

## Dr. Chih-Li Sung

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*website: <https://chihli.github.io/>*

Experience	<b>Associate Professor</b>	2025 - Present
	<b>Assistant Professor</b>	2018 - 2025
	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	<b>• Active:</b>	
	– <a href="#">NSF DMS 2338018</a> ( <b>PI</b> , 06/01/2024 - 05/31/2029, \$423,591), <i>CAREER: Single-Fidelity vs. Multi-Fidelity Computer Experiments: Unveiling the Effectiveness of Multi-Fidelity Emulation.</i>	
	<b>• Completed:</b>	
	– <a href="#">NSF DMS 2113407</a> ( <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.	
Editorial Services	<b>• Associate Editor</b>	
	– The New England Journal of Statistics in Data Science	2024 - present
	– Technometrics	2022 - present

## Publications

Green color indicates supervised student

22. **Sung, C.-L.**, Song, Y., and Hung, Y. (2025). Advancing inverse scattering with surrogate modeling and Bayesian inference for functional inputs.  
*SIAM/ASA Journal on Uncertainty Quantification*, 13(2), 339-517.
21. Zhou, M., Zuo, R., **Sung, C.-L.**, Tong, Y., and Wang, X. (2025). Region-optimal Gaussian process surrogate model via Dirichlet process for cold-flow and combustion emulations.  
*Computer Methods in Applied Mechanics and Engineering*, 439, 117894.
20. Steensma, A. K., Kaste, J. A., **Heo, J.**, Orr, D., **Sung, C.-L.**, Shachar-Hill, Y., and Walker, B. J. (2025). Modeling with uncertainty quantification identifies essential features of a non-canonical algal carbon-concentrating mechanism.  
*Plant Physiology*, 197(2), kiae629.
19. **Heo, J.** and **Sung, C.-L.** (2025). Active learning for a recursive non-additive emulator for multi-fidelity computer experiments.  
*Technometrics*, 67(1), 58-72.  
(Winner of INFORMS 2023 QSR Best Student Paper)  
(Winner of 2024 ASA SPES + Q&P Best Student Paper)
18. **Lin, W.-A.**, **Sung, C.-L.**, and Chen, R.-B. (2024). Category tree Gaussian process for computer experiments with many-category qualitative factors and application to cooling system design.  
*Journal of Quality Technology*, 56(5), 391-408.  
(C. Z. Wei Memorial Award from CIPS in 2022)
17. **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), 1883-1902.
16. **Sung, C.-L.**, Wang, W., Ding, L., and Wang, X. (2024). Mesh-clustered Gaussian process emulator for partial differential equation boundary value problems.  
*Technometrics*, 66(3), 406-421.
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

Green color indicates supervised student

3. **Heo, J.**, **Boutelet, R.**, and **Sung, C.-L.** (2025) Diffusion non-additive model for multi-fidelity simulations with tunable precision.
2. **Boutelet, R.** and **Sung, C.-L.** (2025) Active learning for finite element simulations with adaptive non-stationary kernel function.
1. Chen, Y., **Sung, C.-L.**, Kusari, A., Song, X., and Sun, W. (2024). Uncertainty-aware out-of-distribution detection with Gaussian processes.

#### 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	• <b>NSF CAREER Award</b>	2024
	National Science Foundation	
	• <b>SPES + Q&amp;P Best Student Paper Winner</b>	August 2024
	(Student: Junoh Heo) ASA	
	• <b>QSR Best Student Paper Winner</b>	October 2023
	(Student: Junoh Heo) INFORMS	
	• <b>IMS New Researchers Travel Award</b>	April 2023
	Institute of Mathematical Statistics	
	• <b>Full Membership in Sigma Xi</b>	October 2021
	The Scientific Research Honor Society	
	• <b>Statistics in Physical Engineering Sciences (SPES) Award</b>	August 2019
	American Statistical Association	
	• <b>Alice and John Jarvis, Ph.D. Student Research Award</b>	April 2018
Teaching	(Honorable Mention) Stewart School of ISyE, Georgia Tech	
	• <b>Best Student Poster Winner</b>	October 2017
	(1st Prize) Georgia Statistics Day, Emory University	
	• <b>Best Student Poster Winner</b>	June 2017
	ISBIS Meeting, the IBM Watson Research Center	
	• <b>Spring Research Conference Travel Award</b>	May 2016
	SRC, Illinois Institute of Technology	
	• <b>Hacklytics: Go Back Home Safe</b>	April 2016
	(3rd Place) Data Science at Georgia Tech	
	• <b>Government Scholarship to Study Abroad</b>	August 2015
	Ministry of Education, Taiwan	
	• <b>Dr. Chen Wen-Chen Statistics Science Thesis Award</b>	June 2010
	Dr. Chen Wen-Chen Memorial Foundation	
	• <b>Instructor, Michigan State University</b>	
	- <b>STT442: Probability and Statistics II: Statistics</b>	2024
	- <b>STT481: Capstone in Statistics</b>	2018, 2019, 2020, 2021, 2022, 2023
	- <b>STT801: Design of Experiments</b>	2021, 2022, 2023, 2025
	- <b>STT997: Advanced Topics in Statistics</b>	2024
	• <b>Graduate Teaching Assistant, Georgia Institute of Technology</b>	
	- ISYE6413: Design and Analysis of Experiments	January 2017
	- ISYE3770: Statistics and Applications	August 2015

<b>Mentorship</b>	<ul style="list-style-type: none"> <li>• <b>Ph.D. Students</b> <ul style="list-style-type: none"> <li>- Andrews Boahen (<i>STT</i>) 2024-present</li> <li>- Romain Boutelet (<i>STT</i>, co-supervised with Prof. Andrew O. Finley) 2023-present</li> <li>- Chun-Yi Chang (<i>STT</i>) 2022-present</li> <li>- Junoh Heo (<i>STT</i>) 2021-present</li> <li>- Wei-Ann Lin (<i>NCKU</i>, primary advisor: Prof. Ray-Bing Chen) 2019-2025</li> </ul> </li> <li>• <b>Masters-level Students</b> <ul style="list-style-type: none"> <li>- Haojun Yang (<i>STT</i>) 2021-2022</li> <li>- Chun-Yi Chang (<i>STT</i>, Current position: Ph.D. student at MSU) 2021-2022</li> <li>- Kun Xia (<i>STT</i>) 2021-2022</li> <li>- Wei Chen (<i>Florida Tech</i>, Primary advisor: Prof. Xingjian Wang) 2020-2021</li> <li>- Ashton Pallottini (<i>STT</i>, Current position: Ph.D. student at U. of Chicago) 2019-2020</li> <li>- Jinwon Park (<i>STT</i>) 2019-2019</li> </ul> </li> <li>• <b>Undergraduate-level Students</b> <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> </li> <li>• <b>MSU IMPACTS Trainees</b> <ul style="list-style-type: none"> <li>- Duncan Boren (<i>BMB</i>, primary advisor: Prof. Josh Vermaas) 2022-2023</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>Conference/ Workshop Activities</b>	<ul style="list-style-type: none"> <li>• Organizing the workshop: “UQ and Trustworthy AI Algorithms for Complex Systems and Social Good” March 2025</li> <li>• Organizing the session at JSM: “Recent Advances in Active Learning and Bayesian Optimization” August 2024</li> </ul>
<b>Educational Outreach</b>	<ul style="list-style-type: none"> <li>• <b>Take Your Child to Work Day</b> April 2025 Dr. Guanqun Cao and I co-hosted an interactive exhibit titled “Random Rolls, Smooth Spins: Revealing the Secrets of the Bell Curve” as part of MSUs annual Take Your Child to Work Day. This campus-wide event invites children to explore career paths through engaging, hands-on activities.</li> <li>• <b>13th Annual MSU Science Festival</b> April 2025 Dr. Guanqun Cao and I co-hosted an interactive exhibit titled “Random Rolls, Smooth Spins: Revealing the Secrets of the Bell Curve” as part of the 13th Annual MSU Science Festival an annual, free celebration of science driven by curiosity, wonder, and discovery.</li> <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> </ul>

• **Gifted Education Symposium**

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.

**Software**

8. Heo, J., Boutelet, R., and **Sung, C.-L.** (2025). **DNAmf**: Diffusion Non-Additive Model with Tunable Precision. R package version 0.1.0.
7. Heo, J. and **Sung, C.-L.** (2025). **RNAmf**: Recursive Non-Additive Emulator for Multi-Fidelity Data. R package version 1.1.1.
6. **Sung, C.-L.** (2023). **MRFA**: Fitting and Predicting Large-Scale Nonlinear Regression Problems using Multi-Resolution Functional ANOVA (MRFA) Approach. R package version 0.6.
5. **Sung, C.-L.** (2023). **mcGP**: Mesh-clustered Gaussian process. R package version 0.1.
4. **Sung, C.-L.** (2022). **HetCalibrate**: Calibration of Inexact Computer Models with Heteroscedastic Errors. R package version 0.2.
3. **Sung, C.-L.** (2022). **GPcluster**: Clustered Gaussian Process. R package version 0.1.
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.

**Dissertation  
Committee  
Service**

*STT*: Department of  
Statistics and  
Probability at MSU

- Elliot Shannon (*STT*, in progress)
- Meiqi Liu (*STT*, in progress)
- Tathagata Dutta (*STT*, in progress)
- Duncan Boren (*BMB*, in progress)
- Xuran Wang (*CEPSE*, 2024)
- Haoxiang Feng (*STT*, 2024)
- Joshua Kaste (*Plant Biology*, 2024)
- Zi Li (*ECE*, 2023)
- Yao Song (*Statistics, Rutgers University*, 2023)
- Anirban Samaddar (*STT*, 2023)
- 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

### • 2025

1. **Seminar, Institute of Statistical Science, Academia Sinica** (May). *Advances in multi-fidelity computer experiments with tuning parameters.*
2. **Workshop, Kernel Methods in Uncertainty Quantification and Experimental Design** (April). *Advances in active learning and emulation for multi-fidelity simulations.*
3. **Workshop, UQ and Trustworthy AI Algorithms for Complex Systems and Social Good** (March). *Recursive non-additive surrogate model for multi-fidelity simulations.*
4. **Seminar, Department of Industrial and Systems Engineering, University of Washington** (February). *Advances in multi-fidelity computer experiments: non-additive emulation and active learning.*
5. **Colloquium, Department of Statistics, University of South Carolina** (January). *Advancing multi-fidelity computer experiments: applications to uncertainty quantification.*

### • 2024

1. **JSM 2024 Conference, Portland** (August). *Functional-input Gaussian processes with applications to inverse scattering problems.*
2. **2024 International Conference for Statistics and Data Science** (July). *Stacking designs: designing multifidelity computer experiments with target predictive accuracy.*
3. **The 28th South Taiwan Statistics Conference** (June). *Active learning for a recursive non-additive emulator for multi-fidelity computer experiments.*
4. **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.*