

<b>Guillermo Basulto-Elias, PhD</b>	
Assistant Scientist, Institute for Transportation Iowa State University 2711 South Loop Dr. Suite 4700 Ames, Iowa 50010	(515) 451-7645 <a href="mailto:basulto@iastate.edu">basulto@iastate.edu</a>  <b>IOWA STATE UNIVERSITY</b> <b>Institute for Transportation</b>

**BACKGROUND**

Guillermo Basulto-Elias is an assistant scientist at Iowa State University. He has experience on statistical computing, data visualization, generalized linear mixed effects models, nonparametric statistics, machine learning, and stochastic processes. In recent years, he has worked on nonparametric models of data with measurement error and forensic statistics; which include footwear analysis, models for speaker recognition, and design and supervision of shoe prints forensic database. More recently, he has worked on software development for generating reports of crashes, and statistical models for traffic data, including linear mixed effects models, hierarchical Bayesian models, and functional data analysis.

**EDUCATION**

- PhD, Statistics, Iowa State University, Ames, IA, 2016
- MS, Probability and Statistics, Center for Research in Mathematics (CIMAT), University of Guanajuato, Guanajuato, Mexico, 2011
- BS, Mathematics, University of Guanajuato, Guanajuato, Mexico, 2009

**PROFESSIONAL EXPERIENCE**

- Assistant Scientist, Institute for Transportation, Iowa State University, Ames, IA, 2019–present
- Postdoctoral appointment, Institute for Transportation, Iowa State University, Ames, IA, 2019–2019
- Postdoctoral appointment, Center for Statistics and Applications in Forensic Evidence, Iowa State University, Ames, IA, 2016–2018
- Graduate Assistant, Iowa State University, Ames, IA, 2011–2016

**SELECTED PROJECTS**

- Developed method to assess data quality of Wavetronix traffic sensors in Iowa. Tasks involve statistical methodology, data processing, and summaries. Ongoing.
- 2019–2020. Model reaction point in rural intersections from the SHRP2 data. The analysis uses linear mixed effects models with forward selection to select variables and machine learning techniques to asses such selection.
- 2018–present. Developed R-package to generate Strategic Highway Safety Plan (SHSP) report. This included adapting code from SAS to R and adding functionalities. New features are being added at request.

- 2019. Perform statistical analysis instant speed in work zones using the Strategic Highway Research Program (SHRP2) data. This includes the fit of a mixed effects multiple multivariate regression and processing data at trace level.
- 2019. Developed interactive selection tool to load, visualize and evaluate quality of traces from intersections from the SHRP2 data.
- 2019. Identify reaction point with a robust method at rural intersections. The method was applied to control T, two-way stop, and all way stop intersections from the SHRP2 data. It required acceleration and speed curves smoothed with nonparametric techniques, and structural-change linear models.
- 2018. Adapted Ultimate Report to R. The program was originally made in SAS.
- 2017–2018. Responsible of creating longitudinal database of shoe prints. Each one of 160 participants wore shoes for five months. Measurements were taken in four different occasions. Six different methods were used to create impressions.

### SELECTED PUBLICATIONS

- Basulto-Elias, G., Carriquiry, A., De Brabanter, K., and Nordman, D. 2020. Bivariate kernel deconvolution with panel data. *Sankhya B: The Indian Journal of Statistics*.
- Goswamy, A., Hallmark, S., Basulto-Elias, G., and Pawlovich, M. 2019. Safety Evaluation of Stop-Sign Mounted Beacons—A Cross-Sectional Study. *Journal of Transportation Technologies*, Vol. 09, No. 01.
- Basulto-Elias, G., Carriquiry, A., De Brabanter, K. and Nordman, D. 2017. “fourierin”: An R package to compute Fourier integrals. *The R Journal*, Vol. 9, No. 2.

### WORK-IN-PROGRESS PUBLICATIONS

- Goswamy, A., Basulto-Elias, G., and Hallmark, S. 2018. Crash modification factors for safety edge treatment, Full Bayes before-and-after analysis. In preparation.
- Basulto-Elias and G., Silerio-Vazquez, M. 2018. Semi-automatic alignment of shoeprints using affine transformations. In preparation.
- Basulto-Elias, G., Leos-Barajas, V. 2018. Spline-based density estimation based on observations with measurement error. In preparation.
- Basulto-Elias, G., Carriquiry, A., De Brabanter, K., and Nordman, D. 2018. Kernel Deconvolution Density Estimation with R package kerdec. In preparation. Anticipated submission in spring 2019.
- Basulto-Elias, G., Carriquiry, A., De Brabanter, K., and Nordman, D. 2018. Adaptive bandwidth selection for kernel deconvolution density estimation. In preparation.

### SELECTED TALKS AND POSTERS

- Poster at 2019 Mid-Continent Transportation Research Symposium, Ames, IA, *Instant Speed ion Work Zones at Key Sections on Four Lane and Multi-Lane Highways*, joint work with Amrita Goswamy, Shauna Hallmark, Omar Smadi and Raju Thapa, 2019
- Poster at 10th International Conference on Forensic Inference and Statistics, Minneapolis, *Shoe matching based on image cross-sectioning*, joint work with Martin Silerio, 2017
- *Poverty Determinants in the US*, joint poster work with Natalia da Silva. Poster at Joint Statistical Meetings, Seattle, 2015

- Invited talk at XIII Probability and Statistics Workshop at CIMAT, *Statistical Learning of Machine Learning?*, Guanajuato, Mexico, 2015
- Invited talk at XIII Probability and Statistics Workshop at CIMAT, *Complex Data Visualization in R*, Guanajuato, Mexico, 2015
- *A nonparametric estimator and bootstrap confidence bands for the Kolmogorov canonical measure*, joint work with Víctor Pérez-Abreu and Miguel Nakamura, invited talk at the 2nd Conference of the International Society for Non-parametric Statistics, Cadiz, Spain, 2014
- *Measurement error and compliance with physical activity guidelines in the US*, joint poster work with Brenna Curley and Alicia Carriquiry. Poster at the International Society for Bayesian Statistics Meeting, Cancun, Mexico, 2014
- *DMC 2014 Solution*; joint work with the winning team of the 2014 Data Mining Cup: Fan Cao, Xiaoyue Cheng, Marius Dragomiroiu, Jessica Hicks, Cory Lanker, Ian Mouzon, Lanfeng Pan and Xin Yin; invited talk at Prudsys User Days Conference; Berlin, Germany; 2014

#### **HONORS, AWARDS, AND SERVICE**

- Member of the winning team of the 2014 Data Mining Cup organized by Prudsys AG, 2014
- Second runner-up of Sotero Prieto Award to the best undergraduate thesis in Mathematics of Mexico, given by the Mexican Mathematical Society, 2010
- Third place by Francisco Aranda Award to the best undergraduate thesis in Statistics of Mexico, given by the Mexican Statistics Association, 2010
- President, American Statistical Association, Iowa Chapter, IA, 2019–present
- Vice President, American Statistical Association, Iowa Chapter, IA, 2018–2019
- Organizer of weekly discussion meeting at CSAFE: Students and faculty affiliated with CSAFE at Iowa State present their progress and plans every week to encourage collaboration and immediate feedback, 2016–2018
- Student representative officer, American Statistical Association, Iowa Chapter, IA, 2011–2012