

## Dr. Chih-Li Sung

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*Department of Statistics and Probability, Michigan State University*  
*email: sungchih@msu.edu*  
*website: <https://chihli.github.io/>*

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 2338018 (<b>PI</b>, 06/01/2024 - 05/31/2028, \$423,591), <i>CAREER: Single-Fidelity vs. Multi-Fidelity Computer Experiments: Unveiling the Effectiveness of Multi-Fidelity Emulation.</i></li><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>	
Editorial Services	<b>Associate Editor</b>	
	- Technometrics	2022 - present
	- Computational Statistics & Data Analysis	2021 - present

## Publications

17. **Sung, C.-L.**, Wang, W., Ding, L., and Wang, X. (2024+). Mesh-clustered Gaussian process emulator for partial differential equation boundary value problems. *Technometrics*, accepted.
16. **Sung, C.-L.**, Wang, W., Cakoni, F., Harris, I., and Hung, Y. (2024). Functional-input Gaussian processes with applications to inverse scattering problems. *Statistica Sinica*, 34(4), in press.
15. **Sung, C.-L.**, Ji, Y., Mak, S., Wang, W., and Tang, T. (2024). Stacking designs: designing multifidelity computer experiments with target predictive accuracy. *SIAM/ASA Journal on Uncertainty Quantification*, 12(1), 157-181.
14. **Sung, C.-L.** and Tuo, R. (2024). A review on computer model calibration. *WIREs Computational Statistics*, 16(1), e1645.
13. **Sung, C.-L.** and Hung, Y. (2024). Efficient calibration for imperfect epidemic models with applications to the analysis of COVID-19. *Journal of the Royal Statistical Society: Series C*, 73(1), 47-64.
12. Zhou, M., Ni, C., **Sung, C.-L.**, Ding, S., and Wang, X. (2024). Modeling of thermo-physical properties and vapor-liquid equilibrium using Gaussian process regression. *International Journal of Heat and Mass Transfer*, 219, 124888.
11. Zhou, M., Chen, W., Su, X., **Sung, C.-L.**, Wang, X., and Ren, Z. (2023). Data-driven modeling of general fluid density under subcritical and supercritical conditions. *AIAA Journal*, 61(4), 1519-1531.
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.**, Hung, Y., 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.**, Hung, Y., 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.**, Wang, W., 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., **Sung, C.-L.**, 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> Supervised student

4. Steensma, A. K., Kaste, J. A., Heo, J.<sup>†</sup>, Orr, D., **Sung, C.-L.**, Shachar-Hill, Y., and Walker, B. J. (2024). Modeling with uncertainty quantification identifies essential features of a non-canonical algal carbon-concentrating mechanism, submitted.
3. Heo, J.<sup>†</sup>, **Sung, C.-L.** (2023). Active learning for a recursive non-additive emulator for multi-fidelity computer experiments, submitted.  
(Winner of INFORMS 2023 QSR Best Student Paper)
2. **Sung, C.-L.**, Song, Y., and Hung, Y. (2023). Advancing inverse scattering with surrogate modeling and Bayesian inference for functional inputs, submitted.
1. Lin, W.-A.<sup>†</sup>, **Sung, C.-L.**, and Chen, R.-B. (2022). Category tree Gaussian process for computer experiments with many-category qualitative factors and application to cooling system design, 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*.

## Awards

- **NSF CAREER Award** 2024-2028  
National Science Foundation
- **QSR Best Student Paper Winner** October 2023  
(Student: Junoh Heo) INFORMS
- **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

## 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
  - **STT997: Advanced Topics in Statistics** 2024 Spring
- **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**
  - Andrews Boahen (*STT*) 2024-present
  - Romain Boutelet (*STT*, co-supervised with Prof. Andrew O. Finley) 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**

	<ul style="list-style-type: none"> <li>- Chungmin Lee (<i>Yonsei University</i>) 2024-present</li> <li>- Aditya Pendyala (<i>STT</i>) 2024-present</li> <li>- Noah Jankowski (<i>STT</i>) 2021-2022</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>MSU IMPACTS Trainees</b> <ul style="list-style-type: none"> <li>- Duncan Boren (<i>BMB</i>, primary advisor: Prof. Josh Vermaas) 2022-present</li> <li>- Joshua Kaste (<i>Plant Biology</i>, primary advisor: Prof. Yair Shachar-Hill) 2020-2021</li> </ul> </li> </ul>
<b>Panel Review</b>	<ul style="list-style-type: none"> <li>• National Science Foundation (2022, 2024)</li> </ul>
<b>Educational Outreach</b>	<ul style="list-style-type: none"> <li>• <b>12th Annual MSU Science Festival</b> April 2024 Our lab hosted an engaging event: “Rolling the Dice: Unveiling Normal Distributions” as part of the MSU Science Festival. Our booth provided a fun and hands-on learning experience, helping learners of all ages understand the concept of normal distribution through fun and interactive games.</li> <li>• <b>REU exchange program</b> 2024 Spring I had the honor of mentoring an exchange student from Xian University, alongside three talented MSU undergraduate students. As part of this program, I had the privilege of supervising an undergraduate research project titled “March Machine Learning Mania 2024,” fostering innovation and exploration in the realm of machine learning.</li> <li>• <b>Gifted Education Symposium</b> November 2023 I shared my career journey and applications of statistics and AI, as well as future opportunities in these areas, with junior high school students in Penghu, Taiwan.</li> </ul>
<b>Software</b>	<ol style="list-style-type: none"> <li>7. Heo, J. and <b>Sung, C.-L.</b> (2023). <i>RNAmf</i>: Recursive Non-Additive Emulator for Multi-Fidelity Data. R package version 0.1.0.</li> <li>6. <b>Sung, C.-L.</b> (2023). <i>MRFA</i>: Fitting and Predicting Large-Scale Nonlinear Regression Problems using Multi-Resolution Functional ANOVA (MRFA) Approach. R package version 0.6.</li> <li>5. <b>Sung, C.-L.</b> (2023). <i>mcGP</i>: Mesh-clustered Gaussian process. R package version 0.1.</li> <li>4. <b>Sung, C.-L.</b> (2022). <i>HetCalibrate</i>: Calibration of Inexact Computer Models with Heteroscedastic Errors. R package version 0.2.</li> <li>3. <b>Sung, C.-L.</b> (2022). <i>GPcluster</i>: Clustered Gaussian Process. R package version 0.1.</li> <li>2. <b>Sung, C.-L.</b> (2018). <i>calibrateBinary</i>: Calibration for Computer Experiments with Binary Responses. R package version 0.1.</li> <li>1. <b>Sung, C.-L.</b> (2017). <i>binaryGP</i>: Fitting and Predicting a Gaussian Process Model with (Time-Series) Binary Response. R package version 0.2.</li> </ol>
<b>Dissertation Committee Service</b>	<ul style="list-style-type: none"> <li>- Meiqi Liu (<i>STT</i>, in progress)</li> <li>- Tathagata Dutta (<i>STT</i>, in progress)</li> <li>- Duncan Boren (<i>BMB</i>, in progress)</li> <li>- Xuran Wang (<i>CEPSE</i>, in progress)</li> <li>- Haoxiang Feng (<i>STT</i>, in progress)</li> <li>- Joshua Kaste (<i>Plant Biology</i>, 2024)</li> <li>- Zi Li (<i>ECE</i>, 2023)</li> <li>- Yao Song (<i>Statistics, Rutgers University</i>, 2023)</li> <li>- Anirban Samaddar (<i>STT</i>, 2023)</li> </ul>
<i>STT</i> : Department of Statistics and Probability at MSU	

- Mookyong Son (*STT*, 2023)
- Abhijnan Chattopadhyay (*STT*, 2022)
- Runze Su (*STT*, 2022)
- Ibrahim Kekec (*Economics*, 2021)
- Juna Goo (*STT*, 2020)
- Wei Chen (*Florida Tech*, master thesis, 2020)

## Talks

Invited talks are  
boldfaced

### • 2024

1. **Seminar, Department of Mathematics and Statistics, University of Massachusetts Amherst** (April). *Stacking designs: designing multifidelity computer experiments with target predictive accuracy.*

### • 2023

1. **Annual Meeting and Conference of Chinese Statistical Association** (December). *Stacking designs: designing multi-fidelity computer experiments with target predictive accuracy.*
2. **Seminar, Institute of Statistical Science, Academia Sinica** (October). *Active learning for a recursive non-additive emulator for multi-fidelity computer experiments.*
3. **Seminar, Department of Statistics, National Chengchi University** (October). *Stacking designs: designing multi-fidelity computer experiments with target predictive accuracy.*
4. **Seminar, TAMIDS, Texas A&M University** (August). *Stacking designs: designing multi-fidelity computer experiments with target predictive accuracy.*
5. **Industry 4.0 Technology Implementation workshop** (August). *Statistical emulation, calibration, and optimization for digital twin.*
6. **EcoSta 2023, Tokyo, Japan** (August). *Functional-input Gaussian processes with applications to inverse scattering problems.*
7. **ISI World Statistics Congress 2023** (July). *mcGP: mesh-clustered Gaussian process emulator for partial differential equation systems.*
8. **ICSA Applied Statistics Symposium 2023** (June). *Stacking designs: designing experiments for multi-fidelity modeling with confidence.*
9. **Spring Research Conference 2023** (May). *Stacking designs: designing experiments for multi-fidelity modeling with confidence.*
10. **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.*