

Jonathan J. Lisic

CONTACT INFORMATION

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RESEARCH INTERESTS

Statistical computing, spatial statistics, survey methodology, high performance computing, imputation, machine learning, computer vision.

PROFESSIONAL EXPERIENCE

National Agricultural Statistics Service (NASS), U.S. Department of Agriculture
Washington, District of Columbia

Mathematical Statistician

2009 - present

Researched and developed new methodology for sample stratification and allocation, geospatial image analysis, imputation, machine learning and visualization. Implemented new methodology in SAS, R and C for operational program environment settings. Presented methodology and implementations through research reports, oral presentations and professional conference proceedings to senior staff and members of the statistical community. Recognized as a subject matter expert in statistical computing, and worked as a consultant in this capacity on NASS and USDA's Economic Research Service (ERS) projects. Provided unique skills in information technology (IT) and statistical computing allowing for the development of efficient and maintainable production products. Created and led informal discussion sessions to improve communication and collaboration with the research and development division at NASS. Expert in the R statistical programming language and highly proficient in C and SAS. Worked in cooperation with researchers and fellows from land grant Universities.

Major accomplishments:

- Created the computationally feasible implementation of a hierarchical agglomerative clustering algorithm for survey stratification.
- Developed a parallel parametric bootstrap for small area estimation of agricultural yield, reducing runtime from one year to three days.
- Developed and implemented methodology for optimal allocation and stratification for highly cultivated strata in the June Agricultural Survey through simulated annealing.
- Implemented the iterative sequential regression (ISR) Monte Carlo Markov Chain imputation method to the Agricultural Resource Management Survey (ARMS).
- Collaborated with other agencies to extend the ISR method for ordinal and categorical data.
- Identified and resolved issues with computational instability and correctness in the original ISR research code and decreased runtime by 30 fold.
- Developed and implemented a KD-Tree approach to the local pivotal method for spatially balanced surveys, reducing average computational complexity from $\mathcal{O}(n^2)$ to $\mathcal{O}(n \log n)$.
- Created R functions to download and aggregate remotely sensed data.
- Served as expert in R and statistical computing for NASS projects.
- Evaluated cloud infrastructure for statistical computing and assists in maintaining Linux servers for research needs.
- Research and Development representative for the NASS report review committee.

Bureau of Labor Statistics (BLS), U.S. Department of Labor
Washington, District of Columbia

Mathematical Statistician

2005 - 2009

Developed new methodology and software in SAS, Perl and SQL for federal surveys in the Office of Compensation and Working Conditions (OCWC). Supported production of official statistics through review of survey responses and weighting procedures. Led research teams for the development of

federal statistics products. Presented research through reports and oral presentations to senior staff and members of the statistical community.

Major accomplishments:

- Developed an independent estimation system for the Employment Cost Index (ECI).
- Served as statistical representative to outlier review meetings for wage surveys in OCWC.
- Individually evaluated all changes to production software through the establishment of unit tests.
- Wrote and maintained sample allocation code essential for running federal employment surveys.
- Led the local area benefits team to evaluate the feasibility of producing benefit estimates for 15 major metropolitan areas.
- Developed software for production and evaluation of local area benefit and wage estimates for 15 major metropolitan areas.

EDUCATION

George Mason University, Fairfax, Virginia

Ph.D., Computational Science and Informatics (Computational Statistics), 2015

- Dissertation Topic: “Parcel Level Agricultural Land Cover Prediction”
- Advisor: James E. Gentle

In this dissertation the mean shift kernel density based classification method is improved and used to delineate agricultural field boundaries from high resolution imagery. Classification of the area within each of these boundaries is performed using USDA’s cropland data layer, and a novel hierarchical temporal-spatial multinomial probit model is used to predict future agricultural land cover. Topics explored are machine learning, computer vision, GIS, numeric analysis, Bayesian hierarchical probit models, Markov Chain Monte Carlo.

The University of Akron, Akron, Ohio

M.S., Statistics, 2005

Western Washington University, Bellingham, Washington

B.A., Mathematics, 2003

ACADEMIC
EXPERIENCE

The University of Akron

Akron, Ohio

Teaching Assistant

2003 - 2005

Co-taught introductory courses and labs in statistics, and graded undergraduate coursework. Assisted professors in research and consulting projects.

MILITARY
EXPERIENCE

446th Airlift Wing, U.S. Air Force Reserves

McChord AFB, Tacoma, Washington

Senior Intelligence Analyst, Technical Sergeant (E-6)

1996 - 2007

Served as an intelligence analyst for pilots and other aircrew and executive staff on tactical threats and world events. Developed web-tools to improve speed and quality of intelligence analysis. Provided I.T. support for Unix systems. Helped implement real time threat analysis systems at the 62nd Airlift Wing’s Intelligence Unit. Supported Seeb Airbase, Seeb Oman in 2001 as the intelligence liaison for the force protection cell. Supervised enlisted personnel in 2002 as the non-commissioned officer in charge (NCOIC) of the Frankfurt Airbase Intelligence Unit, Frankfurt Germany. Honorable Discharge (5-point Veteran)

PUBLISHED
REPORTS

Lettau, M.K., **J.J. Lisic**, J. Ranon, B.D. Rhein, T.T. Shipp, and S.J. Stafira. 2009. Local area employee benefits estimates for 15 metropolitan areas. *Monthly Labor Review*.

Ojo, O.E. and **J.J. Lisic**. 2008. BLS resumes estimation of sample errors for benefits measures. *Monthly Labor Review*.

PROCEEDINGS

Miller, D., A. Dau., and **J.J. Lisic**. 2016. Comparison of modern imputation methodologies on complex data from agricultural operations. In *proceedings of the 2015 Federal Committee on Statistical Methodology Conference*.

Lisic, J.J. 2015. A parcel level model for U.S. agricultural land use. In *Proceedings of the Section on Statistics and the Environment, American Statistical Association*, pages 2014-2028.

Zamora, D.A., C.H. Ponikowski, and **J.J. Lisic**. 2010. Effect of benchmark cells collapse patterns on the national compensation survey earnings estimates. In *Proceedings of the Section on Survey Research Methods, American Statistical Association*, pages 3193-3202.

Lisic, J.J. and O.E. Ojo. 2008. Application of Fay's method for variance estimation in the national compensation survey benefits products. In *Proceedings of the Section on Survey Research Methods, American Statistical Association*, pages 1669-1674.

Ernst, L.R., C.J. Guciardo, Y. Izsak, **J.J. Lisic**. 2008. Implementation of controlled selection in the national compensation survey redesign. In *Proceedings of the Section on Survey Research Methods, American Statistical Association*, pages 977-984.

SOFTWARE

Lisic, J.J. 2016. isr3: Iterative sequential regression imputation. R Package version 3.0, <https://github.com/jlisic/isr3>

Lisic, J.J. 2016. saAlloc: Stratification and allocation of sampling units using simulated annealing. R Package version 1.0, <https://github.com/jlisic/saAlloc>

Grafström, A. and **J.J. Lisic**. 2016. BalancedSampling: Balanced and spatially balanced sampling. R Package version 1.5.1, <https://CRAN.R-project.org/package=BalancedSampling>

Lisic, J.J. 2015. meanShiftR: A computationally efficient mean shift implementation. R Package version 1.0, <https://github.com/jlisic/meanShiftR>

Chen, L. and **J.J. Lisic**. 2015. cdTools: A small selection of tools to download and work with USDA cropland data. R Package version 1.0, <https://github.com/jlisic/cdTools>

PAPERS AND
PRESENTATIONS IN
PREPARATION

Lisic, J.J., J. Sang, Z. Zhu, and S. Zimmer. Optimal stratification and allocation for the June agricultural survey. (Submitted to the *Journal of Official Statistics*)

Lisic, J.J. Local pivotal methods for large surveys. (Proceedings for ICES V)

Lisic, J.J. MeanShiftR: An R package for parallel mean shift with applications to remote sensing in agriculture.

Miller, D., A. Dau. and **J.J. Lisic**. Imputations' reaction to data: exploring the boundaries and utility of IVEware and iterative sequential regression (ISR) (Proceeding for ICES V)

Lisic, J.J., D. Miller and A. Dau. A multinomial probit approach to categorical response imputation for iterative sequential regression. (Proceedings for JSM 2016)

PROFESSIONAL SERVICE	Member <i>American Statistical Society</i>	2008 - Present
	Webmaster, <i>Washington Statistical Society</i>	2016 - Present
	Methodology Team Member, <i>Washington Statistical Society</i>	2015 - Present
	Member <i>Institute of Mathematical Sciences</i>	2011 - Present
AWARDS & HONORS	NASS Circle Award for Excellence, ARMS ISR Imputation	2015
	NASS Spot Award, Cattle and Hog Production	2015
	NASS Government Service Award, 10 Years of Federal Service	2013
	NASS Circle Award for Excellence, Chicken and Eggs Model Development Team	2011
	NASS Circle Award for Excellence, Prices Program Documentation Team	2011
	NASS Spot Award, Stratification of the June Agricultural Survey	2011
COMPUTER SKILLS	<ul style="list-style-type: none"> • Programming Languages: Extensive use of C, R, SAS, SQL, Perl, L^AT_EX, and Unix shell scripting. • Libraries: BLAS, LAPACK, OpenGL, OpenCL, OpenCV, OpenMP, MPI, pthreads. • Operating Systems: OS X, Unix/Linux and Windows system administration and use. 	
REFERENCES	Available on request.	