. of Chicago) 2019-2020
- Jinwon Park (*STT*) 2019-2019

### • Undergraduate-level Students

- Noah Jankowski (*STT*) 2021-2022

• **MSU IMPACTS Trainees**

- Duncan Boren (*BMB*, primary advisor: Prof. Josh Vermaas) 2022-present

- Joshua Kaste (*Plant Biology*, primary advisor: Prof. Yair Shachar-Hill) 2020-2021

**Dissertation  
Committee  
Service**

*STT*: Department of  
Statistics and  
Probability at MSU

- Zi Li (*ECE*, in progress)

- Xuran Wang (*CEPSE*, in progress)

- Haoxiang Feng (*STT*, in progress)

- Yao Song (*Statistics, Rutgers University*, in 2023)

- Anirban Samaddar (*STT*, in 2023)

- Mookyong Son (*STT*, 2023)

- Abhijnan Chattopadhyay (*STT*, 2022). Decode phenome-genome interactions: a data science approach.

- Runze Su (*STT*, 2022). Machine learning towards data with complex structures.

- Ibrahim Kekec (*Economics*, 2021). Essays on discrete multivalued treatments with endogeneity and heterogeneous counterfactual errors.

- Juna Goo (*STT*, 2020). A spatio-temporal model for white matter tractography in diffusion tensor imaging.

- Wei Chen (*Florida Tech*, master thesis, 2020). A modified peng-robinson cubic equation of state based on Bayesian framework.

**Awards**

• **IMS New Researchers Travel Award** April 2023  
Institute of Mathematical Statistics

• **Full Membership in Sigma Xi** October 2021  
The Scientific Research Honor Society

• **Statistics in Physical Engineering Sciences (SPES) Award** August 2019  
American Statistical Association

• **Alice and John Jarvis, Ph.D. Student Research Award** April 2018  
(Honorable Mention) Stewart School of ISyE, Georgia Tech

• **Best Student Poster Winner** October 2017  
(1st Prize) Georgia Statistics Day, Emory University

• **Best Student Poster Winner** June 2017  
ISBIS Meeting, the IBM Watson Research Center

• **Spring Research Conference Travel Award** May 2016  
SRC, Illinois Institute of Technology

• **Hacklytics: Go Back Home Safe** April 2016  
(3rd Place) Data Science at Georgia Tech

• **Government Scholarship to Study Abroad** August 2015  
Ministry of Education, Taiwan

• **Dr. Chen Wen-Chen Statistics Science Thesis Award** June 2010  
Dr. Chen Wen-Chen Memorial Foundation

## Software

6. **Sung, C.-L.** (2023). **mcGP**: Mesh-clustered Gaussian process. R package version 0.1.
5. **Sung, C.-L.** (2022). **HetCalibrate**: Calibration of Inexact Computer Models with Heteroscedastic Errors. R package version 0.2.
4. **Sung, C.-L.** (2022). **GPcluster**: Clustered Gaussian Process. R package version 0.1.
3. **Sung, C.-L.** (2019). **MRFA**: Fitting and Predicting Large-Scale Nonlinear Regression Problems using Multi-Resolution Functional ANOVA (MRFA) Approach. R package version 0.4.
2. **Sung, C.-L.** (2018). **calibrateBinary**: Calibration for Computer Experiments with Binary Responses. R package version 0.1.
1. **Sung, C.-L.** (2017). **binaryGP**: Fitting and Predicting a Gaussian Process Model with (Time-Series) Binary Response. R package version 0.2.

## Talks

Invited talks are  
boldfaced

### • 2023

1. **Seminar, TAMIDS, Texas A&M University** (August). *Stacking designs: designing multi-fidelity computer experiments with target predictive accuracy.*
2. **Industry 4.0 Technology Implementation workshop** (August). *Statistical emulation, calibration, and optimization for digital twin.*
3. **EcoSta 2023, Tokyo, Japan** (August). *Functional-input Gaussian processes with applications to inverse scattering problems.*
4. **ISI World Statistics Congress 2023** (July). *mcGP: mesh-clustered Gaussian process emulator for partial differential equation systems.*
5. **ICSA Applied Statistics Symposium 2023** (June). *Stacking designs: designing experiments for multi-fidelity modeling with confidence.*
6. **Spring Research Conference 2023** (May). *Stacking designs: designing experiments for multi-fidelity modeling with confidence.*
7. **Seminar, University of St Andrews, Scotland** (January). *When epidemic models meet statistics: understanding COVID-19 outbreak.*

### • 2022

1. **AISC 2022, UNC Greensboro** (October). *Functional-input Gaussian processes with applications to inverse scattering problems.*
2. **Seminar, Virginia Tech** (September). *Stacking designs: designing multi-fidelity computer experiments with confidence.*
3. **JSM 2022 Conference, Washington DC** (August). *When epidemic models meet statistics: understanding the impact of weather and government interventions on COVID-19 outbreak.*
4. **Seminar, Academia Sinica, Taiwan** (July). *Stacking designs: designing experiments for multi-fidelity modeling with confidence.*
5. **EcoSta 2022, Kyoto, Japan** (June). *Stacking designs: designing experiments for multi-fidelity modeling with confidence.*
6. **Seminar, National Tsing Hua University, Taiwan** (May). *When epidemic models meet statistics: understanding COVID-19 outbreak.*

### • 2021

1. **INFORMS 2021 Conference** (October). *Estimating functional parameters for understanding the impact of weather and government interventions on COVID-19 outbreak.*
2. **JSM 2021 Conference** (August). *Estimating functional parameters for understanding the impact of weather and government interventions on COVID-19 outbreak.*

3. **JSM 2021 Conference** (August). *Multi-level emulator for multi-fidelity simulations.*
  4. **UQ Seminar, Academy of Mathematics and Systems Science, Chinese Academy of Sciences** (January). *Computer experiments with binary time series and applications to cell biology: modeling, emulation and calibration.*
- **2020**
    1. JSM 2020 Conference (August). *Calibration of inexact computer models with heteroscedastic errors.*
    2. **Seminar, University of California, Los Angeles** (February). *Multi-resolution functional ANOVA for large-scale, many-input computer experiments.*
    3. Colloquium, Michigan State University (January). *Applications of computer experiments: emulation and calibration.*
  - **2019**
    1. **INFORMS 2019 Conference** (October). *A clustered Gaussian process model with an application to solar irradiance emulation.*
    2. **INFORMS 2019 Conference** (October). *Multi-resolution functional ANOVA for large-scale, many-input computer experiments.*
    3. **ICOSDA 2019** (October). *Exploiting variance reduction potential in local Gaussian process search.*
    4. **ICISE 2019** (June). *Multi-resolution functional ANOVA for large-scale, many-input computer experiments.*
    5. **EcoSta 2019** (June). *Exploiting variance reduction potential in local Gaussian process search.*
    6. **The 28th South Taiwan Statistics Conference** (June). *Exploiting variance reduction potential in local Gaussian process search.*
    7. **Seminar, Academia Sinica, Taiwan** (June). *Multi-resolution functional ANOVA for large-scale, many-input computer experiments.*
    8. **Seminar, National Tsing Hua University, Taiwan** (May). *Computer Experiments with Binary Time Series and Applications to Cell Biology: modeling, estimation and calibration.*
    9. **Research Colloquium, Purdue University** (February). *Applications of computer experiments: emulation and calibration.*
  - **2018**
    1. **INFORMS 2018 Conference** (October). *An efficient surrogate model for emulation and physics extraction of large eddy simulations.*
    2. **Workshop on Computer Experiments, Academia Sinica, Taiwan** (July). *Calibration for computer experiments with binary responses.*
    3. **SIAM UQ** (April). *Calibration for computer experiments with binary responses.*
  - **2017**
    1. **INFORMS 2017 Conference** (October). *A generalized Gaussian process model for computer experiments with binary time series.*
    2. **Georgia Statistics Day, Emory University** (October). *A generalized Gaussian process model for computer experiments with binary time series* (poster presentation).
    3. **JSM 2017 Conference** (July). *Multi-resolution functional ANOVA for large-scale, many-input computer experiments.*
    4. **ISBIS Meeting** (June). *Multi-resolution functional ANOVA for large-scale, many-input computer experiments* (poster presentation).

5. SPUQ Workshop (May). *A generalized Gaussian process model for computer experiments with binary time series* (poster presentation).
6. NAE Regional Meeting (April). *Surrogate modeling and data-driven physics extraction of large-eddy simulations* (poster presentation).

- **2016:**

1. ICSA Symposium (June). *Potentially predictive variance reducing subsample locations in local Gaussian process regression.*
2. SRC Conference (May). *Potentially predictive variance reducing subsample locations in local Gaussian process regression.*