

# Willem van den Boom

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<b>Education</b>	Duke University, Department of Statistical Science		
	Ph.D. in Statistical Science	2018	
	Certificate in College Teaching	2018	
	M.S. in Statistical Science	2016	
	Dissertation: Tailored scalable dimensionality reduction		
	Advisors: David B. Dunson and Galen Reeves		
	Utrecht University, University College Roosevelt		
	B.Sc. in Liberal Arts and Sciences	2014	
	Major in Mathematics, Computer Science, and Physics		
	Minor in Methods & Statistics		
<b>Academic positions</b>	National University of Singapore, Yong Loo Lin School of Medicine		
	<i>Senior Research Fellow</i>	2021 – present	
	Agency for Science, Technology and Research (A*STAR), Singapore Institute for Clinical Sciences		
	<i>Visiting Fellow</i>	2020 – 2021	
	National University of Singapore, Yale-NUS College, Division of Science		
	<i>Senior Research Fellow</i>	2021	
	<i>Research Fellow</i>	2020 – 2021	
	<i>Lecturer</i>	2019 – 2020	
	<i>Research Fellow</i>	2019	
	National University of Singapore, Department of Statistics and Data Science		
	<i>Research Fellow</i>	2018 – 2019	
<b>Research grants</b>	Principal Investigator, ‘Optimal treatment target identification from longitudinal electronic medical records’, National Medical Research Council, Young Individual Research Grant, S\$298,000	2020 – 2024	

**Publications:**  
**Peer reviewed**

1. Qian, F., van den Boom, W., and See, K.C. (2024). The new global definition of acute respiratory distress syndrome: Insights from the MIMIC-IV database. *Intensive Care Medicine*, 50(4), 608–609. doi:10.1007/10.1007/s00134-024-07383-x
2. Saini, S., Manai, G., van den Boom, W., De Iorio, M., and Qian, F. (2024). Invoice level forecasting with discrete survival methods for effective forecasting of account receivables in supply chain. *Discover Analytics*, 2, 5. doi:10.1007/s44257-024-00013-2
3. Natarajan, A., van den Boom, W., Odang, K.B., and De Iorio, M. (2024). On a wider class of prior distributions for graphical models. *Journal of Applied Probability*, 61(1), 230–243. doi:10.1017/jpr.2023.33
4. Feng, S.F., van den Boom, W., De Iorio, M., Thng, G.J., Chan, J.K.Y., Chen, H.Y., Tan, K.H., and Kee, M.Z.L. (2024). Joint modelling of mental health markers through pregnancy: A Bayesian semi-parametric approach. *Journal of Applied Statistics*, 51(2), 388–405. doi:10.1080/02664763.2022.2154329
5. van den Boom, W., De Iorio, M., and Beskos, A. (2023). Bayesian learning of graph substructures. *Bayesian Analysis*, 18(4), 1311–1339. doi:10.1214/22-BA1338
6. Qian, F., van den Boom, W., and See, K.C. (2023). Real-world evidence challenges controlled hypoxemia guidelines for critically ill patients with chronic obstructive pulmonary disease. *Intensive Care Medicine*, 49(9), 1133–1135. doi:10.1007/s00134-023-07166-w
7. Young, A.L., van den Boom, W., Schroeder, R.A., Krishnamoorthy, V., Raghunathan, K., Wu, H.T., and Dunson, D.B. (2023). Mutual information: Measuring nonlinear dependence in longitudinal epidemiological data. *PLOS ONE*, 18(4), e0284904. doi:10.1371/journal.pone.0284904
8. Franzolini, B., Cremaschi, A., van den Boom, W., and De Iorio, M. (2023). Bayesian clustering of multiple zero-inflated outcomes. *Philosophical Transactions of the Royal Society A*, 381(2247), 20220145. doi:10.1098/rsta.2022.0145
9. van den Boom, W., Beskos, A., and De Iorio, M. (2022). The  $G$ -Wishart weighted proposal algorithm: Efficient posterior computation for Gaussian graphical models. *Journal of Computational and Graphical Statistics*, 31(4), 1215–1224. doi:10.1080/10618600.2022.2050250
10. van den Boom, W., Jasra, A., De Iorio, M., Beskos, A., and Eriksson, J.G. (2022). Unbiased approximation of posteriors via coupled particle Markov chain Monte Carlo. *Statistics and Computing*, 32(3), 36. doi:10.1007/s11222-022-10093-3

11. van den Boom, W., De Iorio, M., and Tallarita, M. (2022). Bayesian inference on the number of recurrent events: A joint model of recurrence and survival. *Statistical Methods in Medical Research*, 31(1), 139–153. doi:10.1177/09622802211048059
12. Lysaght, T., Ballantyne, A., Toh, H.J., Lau, A., Ong, S., Schaefer, O., Shiraishi, M., van den Boom, W., Xafis, V., and Tai, E.S. (2021). Trust and trade-offs in sharing data for precision medicine: A national survey of Singapore. *Journal of Personalized Medicine*, 11(9), 921. doi:10.3390/jpm11090921
13. van den Boom, W., Reeves, G., and Dunson, D.B. (2021). Approximating posteriors with high-dimensional nuisance parameters via integrated rotated Gaussian approximation. *Biometrika*, 108(2), 269–282. doi:10.1093/biomet/asaa068
14. van den Boom, W., Hoy, M., Sankaran, J., Liu, M., Chahed, H., Feng, M., and See, K.C. (2020). The search for optimal oxygen saturation targets in critically ill patients: Observational data from large ICU databases. *Chest*, 157(3), 566–573. doi:10.1016/j.chest.2019.09.015
15. van den Boom, W., Mao, C., Schroeder, R.A., and Dunson, D.B. (2018). Extrema-weighted feature extraction for functional data. *Bioinformatics*, 34(14), 2457–2464. doi:10.1093/bioinformatics/bty120
16. van den Boom, W., Schroeder, R.A., Manning, M.W., Setji, T.L., Fiestan, G., and Dunson, D.B. (2018). Effect of A1C and glucose on postoperative mortality in noncardiac and cardiac surgeries. *Diabetes Care*, 41(4), 782–788. doi:10.2337/dc17-2232
17. van den Boom, W., Dunson, D., and Reeves, G. (2015). Quantifying uncertainty in variable selection with arbitrary matrices. *IEEE 6th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, 385–388. doi:10.1109/CAMSAP.2015.7383817

**Publications:  
Not peer  
reviewed**

1. Qian, F., van den Boom, W., and See, K.C. (2023). Different oxygenation targets for stable COPD and acute exacerbations in the ICU. Author’s reply. *Intensive Care Medicine*, 49(11), 1430–1432. doi:10.1007/s00134-023-07229-y
2. van den Boom, W., Hoy, M., Sankaran, J., Liu, M., Chahed, H., Feng, M., and See, K.C. (2020). Response to letter to the editor. *Chest*, 158(3), 1287–1288. doi:10.1016/j.chest.2020.04.023
3. van den Boom, W. and Thiery, A. H. (2020). EP-IS: Combining expectation propagation and importance sampling for Bayesian nonlinear inverse problems. In: *Proceeding. ISI World Statistics Congress 2019. Contributed Paper Session. (Volume 2)*, pp. 145–152.

- Publications:  
Preprint**
1. van den Boom, W., De Iorio, M., Beskos, A., and Jasra, A. (2023). Graph sphere: From nodes to supernodes in graphical models. doi:10.48550/arXiv.2310.11741
  2. van den Boom, W., De Iorio, M., Qian, F., and Guglielmi, A. (2023). The Multivariate Bernoulli detector: Change point estimation in discrete survival analysis. doi:10.48550/arXiv.2308.10583
  3. van den Boom, W., Reeves, G., and Dunson, D.B. (2015). Scalable approximations of marginal posteriors in variable selection. doi:10.48550/arXiv.1506.06629

- Honors &  
awards**
- Best Student/Postdoc Contributed Paper Award. 2021 World Meeting of the International Society for Bayesian Analysis, 2021.
- Fulbright Grant. Fulbright Foreign Student Program, 2014.
- Graduated Summa Cum Laude. Utrecht University, University College Roosevelt, 2014.

- Invited talks**
1. Bayesian computation and learning of substructures in Gaussian graphical models. *Business Analytics Seminar*, University of Amsterdam, Amsterdam Business School, the Netherlands, 2023.
  2. The multivariate Bernoulli detector: Change point detection in discrete survival analysis. *16th International Conference of the ERCIM WG on Computational and Methodological Statistics and 17th International Conference on Computational and Financial Econometrics*, Berlin, Germany, 2023.
  3. The  $G$ -Wishart weighted proposal algorithm: Efficient posterior computation for Gaussian graphical models. *6th International Conference on Econometrics and Statistics*, Tokyo, Japan, 2023.
  4. Bayesian learning of graph substructures. *Statistics Across Campuses Seminar*, Australia, 2022.
  5. Unbiased approximation of posteriors via coupled particle Markov chain Monte Carlo. *15th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing*, Linz, Austria, 2022.
  6. The  $G$ -Wishart weighted proposal algorithm: Efficient posterior computation for Gaussian graphical models. *2022 World Meeting of the International Society for Bayesian Analysis*, Montreal, Canada, 2022.
  7. Bayesian joint modelling of recurrence and survival: A conditional approach. *13th International Conference of the ERCIM WG on Computational and Methodological Statistics and 14th International Confer-*

*ence on Computational and Financial Econometrics*, London, United Kingdom, 2020.

8. Approximating high-dimensional posteriors with nuisance parameters via integrated rotated Gaussian approximation. *Bayesian Computation for High-Dimensional Statistical Models*, Institute of Mathematical Sciences, National University of Singapore, 2018.
9. Scalable posterior approximations of marginal posteriors in variable selection. *2017 Joint Statistical Meetings*, Baltimore, MD, United States, 2017.

### **Contributed talks**

1. Bayesian learning of graph substructures. *13th International Conference on Bayesian Nonparametrics*, Puerto Varas, Chile, 2022.
2. Bayesian learning of graph substructures. *Bayesian Young Statisticians Meeting*, Montreal, Canada, 2022.
3. Stein adaptive importance sampling. *2021 World Meeting of the International Society for Bayesian Analysis*, online, 2021.
4. EP-IS: Combining expectation propagation and importance sampling for Bayesian nonlinear inverse problems. *62nd ISI World Statistics Congress*, Kuala Lumpur, Malaysia, 2019.

### **Poster presentations**

1. EP-IS: Combining expectation propagation and importance sampling for Bayesian nonlinear inverse problems. *12th Conference on Bayesian Nonparametrics*, Oxford, United Kingdom, 2019.
2. Flexible Bayesian feature extraction from varying length functional data. *11th Conference on Bayesian Nonparametrics*, Paris, France, 2017.
3. Effect of A1c and glucose on postoperative mortality in non-cardiac versus cardiac surgeries. *American Diabetes Association's 77th Scientific Sessions*, San Diego, CA, United States, 2017.
4. Scalable posterior approximation. *Laboratory for Analytic Sciences Symposium*, Raleigh, NC, United States, 2016.
5. Scalable posterior approximation in variable selection. *IEEE 6th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Cancun, Mexico, 2015.
6. Scalable posterior approximation in variable selection. *Laboratory for Analytic Sciences Symposium*, Raleigh, NC, United States, 2015.

<b>Teaching experience</b>	National University of Singapore, Yale-NUS College	
	<i>Instructor of Record.</i> Introduction to Data Science	2019 – 2020
	Responsible for the design of this new course	
	<i>Instructor of Record.</i> Quantitative Reasoning	2019
	Duke University	
	<i>Instructor of Record.</i> Data Analysis and Statistical Inference	2017
	Full credit course taught online	
	<i>Teaching Assistant.</i> Bayesian Methods and Modern Statistics	2017
	<i>Project Manager and Mentor.</i> Data+	2017
	Summer research experience for students	
	<i>Teaching Assistant.</i> Data Analysis and Statistical Inference	2016
	Utrecht University, University College Roosevelt	
	<i>Teaching Assistant.</i> Mathematical Ideas & Methods in Context	2014
<b>Research experience</b>	<i>Research Assistant</i>	2017 – 2018
	Duke University, Department of Statistical Science	
	<i>Accenture Fellow</i>	2015 – 2017
	Duke University, Rhodes Information Initiative at Duke	
<b>Service: To NUS</b>	Representative of the Division of Biomedical Data Science, Department of Paediatrics, 2021 – present	
	Paediatrics Department Safety and Health Committee, 2021 – present	
	Maintenance of the website for the Mathematical, Computational & Statistical Sciences major, Yale-NUS College, 2019 – 2020	
	Evaluation Committee for Student-Initiated Research Projects of the Summer Research Programme, Yale-NUS College, 2020	
	Academic Sampler at the Experience Yale-NUS Weekend, 2019	
<b>Service: Other</b>	Associate Editor, Statistics and Computing, 2023 – present	
	Committee for the student paper competition of the Section on Bayesian Statistical Science of the American Statistical Association, 2024	
	Bayesian Young Statisticians Meeting, scientific committee, 2023	

junior-ISBA board, Secretary, 2020 – 2021

UTC+ Scientific Committee of the Blackwell-Rosenbluth Award, j-ISBA liaison, 2021

Reviewer for the Duke Datathon, 2021

Bayesian Young Statisticians Meeting, organizing committee, 2021

Bayesian Young Statisticians Meeting: Online, organizing and scientific committee, 2020

ASA DataFest@Duke, VIP Consultant, 2015 – 2017

Graduate Consultative Committee, 2015 – 2016  
Duke University, Department of Statistical Science

Journal reviews: Electronic Journal of Statistics, Bayesian Analysis, Frontiers in Applied Mathematics and Statistics, Journal of Computational and Graphical Statistics, Journal of the Korean Statistical Society, SIAM/ASA Journal on Uncertainty Quantification, Stat, Statistical Methods in Medical Research, Statistics and Computing

**Postdoc supervision**

Fang Qian, 2022 – 2024

**Summer research supervision**

Madhumitha Ayyappan, 2020  
Jia Tang, 2020

**Capstone supervision**

Ahmed Elsayed Gobba, 2019 – 2020  
Haroun Chahed, 2019 – 2020  
Sunwoo Nam, 2019 – 2020

**Independent study supervision**

Callie Mao, 2015 – 2016  
Gic-Owens Fiestan, 2015 – 2016

**Software**

[github.com/willemvandenboom](https://github.com/willemvandenboom)

van den Boom, W. (2018) `xwf`: An R package for extrema-weighted feature extraction for varying length functional data.

**Professional  
affiliations**

International Society for Bayesian Analysis  
International Statistical Institute