

Zeynep KALAYLIOGLU

Professor of Statistics

PERSONAL DATA

ADDRESS: Department of Statistics, Middle East Technical University, Ankara, Turkey
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WORK EXPERIENCE

2022-PRESENT Professor of Statistics, MIDDLE EAST TECHNICAL UNIVERSITY
2019-2020 Visiting Professor, School of Science, ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY, AUSTRALIA
2014-2022 Associate Professor of Statistics, MIDDLE EAST TECHNICAL UNIVERSITY
2012 SEP 5-15 Visiting Scholar, OTTO VON GUERICKE UNIVERSITY MAGDEBURG, GERMANY
2010 JULY 7-17 Visiting Scholar, DORTMUND TECHNICAL UNIVERSITY, GERMANY
2009-2014 Assistant Professor of Statistics, MIDDLE EAST TECHNICAL UNIVERSITY
2007-2009 Instructor, MIDDLE EAST TECHNICAL UNIVERSITY
2002-2007 Statistician, INFORMATION MANAGEMENT SERVICES INC., USA
1999-2002 Statistical Tutor DEPARTMENT OF STATISTICS, NORTH CAROLINA STATE UNIVERSITY, USA
1995-1997 Research Assistant, DEPARTMENT OF STATISTICS, MIDDLE EAST TECHNICAL UNIVERSITY

EDUCATION

2002 Ph.D. in STATISTICS, **North Carolina State University**, Raleigh USA
Thesis: "Bayesian and Frequentist Unit Root Tests in Stochastic Volatility Models"
Advisors: Prof. Sastry PANTULA and Prof. Sujit K. GHOSH
2000 M.S. in STATISTICS, **North Carolina State University**, Raleigh USA, with
Minor: Computational Engineering and Sciences
1995 B.Sc. in STATISTICS, **Middle East Technical University**, with
Minor: Computer Engineering

RESEARCH AREAS

Bayesian inference, categorical data analysis, model selection, directional data.

TEACHING EXPERIENCE

Undergraduate Courses: Mathematical Statistics, Probability, Decision Analysis, Computational Statistics, Statistical Computing, Categorical Data Analysis, Biostatistics, R, Matlab.

Graduate Courses: Advanced Theory of Statistics, Advanced Computational Statistics, Logistic Regression Analysis, Decision Theory and Bayesian Analysis, Bayesian Inference, Biostatistics and Statistical Genetics, Applied Time Series Analysis (at RMIT University, Australia), Bayesian Logistic Regression Analysis using BUGS (at Dortmund Technical University, Germany)

PUBLICATIONS

Ince, O. and **Kalaylioglu, Z.** (2023), "A smoothing based method for optimal classification of a continuous predictive variable," *In Writing*

Kalaylioglu, Z. and Surucu, B. (2023), "Testing for censored cylindrical distributions," *In Writing*

Camli, O. and **Kalaylioglu, Z.** (2023), "Variable selection in circular-circular regression models," *In Writing*

Camli, O. **Kalaylioglu, Z.**, SenGupta, A. (2022), "Variable selection in linear-circular regression models," *Journal of Applied Statistics*, DOI: 10.1080/02664763.2022.2110860

Kalaylioglu, Z., (2022), "Analysis of correlated circular and extremal data with a novel flexible cylindrical distribution," *Environmental and Ecological Statistics*, 29, 207-222

Kilic, M.B., SenGupta, A., **Kalaylioglu, Z.**, (2022), "Flexible modeling for multi-modal circular data using Bayesian semi-parametric mixture models," *Hacettepe Journal of Mathematics and Statistics*, 1160-1173

Camli, O. and **Kalaylioglu, Z.**, (2021), "Bayesian predictive model selection and comparison in circular random effects models with applications in ecological and environmental studies," *Environmental and Ecological Statistics*, 28, 21-34

Kalafat, E., **Kalaylioglu, Z.**, Thilaganathan, B., Khalil, A., (2020), "Is umbilicocerebral ratio better than cerebroplacental ratio for predicting adverse pregnancy and neonatal outcomes?," *American Journal of Obstetrics and Gynecology*, 223(3), 462-463

Hassanzadeh, F. and **Kalaylioglu, Z.**, (2018), "A new multimodal and asymmetric bivariate circular distribution," *Environmental and Ecological Statistics*, 25, 363-385

Tanju, O. and **Kalaylioglu, Z.**, (2018), "A cluster tree based model selection approach for logistic regression classifier," *Journal of Statistical Computation and Simulation*, 88(7), 1394-1414

Karagulle, S. and **Kalaylioglu, Z.**, (2016), "Score test for etiologic heterogeneity in two stage polytomous logistic regression," *Journal of Applied Statistics*, 43(3), 538-54

Atasever, M., Kalem, M.N., Hatirnaz, S., Hatirnaz, E., Kalem, Z., **Kalaylioglu, Z.**, (2016), "Factors affecting clinical pregnancy rates after IUI for the treatment of unexplained infertility and mild male subfertility," *Journal of the Turkish-German Gynecological Association*, 17, 134-138

Kalaylioglu, Z. and Demirhan, H., (2015), "A joint Bayesian approach for the analysis of response measured at a primary endpoint and longitudinal continuous covariates," *Statistical Methods in Medical Research*, 26(6), 2885-2896

Demirhan, H. and **Kalaylioglu, Z.**, (2015), "On the generalized multivariate Gumbel distribution," *Statistics and Probability Letters*, 103, 93-99

Demirhan, H. and **Kalaylioglu, Z.**, (2015), "Joint prior distributions for variance parameters in normal hierarchical models," *J. of Multivariate Analysis*, 135, 163-174.

Yildirak, K., **Kalaylioglu, Z.**, Mermer, A., (2015), "Bayesian estimation of crop yield function: Drought based wheat prediction model," *Environmental and Ecological Statistics*, 22, 693-704

PUBLICATIONS

Ozgu-Erdinc S, Iskender C, Uygur D, Oksuzoglu A, Seckin KD, Yeral MI, **Kalaylioglu, Z.**, Yucel A, Danisman AN, (2015), "One-hour versus two-hour postprandial blood glucose measurement in women with gestational diabetes mellitus: which is more predictive?," *Endocrine*, DOI 10.1007/s12020-015-0813-5

Kalafat, E., Yuce, T., Konuralp, B., Katlan, D. C., **Kalaylioglu, Z.**, Beksac, M., Koc, A., Soylemez, F.,(2015), "Effects of in-utero cord blood collection on post-cesarean hemoglobin levels," *European Journal of Obstetrics, Gynecology and Reproductive Biology*, 193, 123-126

Kalaylioglu, Z., (2014), "Performances of Bayesian model selection criteria for generalised linear models with nonignorable missing covariates," *J. of Statistical Computation and Simulation*, 84(8),1670-1691.

Karatayli, S.C., Bozdayi, A.M., Karatayli, E., Ozturk, T., Husseini, A.A., Albayrak, R., Ozkan, M., **Kalaylioglu, Z.**, Yalcin, K., Cinar, K., Idilman, R., Yurdaydin, C., (2014), "Interleukin-28 gene polymorphisms may contribute to hbsag persistence and the development of hbeag-negative chronic hepatitis b," *Liver International*, DOI: 10.1111/liv.12595.

Kalaylioglu, Z., Bozdemir, B., Ghosh S. K., (2013), "Bayesian unit root test in stochastic volatility models with correlated errors," *Hacetupe J. of Mathematics and Statistics* 42(6),659-669.

Kalaylioglu, Z. and Ozturk, O., (2013), "Bayesian semiparametric models for nonignorable missing mechanisms in generalized linear models," *Journal of Applied Statistics*, 40(8),1746-1763.

Senses, K.M., Gonen, M., Barutcu, A.R., **Kalaylioglu, Z.**, Isbilen, M., Konu, O., Chen, Y.T., Altorki, N.K., and Gure, A.O., (2013), "Cancer-testis gene expression is associated with the methylenetetrahydrofolate reductase 677 CT polymorphism in nonsmall cell lung carcinoma," *BMC Medical Genetics* (<http://www.biomedcentral.com/1471-2350/14/97>).

Beklioglu, M., Bezirci, G., Akkas, S.B., Rinke, K., Yildirim, F., **Kalaylioglu, Z.**, Severcan, F., (2012), "Impacts of Salinity and Fish-Exuded Kairomone on the Survival and Macromolecular Profile of *Daphnia Pulex*," *Ecotoxicology*, 21(2), 601-614.

Dogan, L., **Kalaylioglu, Z.**, Karaman, N., Ozaslan, C., Atalay, C., Altinok, M., (2011), "Relationships Between Epidemiological Features and Tumor Characteristics of Breast Cancer," *Asian Pacific Journal of Cancer Prevention*, 12(12), 3375-3380.

Kalaylioglu, Z. and Ghosh S. K., (2009), "Bayesian unit root tests for stochastic volatility models," *Statistical Methodology*, 6(2), 189-201

Vural, B., Demirkan, A., Ugurel, E., **Kalaylioglu, Z.**, Esen, B.A., Gure, A.O., Gl, A., Ozbek, U., (2009), "Seroreactivity against PTEN-induced putative kinase 1 (PINK1) in Turkish patients with Behcets disease," *Clinical and Experimental Rheumatology*, 27(2 Suppl 53):S67-72.

Chatterjee, N., **Kalaylioglu, Z.**, Shih J., Gail M., (2007), "Letter to the editor," *Biometrics*, 63, 964-966.

Sherman, M.E., Rimm, D.L., Yang, X., Chatterjee, N., Brinton, C., Lissowska, J., Peplonska, B. Szeszenia D., Mikolajczak, A.B., Zatonski, W., Cartun, R., Mandich, D., Rymkiewicz, G., Sikor, D.M, Lukaszek, S., Kordek, R., **Kalaylioglu, Z.**, Harigopal, M., Charrette, L., Falk, R.T., Richesson, D., Anderson, W.F., Hewitt, S.M., Closas, M.G., (2007), "Variation in breast cancer hormone receptor and HER2 levels by etiologic factors: A population-based analysis," *International Journal of Cancer*, September 1; 121(5): 1079-85

PUBLICATIONS

Saatci, E., Kocak, Y., Akpınar, E., **Kalaylıoğlu-Wheeler, Z.**, (2007), "Effect of chemotherapy on quality of life in patients with lymphoma," *Marmara Medical Journal*, 20(2), 98-103

Chatterjee, N., **Kalaylıoğlu, Z.**, Moslehi, R., Peters, U., Wacholder, S., (2006), "Powerful multi-locus tests for genetic association in the presence of gene-gene and gene-environment interactions," *American Journal of Human Genetics*, Vol. 79(6), 1002-1016

Chatterjee, N., **Kalaylıoğlu, Z.**, Shih J., Gail M., (2006), "Case-control and case-only designs with genotype and family history data: Estimating relative-risk, familial aggregation and absolute risk," *Biometrics*, 62(1), 36-48.

Garcia-Closas, M., Brinton, L. A., Chatterjee, N., Peplonska B., Szeszenia-Dabrowska, N., Bardin Mikolajczak, A., Zatonski, W., Blair, A., Anderson, W. F., Rymkiewicz, G., Mazepa-Sikora, D., Kordek, R., Lukaszek, S., **Kalaylıoğlu, Z.**, Sherman, M., (2006), "Established breast cancer risk factors by clinically important tumor characteristics," *British Journal of Cancer*, 95(1), 123-129

Chatterjee, N., **Kalaylıoğlu, Z.**, Carroll, R. J., (2005), "Exploiting gene-environment independence in family based case-control studies: Increased power for detecting associations, interactions, and joint effects," *Genetic Epidemiology*, 28, 138-156

Hisada, M., Chatterjee, N., **Kalaylıoğlu, Z.**, Battjes, R. J., Goedert, J. J., (2005), "Hepatitis C virus load and survival among injection drug users in the United States," *Hepatology*, 42(6), 1446-1452

PRESENTATIONS AND TALKS

"Bayesian methods in archaeometrical research", 2021, Department of Archaeometry, METU

"A gentle introduction to directional statistics", Royal Melbourne Institute of Technology, 2020, Melbourne Australia

"Bayesian predictive model comparison in complex circular models", Advances in Directional Statistics Workshop, 2018, Rome Italy

"A joint Bayesian analysis for cross sectional response and longitudinal covariate," 9th Annual International Conference on Mathematics and Statistics, 2015, Athens, Greece

"Bayesian analysis of directional data," 2015, Department of Statistics, Isfahan, Iran

"A joint Bayesian analysis for cross sectional response and longitudinal covariate," International Biometric Society, 8th. EMR Meeting, 2015, Cappadocia, Turkey

"A Joint prior for variance components in random effects models," 8th International Biometric Society Eastern Mediterranean Region, 2014, Florence, Italy

"A joint prior for variance components in random effects models," Bayesian Biostatistics, 2014, Zurich, Switzerland

"Joint prior distributions for variance parameters in normal hierarchical models," 7th International Workshop on Simulation, 2013, Rimini, Italy

"Joint prior distributions for variance parameters in normal hierarchical models," 2012, Institut für Mathematische Stokastik, Otto von Guericke Universität, Magdeburg, Germany

"Bayesian model selection criteria in generalized linear models with nonignorably missing covariates," Applied Statistics Conference, 2012, Ribno, Slovenia

"Bayesian model selection criteria in generalized linear models with nonignorably missing covariates," 14th National Biostatistics Congress, 2012, Kayseri, Turkey

"Bayesian semiparametric models for nonignorable missing mechanisms in generalized linear models," International Research Conference on Bayesian Learning, 2011, Istanbul, Turkey

"Bayesian semiparametric models for nonignorable missing mechanisms in generalized linear models," International Biometric Society, 6th. EMR Meeting, 2011, Hersonissos, Crete

"Role of statistics in genetic association studies: an overview and update," Workshop in Recent Developments in Applied Probability and Statistics, 2009, METU Institute of Applied Mathematics, Ankara, Turkey

"Frequentist unit root tests in stochastic volatility models, American Statistical Association Meetings, 2003, San Fransisco, USA

"Bayesian unit root tests in stochastic volatility models," American Statistical Association Meetings, 2002, New York City, USA

"Bayesian unit root tests in stochastic volatility models, NBER/NSF Time Series Workshop, 2001, Raleigh, USA

COMPLETED MSc AND PHD THESES

Dr. Onur Camli, Variable selection in circular regression models, 2023, PhD, Department of Statistics, METU.

Dr. Melek Er, A novel GIS based statistical prediction model for archaeological site prediction in Aegean Turkey, 2023, PhD, Department of Archaeometry, METU.

Dr. Sezgin Ciftci, Bayesian model averaging for the analysis of generalized linear models with nonignorably missing covariates, 2020, PhD, Department of Statistics, METU.

Dr. Tugba Erdem, A Bayesian joint model for recurrent event times and longitudinal covariates, 2019, PhD, Department of Statistics, METU.

Dr. Muhammed Burak Kilic, Bayesian circular data modeling, 2015, PhD, Department of Statistics, METU.

Mr. Onur Ince , Sensitivity and specificity smoothing method for determining optimal cutpoint of a continuous predictive variable, 2023, MSc, Department of Statistics, METU.

Mr. Oguz Ozdemir, Robustness of Bayesian analysis in data structures with cross sectional response and longitudinal covariates, 2018, MSc, Department of Statistics, METU.

Mr. Onur Camli, Bayesian modeling and model selection for circular longitudinal data, 2017, MSc, Department of Statistics, METU.

Ms. Ozge Tanju, Cluster based model diagnostics for logistic regression, 2016, MSc, Department of Statistics, METU.

Ms. Gulsum Cinar Dolgun, Performances of missing data handling methods in surveys, 2013, MSc, Department of Statistics, METU.

Mr. Saygin Karabulut, Score test for etiologic heterogeneity in two stage polytomous logistic regression, 2013, MSc, Department of Statistics, METU.

Ms. Icten Tansel, A statistical cluster based theoretic model for forgery analysis in archaeology, 2013, MSc, Department of Archaeometry, METU.

Ms. Tugba Erdem, Modeling diseases with multiple disease characteristics: Comparison of models and estimation methods, 2011, MSc, Department of Statistics, METU.

Mr. Olcay Ozturk, Bayesian semiparametric modeling for nonignorably missing covariates, 2011, MSc, Department of Statistics, METU.

COMPLETED PROJECTS

January, 2016 - December 2016, METU Scientific Research Project: Model selection in binary regression (principle investigator)

January, 2015 - December 2015, METU Scientific Research Project: Bayesian model averaging for the analysis of generalized linear models with covariates subject to nonignorable missingness (principle investigator)

July 2009 - December 2011, EU FB-7: Short and long term effects of genetically modified organisms on animal health (statistical analyst)

July 2009 - 2011, TUBITAK 1002: Cancer testis gene expression as biomarker for methylenetetrahydrofolate reductase polymorphism in nonsmall cell lung cancer (statistical researcher)

May 2009 - June 2010, Turkish Undersecretariat of Treasury: Construction of Turkish morbidity tables-incidence and prevalence estimation (researcher)

February 2009 - February 2010, METU Scientific Research Project: Bayesian unit root test for stochastic volatility models with leverage effect (principle investigator)

Intramural Research Program of the National Cancer Institute USA (completed in 2007): Variation in breast cancer hormone receptor and HER2 levels by etiologic factors: A population-based analysis (data analyst)

Intramural Research Program of the National Cancer Institute, Division of Cancer Epidemiology and Genetics, USA and FIS/Spain (00/0745, G03/174, G03/160, C03/09, C03/10) (completed in 2007): Large scale evaluation of candidate genes identities associations between VEGF polymorphisms and bladder cancer risk (data analyst)

Intramural Research Program of the National Cancer Institute, USA (completed in 2007): Transforming growth factor beta 1 (TGFB1) gene polymorphisms and risk of advanced colorectal adenoma (data analyst)

Intramural Program of the National Institutes of Health, USA (completed in 2006): Powerful multi-locus tests for genetic association in the presence of gene-gene and gene-environment interactions (researcher)

Intramural Research Program of the National Cancer Institute USA (completed in 2006): Established breast cancer risk factors by clinically important tumor characteristics (data analyst)

Intramural Research Program of the National Cancer Institute, Division of Cancer Epidemiology and Genetics, USA and FIS/Spain (00/0745, G03/174, G03/160, C03/09, C03/10) (completed in 2006): Genetic Variation in the Nucleotide Excision Repair Pathway and Bladder Cancer Risk (data analyst)

National Cancer Institute (CA-57030) and National Institute of Environmental Health Sciences (P30-ES09106), USA (completed in 2005): Exploiting gene-environment independence in family-based case-control studies- Increased power for detecting associations, interactions, and joint effects (researcher)

Intramural Research Program of the National Cancer Institute USA (completed in 2005): Hepatitis C virus load and survival among injection drug users in the United States (data analyst)

National Cancer Institute (CA-90302, CA-57030) and National Institute of Environmental Health Sciences (P30-ES09306), USA (completed in 2005): Analysis of casecontrol studies of genetic and environmental factors with missing genetic information and haplotype-phase ambiguity (data analyst)

National Cancer Institute and Texas AM Center for Environmental and Rural Health, USA (completed in 2005): Semiparametric maximum likelihood estimation exploiting gene-environment independence in case control studies (computational statistician)

FELLOWSHIPS/AWARDS

1997-2002, Turkish Higher Education Council Doctoral Study-Abroad Fellowship
2015, Best Presentation Award at National Biostatistics Conference
2013, Gold Medal at Genetically Designed Engineering European Student Competition¹
(advisor to the METU team)

REFEREE

Journal of the Royal Statistical Society
Computational Statistics
CRC Taylor And Francis book review
Computational Statistics and Data Analysis
Journal of Statistical Computation and Simulation
Journal of Applied Statistics
Statistica Neerlandica
Studies in Nonlinear Dynamics and Econometrics
Statistical Papers
Journal of Computational and Applied Mathematics
Environmental and Ecological Statistics
Journal of Statistical Software
Test
Communications in Statistics
Hacettepe Journal of Mathematics and Statistics
BMC Medical Research Methodology
Journal of Agricultural, Biological, and Environmental Statistics
Environmetrics
Spatial and Spatio-Temporal Epidemiology
Spatial Statistics
Statistical Methods in Medical Research

LEADERSHIP ROLES

2021- , Seminar Coordinator, Department of Archaeometry, METU
2015-2019, Vice Chair, Department of Statistics, METU
2017-2019, Advisor to METU Statistics Student Club
2009-2019, Erasmus Coordinator, Department of Statistics, METU
2014-2017, Vice Manager, Center for Wind Energy Research, METU
2012-2014, Assistant Professors Representative Elect, Board of Faculty of Arts and Sciences, METU
2008-2009, Seminar Coordinator, Department of Statistics, METU

LANGUAGES

TURKISH: Mothertongue
ENGLISH: Fluent
GERMAN: Basic Knowledge
PERSIAN: Basic Knowledge

REFERENCES

Prof. Sujit K. Ghosh, Department of Statistics, North Carolina State University, Raleigh USA
Prof. Ashis SenGupta, Applied Statistics Unit, Indian Statistical Institute, Kolkata India
Prof. Baris Surucu, Department of Statistics, Middle East Technical University, Ankara Turkey

SOME LINKS

[Mathematics Genealogy Project](#)
[LinkedIn](#)