Alan Roberto Vazquez-Alcocer

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EDUCATION

University of Antwerp, Belgium
Ph.D. in Applied Economics 05/2014 - 05/2018
Thesis: Orthogonal Experimental Designs for Screening: Construction and Analysis.
Advisors: Prof. Peter Goos and Dr. Eric Schoen.

Monterrey Institute of Technology, Mexico
M.S. in Applied Statistics (Honors) 08/2010 - 05/2012

Autonomous University of Nuevo Leon, Mexico
B.S. in Mathematics 08/2005 - 05/2010

ACADEMIC POSITIONS

Department of Statistics,
University of California, Los Angeles, U.S.A. 10/2020 - present
Assistant Adjunct Professor

Department of Mathematics, Statistics and Computer Science,
University of Illinois at Chicago, Chicago, U.S.A. 03/2020
Visiting Researcher

- Started a research project on subdata selection methods for big data under a hierarchical mixtures of experts model.
- Collaborator: Prof. Min Yang.

Department of Biosystems, University of Leuven,
Belgium 06/2018 - 09/2020
Postdoctoral Researcher

- Worked on constructing optimal designs for screening and mixture experiments using mixed integer linear and nonlinear programming.
- During my second post-doc year, I earned a Junior Postdoctoral Fellowship from the Flemish Fund for Scientific Research (FWO). The fellowship is from 1 October, 2019 until 31 August, 2022, but I suspended it for 2 years to join UCLA.

Department of Statistics,
University of California, Los Angeles, U.S.A. 03/2017 - 06/2017
Visiting Graduate Researcher

- Developed theory and algorithms for constructing large two-level experimental designs.
- Advisor: Prof. Hongquan Xu.

Department of Engineering Management,
University of Antwerp, Belgium 05/2014 - 05/2018
Ph.D. Researcher

- Constructed orthogonal experimental designs for screening.
- Applied optimization methods to analyze experimental designs.

- Used Definitive Screening Designs for process optimization in the International Atomic Energy Agency in Vienna, Austria.

Mathematics Research Center CIMAT, Mexico 07/2012 - 01/2014
Research Assistant
- Designed and analyzed longitudinal studies for the Animal Experimental Unit of the Research and Development Center in Health Sciences, Autonomous University of Nuevo Leon.
- Author of LADES, a software for designing and analyzing longitudinal experiments involving animal models.

EGADE Business School, Mexico 01/2012 - 05/2012
Research Assistant
- Designed a bank teller roster for reducing the waiting times of clients in a major bank in Mexico.

RESEARCH AREAS
- Statistics: Experimental design, model selection and longitudinal data analysis.
- Operations Research: Heuristic algorithms and mixed integer programming.

PUBLICATIONS

1. Vazquez, A. R., Schoen, E. D., and Goos, P. (2021). Two-level orthogonal screening designs with 80, 96 and 112 runs, and up to 29 factors. *Journal of Quality Technology*. Published online.
   JCR Impact factor(s) **2018**: 1.755; **2019**: 2.019; **2020**: 3.946.
2. Vazquez, A. R., Schoen, E. D., and Goos, P. (2021). A mixed integer optimization approach for model selection in screening experiments. *Journal of Quality Technology*, 53:243-266.
   JCR Impact factor(s) **2018**: 1.755; **2019**: 2.019; **2020**: 3.946.
3. Kort R., Schlösser, J., Vazquez, A. R., Atakunda, P., Muhoozi, G. K. M., Wacoo, A. P., Sybesma, W. G. H., Westerberg, A. C., Iversen, P. O., and Schoen E. D. (2021). Model selection reveals the butyrate-producing gut bacterium Coprococcus eutactus as predictor for language development in three-year-old rural Ugandan children. *Frontiers in Microbiology, section Systems Microbiology*, 12:1-14.
   JCR Impact factor(s) **2018**: 4.259; **2019**: 4.236; **2020**: 5.640.
4. Vazquez, A. R., Goos, P., and Schoen, E. D. (2019). Projections of definitive screening designs by dropping columns: Selection and evaluation. *Technometrics*, 62:37-47.
   JCR Impact factor(s) **2018**: 2.089; **2019**: 2.091; **2020**: 2.988.
5. Vazquez, A. R., and Xu, H. (2019). Construction of two-level nonregular designs of strength three with large run sizes. *Technometrics*, 61:341-353.
   JCR Impact factor(s) **2018**: 2.089; **2019**: 2.091; **2020**: 2.988.
6. Vazquez, A. R., Goos, P., and Schoen, E. D. (2019). Constructing two-level designs by concatenation of strength-3 orthogonal arrays. *Technometrics*, 61:219-232.
   JCR Impact factor(s) **2018**: 2.089; **2019**: 2.091; **2020**: 2.988.
7. Goos, P., Syafitri, U., Sartono, B., and Vazquez, A. R. (2019). A nonlinear multidimensional knapsack problem in the optimal design of mixture experiments. *European Journal of Operational Research*. 128:201-221.
   JCR Impact factor(s) **2018**: 3.806; **2019**: 4.213; **2020**: 5.334.
8. Trigos, F., Vazquez, A. R., and Cárdenas-Barrón, L. E. (2019). A simulation-based heuristic that promotes business profit while increasing the perceived quality of service industries. *International Journal of Production Economics*, 211:60-70.
   JCR Impact factor(s) **2018**: 4.998; **2019**: 5.134; **2020**: 7.885.

9. Eendebak, P. T. and Vazquez, A. R. (2019). OApackage: A Python package for generation and analysis of orthogonal arrays, optimal designs and conference designs. *Journal of Open Source Software*, 4:1097.
10. Maestroni, B. M., Vazquez, A. R., Avossa, V., Goos, P., Cesio, V., Heinzen, H., Riener, J., Cannavan, A. (2018). Ruggedness testing of an analytical method for pesticide residues in potato. *Accreditation and Quality Assurance*, 23:303-316.
JCR Impact factor(s) **2018**: 0.800; **2019**: 0.662; **2020**: 0.655.
11. Vázquez-Alcocer, A., Garzón, D. L., and Sánchez-Casas, R. M. (2014). LADES: A software for constructing and analyzing longitudinal designs in biomedical research. *PLoS ONE* 9(7): e100570.
JCR Impact factor(s) **2018**: 2.776; **2019**: 2.740; **2020**: 3.240.

MANUSCRIPTS

Vazquez, A. R., and Xu, H. (2021). An integer programming approach for constructing maximin distance designs from good lattice point sets and the Williams' transformation. Submitted.

Vazquez, A. R., Wong, W.-K., and Goos, P. (2021). Constructing two-level Q_B-optimal designs for screening experiments using mixed integer programming and heuristic algorithms. Submitted.

Schoen, E. D., Eendebak P. T., Vazquez, A. R., and Goos, P. (2021). Systematic enumeration of definitive screening designs. Submitted.

Staes, I., Bäcker, L. E., Simoens, K., De Winter, K., Marolt, G., Cenens, W., Wolput, S., Vazquez, A. R., Goos, P, Lavigne, R., Bernaerts, K., and Aertsen, A. (2021). Superinfection exclusion factors allow for a history-dependent switch from vertical to horizontal phage transmission. Submitted.

Eendebak P. T., Schoen, E. D., Vazquez, A. R., and Goos, P. (2021). Systematic enumeration of two-level even-odd designs. In preparation.

TEACHING EXPERIENCE

College of Physical Sciences, University of California, Los Angeles, U.S.A.

- STATS199 - Directed Research in Statistics 10/2021 - present
- STATS101B - Introduction to Design and Analysis of Experiments 03/2021 - 06/2021
- STATS101C - Introduction to Statistical Models and Data Mining 10/2020 - 12/2020

Faculty of Bioscience Engineering, University of Leuven, Belgium

- I0R00A - Experimental Planning and Data Modelling 09/2019 - 01/2020
- I0R00A - Mathematical Planning and Advanced Statistics 09/2018 - 01/2019
- G0B68A - Experimental Design* 10/2016 - 11/2016

*: Gave two lectures about optimal designs, factorial experiments and split-plot experiments. The course is part of the Master of Food Technology program.

JMP School on Statistics, Belgium

- Multivariate Statistics* 09/2018

*: Replaced Dr. Bart De Ketelaere during the afternoon session. The school involves statistical training for practitioners in business and industry.

Metropolitan University of Monterrey, Mexico 01/2010 - 07/2010

- Instructor of Algebra, Geometry and Analytic Geometry.

THESIS DIRECTED

Faculty of Bioscience Engineering, University of Leuven, Belgium 10/2019 - 09/2020

Adityavarna Dehaleesan
M.S. in Statistics
Thesis: Construction of Large Orthogonal Designs by Concatenating Smaller Designs With Different Numbers of Runs.
Co-advisor: Prof. Peter Goos.

Faculty of Bioscience Engineering, University of Leuven, Belgium 09/2018 - 06/2020

Cristina Tapia
M.S. in Statistics
Thesis: I-optimal Designs with Blocks of Size Two.
Co-advisor: Prof. Peter Goos.

Faculty of Business and Economics, University of Antwerp, Belgium 10/2016 - 07/2017

Hajar Hamidouche
M.S. in Business Engineering
Thesis: Conference-Design-Based Definitive Screening Designs.
Co-advisor: Prof. Peter Goos.

AWARDS AND GRANTS

- Flemish Fund for Scientific Research (FWO) Grant for a Short Research Stay Abroad. 01/2020
- FWO Junior Postdoctoral Fellowship. 06/2019
- Travel Grant for the International Conference on Design of Experiments 2019. 05/2019
- European Network for Business and Industrial Statistics (ENBIS) Knowledge Fund for Participation in the ENBIS-2019 Conference. 04/2019
- FWO Grant for Participation in a Conference Abroad. 10/2018
- Travel Grant for the Design and Analysis of Experiments Conference 2017. 10/2017
- FWO Grant for a Long Research Stay Abroad. 12/2016
- Monterrey Institute of Technology Ph.D. Degree Scholarship. 05/2012
- Mexico's National Science and Technology Council (CONACyT) Master Degree Scholarship. 08/2010

CONFERENCE PRESENTATIONS AND SEMINARS (†: INVITED)

†Effective algorithms for constructing two-level Q_B-optimal designs for screening experiments. *Invited webinar at the Department of Mathematics at King's College London.* London, U.K. November, 2021.

†Two-level orthogonal designs for intensive screening experiments: Construction and evaluation (in Spanish). Conference in Honor of Guadalupe Evaristo Cedillo-Garza, Autonomous University of Nuevo Leon. San Nicolas de los Garza, Mexico. August, 2021. A recording of my presentation is available at the following link: `https://www.facebook.com/fime.oficial/videos/272984141000518`.

†Two-level orthogonal screening designs with 80, 96 and 112 runs: Construction and evaluation. *Quality and Productivity Research Conference 2021.* Tallahassee, U.S.A. July, 2021.

†Constructing optimal screening designs for effective experimentation using metaheuristics. *Metaheuristic Optimization, Machine Learning and AI – Virtual Workshop.* Hosted by The Statistical and Applied Mathematical Sciences Institute (SAMSI). March, 2021. A recording of my presentation is available at the following link: `https://vimeo.com/522352717`.

†A mixed integer optimization approach for model selection in screening experiments. *Invited seminar at GlaxoSmithKline (GSK).* Rixensart, Belgium. October, 2019.

A mixed integer optimization approach for model selection in screening experiments. *Meeting of the European Network for Business and Industrial Statistics 2019 (ENBIS 2019).* Budapest, Hungary. September, 2019.

†A mixed integer optimization approach for model selection in screening experiments. *European Conference on Operational Research (EURO-2019).* Dublin, Ireland. June, 2019.

†Construction of large two-level nonregular designs of strength three. *International Conference on Design of Experiments 2019 (ICODOE 2019).* Memphis, U.S.A. May, 2019.

†A mixed integer optimization approach for model selection in screening experiments. *Conference on Experimental Design and Analysis 2018 (CEDA 2018).* Hsinchu, Taiwan. December, 2018.

Two-Level Designs Constructed by Concatenating Orthogonal Arrays of Strength Three. Poster presented at *The Design and Analysis of Experiments Conference 2017 (DAE 2017).* Los Angeles, U.S.A. October, 2017.

†Extending the Definitive Screening Designs (in Spanish). Faculty of Physical and Mathematical Sciences Seminar, Autonomous University of Nuevo Leon. San Nicolas de los Garza, Mexico. June, 2017.

Dropping Columns from Definitive Screening Designs. *Doctoral Day 2016.* Antwerp, Belgium. November, 2016.

†Extending Definitive Screening Designs by Concatenation. *International Symposium on Business and Industrial Statistics 2016 (ISBIS-2016).* Barcelona, Spain. June, 2016.

Fractional Factorial Designs by Combining Two-Level Designs. *Meeting of the European Network for Business and Industrial Statistics 2015 (ENBIS 2015).* Prague, Czech Republic. September, 2015.

Fractional Factorial Designs by Combining Two-Level Designs. *Belgian Statistical Society Meeting 2015 (BSS 2015).* Antwerp, Belgium. October, 2015.

The Construction of Large Two-Level Designs from Two Orthogonal Arrays of Strength Two. Poster presented at the *Leuven Statistics Day 2014.* Leuven, Belgium. December, 2014.

REFEREE SERVICE

Australian & New Zealand Journal of Statistics (1); Computers and Industrial Engineering (1); Journal of Computational Statistics and Data Analysis (1); Journal of Statistical Planning and Inference (1); Journal of Statistical Theory and Practice (1); Metrika (2); STATISTICA (1); Statistics and Probability Letters (1); Statistica Sinica (1).

ADDITIONAL SKILLS

Computing:

- Programming languages: R, Python, Matlab.
- Statistical Software: JMP, Minitab.
- Optimization Software: Gurobi, SCIP, GAMS.
- Other: Cluster computing.

Languages: Spanish (native), English (professional).

GITHUB

`https://github.com/alanrvazquez`

Last update: November 11, 2021.