
CHARLES D. NICHOLSON, PH.D.

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SUMMARY

Dr. Charles Nicholson is an assistant professor at the University of Oklahoma in the School of Industrial and Systems Engineering and a principal faculty member of the Data Science and Analytics program in the Gallogly College of Engineering. He earned his Ph.D. in Operations Research from the Lyle School of Engineering at Southern Methodist University in Dallas, Texas in 2010.

Before joining the University of Oklahoma, he worked in the field of data science and analytics for 12 years. During this time, he led multiple efforts and various teams in designing a broad array of proprietary data analytics solutions for multiple corporations across the nation and internationally. Projects include a wide variety of predictive and prescriptive analytics for diverse companies representing multi-billion dollar retail, finance, and restaurant industries. Successful data-intensive solutions developed include customer-level behavior prediction, fraudulent activity detection, GIS-based strategic and competitive targeting, and product allocation optimization.

After joining the University of Oklahoma in 2013, Dr. Nicholson developed two new graduate courses which became part of the core required curriculum of the Masters in Data Science and Analytics. His courses, offered on-campus and online, have attracted attention outside of the college and it is common to have students electing to enroll from other majors including Petroleum Engineering, Chemical Engineering, Industrial and Systems Engineering, Management, Economics, and others. His courses are often at full capacity, and it is not unusual to have 70+ graduate students enrolled with more still on the waiting list. Dr. Nicholson won the Gallogly College Teaching Scholar Award in 2017 in recognition of his excellence in teaching.

His research area is in complex resilient network systems, novel predictive and classification modeling approaches, and applied meta-heuristics. His current research activities are focused on modeling, optimization, and machine-learning algorithm methods to enhance communities (e.g., cities, towns) so that they can withstand and recover rapidly from major natural disasters. He works with experts from Civil Engineering, Economics, Social Science, and Computer Science to study and quantify how disruptions in the complex interdependent infrastructure systems that underpin modern society impact economic measures and social norms. This work is funded by both the National Institutes of Standards and Technology and the National Science Foundation.

EDUCATION

- Doctor of Philosophy, Operations Research, Southern Methodist University, Dallas, TX, December 2010
- Master of Science, Decision Technologies, College of Business, University of North Texas, Denton, TX, May 2001
- Bachelor of Science, Physics, University of North Texas, Denton, TX, May 1999
- Bachelor of Science, Mathematics, University of North Texas, Denton, TX, May 1999

PROFESSIONAL EXPERIENCE

2013 – present **Assistant Professor, Industrial and Systems Engineering;
Faculty, Data Science and Analytics Program;
Gallogy College of Engineering, University of Oklahoma**

- Conduct research, teach graduate and undergraduate courses, advise and mentor PhD and MS students, obtain funding, and contribute to School, College, and University. Details provided below.

2008 – 2013 **Director and Founder, CN Analytics LLC, North Richland Hills, TX**

- Provided data science and analytics consulting, including statistical analysis, data mining, optimization modeling, predictive modeling, and database analytics consulting
- Recruited, coordinated, and directed efforts of analysts for CN Analytics LLC

Project Excerpts

Client: *Overseas online automobile insurance company*

Project: Proprietary longitudinal customer data consolidated with demographic and survey data to develop a market segmentation paradigm for new product introduction

Client: *Emergency Department at large urban hospital*

Project: Analysis of Emergency Department (ED) to evaluate the patient flow and the ED staffing using a simulation of the ED department based on available data.

Client: *National casual dining restaurant chain*

Project: A technical analysis of company's data, systems, partners, and technological capabilities with respect to evolving their marketing strategies and channels.

Client: *National fast-food restaurant chain*

Project: Pre-post analysis of survey responses to determine and improve customer satisfaction in menu and products.

2007 – 2013 **Teaching Professor, Game and Simulation Programming,
College of Engineering and Information Sciences
DeVry University, Irving, TX**

Simulation Modeling (GSP 281), 11 sessions: Mathematical theories and principles fundamental to development of computer simulations for study and interpretation of real phenomena.

Discrete Math (MATH 233), 12 sessions: Introduction to discrete mathematics. Topics include logic, sets, Boolean algebra, counting, probability, randomness, algorithm efficiency, and graph theory.

Math for Game Programming I and II (GSP 221/321), 25 sessions: Implementation of mathematical and physics principles in computer programming; students develop a 3D rigid body physics engine using C++.

Artificial Intelligence (GSP 315), 3 sessions: Autonomous movement, path finding, decision making, and machine learning.

Physics (PHYS 216), 12 sessions: Introduction to Newtonian and fluid mechanics; Topics include kinematics, dynamics, energy, and momentum.

2002 – 2007 **Director of Consumer Analysis, Blockbuster, Dallas, TX**

- Lead marketing analytics and data mining for Blockbuster's strategic marketing department and various initiatives, including: Customer Relationship Management (CRM), competitive response, and new store concepts.
- Develop and lead teams of statistical analysts, programmers and campaign managers to provide: predictive modeling, exploratory data analysis, customer segmentation, directing marketing analysis, experimental design and GIS analysis for Marketing, Product, Finance, Field and Operations departments.
- Lead the data exploration and analysis of the multi-terabytes of data on customers, prospects, retail stores, finances, and competitors in a variety of data warehouses and proprietary systems.
- Provide management with valid, data-based decision support and communicating relevant findings effectively.
- Collaborate with cross functional teams of business subject matter experts, information technology teams, and external consultants to help guide the evolution of the in-house CRM system.

2000 – 2002 **Statistical Analyst, UICI (Health Markets), North Richland Hills, TX**

- Create predictive models, customer profile analyses and experimental designs.

- Perform intense data and statistical analysis on large databases to evaluate and improve marketing strategies
- Design and implement multiple information system solutions leveraging Oracle and SAS on both NT and UNIX platforms.
- Direct vendor screening and selection process for large-scale information systems projects.

JOURNAL PUBLICATIONS

(student authors denoted by asterisk)

1. Zhang, W.*, P. Lin*, N. Wang, C. Nicholson, X. Xue. 2018. Probabilistic prediction of post-disaster functionality loss of community building portfolios considering utility disruptions. *ASCE Journal of Structural Engineering, Special Issue on Structural Design and Robustness for Community Resilience to Natural Hazards*, **144**(4), 04018015.
2. Morshedlou, N.*, K. Barker, G. Sansavini, C. Nicholson. 2018. Adaptive capacity planning formulation for infrastructure networks. *Journal of Infrastructure Systems*, **24**(4): 04018022.
3. Zhang, W.*, N. Wang, C. Nicholson. 2017. Resilience-based post-disaster recovery strategies for road-bridge networks. *Structure and Infrastructure Engineering*, **13**(11):1404-1413
4. Almoghathawi, Y*., K. Barker, C.M. Rocco, and C. Nicholson. 2017. A multi-criteria decision analysis approach for importance ranking of network components. *Reliability Engineering and System Safety*, **158**: 142-151
5. Nicholson, C., L. Goodwin*, and C. Clark. 2017. Variable neighborhood search for reverse engineering of gene regulatory networks. *Journal of Biomedical Informatics*, **65**:120-131
6. Barker, K., J. Lambert, C. Zobel, A. Tapia, J. Ramirez-Marquez, L. McLay, C. Caragea, C. Nicholson. 2017. Defining resilience analytics for interdependent cyber-physical-social networks. *Sustainable and Resilient Infrastructure*, **2**(2):59-67
7. Nicholson, C., K. Barker, and J.E. Ramirez-Marquez. 2016. Flow-based vulnerability measures for network component importance: Experimentation with preparedness planning. *Reliability Engineering and System Safety*, **145**: 62-73
8. Zhang, W.* and C. Nicholson. 2016. Prediction-based relaxation solution approach for the fixed-charge network flow problem. *Computers & Industrial Engineering*, **99**:106-11
9. Nicholson, C. and W. Zhang.* 2016. Optimal network flow: A predictive analytics perspective on the fixed-charge network flow problem. *Computers & Industrial Engineering*, **99**:260-268
10. Zhang, W.* and C. Nicholson. 2016. A multi-objective optimization model for retrofit strategies to mitigate direct economic loss and population dislocation. *Sustainable and Resilient Infrastructure*, **1** (3-4):123-136
11. Kennington, J. and C. Nicholson. 2010. The uncapacitated time-space fixed-charge network flow problem: An empirical investigation of procedures for arc capacity assignment. *INFORMS Journal on Computing*, **22**: 326-337.

JOURNAL PUBLICATIONS UNDER REVIEW

(student authors denoted by asterisk)

1. Darayi, M.*, K. Barker, C. Nicholson. A multi-industry economic impact perspective on adaptive capacity planning in a freight transportation network. In review in *International Journal of Production Economics*. (3rd Round)
2. Zhang, W.*, N. Wang, C. Nicholson, M. Tehrani M. 2017. A stage-wise decision framework for transportation network resilience planning and recovery. In review in *Sustainable and Resilient Infrastructure*. (2nd Round)
3. Zhang, W.* and C. Nicholson. Objective scaling ensemble approach for mixed integer programming. In review in *Journal of Heuristics*.
4. C. Nicholson. Parameterized dynamic slope scaling for the fixed-charge network flow problem. In review in *Computers & Industrial Engineering*.
5. Zhang, W.*, C. Nicholson, N. Wang, P. Lin*, X. Xue. Interdependent networks recovery problem. 2018. In review in *Journal of Infrastructure Systems*.
6. Rodríguez, A.*, C. Nicholson. Probabilistic perspective on network component importance measures for mitigation decision-making. In review in *Reliability Engineering and System Safety*.
7. Beyney, C.*, S. K. T. Bhavaraju*, C. Nicholson. Quantitative analysis of social media sensitivity to natural disasters. In review in *Reliability Engineering and System Safety*.
8. Rodríguez, A.*, C. Nicholson. Data-based stochastic network mitigation. In review in *European Journal of Operational Research*.

CONFERENCE PROCEEDINGS

(student authors denoted by asterisk)

1. Rodríguez, A.*, C. Nicholson. 2018. Data-based methodology for mitigation decision-making in critical infrastructure. Proceedings of the 2018 IISE Annual Conference, Orlando, FL. May 2018.
2. Bosco, V.*, C. Nicholson. 2018. Dynamic decision models for port shutdown and ship rerouting. Proceedings of 2018 IISE Annual Conference, Orlando, FL. May 2018.
3. Nicholson, C. 2018. A hybrid machine learning and optimization modeling application for economic analysis. Proceedings of the Learning and Intelligent Optimization Conference, Kalamata, Greece. June 2018.
4. Zhang, W.*, N. Wang, C. Nicholson, M.H. Tehrani*. 2017. Stage-wised resilience planning for transportation networks. Proceedings of the 12th International Conference on Structural Safety & Reliability, Vienna, Austria. August 2017.
5. Cutler, H., C. Nicholson, N. Wang, S. Zahran. 2016. Merging economic and civil engineering models to estimate the impact of earthquakes. Proceedings of the 55th Annual Meeting of the Southern Regional Science Association, Washington, D.C. March 2016.

6. Barker, K., C. Nicholson, J. Ramirez-Marquez. 2015. Vulnerability importance measures toward resilience-based network design. Proceedings of the International Conference on Applications of Statistics and Probability in Civil Engineering, Canada. July 2015.

INVITED TALKS AND CONFERENCE PRESENTATIONS (WITHOUT PROCEEDINGS)

(student authors denoted by asterisk)

1. Nicholson, C., H. Cutler, N. Rosenheim. 2018. Interdependent recovery modeling methods. Live webinar at Semi-Annual Meeting of the NIST-funded Center for Risk-based Community Resilience Planning, Fort Collins, CO. May 2018.
2. Nicholson C., Intelligent data analytics. OKC Innovates Big Data Symposium, Oklahoma City, OK. October 2017.
3. Nicholson, C., 2017. Information flow in recovery modeling of physical systems for Shelby County, TN. Semi-Annual Meeting of the NIST-funded Center for Risk-based Community Resilience Planning, Gaithersburg, MD. November 2017.
4. Nicholson, C. 2016. Interfacing physical, social, and economic systems for resilience decision-making. Semi-Annual Meeting of the NIST-funded Center for Risk-based Community Resilience Planning, Fort Collins, CO. April 2017.
5. Nicholson, C., 2016. System and modeling interfacing. Semi-Annual Meeting of the NIST-funded Center for Risk-based Community Resilience Planning, Gaithersburg, MD. Nov 2016.
6. Zhang, W.*, N. Wang, C. Nicholson. 2016. Resilience-based post-disaster recovery strategies for community road-bridge networks. INFORMS Annual Meeting, Nashville, TN. November 2016.
7. Zhang, W.*, C. Nicholson. 2016. A multiobjective optimization model for mitigating community economic loss and population dislocation. INFORMS Annual Meeting, Nashville, TN. November 2016.
8. Zhang, W.*, C. Nicholson. 2016. Objective scaling ensemble approach for integer linear programming. INFORMS Annual Meeting, Nashville, TN. November 2016.
9. Zhang, W.*, N. Wang, C. Nicholson. 2016. Resilience-based risk mitigation and recovery for highway transportation network. Probabilistic Mechanics & Reliability Conference 2016, Nashville, TN. May 2016.
10. Nicholson, C., 2016. Decision algorithm overview. Semi-Annual Meeting of the NIST-funded Center for Risk-based Community Resilience Planning, Fort Collins, CO. April 2016.
11. Nicholson, C. and W. Zhang*. 2015. Optimal flow analysis. INFORMS Annual Meeting, Philadelphia, PA. November 2015.
12. Zhang, W* . and C. Nicholson. 2015. Regression based relaxation. INFORMS Annual Meeting, Philadelphia, PA. November 2015.
13. Barker, K., C. Nicholson, and J.E. Ramirez-Marquez. 2014. Resilience-based importance measures for network design optimization. Industrial and Systems Engineering Research Conference, Montreal, QC. June 2014.

14. Clark, C. and C. Nicholson. 2013. Distributed parallel process particle swarm optimization on fixed charge network flow problems. INFORMS Annual Meeting, Minneapolis, MN. November 2013.
15. Nicholson, C. 2010. Generalized time-space fixed-charge network flows. INFORMS Annual Meeting. Austin, TX. November 2010.
16. Nicholson, C. 2009. Time-space fixed-charge network flows. INFORMS Annual Meeting. San Diego, CA. November 2009.

INVITED TALKS AND CONFERENCE PROCEEDINGS (UPCOMING)

(student authors denoted by asterisk)

1. McAllister, Y., M. Shields, J. Lee, C. Nicholson. 2019. Analysis challenges in community resilience decision support. Invited paper for the mini-symposium “Risk-informed strategies for enhancing urban resilience under natural hazards” at 13th International Conference on Applications of Statistics and Probability in Civil Engineering, Seoul, S. Korea, May 2019.
2. C. Nicholson. 2019. Interdependent network recovery modeling. Invited paper for the mini-symposium “Modeling Recovery of Spatial Distributed Community Physical Systems from Natural Disasters” at 13th International Conference on Applications of Statistics and Probability in Civil Engineering. Seoul, S. Korea, May 2019.
3. Nicholson, C., W. Zhang*, N. Wang, P. Lin*, X. Xue. 2018. Interdependent network functionality and recovery for community resilience. Invited presentation at 2018 INFORMS Annual Meeting, November 2018.
4. Nicholson, C., A. Rodriguez*. 2018. A hybrid machine learning approach: The stochastic network design problem for mitigation strategies. Invited presentation at 2018 INFORMS Annual Meeting, November 2018.

FUNDING: AWARDED

Total Awarded (Nicholson portion): \$765,352

Center for Risk-Based Community Resilience Planning,

National Institute of Standards and Technology

Co-Principal Investigator: 02.01.2015 to 01.31.2020

Total: \$20,000,000; OU portion: \$1,374,998; Nicholson: \$458,332

Resilience Analytics: A Data-Driven Approach for Enhanced Interdependent Network Resilience

National Science Foundation

Critical Resilient Interdependent Infrastructure Systems and Processes Collaborative Award

Co-Principal Investigator: 10.15.2015 to 10.14.2018

Total: \$2,209,129; OU portion: \$534,040; Nicholson: \$267,020

Data mining applications for gaming data

Nerd Kingdom

Principal Investigator: 01.15.2016 to 5.15.2017

Total: \$40,000; Nicholson: \$40,000

FUNDING: PENDING

CAREER: Data Science Paradigm for Ideal Community Resilience

National Science Foundation

Submitted: July 2018

Principal Investigator: 8.01.2019 to 10.14.2018

Nicholson: \$509,020

Enabling Pre-Ops with Multi-Day Models to Mitigate IROP Impacts

Southwest Airlines

Submitted: Jan 2018

Co-Principal Investigator: 09.01.2018 to 12.01.2019

Total: \$291,120; Nicholson: \$116,448

FUNDING: TO BE SUBMITTED

RENEWAL: Center for Risk-Based Community Resilience Planning

National Institute of Standards and Technology

To be submitted: Early 2019

Co-Principal Investigator: 02.01.2020 to 01.31.2025

Total: \$20,000,000; OU portion: \$1,400,000; Nicholson: \$450,000 (estimated)

TEACHING ACTIVITIES, UNIVERSITY OF OKLAHOMA

SUMMARY:

PhD: 1 completion, 4 current

MS ISE and DSA: 15 completions, 3 current

GRADUATE ADVISING: Ph.D. Graduated/Students

INDUSTRIAL AND SYSTEMS ENGINEERING

Weili Zhang, Ph.D. Completion: December 2017

Dissertation: *Resilience-based performance modeling and decision optimization for transportation network*

2018 ISE Outstanding PhD Dissertation Award

Currently: Machine Learning Scientist at eBay

Vera Bosco; Ph.D. Candidate (2016-Present)
Dissertation topic: *Optimization modeling for port resilience*

Sai Theja Bhavraju; Ph.D. Student (2017-Present)

Yunjie Wen; Ph.D. Student (2017-Present)

Jay McKinley; Ph. D. Student (2018 – Present)

GRADUATE ADVISING: MS Students

INDUSTRIAL AND SYSTEMS ENGINEERING

Yanbin Chang, Completion: May 2018
Optimal scheduling for transportation network recovery

Samineh Nayeri, Completion: December 2017
Decomposition algorithm for time-space fixed-charge network flow problems

Pauline Ribeyre, Completion: December 2017
Machine learning to identify characteristics of promising compounds for anticancer drug discovery

Megan Snelling, Completion: May 2017
Model for mitigating economic and social disaster damage through structural reinforcement

Param Tripathi, Completion: December 2016
Analysis of resilience in US stock markets during natural disasters

Olivia Perret, Completion: May 2016
A novel post-hoc matching procedure using statistical learning methods

Leslie Goodwin, Completion: May 2015
Divided neighborhood exploration search for inferring gene regulatory networks

Diana Wang, Completion: May 2015
Modeling approach to network performance evaluation

Cyril Beyney, Completion: May 2015
Quantitative analysis of social media sensitivity to natural disasters

DATA SCIENCE AND ANALYTICS

Alexander Rodríguez, Completion: May 2018
Novel approach to component-importance for resilience decision-making

Yunjie Wen, Completion: December 2017

Game theoretic approach to resilience strategies in transportation systems

Gowtham Talluru, Completion: December 2017

Dynamic incremental response modeling

Alexandra Amidon, Completion: December 2017

Dynamic online learning strategies for neural networks

Emily Grimes, Completion: December 2017

Quantitative framework for user engagement analysis

Weili Zhang, Completion: December 2015

Optimal flow analysis, prediction, and applications

Paul Calle, Current: completion expected December 2018

Surrogate modeling for economic community resilience

Alex Beene, Current: completion expected December 2018

Predictive modeling for professional basketball performance

Genwei Zhang, Current: completion expected May 2019

Intelligent search for low-energy conformer TPP-1 polypeptide

COURSES

ISE/DSA 5103 – Intelligent Data Analysis

(Spring '14, Fall '14, Fall '15, Fall '16, Fall '17, Fall '18)

Intelligent Data Analytics is an approach to addressing real-world data intensive problems that integrates human intuition with data analysis tools to best draw out meaningful insights. Topics include problem approach and framing, data cleansing, exploratory analysis and visualization, dimension reduction, linear and logistic regression, decision trees, and clustering. Students will be introduced to a powerful open source statistical programming language (R) and work on hands-on, applied data analysis projects.

ISE 5113 Advanced Analytics and Metaheuristics

(Spring '15, Spring '16, Spring '17)

Advanced Analytics and Metaheuristics builds on the foundation established in Intelligent Data Analytics to explore and apply advanced techniques for addressing complex and potentially data intensive problems. Focus is on developing and employing problem solving strategies using advanced methods in the context of Data Science and Analytics. Topics include both continuous and combinatorial optimization with an emphasis on traditional

techniques such as mathematical programming as well as modern heuristics such as simulated annealing, evolutionary algorithms, and swarm optimization. Students will use programming skills to implement algorithms and solve problems.

ISE 3293/5013 Applied Engineering Statistics

(Summer '14, Fall '14, Summer '15, Fall '15)

Introduction to probability, random variates, function of random variables, expectation, discrete and continuous distributions, sampling and descriptive statistics, parameter estimation, use of statistical packages.

ISE 4113 Spreadsheet-based Decision Support Systems

(Fall '16, Fall '17, Fall '18)

Covers all aspects of spreadsheet-based software functionality that are relevant to supporting decision-making. Microsoft Excel is used as the subject tool. Students learn advanced functions of Excel that are available through the spreadsheet interface, the Visual Basic language and its integration with the spreadsheet environment, principles of decision-support systems studied in a variety of applications, including facility layout, warehousing, portfolio optimization, and various statistical inference problems.

MS DATA SCIENCE AND ANALYTICS PRACTICUM ADVISING

Summer 2018

- Genwei Zhang, Low-energy conformer search of TPP-1 polypeptide via genetic algorithm
- Paul Contreras, Surrogate modeling and multi-objective optimization in mitigation resource allocation
- Anthony Silva, Reports and dashboards for a non-profit organization
- Andrew Duffie, Data warehouse ecosystem for KEEN customer analytics

Summer 2017

- Alexander Rodríguez, Data-based network component ranking for resilience decision-making in infrastructure systems
- Jeffrey Pelter, Identifying fraud in a near real time environment
- Alekhya Nemoori, Temporal and regional trends of oil and gas production
- Gowtham Talluru, Customer behavior simulation

Spring 2017

- Greg Flood, Excess Water Production in the Oil and Gas Industry – Detection and Diagnostics
- Emily Grimes, Effective Use of User Interaction Engagements
- Yunjie Wen, Driving Behavior Algorithm

Fall 2016

- Alexandra Amidon, Implementing CompreX to identify anomalies in databases

Fall 2015

- Weili Zhang, Predictive analytics for network flow models

UNDERGRADUATE CAPSTONE PROJECT ADVISING

2018 – Worldwide Express: “Utilizing Customer Quoting History to Perform Strategic Pricing Decisions” (3 students)

Century Link: “Identifying customer experience needs” (3 students)

2017 – Sabre: “Analysis and definition of implementation configurations” (2 students)

FAA: “Selection of training management software & transition process” (3 students)

2016 – Luggage with Love: “Improving Operational Efficiency” (3 students)

2014 – Sabre: “Sabre Traveler Segmentation” (3 students)

UPS: “Shipyard Movement Analysis” (3 students)

TEACHING EVALUATION SCORE SUMMARY (FALL 2014 – SPRING 2018)

On a 5-point scale for teaching evaluations, I consistently outperform the average evaluations of the School of Industrial and Systems Engineering and the College of Engineering. A weighted average of the summary evaluation scores from Fall 2014 to Spring 2018 is provided.

	Nicholson	School of ISE	College of Engineering
<i>Graduate Courses</i>	4.623	4.154	4.169
<i>Undergraduate Courses</i>	4.380	4.256	4.230

EDITORIAL BOARDS

2015-Present: *Journal of Sustainable and Resilience Infrastructure*

OTHER SERVICE

- Gallogly College of Engineering Vision Task Force (August 2018 – Present)
- OU Machine Learning Symposium Lead (July 2017 – Present)
- ISE Director Search Committee (Sep 2017 – Present)
- Session Organizer and Chair 2018 IISE Annual Conference
- ISE Faculty Search Committee in 2014, 2016, and 2017/18
- Gallogly College of Engineering PPO Committee (Sep 2017 – May 2018)
- OU organizer and co-host for multi-university NIST-funded Center of Excellence meeting, August 31 – September 1, 2017

HONORS AND RECOGNITONS

- 2017 Gallogly College of Engineering Teaching Scholar Award

During graduate and undergraduate studies

- Decision Technology Masters Academic Excellence Award; Business Computer Information Systems Honors Award; University of North Texas Master Fellowship
- University of North Texas Transfer Scholarship; National Association for the Self Employed (NASE) Academic Scholarship; University of North Texas Dean’s List; Physics Scholarship

TOOLS AND SKILLS

- Statistical and Analytical Software: SAS, Enterprise Miner, SPSS, R
- Optimization: AMPL, CPLEX, Gurobi
- Database: Oracle PL/SQL, SQL, SQL*Plus, TOAD
- Simulation: ProModel, Anylogic
- Programming: Python, C++, Java, Visual Basic, VBA, UNIX Scripting

PROFESSIONAL AFFILIATIONS

- Institute for Operations Research and Management Science (INFORMS): 2009 - Present
- Institute for Industrial and Systems Engineers (IISE): 2014, 2018-Present
- University of North Texas Information Technology and Decision Science Advisory Board Member: 2006-2007
- Luggage With Love, Board of Directors: 2016 (non-profit group supporting foster families)

PROFESSIONAL EDUCATION

- Certified Professional SAS Programmer
- SAS: Data Mining, Predictive Modeling, Neural Networks, Decision Trees, Advanced Programming
- ORACLE: Oracle SQL Optimization, PL-SQL

SPOKEN LANGUAGES

Completely fluent in English and Spanish