Kris De Brabanter

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Education

2011	PhD, Applied Sciences (mathematical engineering), KU Leuven (Supervisor: Prof. B. De Moor)
2007	M.Sc. Electrical Engineering option data-mining and automation, Faculteit Elektrotechniek, ESAT-SCD, KU Leuven
2005	M.Sc. Industrial Sciences, Technology and Nautical Sciences, option Electronics, Erasmus Hogeschool Brussel, Departement Industriële Wetenschappen en Technologie
2003	B.Sc. Industrial Sciences, Technology and Nautical Sciences, Hogeschool Brussel

Academic Positions

(Aug. 2019 - current)	Associate professor, Iowa State University, Department of Statistics & Department of Industrial and Manufacturing Systems Engineering
(Aug. 2013 – Aug. 2019)	Assistant professor, Iowa State University, Dep. Statistics & Dep. Computer Science
(April 2018 – July 2019)	Courtesy appointment Department of Industrial and Manufacturing Systems Engineering, Iowa State University
(Oct. 2012 – Aug. 2013)	FWO fellow postdoctoral researcher (KU Leuven)
(Oct. 2011 – Sep. 2012)	Postdoctoral researcher, Special Research Fund, KU Leuven
(April 2011 – Sep. 2011)	Postdoctoral researcher, Dep. Electrical Engineering, KU Leuven

Honors and Awards

- 2020-2021, "Automatic Classification of Bloodstain Patterns Caused by Gunshot and Blunt Impact at Various Distances," is among our top cited papers and generated immediate impact in your community (Journal of Forensic Sciences)
- 2020, "Automatic Classification of Bloodstain Patterns Caused by Gunshot and Blunt Impact at Various Distances," has been chosen by the *JFS* Associate Editors to be featured in the special *JFS* Virtual Issue compiled to celebrate National Forensic Science Week
- 2014, Elsevier Editor's choice for the paper Optimized fixed-size kernel models for large data sets K. De Brabanter, J. De Brabanter, J.A.K. Suykens, B. De Moor, *Computational Statistics & Data Analysis,* Volume 54, Issue 6, June 2010, Pages 1484-1504
- 2012, FWO postdoctoral fellowship research grant

- 2011, KU Leuven PDM postdoctoral mandate
- 2011, FWO travel grant K204112N (research visit Budapest University of Technology & Economics)
- 2011, Travel grant Academische stichting Leuven (research visit McGill University)
- 2011, Best poster award at the Graybill conference on nonparametric methods (Colorado State University)
- 2011, Featured paper (Approximate Confidence and Prediction Intervals for Least Squares Support Vector Regression, IEEE Transactions on Neural Networks, vol. 22, no. 1, Jan. 2011, pp. 110-120) at IEEE Computational Intelligence Society webpage (posted 2011-05-17)

Research Visits

- Nov. 7 – Dec. 6, 2012, Colorado State University, Fort Collins, CO, USA (Jean Opsomer)
- Mar. 26 – Apr. 17, 2012, Budapest University of Technology & Economics, Hungary (László Györfi)
- Feb. 23 – Mar. 21, 2012, McGill University, Montreal, Canada (Luc Devroye)
- Feb. 23 – Mar. 21, 2012, Concordia University, Montreal, Canada (Adam Krzyżak)

Published Works

All superscripts "gs" and "ugs" indicate graduate students and undergraduate students respectively.

Book Chapters (reviewed):

- K. De Brabanter, Y. Liu[gs], "Smoothed Nonparametric Derivative Estimation Based on Weighted Difference Sequences", In Stochastic Models, Statistics and Their Applications, A. Steland, E. Rafajłowicz, K. Szajowski (Eds.), Chapter 4 (p. 31 - 38), Springer, February 2015
- Kris De Brabanter, Paola Gloria Ferrario & László Györfi. , Detecting ineffective features for nonparametric regression. In Regularization, Optimization, Kernels, and Support Vector Machines, Johan A.K. Suykens, Marco Signoretto, Andreas Argyriou, (eds), Chapter 8 (p. 177-194), Chapman & Hall/CRC Machine Learning and Pattern Recognition Series, 2014

Refereed Journal Publications:

- Attinger D., Champod C. & De Brabanter K., Using the Likelihood Ratio in Bloodstain Pattern Analysis, *Journal of Forensic Sciences*, Vol. 67, No.1, p. 33-43, Jan. 2022, https://doi.org/10.1111/1556-4029.14899
- De Brabanter K. & Sabzikar F., Asymptotic theory for regression models with fractional local to unity root errors, Metrika, 84, 997–1024 2021.
- S. McCleary[gs], E. Liscio, K. De Brabanter & D. Attinger, Automated Reconstruction of Cast-off Blood Spatter Patterns based on Euclidean Geometry and Statistical Likelihood, Forensic Science International, Vol. 319, 110628, 2021
- De Brabanter K., & De Brabanter J., Robustness by Reweighting for Kernel Estimators: An Overview, Statistical Science, Vol. 36, No. 4, 578-594, 2021
- Liu[gs] Y. & De Brabanter K., Smoothed Nonparametric Derivative Estimation using Weighted Difference Quotients, Journal of Machine Learning Research, vol. 21, no. 65, p. 1–45, 2020
- Liu[gs] Y., Attinger D. & De Brabanter K., Letter to the Editor based on Comment to "Automatic Classification of Bloodstain Patterns Caused by Gunshot and Blunt Impact At Various Distances", Accepted in Journal of Forensic Sciences, April 2020
- Basulto-Elias[gs] G., Carriquiry A., De Brabanter K. and Nordman D. Bivariate kernel deconvolution with panel data, Sankhya B (2020). https://doi.org/10.1007/s13571-020-00226-x

- Liu[gs] Y., Attinger D. & De Brabanter K., Automatic Classification of Bloodstain Patterns Caused by Gunshot and Blunt Impact At Various Distances, *Journal of Forensic Sciences*, vol 65, no 3, p. 729-743, May 2020
- Attinger D., Comiskey P. Yarin A. & De Brabanter K. Determining the region of origin of blood spatters considering fluid dynamics and statistical uncertainties, Forensic Science International, vol. 298, pp. 323-331, May 2019
- Attinger D., Liu[gs] Y., Faflack R., Rao[gs] Y., Struttman[ugs] B.A., De Brabanter K., Comiskey P.M. & Yarin A.L., A data set of bloodstain patterns for teaching and research in bloodstain pattern analysis: gunshot backspatters, *Data in Brief,* vol. 22, p. 269-278, Feb. 2019
- K. De Brabanter, F. Cao[gs], I. Gijbels & J. Opsomer, Local Polynomial Regression with Correlated Errors in Random Design and Unknown Correlation Structure, *Biometrika*, vol. 105, no. 3, p. 681-690, 2018
- D. Attinger, Y. Liu[gs], T. Bybee[ugs] & K. De Brabanter, A data set of bloodstain patterns for teaching and research in bloodstain pattern analysis: impact beating spatters, *Data in Brief,* vol. 18, p. 648-654, 2018
- G. Basulto-Elias[gs], A. Carriquiry, K. De Brabanter & D.J. Nordman, ``fourierin'': An R package to compute Fourier integrals, R Journal, vol. 9, no. 2, 72-83, 2017
- Alhasan[gs], A., White, D. J., and De Brabanter, K. "Wavelet filter design for pavement roughness analysis", Computer-Aided Civil and Infrastructure Engineering, vol. 31, p. 907-920, Nov. 2016
- A. Alhasan[gs], D. White & K. De Brabanter, "Continuous Wavelet Analysis of Pavement Profiles", *Automation in Construction*, 63: 134-143, March 2016
- De Brabanter K, Liu[gs] Y. & Hua[gs] C., Convergence Rates for Uniform Confidence Intervals Based on Local Polynomial Regression Estimators, Journal of Nonparametric Statistics, vol. 28, no. 1, p. 31- 48, Feb. 2016
- A. Alhasan[gs], D. White & K. De Brabanter, "Spatial Pavement Roughness from Stationary Laser Scanning", *International Journal of Pavement Engineering*, p. 1-14, 2015
- A. Alhasan[gs], D. White & K. De Brabanter, "Quantifying Unpaved Road Roughness from Terrestrial Laser Scanning", Transportation Research Record: Journal of the Transportation Research Board, vol. 2523, p. 105-114, 2015
- Minta[gs] T., De Brabanter K., Suykens J.A.K., De Moor B., ``Predicting Breast Cancer Using an Expression Values Weighted Clinical Classifier'', *BMC Bioinformatics*, vol. 15:6603, Dec. 2014
- Minta[gs] T., De Brabanter K., De Moor B., ``New Bandwidth Selection Criterion for Kernel PCA: Approach to Dimensionality Reduction and Classification Problems'', *BMC Bioinformatics*, vol. 15:137, May 2014
- De Brabanter K., Suykens J.A.K., De Moor B., ``Nonparametric Regression via StatLSSVM'', *Journal of Statistical Software*, vol. 55, no. 2, 1-21, October 2013
- De Brabanter K., De Brabanter J., Gijbels I., De Moor B., ``Derivative Estimation with Local Polynomial Fitting'', Journal of Machine Learning Research, vol. 14, Jan. 2013, pp. 281-301
- Falck T., Dreesen P., De Brabanter K., Pelckmans K., De Moor B., Suykens J.A.K., ``Least-Squares Support Vector Machines for the Identification of Wiener-Hammerstein Systems'', Control Engineering Practice, vol. 20, no. 11, Nov. 2012, pp. 1165-1174
- Sahhaf S., Degraeve R., Srividya V., De Brabanter K., Schram T., Gilbert M., Vandervorst W., Groeseneken G., ``HfSiO Bulk Trap Density Controls the Initial Vth in nMOSFETs'', IEEE Transactions on Device and Materials Reliability, vol. 12, no. 2, June 2012, pp. 323-334
- De Brabanter K., De Brabanter J., Suykens J.A.K., De Moor B., ``Kernel Regression in the Presence of Correlated Errors'', Journal of Machine Learning Research, vol. 12, June 2011, pp. 1955-1976
- De Brabanter K., Karsmakers P., De Brabanter J., Suykens J.A.K., De Moor B., ``Confidence Bands for Least Squares Support Vector Machine Classifiers: A Regression Approach'', Pattern Recognition, vol. 45, no. 6, Feb. 2012, pp 2280-2287

- De Brabanter K., De Brabanter J., Suykens J.A.K., De Moor B., ``Approximate Confidence and Prediction Intervals for Least Squares Support Vector Regression'', IEEE Transactions on Neural Networks, vol. 22, no. 1, Jan. 2011, pp. 110-120
- Karsmakers P., Pelckmans K., De Brabanter K., Van Hamme H., Suykens J.A.K., ``Sparse Conjugate Directions Pursuit with Application to Fixed-size Kernel Models'', Machine Learning, Special Issue on Model Selection and Optimization in Machine Learning, vol. 85, no. 1, Sept. 2011, pp 109-148
- Sahhaf S., De Brabanter K., Degraeve R., Suykens J.A.K., De Moor B., Groeseneken G., ``Modelling of Charge Trapping/De-trapping Induced Voltage Instability in High-k Gate Dielectrics'', IEEE Transactions on Device and Materials Reliability, vol. 12, no. 1, Mar. 2012, pp. 152-157
- Sahhaf S., Degraeve R., Cho M., De Brabanter K., Roussel Ph.J., Zahid M.B., Groeseneken G., ``Detailed Analysis of Charge Pumping and IdVg Hysteresis for Profiling Traps in SiO2/HfSiO(N)'', Microelectronic Engineering, vol. 87, no. 12, Dec. 2010, pp. 2614-2619
- De Brabanter K., De Brabanter J., Suykens J.A.K., De Moor B., ``Optimized Fixed-Size Kernel Models for Large Data Sets'', Computational Statistics & Data Analysis, vol. 54, no. 6, Jun. 2010, pp. 1484-1504

Refereed Conference Proceedings:

- M. Fili, K. De Brabanter, G. Hu & L. Bi, Predicting COVID-19 New Cases Considering Mitigation Policies and Weather Data for European Countries, Accepted at INFORMS 2022
- Liu[gs] Y. & De Brabanter K., Derivative Estimation in Random Design, *NIPS* 2018, accepted Sept. 2018
- Passe, U., Anderson, N., De Brabanter, K., Dorneich, M., Krejci, C., Poplin, A., Shenk, L., Methodologies for Studying Human-Microclimate Interactions for Resilient, Smart City Decision-Making, in: Proceedings of PLEA 2016 Los Angeles - Cities, Buildings, People: Towards Regenerative Environments, 11-13 July 2016
- A. Alhasan[gs], D. White & K. De Brabanter, "Quantifying Unpaved Road Roughness from Terrestrial Laser Scanning", Transportation Research Board, 94th Annual Meeting, Washington D.C, 2015
- De Brabanter K., Györfi L., ``Feature Selection via Detecting Ineffective Features'', ROKS 2013, p. 43-44, Heverlee, Belgium.
- De Brabanter K. & De Moor B., ``Deconvolution in Nonparametric Statistics'', in Proc. of the European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN), Brugge, Belgium, Apr. 2012, pp. 341-350.
- De Brabanter K., De Brabanter J., Suykens J.A.K., Vandewalle J., De Moor B., ``Robustness in Kernel Bases Regression: Influence and Weight Functions'', IEEE World Congress on Computational Intelligence (IEEE WCCI/IJCNN 2012), pp. 3387-3394, Brisbane, Australia, June 2012.
- De Brabanter K., De Brabanter J., De Moor B., ``Nonparametric Derivative Estimation'', in Proc. of the 23rd Benelux Conference on Artificial Intelligence (BNAIC), Gent, Belgium, pp. 75-81, Nov. 2011.
- Lopez J., De Brabanter K., Dorronsoro J.R., Suykens J.A.K, ``Sparse LS-SVMs with L0-Norm Minimization'', 2010, in Proc. of the European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN), Bruges, Belgium, Apr. 2011, pp. 189-194.
- De Brabanter K., Karsmakers P., De Brabanter J., Pelckmans K., Suykens J.A.K., De Moor B., ``On Robustness in Kernel Based Regression'', in NIPS 2010 Workshop Robust Statistical Learning, Whistler, Canada, Dec. 2010.
- Huyck B., De Brabanter K., Logist F., De Brabanter J., Van Impe J., De Moor B., ``Identification of a Pilot Scale Distillation Column: A Kernel Based Approach'', in Proc. of the 18th World Congress of the International Federation of Automatic Control (IFAC), Milan, Italy, Sep. 2011, pp. 471-476.
- De Brabanter K., Sahhaf S., Karsmakers P., De Brabanter J., Suykens J.A.K., De Moor B., ``Nonparametric Comparison of Densities Based on Statistical Bootstrap'', in Proc. of the Fourth

European Conference on the Use of Modern Information and Communication Technologies (ECUMICT), Gent, Belgium, Mar. 2010, pp. 179-190.

- De Brabanter K., De Brabanter J., Suykens J.A.K., De Moor B., ``Kernel Regression with Correlated Errors'', in Proc. of the 11th International Symposium on Computer Applications in Biotechnology (CAB), Leuven, Belgium, Jul. 2010, pp. 13-18.
- De Brabanter K., Pelckmans K., De Brabanter J., Debruyne M., Suykens J.A.K., Hubert M., De Moor B., ``Robustness of Kernel Based Regression: a Comparison of Iterative Weighting Schemes'', in Proc. of the 19th International Conference on Artificial Neural Networks (ICANN), Limassol, Cyprus, Sep. 2009, pp. 100-110.
- De Brabanter K., Dreesen P., Karsmakers P., Pelckmans K., De Brabanter J., Suykens J.A.K., De Moor B., ``Fixed-Size LS-SVM Applied to the Wiener-Hammerstein Benchmark'', in Proc. of the 15th IFAC Symposium on System Identification (SYSID 2009), Saint-Malo, France, Jul. 2009, pp. 826-831.

Refereed Abstracts:

- Huyck B., De Brabanter K., Logist F., De Brabanter J., Van Impe J., De Moor B., ``LS-SVM Identification of a Distillation Column'', Benelux Meeting on Systems and Control 2011, Lommel, Belgium.
- De Brabanter K., De Brabanter J., De Moor B., ``An Overview of Recent Developments in Kernel Based Regression'', 2011.
- De Brabanter K., Karsmakers P., De Brabanter J., Pelckmans K., Suykens J.A.K., De Moor B., ``On Robustness in Kernel Based Regression'', in NIPS 2010 Workshop Robust Statistical Learning, Whistler, Canada, Dec. 2010.
- Lopez J., De Brabanter K., Dorronsoro J.R., Suykens J.A.K, ``Sparse LS-SVMs with L0-Norm Minimization'', 2010, in Proc. of the European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN), Bruges, Belgium, Apr. 2011, pp. 189-194..
- De Brabanter K., De Brabanter J., Gijbels I., Suykens J.A.K., De Moor B., ``New Developments in Kernel Regression with Correlated Errors'', in Graybill 2011 Conference on Modern Nonparametric Methods (Graybill), Fort Collins, Colorado, Jun. 2011.

Posters

- Iddo Friedberg, Kris De Brabanter, Dermot Hayes, Priyanka Jayashankar, Jonathan Kelly, Catherine Kling, Daren Mueller, Dan Nettleton, Mark Rasmussen, Soumik Sarkar, Patrick Schnable, Asheesh Singh, Srikant Srinivasan, Arti Singh, Zhengyuan Zhu, Kyoung Tak Cho, Lori Sjolund, Baskar Ganapathysubramanian and Carolyn Lawrence-Dill, D3AI: Data Driven Discovery for Agricultural Innovation, International Society for Computational Biology (ISMB), 2016

Software

- G. Basulto-Elias*, A. Carriquiry, De Brabanter K. & D.J. Nordman, ``fourierin'': An R package to compute Fourier integrals, *R Journal*, vol. 9, no. 2, 72-83, 2017

  https://cran.r-project.org/web/packages/fourierin/index.html
- De Brabanter K., Suykens J.A.K., De Moor B., ``Nonparametric Regression via StatLSSVM'', *Journal of Statistical Software*, vol. 55, no. 2, 1-21, 2013

  http://www.jstatsoft.org/v55/i02/
- De Brabanter K., Karsmakers P., Ojeda F., Alzate C., De Brabanter J., Pelckmans K., De Moor B., Vandewalle J., Suykens J.A.K., ``LS-SVMlab Toolbox User's Guide version 1.8'', Internal Report 10-146, ESAT-SISTA, K.U.Leuven (Leuven, Belgium), 2010.

  http://www.esat.kuleuven.be/sista/lssvmlab/

Book of Abstracts:

- Suykens J.A.K., Argyriou A., De Brabanter K., Diehl M., Pelckmans K., Signoretto M., Van Belle V., Vandewalle J., (eds.), International workshop on advances in Regularization, Optimization, Kernel Methods and Support Vector Machines: theory and applications (ROKS 2013), Book of Abstracts, KU Leuven (Leuven, Belgium), 2013, 128 p.
- De Brabanter K., De Brabanter J., Gijbels I., Van Impe J., Vandewalle J., (eds.) , Workshop on Modern Nonparametric Methods for Time Series, Reliability & Optimization, Book of Abstracts, KU Leuven (Leuven, Belgium), 2012, 28 p.

Non-Refereed Proceedings/Technical Reports:

- De Brabanter K., De Brabanter J., De Moor B., ``An Overview of Recent Developments in Kernel Based Regression'', 2011.
- Huyck B., De Brabanter K., Logist F., De Brabanter J., Van Impe J., De Moor B., ``LS-SVM Identification of a Distillation Column'', Benelux Meeting on Systems and Control 2011, Lommel, Belgium.
- De Brabanter K., Karsmakers P., Ojeda F., Alzate C., De Brabanter J., Pelckmans K., De Moor B., Vandewalle J., Suykens J.A.K., ``LS-SVMlab Toolbox User's Guide version 1.8'', Internal Report 10-146, ESAT-SISTA, K.U.Leuven (Leuven, Belgium), 2010.

Manuscripts in preparation:

- De Brabanter K., De Brabanter J., Gijbels I, On Asymptotic Properties of Linear Smoothers
- G. Basulto-Elias, A. Carriquiry, K. De Brabanter & D.J. Nordman, Software for kernel density deconvolution
- De Brabanter & Sabzikar, Bandwidth selection under long range dependence.
- Cabrera, De Brabanter & Sabzikar, Data driven parameter selection for tempered long range dependence.
- Chaudhury, De Brabanter & Gosh, Asymptotic properties of least squares support vector machines
- De Brabanter & Wang, nonparametric regression when data are spatially correlated

Submitted Manuscripts:

Contracts & Grants

Funded Projects as PI:

- 06/2020 – 06/2025, NIST (CSAFE): Bloodspatter analysis via machine learning (total $462,000)
- 09/2018 – 05/2020, NIST (CSAFE): Part II: Combining fluid dynamics, statistics and pattern recognition in bloodstain pattern analysis to quantify spatial uncertainty and remove human bias. **K. De Brabanter (PI)** and D. Attinger (co-PI), and collaborator (S. Lund). (total $292,000, my share $146,000)
- 10/2012 – 09/2015, Nonparametric modeling for non-i.i.d. data, FWO fellowship grant (€285,000). Years 2-3 declined to take current position
- 10/2011 – 09/2012, Nonparametric regression for correlated data, Research fund BOF KU Leuven (€89,000)
- 04/2011 – 09/2011, A statistical approach to least squares support vector machines, KU Leuven ESAT-SCD research support (€33,000),

Funded Projects as Co-PI:

- 10/2016 – 05/2018, NIST (CSAFE): Part I: Combining fluid dynamics, statistics and pattern recognition in bloodstain pattern analysis to quantify spatial uncertainty and remove human bias. D. Attinger (PI), K. De Brabanter (co-PI) and collaborators (S. Chang and Gillen). (total $300,000, my share $150,000)
- 09/2016 – 08/2019, PIIR in Data Driven Science: Big Data for Sustainable City Decision-Making (Co-PI) with U. Passe (PI) *et al*. ($375,000, my share $37,500)
- 10/2015 – 09/2018, PIIR in Data Driven Science: An interdisciplinary approach to developing an Automated Functional Language EXtraction (AFLEX) system to transform the translation of STEM research to society (Co-Pi): A. O'Connor (PI), C. Chappelle, J. Coetzee, E. Cotos, S. Gilbert, R. MacDonald ($495,000, my share $49,500)
- 10/2015 – 09/2018, PIIR in Data Driven Science: Leveraging Big Data for sustainability and profitability in agriculture (Co-PI), A. K. Singh (PI), B. Ganapathysubramanian, A. Singh, S. Sarkar, D. Mueller, P. Jayashankar, G. Tylka, C. Lawrence-Dill et al. (total $750,000, my share $17,500)
- 10/2015 – 09/2016, PIIR in Data Driven Science: Big Data for Sustainable City Decision-Making (Co-PI) with U. Passe (PI), N. Anderson, M. Dorneich, J. Goodwin, C. Krejci, A. Poplin, L. Shenk, C. Anderson and L. Graham ($50,000, my share $5,000)
- 10/2009 – 09/2013, SCORES4CHEM: Systems, Control and Optimization: Research, Education and Services for the Chemical Industry (€800,000, my share €15,000)

Professional Activities and Service

Grant refereeing: Romanian National Council for Research and Development (2 proposals), NSA Mathematical Sciences Grant Program (2 proposals), Agencia Nacional de Investigación y Desarrollo FONDECYT , Chili (2 proposals)

Manuscript Refereeing: Engineering with Computers, The Canadian Journal of Statistics**,** Annals of Applied Probability, Annals of Applied Statistics, The Annals of Probability, Journal of Statistical Planning and Inference, PLoS One, JASA, Sankhya A, Technometrics, Biometrika, Electronic Journal of Statistics, Journal of Agricultural, Biological, and Environmental Statistics, Journal of Machine Learning Research, ESAIM Probability & Statistics, Communications in Nonlinear Science and Numerical Simulation, Statistica Neerlandica, South African Statistical Journal, Communications in Statistics: Theory and Methods, Neurocomputing, Biometrics, Computational Statistics & Data Analysis, Automatica , IEEE Transactions on Information Theory, IEEE Transactions on Neural Networks, IEEE Transactions on Systems, Man, and Cybernetics Part B, IEEE Transactions on Systems, Man, and Cybernetics Part C, IEEE Transactions on Control Systems Technology, Applied Mathematical Modelling, IEEE Transactions on Neural Networks and Learning Systems, Knowledge-Based Systems, Engineering Applications of Artificial Intelligence, Data & Knowledge Engineering, Animal, Journal of Intelligent Information Systems, Journal of Automobile Engineering, Expert Systems With Applications, Mathematical Problems in Engineering, Pattern Recognition

University service:

- Research Planning and Policy Committee: Reviews issues of long term and short-term importance to the ISU research efforts. Serves as the advisory committee to the vice president for research and economic development (VPR/ED), and prepares reports and recommendations on items of importance to the faculty and/or theVPR/ED. The chair also serves on the Research and Economic Development Council (formerly CURIA). (June 2020-May 2023)
- Data Driven Science Initiative (DDSI) faculty steering committee member: A key component of DDSI is the support and development of research groups that integrate application disciplines, data science, and their extension to education and outreach in an interdisciplinary fashion. The charge of the committee would be to extend the current knowledge base and the potential for interdisciplinary collaborations by organizing a variety of activities aimed at developing our internal community and external visibility. (June 2015 – May 2019)

Interdepartmental service:

- Data Driven Discovery for Agricultural Innovation enables four research teams to build a single cohesive team with expertise to address research challenges in data driven agriculture spanning the smallest plant scale through co-op scales, and eventually regional scales. (Aug. 2015 – 2019)
- 2018-2019: Member of the Physics and Astronomy Cluster Search Committee
- Preparing Future Faculty Mentor (PFF) for Sagnik Banerjee (PhD Candidate BCB) (Fall 2018 – Spring 2019)

Departmental service:

- **Department of Statistics (Aug. 2013 - present)**
  - 2021-2022 Curriculum Review committee (member)
    MS-PhD Exams committee (chair)
  - 2020-2021 Curriculum committee (member)
  - 2019-2020 Search committee (member, CSAFE)
  - 2017-2018 Search committee (member, DS program)
  - 2017-2020 PhD & MS exam committee (member)
  - 2017-2020 Snedecor sustainability committee (member)
  - 2017 (Spring) Seminar Coordinator
  - 2013-2016 Graduate Admissions Committee (Member)
  - 2013-2016 Computation Advisory Committee (Member)
  - 2013-2014 Search committee President's high impact faculty hire
  - 2013-2014 Organizing Committee: Operations research graduate program
  - 2014-2015 Honors & Awards committee (member)

- **Department of Industrial Manufacturing & Systems Engineering (Jul. 2019 - present)**
  - 2021-2022 Faculty search committee (member)
  - 2021-2022 ABET committee (member)
  - 2020-2021 OR/A resources committee (member)
  - 2019-2020 PR committee (chair)

- **Department of Computer Science (Aug. 2013- Jul. 2019)**
  - 2013-2019 Undergraduate Committee (Member)
  - 2015-2019 Undergrad Curriculum Committee (Member)
  - 2018-2019 Graduate Curriculum Committee (Member)
  - 2013-2014 Big Grant Advisory Committee (Member)

- 2013-2014 Search committee BIGDATA President's high impact hire
- 2014-2015 Search committee BCB Cluster Hire (Member)

Professional Activities:

- 2013 – 2021 Member Institute of Mathematical Statistics (IMS)
- 2013 – present Member American Statistical Association (ASA)

Group leader: Special interest group: "Mathematical statistics in optimization" in collaboration with the department of mathematics, section of statistics (LStat) at KU Leuven (Jan. 2011- Aug. 2013)

Professional workshops attendence:

- March 24, 2022: Maintaining Excellence Beyond Tenure Workshop & promotion to full professor
- Nov. 2021: NSF DMS Virtual Office Hours
- Oct. 2013: Grant Writer's Seminars and Workshops, ISU

Papers Presented/Symposia/Workshops/session tutorials

Contributed Papers:

- 02/18/2014, Smoothed Nonparametric Derivative Estimation Based on Weighted Difference Sequences, Stochastic Models, Statistics and Their Applications, Wroclaw, Poland (invited)
- 07/08/2013, Feature Selection via Detecting Ineffective Features, Heverlee, Belgium.
- 06/15/2012, Robustness of kernel based regression: influence and weighting functions, IJCNN, Brisbane, Australia
- 04/26/2012, Deconvolution in nonparametric statistics, ESANN, Brugge, Belgium
- 11/03/2011, Nonparametric derivative estimation, BNAIC, Gent, Belgium
- 12/10/2010, On robustness in kernel based regression, NIPS workshops, Whistler, BC, Canada
- 07/07/2010, Kernel regression with correlated errors, CAB, Leuven, Belgium
- 03/08/2010, Nonparametric Comparison of Densities Based on Statistical Bootstrap, ECUMICT, Gent, Belgium
- 10/16/2009, Robustness of kernel based regression: a comparison of iterative weighting schemes, ICANN, Limassol, Cyprus
- 07/07/2009, Fixed-Size LS-SVM applied to the Wiener-Hammerstein benchmark: A black-box approach, SYSID, Saint Malo, France

Seminars:

- 05/02/2019, Theory & Practice: A killer combination, Industrial and manufacturing Systems Engineering, Iowa State University, Iowa, USA
- 09/17/2018, Convergence rates for uniform confidence intervals based on local polynomial regression estimation, Department of Statistics, Iowa State University, Iowa, USA
- 12/6/2017: Nonparametric regression with unknown correlation structure, Industrial and manufacturing Systems Engineering, Iowa State University, Iowa, USA
- 10/23/2013, Big data and nonparametric regression, Department of Statistics (Computational Statistics group), Iowa State University, Iowa, USA

- 10/22/2013, Support vector machines and its applications. Department of Statistics, Iowa State University, Iowa, USA
- 09/19/2013, Nonparametric techniques: big data meets statistics. Department of Computer Science, Iowa State University, Iowa, USA
- 02/09/2012, Asymptotic properties of linear smoothers, Dep. Electrical engineering ESAT-SCD, KU Leuven, Belgium
- 09/23-24/2010, Approximate confidence and prediction intervals for least squares support vector regression, OPTEC Meeting event, Spa, Belgium
- 06/17/2009, Least squares support vector machines for large data sets: a fixed size approach, Dep. Electrical engineering ESAT-SCD, KU Leuven, Belgium
- 06/09/2009, Least squares support vector machines: a large scale approach, Dep. Electrical engineering ESAT-SCD, KU Leuven, Belgium

Invited Seminars and keynote talks:

- 03/23/2022: University of Northern Iowa, Dep. of Mathematics, Theory & applications of regression with long-range dependent errors.
- 10/14/2021: Katholieke Universiteit Leuven, Leuven Statistics Research Centre & Dep. Economics and Business (online)
- 9/27/2021 – 1/10/2021: International Association of Bloodstain Pattern Analysists (IABPA), invited session for "S. McCleary, E. Liscio, K. De Brabanter & D. Attinger, Automated Reconstruction of Cast-off Blood Spatter Patterns based on Euclidean Geometry and Statistical Likelihood, Forensic Science International, Vol. 319, 110628, 2021". (could not attend due to ISU's COVID-19 policy regarding online lectures. Dr. Attinger gave the workshop)
- 05/2020: Dep. Mathematics section Statistics, KU Leuven (cancelled due to COVID-19)
- 07/10-12/2018, Local polynomial regression with correlated errors and unknown correlation structure, Workshop on New Developments in Statistics: Big Data, a Challenge or a Curse for Statistics? Heverlee, Belgium
- 05/12-14/2018, Midwest Big Data Summer School, ISU
- 07/10-14/2017, Midwest Big Data Summer School, 3 seminars about statistics and machine learning, ISU
- 06/14/2017, Mini Symposium: Advances in Nonparametric Smoothing, Heverlee, Belgium
- 06/20-24/2016, Midwest Big Data Summer School, 3 seminars about statistics and machine learning, ISU
- 02/16-20/2015, 12th Workshop on Stochastic Models, Statistics and Their Applications, Wrocław, Poland
- 09/11/2014, Department of Statistics & Actuarial Science, University of Iowa, IA, USA
- 10/11/2013, LAS College Signature Theme Workshop on Data Rich Environments, Iowa State University, Iowa, USA
- 05/14/2013, Department of mathematics section of statistics, KU Leuven (FLAMES), Belgium
- 04/01/2013, Department of statistics, Iowa State University, Iowa, USA
- 11/26/2012, Department of statistics, Colorado State University, Fort Collins, CO, USA
- 06/26/2012, Department of statistics, Melbourne University, Australia
- 01/16/2012, Department of chemical engineering, KU Leuven, Belgium

Tutorials:

- 04/26/2012, Deconvolution in nonparametric statistics (session tutorial), ESANN 2012, Brugge, Belgium

Organization & Membership Conferences and Seminars

Organization:

- 05/08-09/2018, The 1st Midwest Statistical Machine Learning Colloquium, Iowa State University, Organizing Committee
- 06/2-3/2015, Conference on Autonomous and Robotic Construction of Infrastructure (Planning committee)
- 05/30/2013, seminar: Testing and adjusting for informativeness in analytic inference by Jean Opsomer at Dep. Mathematics Section Statistics in collaboration with I. Gijbels and G. Claeskens
- 07/08-10/2013, International Workshop on Advances in Regularization, Optimization, Kernel Methods and Support Vector Machines: theory and applications (ROKS 2013)
- 10/10-12/2012, Workshop on Modern Nonparametric Methods for Time-Series, Reliability & Optimization, Heverlee, Belgium
- 04/26/2012, special session on Statistical methods and kernel-based algorithms, ESANN 2012, Brugge, Belgium
- 03/18/2010, seminar: Nonparametric prediction of stationary time series by László Györfi at Dep. Electrical engineering, ESAT-SCD, KU Leuven, Belgium

Conference/Workshop Committee membership:

- Organizing committee MECS
- Program committee ESANN 2014, ESANN 2015
- Scientific and technical committee ESANN 2013, ESANN 2016, ESANN2017, ESANN2018

Professional Practice and Collaboration

- Research Collaboration with A. Alhasan and D. White in the Civil Engineering department (ISU)
- Research collaboration with Wei Zhang (Department of Business, Iowa State University) on nonparametric methods and their use in marketing studies
- Research partner in the interuniversity attraction pole DYSCO together with Stanford University, Princeton University and MIT
- FWO research project on nonparametric modeling for non-i.i.d. data, in collaboration with dep. of Statistics, KU Leuven, Belgium
- Stability analysis of beer, Laboratory of Enzyme and Brewing Technology, KaHo Sint Lieven, Gent Belgium
- Food safety analysis for horticulture industry and food sector, Scientia Terrae Research Institute, Mechelen, Belgium
- Fault-detection in bio-chemical processes using partial least squares, dep. of Chemical engineering, KU Leuven, Belgium
- Data-analysis advising function with iMinds (interuniversity collaboration between KU Leuven, Gent University, Antwerp University, Vrije Universiteit Brussel, Hasselt University)

Student Advising/(under) Graduate Supervision

Current Graduate Advisees (Co & Major Professor):

- Kanak Choudhury (joint with Arka Gosh)
- Jason Saporta

Current MS students (Major Professor):

- Shibo (Hylia) Gao
- Mohammad Fili

Current Undergraduate Advisees: None

Completed MS students (Major Professor):

- Mohammad Fili, Predicting the Number of New COVID-19 Cases using an LSTM-based Model for European Countries, STAT, Summer 2022
- Zirou Zhou, A simulation study of bandwidth selection methods for non-parametric regression with long and semi-long range dependent errors, Summer 2021
- Yu Liu, Derivative estimation in random design, Spring 2018
- Chen Liu, Implementation of local polynomial estimators in measurement error problems, Spring 2016
- Chen Hua, Simultaneous Confidence Intervals of Derivative Estimation Based on Local Polynomial Regression, Fall 2015
- Maan Alduaiji , Clustering methods to identify mining accidents, Dep. Computer Science, Iowa State University, Fall 2014
- Yuanyuan Wang, System identification based on deconvolution approaches, joint with Irène Gijbels, KU Leuven, Belgium, June 2014
- Pieter-Jan Kerstens, Uniform confidence intervals for kernel based regression, KU Leuven, 2012
- Wang Chen, Bootstrap based confidence intervals for nonparametric regression, KU Leuven, 2011
- Adriaan Blommaert, Copula testing and its use in time series analysis, KU Leuven, 2010
- Niels Blomme, Fault-detection and fault diagnosis in industrial applications, KU Leuven, 2008

Completed PhD students (Major/Co-Major Professor):

- Kim Ju Jeung, Least Squares Support Vector Regression with Particle Swarm Optimization and its Relation to Mean Field Game, Iowa State Univeristy, Summer 2022
- Yu Liu, Nonparametric Curve Estimation and Applications Dep. Computer Science, Iowa State University, Spring 2019
- Eric Hare, Bullet matching: A statistical approach, Dep. Statistics & Dep. Computer Science, Iowa State University, Spring 2017 (co-major with Heike Hofmann)
- Eduardo A Trujillo-Rivera, Deconvolution Approaches in Regression: A Bayesian perspective, Dep. Statistics, Spring 2017 (co-major with Alicia Carriquiry and Dan Nordman)

- Fan Cao, Local Polynomial Kernel Smoothing with Correlated Errors, Iowa State university, Fall 2016
- Guillermo Basulto-Elias, Kernel Deconvolution Density Estimation, Dep. Statistics, Iowa State University, Aug. 2016 (co-major with Alicia Carriquiry and Dan Nordman)

Completed MS students (PoSC member):

- Ullah Hamad, COM S, spring 2022
- Tanner Boyle, STAT, Summer 2021
- Fatima Mgaedeh, Human factors impact of COVID-19 face mask usage for essential workers: Engineering evaluation of mask usage, IMSE, Spring 2021
- Sridhar Kishor Kumar, Using Machine Learning To Predict Readmissions Of Diabetes Patients, ISBA, Fall 2020
- Yeng Miller-Chang, On optimal block resampling for Gaussian-subordinated long-range dependent processes, Dep. Statistics, Spring 2020
- Miranda Tilton, CoNNOR: Convolutional Neural Network for Outsole Recognition, Iowa State University, Dep. Statistics, Spring 2019
- Abhineet Sharma, Using node ordering to improve structure MCMC for Bayesian model averaging, Iowa State University, Dep. Of Computer Science, Fall 2016
- Jeremy Lis, Dep. Statistics, Iowa State University, Fall 2015
- Lingjian Meng , Exact Bayesian Learning of Ancestor relations in Bayesian Networks: Implementation and Parallelization, Dep. Computer Science, Iowa State University, Spring 2015

Completed PhD students (PoSC member):

- Pramiti Sarkar, Use of inventory control theory and multi-objective optimization to model work-rest scheduling, IMSE, Summer 2022
- Fatemeh Amini, Application of Optimization and Simulation Models in Genomic Prediction and Genomic Selection, IMSE, Spring 2022
- Nasim Sabetpour, Towards Complex Data Structure Aggregation in Truth Discovery, COM S, Spring 2022
- Sagnik Banerjee, Novel approaches to annotate gene structures, decipher protein interactions and compress alignment data, BCB, Spring 2022
- Thapa Bina, Spatio-temporal Distribution and Modeling of Spruce Budworm Outbreak in Border Lakes Ecoregion Using Long-term Remote Sensing Data, NREM, Fall 2021
- Manju Johny, Comparison of time series: a functional data approach, STAT, Summer 2021
- Katherine Goode, Visual diagnostics for explaining machine learning models ,STAT, Summer 2021
- Vahid Azizi, Decision making framework in deterministic and stochastic forward/reverse logistics supply chain design, IMSE, Spring 2021
- Chance Johnstone, Shape restricted random forest and distribution-free prediction intervals, STAT, Fall 2020
- Safal Kshetri, Study of soil-tine interaction for the application of automated mechanical weeder, Agricultural and Biosystems Engineering (ABE), Summer 2020
- Jinu Susan Kabala, Understanding the Internet AS Topology & its Applications, Computer Science, ISU, Spring 2020

- David Hufnagel, Distinct Teosinte Hybrid Zones and Genomic Architectures of Hybridization, BCB (EEOB), ISU, Fall 2019
- Brandon Groth, Using Machine Learning to improve dense and sparse matrix multiplication kernels Mathematics, ISU, Fall 2019
- Rita Wells, Precision Measurements of Blazar Spectra with VERITAS, PHYS, ISU, Summer 2019
- Aaron Bertram, Machine Learning Assisted Optimization with Applications to Diesel Engine Optimization with the Particle Swarm Optimization Algorithm, ME, ISU, Summer 2019
- Wang Pengyuan, Data-Driven Cyber Attack Detection and Mitigation for Decentralized Wide-Area Protection and Control in Smart Grids, EE E CPRE, ISU, Spring 2019
- Carla Mann, Applications of Machine Learning to Solve Biological Puzzles, Bioinformatics and Computational Biology, ISU, Summer 201902/14/2022
- Timothy Rinn, Bottom and charm separation through semileptonic decays in p+p collisions at 200 GeV at RHIC, NPHYS/PHYS ISU, Fall 2018
- Lu Songtao, First order methods for solving nonconvex optimization problems: Algorithms, convergence and optimality, Electrical and Computer Engineering, ISU, Summer 2018
- Yeon-jung Seo, Selection and assessment of bivariate Markov random field models, Dep. Statistics, Spring 2018
- Li Shiyang, Online monitoring and control of voltage stability margin via machine learning-based adaptive approaches, Dep. Electrical Engineering, Iowa State University, November 2017
- Natalia Da Silva, Bagged Projection Methods for Supervised Classification in Big Data, Dep. Statistics, Iowa State University, June 2017
- Andee Kaplan, On advancing MCMC-based methods for Markovian data structures with applications to deep learning, simulation, and resampling statistics, Dep. Statistics, Iowa State University, June 2017
- Yetian Chen, Structure Discovery in Bayesian Networks: Algorithms and Applications, Dep. Computer Science, Iowa State University, July 2016
- Jinchun Zhan, Sparse matrix recovery in the presence of bounded or structured noise, Dep. Electrical & Computer Engineering, ISU, Fall 2016
- Ahmad Alhasan, Quantifying road roughness: Multiresolution and near real-time analysis, Dep. Civil, Construction and Environmental Engineering, ISU, Fall 2016
- Mahdi Zamanighomi, Network Topology Identification based on Measured Data, ECpE, Iowa State University, Spring 2015
- Cory Lanker, A Data-Derived Mixture Prior for Prediction Based on Hierarchical Bayes Gaussian Mixture Models, Iowa State University, Spring 2015
- Jorge López Lázaro, Analysis and Convergence of SMO-like Decomposition and Geometrical Algorithms for Support Vector Machines, Universidad Autónoma de Madrid, 2012

PhD PoS Committee Member (ISU):

- Zhonglun Wang, IMSE
- Nirala Ashutosh Kumar, COM S
- Jia Liu, ABE, ISU
- Modeste Atsague, COM S
- Fatemeh Amini, IMSE
- Colleen Yanarella, BCB

- Rajabalizadeh Atefeh, IMSE
- Niayeshpour Farshad, IMSE
- Zhang Liang, E CPE
- Chang Yun, ECON
- Jiang Zehui, ECON
- Xiaoping Wang, Dep. Statistics
- Kandoi Gaurav, BCB
- Feng Jiale, COM S

MS PoS Committee Member (ISU):

Completed undergraduate Advisees:

- Bryce Struttman, Dep. Computer Science, Iowa State University
- Tyler Bybee, Dep. Computer Science, Iowa State University
- Franscesca Spencer, Genetics and Biotechnology with a minor in Criminology, Iowa State University

Teaching

Iowa State University:

Department of Statistics (Aug. 2013 - present)

- STAT 231: Probability and Inference for Engineers: Spring 2021
- STAT 483/583: Empirical Methods for Computer Scientists: Fall 2020, Fall 2022
- STAT 542: Theory of Probability & Statistics I: Fall 2019, 2021, 2022
- STAT 546: Nonparametric Methods in Statistics: Fall 2017, 2019, 2021
- STAT 341: Introduction to Theoretical Probability & Statistics: Spring 2016
- STAT 415 (Section II smoothing and nonparametric regression): Fall 2014
- STAT 430: Empirical Methods for Computer Scientists: Fall 2013, 2014, 2015, 2016, 2018
- STAT 330: Probability for Computer Science: Spring 2014 (Faculty adviser)

Department of Industrial Manufacturing & Systems Engineering (Jul 2019-present)

- IE 551X: Engineering Data Analysis: Theory and Practice, Spring 2021, Summer 2022
- IE 361: Statistical Quality Assurance, Spring 2020, 2022, 2023

Department of Computer Science (Aug. 2013 – Jul. 2019)

- COM S 574: Intro to Machine Learning, Spring 2019
- DS 301: Machine Learning: Spring 2018, Fall 2018, Spring 2019
- COM S 474: Intro to Machine Learning: Spring 2017, Spring 2019
- COM S 573: Machine Learning: Spring 2014, 2015, 2016

Katholieke Universiteit Leuven & Campus De Nayer (Belgium):

- Applied Statistics for Engineers (Doctoral course), 2nd semester (2011, 2012, 2013), KU Leuven, Belgium
- Control for engineers (undergraduate course), 1st semester (2011, 2012, 2013), Campus De Nayer, Mechelen, Belgium
- Measurement techniques (undergraduate course), 1st semester (2011, 2012), Campus De Nayer, Mechelen, Belgium
- Non-linear systems (graduate course), 2nd semester (2009, 2010, 2011, 2012, 2013), KU Leuven, Belgium
- One phase and three phase electric transformers (undergraduate course), 2nd semester (2008), KU Leuven, Belgium

Technical Skills

Programming:	Matlab/Simulink, R, Mathematica, SAS, Minitab, Statistica
Operating systems:	Windows, Linux, MacOS
Software/Word processing:	MS Office, LaTeX, PDFTeX

Languages

Dutch (flemish):	native
English:	fluent
French:	moderate
German:	basic