Adolfo R. Escobedo

Assistant Professor, School of Computing and Augmented Intelligence
Arizona State University (ASU), Tempe, AZ
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Research interests

Methodologies: Operation research, discrete optimization, design and analysis of algorithms, numerical linear algebra, computational social choice.

Application areas: Planning and operation of sustainable infrastructures, service territory design, circular economy, collective intelligence and crowdsourcing.

Education

Ph.D.	**Industrial & Systems Engineering** Texas A&M University (TAMU)	August 2016
B.A.	**Mathematics** (with a minor in History) California State University, Los Angeles (CSULA)	June 2009

Academic Appointments and Employment

ASU	**Executive Director** DHS Center for Accelerating Operational Efficiency (CAOE)	Jan 2023 – present
AFRL	**Summer Faculty Fellow** U.S. Air Force Academy	May 2022 - July 2022
ASU	**Assistant Professor** School of Computing and Augmented Intelligence (SCAI)[1]	Aug 2016 – present
TAMU	**Instructor of Record**	Spring 2016, Spring 2015
LLNL	**Graduate Student Intern** Computational Engineering Division	May 2015 - Sep 2015
TAMU	**Graduate Research Assistant**	June 2012 – Aug 2016

Publications

Legend:
- **Bold font**: ASU Graduate Student
- (#): ASU Undergraduate Student
- (×): Student at Another Institution
- (*) : Corresponding Author

Note: In general, the order of the journal publication's authorship order connotes the level of contribution (i.e., first is highest).

[1] Formerly the School of Computing, Informatics, and Decision Systems Engineering (CIDSE)

Appeared (or Soon to Appear) in Refereed Journals:

17. **S. Akbari***, A. R. Escobedo, "Beyond Kemeny aggregation: Theoretical and computational insights for robust ranking aggregation", to appear in *Omega*.

16. A. R. Escobedo*, "Exact matrix factorization updates for nonlinear programming", to appear in *INFORMS Journal on Computing*. Available at `https://arxiv.org/abs/2202.00520`.

15. **S. Akbari***, A. R. Escobedo, "Approximate Condorcet partitioning: Solving very large rank aggregation problems at scale", to appear in *Computers & Operations Research*, 2023.

14. **Z. Kassem***, A. R. Escobedo, "Models and network insights for edge-based districting with simultaneous location-allocation decisions", to appear in *IISE Transactions*, 2022.

13. **R. Yasmin***, M. M. Hassan$^{\times}$, **J. Grassel**, H. Bhogaraju$^{\#}$, A. R. Escobedo, O. Fuentes, "Improving crowdsourcing-based image classification through expanded input elicitation and machine learning", *Frontiers in Artificial Intelligence*, 5(1) 2022, 848056.
Invited to special issue on Human-Centered AI: Crowd Computing

12. **J. K. Skolfield***, L. M. Escobar$^{\times}$, A. R. Escobedo, "Derivation and generation of path-based valid inequalities for transmission expansion planning", *Annals of Operations Research*, 312(1) 2022, 1031-1049.

11. A. R. Escobedo*, E. Moreno-Centeno, **R. Yasmin**, "An axiomatic distance methodology for aggregating multimodal evaluations", *Information Sciences*, 590(1) 2022, 322–345.

10. **J. K. Skolfield***, A. R. Escobedo, "Operations research in optimal power flow: a guide to recent and emerging methodologies and applications", *European Journal of Operational Research*, 300(2) 2022, 387-404.

9. **Y. Yoo***, A. R. Escobedo, "A new binary programming formulation and social choice property for Kemeny rank aggregation", *Decision Analysis*, 18(4) 2021, 296-320.

8. Y. Zhang$^{\times}$, M. Bansal*, A. R. Escobedo, "Risk-neutral and risk-averse transmission switching for load shed recovery with uncertain renewable generation and demand", *IET Generation, Transmission & Distribution*, 14(21) 2020, 4936–4945.

7. **Y. Yoo***, A. R. Escobedo, **J. K. Skolfield**, "A new correlation coefficient for comparing and aggregating non-strict and incomplete rankings," *European Journal of Operational Research*, 285(3) 2020, 1025–1041.

6. C. Lourenco$^{\times}$*, A. R. Escobedo, E. Moreno-Centeno, T. A. Davis, "Exact solution of sparse linear systems via left-looking roundoff-error-free LU factorization in time proportional to arithmetic work", *SIAM Journal on Matrix Analysis and Applications*, 40(2) 2019, 609–638.

5. A. R. Escobedo*, E. Moreno-Centeno, C. Lourenco$^{\times}$, "Solution of dense linear systems via roundoff-error-free factorization algorithms: theoretical connections and computational comparisons", *ACM Transactions on Mathematical Software*, 44(4) 2018, 40–63.

4. A. R. Escobedo*, E. Moreno-Centeno, "Roundoff-error-free basis updates of LU factorizations for the efficient validation of optimality certificates", *SIAM Journal on Matrix Analysis and Applications*, 38(3) 2017, 807–828.

3. E. Moreno-Centeno, A. R. Escobedo*, "Axiomatic aggregation of incomplete rankings", *IIE Transactions*, 48(6) 2016, 475–488.

2. A. R. Escobedo*, E. Moreno-Centeno, "Roundoff-error-free algorithms for solving linear systems via Cholesky and LU factorizations", *INFORMS Journal on Computing*, 27(4) 2015, 677–689.

   INFORMS Junior Faculty Paper Competition Honorable Mention, top-6 finalist

1. A. R. Escobedo*, E. Moreno-Centeno, K. W. Hedman, "Topology control for load-shed recovery", *IEEE Transactions on Power Systems*, 29(2) 2014, 908–916.

Appeared (or Soon to Appear) in Refereed Conference Proceedings:

8. **S. Akbari***, A. R. Escobedo, "Top-k list aggregation: Mathematical formulations and polyhedral comparisons", to appear in *International Symposium on Combinatorial Optimization (ISCO), Lecture Notes in Computer Science*, 2022.

   24 of 50 papers accepted (48% acceptance rate)

7. **S. Akbari***, A. R. Escobedo, "Lower bounds on Kemeny rank aggregation with non-strict rankings", *IEEE Symposium Series on Computational Intelligence (SSCI)*, 2021, 1-8.

6. **R. Yasmin***, **J. Grassel**, M. M. Hassan$^{\times}$, O. Fuentes, A. R. Escobedo, "Enhancing image classification capabilities of crowdsourcing-based methods through expanded input elicitation", *AAAI Conference on Human Computation and Crowdsourcing (HCOMP)*, 9(1), 2021, 166–178.

   16 of 58 papers accepted (27.6% acceptance rate)

5. **Z. Kassem***, **V. S. Gudivada**, A. R. Escobedo, W. F. Campbell, "A decision support tool for calculating waste collection needs", *Institute of Industrial and Systems Engineers (IISE) Annual Conference*, 2021, 944-949.

4. **J. K. Skolfield***, A. R. Escobedo, J. Ramirez-Vergara$^{\times}$, "Transmission and capacity expansion planning against rising temperatures: A case study in Arizona", *Institute of Industrial and Systems Engineers (IISE) Annual Conference*, 2021, 872-877. Arizona".

   Winner of IISE Energy Systems Division Best Student Paper Award

3. R. Kemmer$^{\#}$*, **Y. Yoo***, A. R. Escobedo, and R. Maciejewski, "Enhancing collective estimates by aggregating cardinal and ordinal inputs", *AAAI Conference on Human Computation and Crowdsourcing (HCOMP)*, 8(1), 2020, 73–82.

   15 of 55 papers accepted (27% acceptance rate)

2. **J. K. Skolfield***, **R. Yasmin**, A. R. Escobedo, L. M. Huie, "A comparison of axiomatic distance-based collective intelligence methods for wireless sensor network state estimation with false data injection", *IEEE 6th World Forum on Internet of Things (WF-IoT)*, 2020, 1–6.

1. L. M. Escobar$^{\times}$*, A. R. Escobedo, D. Escobar$^{\times}$, R. A. Romero Lázaro, "Bus-angle difference valid inequalities for transmission system expansion planning with L-1 reliability", *Procs. of IEEE Electrical Power and Energy Conference*, 2018.

Under Review in Refereed Journals:

2. A. R. Escobedo and **R. Yasmin***, "Derivations of large classes of facet defining inequalities of the weak order polytope using ranking structures", in **third round** of review, *Journal of Combinatorial Optimization*. Available at `https://arxiv.org/abs/2008.03799`.

1. **J. K. Skolfield***, A. Alnakhli$^{\times}$, A. Alawad$^{\times}$, A. R. Escobedo, and P. Dehghanian, "Data-driven robust transmission expansion planning against rising temperatures", **in second round** of review, *IEEE Transactions on Power Systems*.

Under Review in Refereed Conferences:

1. **H. Bhogaraju**$^{\#}$*, A. Jain$\times$, J. Jaiswal$\times$, A. R. Escobedo, 'Assessing the effects of expanded input elicitation and machine learning-based priming for crowd stock prediction", under review, 15th International Conference on Computational Collective Intelligence.

Manuscripts in Preparation:

1. **S. Akbari**, A. R. Escobedo, "Exact and inexact methods for top-k list aggregation under the generalized Kendall tau distance".
2. **S. Akbari**, A. R. Escobedo, J. A. Sefair, "The minimum feedback arc set problem over bidirectional graphs with an application to faculty hiring networks".
3. **R. Yasmin**, F. Arias, I. Naik, A. R. Escobedo, "A principled methodology for challenging the single ground truth assumption in preference aggregation".
4. **Y. Yoo**, R. Kemmer$^{\#}$, S. Muppirala$^{\#}$, A. R. Escobedo, E. Chiou, "Joint elicitation and aggregation of ordinal and cardinal estimates improves wisdom of crowd effects on ordering tasks".

Academic Awards and Fellowships

Academic Awards:

- Finalist, ASU Outstanding Faculty Mentor Awards 2022
- INFORMS Computing Society (ICS) Prize 2021
  (with Erick Moreno-Centeno, Christopher Lourenco, and Tim A. Davis)
- ASU Top 5% Best Teacher 2020
- Finalist, INFORMS Junior Faculty Forum Paper Competition 2015
  (with Erick Moreno-Centeno)
- Selectee of INFORMS Doctoral Student Colloquium 2015
- Selectee of University of Michigan's Engineering NextProf Workshop 2014
- Extreme Science and Engineering Discovery Scholar 2012 & 2014
- First place in TAMU INFORMS PhD Student Chapter presentation competition 2013
- Member of Phi Kappa Phi Honor Society, CSULA 2009
- Cum laude, B. A. in Mathematics, CSULA 2009

Fellowships:

- Summer Faculty Fellowship Program, AFOSR 2022
- Rob & Melani Walton Sustainability Solutions Service Faculty Affiliate, ASU 2021

- U.S. Senator Phil Gramm Doctoral Fellowship, TAMU, 2016
- Jimmy H. Smith, Ph.D., P.E. Graduate Scholarship, TAMU, 2015
- TAMU Energy Institute/Conoco Phillips Fellowship, TAMU, 2013 & 2014
- Graduate Diversity Fellowship, TAMU, 2012 – 2015
- LSAMP Bridge to the Doctorate Fellowship, TAMU, 2010 – 2012
- President's Scholarship, CSULA, 2004 – 2008

Research Grants and Proposals

Federal and State Agency Grants:

- PI (UF Co-PI: Jorge A. Sefair).
  "Examining current and future operational efficiencies in process flows through form I-751".
  Total awarded: $3,600,000. **Personal share**: $171,165.
  Note: The total awarded amount represents the center's award for 2022-2023. I am the lead PI of an associated research project for U.S. Citizenship and Immigration Services (USCIS).
  Period of performance: November 2022 - June 2023.

- Co-PI (ASU PI: Raj Buch; NAU PI: Richard Rushforth; ASU Co-PIs: Anthony Evans, James Timothy, Alicia Marseille).
  "TRIF: Supporting and increasing recycling around Arizona".
  Arizona Board of Regents Regents Grant Program.
  Total awarded: $1,600,000. **Personal share**: $325,000.
  Period of performance: May 2022 - April 2025 (projected).

- Co-PI (PI: Raj Buch, Co-PI: Alicia Marseille).
  "Designing a hub-and-spoke model to increase access to recycling in rural Arizona".
  U.S. Department of Agriculture (USDA) Utilities Program.
  Total awarded: $160,559. **Personal share**: $48,168.
  Period of performance: October 2021 - September 2022.

- PI (UTEP Co-PI: Olac Fuentes), "Improving Baggage Screening Using Collective Intelligence and Machine Learning".
  U.S. Department of Homeland Security (DHS) Center for Accelerating Operational Efficiency.
  Total awarded: $7,600,500. **Personal share**: $384,030.
  Note: The total awarded amount represents the center's award for 2020-2022.
  Period of performance: August 2020 - June 2022.

- PI. "CRII: Novel computational social choice extensions for highly distributed decision-making contexts". National Science Foundation (NSF).
  Total awarded: $222,329.
  Period of performance: August 2019 - July 2023.

- PI. "Assessing and expanding the limits of collective intelligence".
  Department of Defense - ARMY.
  Total awarded: $60,000.
  Period of performance: April 2019 - Jan 2020.

Industry and Other Grants:

- PI. "Enhancing circularity and sustainability of SRP's cabling supply chain".
  Salt River Project (SRP).
  Total awarded: $66,703.
  Period of performance: August 2022 - July 2023.

- Co-PI (PI: Heather Haseley). "Practice Lab".
  Logitech.
  Total awarded: $75,000; **Personal share**: $3,500.
  Period of performance: September 2021 - June 2022.

- PI. "Analyzing the materials return process at SRP".
  Salt River Project (SRP).
  Total awarded: $63,636.
  Period of performance: September 2020 - August 2021.

- PI. "Analysis and optimization of SRP's waste disposal system".
  Salt River Project (SRP).
  Total awarded: $58,182.
  Period of performance: September 2020 - August 2021.

- PI. "Waste stream inventory".
  Salt River Project (SRP).
  Total awarded: $63,636.
  Period of performance: August 2019 - July 2020.

- PI (URI PI: Jimmi Oxley; ASU Co-PI: Pitu Mirchandani; URI Co-PI: Manbir Sodhi).
  "Discovery of critical commodity chemical supply chain networks using public data".
  ASU & URI Innovation Hub for Collaborative Research (seed grant).
  Total awarded: $50,000. **Personal share**: $12,500.
  Period of performance: July 2019 - June 2020.

- PI. "A shared circular economy framework for enabling large-scale source separation", ASU Rob and Melani Walton Sustainability Solutions Service seed grant.
  Total awarded: $19,500.
  Period of performance: June 2018 - Nov 2018.

Selected Grant Proposals under Review:

- Co-PI (PI: Raj Buch, Co-PI: Alicia Marseille).
  "Designing scenarios for statewide hub-and-spoke systems to increase access to recycling in rural Arizona".
  U.S. Department of Agriculture (USDA) Utilities Program.
  Total requested: $269,050. **Personal share**: $134,525.

- PI. "Accelerated certify-and-repair algorithms for reliably solving linear and mixed integer programs".
  Department of Energy Early Career Research Program (DOE ECRP).
  Total requested: $875,000.

- Co-PI (PI: Andrea Hupman). "Aggregating diverse types of information for decision makers with diverse priorities to maximize the value of information for risk mitigation decisions" U.S. Department of Homeland Security (DHS) Center for Accelerating Operational Efficiency. **Total requested**: $740,000. **Personal share**: $340,000.

Student Mentoring

PhD Students Advised:

- **Dissertation Chair (ASU)**:
  - Yeawon Yoo 2016 - 2021
    Position after graduation: Postdoc, Johns Hopkins University
  - J. Kyle Skolfield 2017 - 2022
    Position after graduation: R&D Scientist, Sandia National lab
  - Sina Akbari 2018 - 2022
    Position after graduation: Operations Research Scientist, FedEx Freight
  - K. Wahadul Hasan 2022 - present
    Expected completion term: Spring 2027
  - Zeyad Kassem (PhD Candidate) 2018 - present
    Expected completion date: Fall 2023
  - Romena Yasmin 2018 - present
    Expected completion term: Spring 2024
  - Joshua T. Grassel 2021 - present
    Expected completion term: Spring 2026
- **Dissertation Committee Member (ASU)**: Seho Kee (IE, Summer 2020), Alkhalifa Loay (Mathematics, Spring 2020), Sangdi Lin (IE, Summer 2018), Navid Matin (IE, Summer 2020), Anson Park (IE, Summer 2019), Maziar Roodsari (IE, Fall 2021), Ghazal Shams (IE, Spring 2020), Nooshin Shomalzadeh (IE, Summer 2021), Xufeng Yao (IE, Summer 2021).
- **Dissertation Committee Member (External)**: Md Mahmudulla Hassan (University of Texas at El Paso, CSE, expected Summer 2023), Yingqiu Zhang (Virginia Tech University, IE, Summer 2021)

Masters Students Advised:

- **Thesis Co-chair**:
  - Loy Lobo
    IE MS (Co-Chair: J. Sefair)
    Completion term: Summer 2017

Undergraduate Students Advised:

- **Barrett Honors College Undergraduate Thesis Advisor**:
  - Harika Bhogaraju
    CSE BS
    Completion term: Fall 2022
  - Sárbith Aguilar
    IE BS
    Completion term: Fall 2020
  - Amy Holladay
    IE BS
    Completion term: Spring 2020
  - Ryan Kemmer
    CSE BS
    Completion term: Spring 2020
- **Barrett Honors College Undergraduate Thesis Committee Member**: Anish Agarwal & Sarthak Gupta (CSE, Fall 2022), Grant Schuchter (IE, Spring 2019).

Selected Academic Awards by Advised Students:

- **ASU Fulton Undergraduate Research Initiative project awards**: Arlen Dean (Fall 2017), Amy Holladay (Spring 2020), Ryan Kemmer (Spring & Fall 2020), Samihan Muppirala (Fall 2022), Kelly White (Fall 2019 & Spring 2020).
- **ASU Grand Challenge Scholar**: Arlen Dean (Summer 2017)
- **ASU Fulton Master's Opportunity for Research in Engineering project awards**: Andres Flores (Spring 2023), Venkata Saisrikar Gudivada (Fall 2020 & Spring 2021), Durga Kasireddy (Fall 2019), Charan Rajagopal (Summer 2021), Vishwa Vasani (Spring 2018)
- **Dean's Fellowship**: Joshua T. Grassel (Fall 2021 - Spring 2025), J. Kyle Skolfield, Fall 2016 - spring 2020
- Best Student Paper Prize, IISE Energy Systems Division, J. Kyle Skolfield, 2021
- Honorable Mention, Computational Research Association (CRA) Outstanding Undergraduate Research Awards, R. Kemmer, 2021
- Bayer Women in Operations Research Scholarship, Y. Yoo, Fall 2020
- Finalist, INFORMS Minority Issue Forum Student Poster Competition, Y. Yoo, Fall 2020
- Honorable Mention, INFORMS Annual Meeting Poster Competition, Y. Yoo, Fall 2020
- Mohammed Fazle Rabbi and Rukhsana Wahhab Fellowship, R. Yasmin, Spring 2020
- Graduate Research Fellowship, National Science Foundation (NSF), Arlen Dean, Spring 2019
- Winner, ASU INFORMS Student Chapter PhD Presentation Competition, Y. Yoo, Spring 2018

Teaching

- Undergraduate Courses Taught at ASU, Including New Course Development: 4
  (includes two courses taught at Texas A&M)
- Graduate Courses Taught, Including New Course Development: 18
- Average Teaching Evaluation Score for Undergraduate Courses Taught at ASU: 4.32/5.00
- Average Teaching Evaluation Score for Undergraduate Courses Taught at TAMU: 4.43/5.00
- Average Teaching Evaluation Score for Graduate Courses Taught at ASU: 4.59/5.00

- Courses taught at ASU
  - IEE 300 Economic Analysis for Engineers
  - IEE 376 Operations Research: Deterministic Techniques/Applications
  - IEE 574 Applied Deterministic Operations Research
  - CSE/IEE 598 Computational Social Choice
  - IEE 622 Optimization II: Integer Programming
- Courses taught at TAMU
  - IEE 300 Engineering Economic Analysis

Service

External Service:

- Associate editor for:
  - Energy Systems 2017 - present
- Referee for:
  - Ain Shams Engineering Journal
  - Computational Statistics and Data Analysis
  - Computers & Industrial Engineering
  - Computers & Operations Research
  - IEEE Access
  - IEEE Power Engineering Letters
  - IEEE Transactions on Power Systems
  - Information Fusion
  - INFORMS Journal on Computing
  - International Journal of Electrical Power & Energy Systems
  - IISE Transactions
  - Journal of Global Optimization
  - Mathematical Social Sciences
  - Networks
  - Optimization Letters
  - PLOS Computational Biology
  - 2021 IISE Operations Research Track Undergraduate Student Best Paper Competition

  - 2022 INFORMS Data Mining Best Paper Competition

- 2023 INFORMS Annual Meeting Organizing Committee — Spring 2022 - present
- Review panelist for NSF Graduate Research Fellowship program — 2021
- Judge, INFORMS Annual Meeting Poster Competition — Fall 2027, Fall 2021
- Review Panelist for NSF-CMMI Operations Engineering program — 2017
- Track Chair of Operations Research for IISE Anual Conference & Expo — AY 2016

Internal Service:

SCAI:

- IE Graduate Program Committee Chair — Fall 2022 - present
- IE Graduate Program Committee Member — Fall 2019 - Spring 2021
- IE Capstone Faculty Advisor (7 total Capstone teams) — 2018 - present
- INFORMS Student Chapter Junior Faculty Panel — Sep 2018
- IE PhD Student Recruiting Committee Co-Chair (with Nong Ye) — Fall 2018 - Fall 2019
- INFORMS SC Presentation Competition Organization Committee — Fall 2017, Spring 2018
- Faculty Search Committee (Industrial Statistics & Stochastic Optimization) — AY 2017
- IE Seminar Series Committee (with G. Pedrielli) — AY 2017
- Engineering Management Undergraduate Program Committee — Fall 2016 - Spring 2019

ASU & Fulton Schools of Engineering:

- DEIB Faculty Advisory Council — Fall 2022 - present
- ASU Summer Research Internships Coordinator/Advisor (7 students) — 2022
- ASU Summer Research Internships Coordinator/Advisor (7 students) — 2021
- ASU Summer Research Internships Coordinator/Advisor (7 students) — 2020
- Ira A. Fulton Schools of Engineering PhD Recruiment Committee — AY 2020
- Master's Opportunities in Research program (MORE) Review Committee — Fall 2019 - present
- Ira A. Fulton Schools of Engineering General Scholarship Committee — Spring 2019
- E2 Camp — Aug 2017
- Fulton Schools of Engineering PhD Open House — Feb 2017

Other:

- Appointed Ambassador for TAMU-System AGEP program — Dec 2015 - June 2016
- Mentor for LSAMP Bridge to the Doctorate Program, TAMU — Aug 2015 - May 2016
- Appointed member of 2016 Convocation Speaker Committee, TAMU — March 2015
- Departmental representative in College Student Council, TAMU — Jan 2015 - May 2016
- Poster session judge for USRG/REU programs, TAMU — Aug 2014

- LSAMP Graduate School Experience Panel, TAMU Oct 2013
- Graduate student mentor for INFORMS Student Chapter, TAMU Sep 2013 - May 2016
- Poster session judge for LSAMP Annual Symposium Feb 2013

Presentations [(*) indicates the presenting author]

Invited — External:

- A. R. Escobedo*, "Scaling up principled aggregation by melding socio-theoretical insights and optimization", Virginia Tech Department of Industrial and Systems Engineering, virtual seminar, February 2022.
- A. R. Escobedo*, "Scaling up principled aggregation by melding socio-theoretical insights and optimization", University of Houston Department of Industrial Engineering, February 2022.
- A. R. Escobedo*, "Optimización en redes eléctricas: métodos de expansión y operación flexibles", virtual conference hosted by Universidad Técnica Nacional, Costa Rica, October, 2021.
- A. R. Escobedo*, "The pros of being a mathematics generalist in engineering and computational research," CSULA Mathematics Department, Los Angeles CA, Dec 2021.
- A. R. Escobedo*, E. Moreno-Centeno, V. S. Gudivada, " Efficient update algorithms for the roundoff-error-free LU and Cholesky factorizations", United States Naval Academy Optimization and Operations Research Conference, virtual conference, June 2021.
- A. R. Escobedo*, "Graph theory in network optimization," CSULA Mathematics Department, Los Angeles CA, April 2021.
- R. Kemmer, Y. Yoo, A. R. Escobedo*, and R. Maciejewski, "Enhancing collective estimates by aggregating cardinal and ordinal inputs", Advances in Data Science & Operations Research, virtual conference, Universidad de Galileo in Guatemala and INFORMS, September 2020.
- A. R. Escobedo*, "The research operations side of operations research", CSUF Mathematics Department, Oct 2019.
- A. R. Escobedo*, "The research operations side of operations research", Cal Poly San Luis Obispo Industrial and Manufacturing Engineering Department, Oct 2019.
- A. R. Escobedo*, "Synergistic advances in integer programming and computational social choice for ranking aggregation", Mixed Integer Programming Workshop (MIP Workshop), Cambridge MA, July 2019.
- A. R. Escobedo*, "Thinking outside the box (and supply chain): Opportunities in industrial engineering for math students", Northern Arizona University Mathematics Department, Flagstaff AZ, Nov 2018.
- A. R. Escobedo*, "New ranking measures and algorithms for expanding robust group decision-making frameworks", Cal Poly Pomona Industrial & Manufacturing Engineering, Pomona CA, April 2018.
- A. R. Escobedo*, "New ranking measures and algorithms for expanding robust group decision-making frameworks", CSULB Mathematics Department, Long Beach CA, April 2018.
- A. R. Escobedo*, "Unification of distance and correlation ranking aggregation theories", Oakland University Mathematics and Statistics Department, Rochester MI, Feb 2018.
- A. R. Escobedo*, "Guiding power grid investments for mitigating outages and extreme weather events", Collaborative Network on Models to Support Decision Making in the Energy Sector – Workshop, Técnologico de Monterrey, Mexico City Mexico, Dec 2017.

- A. R. Escobedo*, "Roundoff-error-free algorithms for optimization" CSUSD Mathematics Department, San Diego CA, Oct 2017.
- A. R. Escobedo*, "Roundoff-error-free algorithms for optimization," CSULA Mathematics Department, Los Angeles CA, Oct 2016.
- A. R. Escobedo*, E. Moreno-Centeno, "An overview of integer-preserving Gaussian elimination and the roundoff-error-free LU and Cholesky factorizations," (invited seminar) Texas A&M University Mathematics Department, College Station TX, Dec 2014.
- A. R. Escobedo*, "Roundoff-error-free algorithms for optimization," CSULA Mathematics Department, Los Angeles CA, Nov 2014.
- A. R. Escobedo*, "Computational tools for recovering load shed via topology control," Texas A&M University Electric Power and Power Electronics Institute, College Station TX, Oct 2014.

Invited Presentations — ASU Internal:

- A. R. Escobedo*, "Advancing crowdsourced wisdom: Rethinking what information is gathered and how it is aggregated", Global Security Initiative (GSI) Center for Human, Artificial Intelligence, and Robot Teaming (CHART) Speaker Series, February 2022.
- A. R. Escobedo*, "Roundoff-error-free algorithms for constructing, applying, and updating LU Factorizations", School of Mathematical and Statistical Sciences, March 2018.
- A. R. Escobedo*, "Unification of distance and correlation theories for the removal of systemic bias in consensus ranking" School of Computing, Informatics, and Decision Systems Engineering Computational/Applied Math Seminar Series Series, March 2017.

Conference Presentations:

- Y. Yoo*, A. R. Escobedo, "Efficient crowdsourcing via multimodal elicitation", INFORMS Annual Meeting, Indianapolis IN, Oct 2022.
- A. R. Escobedo*, "Exact factorization updates for nonlinear programming", INFORMS Annual Meeting, Indianapolis IN, Oct 2022.
- Z. Kassem*, A. R. Escobedo, "Models and network insights for edge-based districting", INFORMS Annual Meeting, Indianapolis IN, Oct 2022.
- Y. Yasmin*, A. R. Escobedo, "A principled methodology For challenging the single ground truth assumption", INFORMS Annual Meeting, Indianapolis IN, Oct 2022.
- S. Akbari*, A. R. Escobedo, "Top-k list aggregation: mathematical formulations and polyhedral comparisons", International Symposium on Combinatorial Optimization (ISCO), virtual conference May 2022.
- S. Akbari*, A. R. Escobedo, "Approximate Condorcet partitioning: solving very large rank aggregation problems at scale", INFORMS Optimization Society Conference, Greenville SC, March 2022.
- S. Akbari*, A. R. Escobedo, "Exact formulation and partitioning of the general rank aggregation problem", INFORMS Optimization Society Conference, Greenville SC, March 2022.
- A. R. Escobedo*, "Fast and exact matrix factorization updates for nonlinear programming", INFORMS Optimization Society Conference, Greenville SC, March 2022.
- Z. Kassem*, A. R. Escobedo, "Edge-based districting without predetermined centers: models and network insights", INFORMS Optimization Society Conference, Greenville SC, March 2022.

- A. R. Escobedo*, Erick Moreno-Centeno, Christopher Lourenco, Timothy A. Davis, "Roundoff-error-free matrix factorizations", ICS Awards invited talk, INFORMS Computing Society Conference, Tampa FL, Jan 2022.
- A. R. Escobedo*, Erick Moreno-Centeno, "Efficient update algorithms for the roundoff-error-free LU and Cholesky factorizations", INFORMS Computing Society Conference, Tampa FL, Jan 2022.
- S. Akbari*, A. R. Escobedo, "Approximate Condorcet partitioning: solving very large rank aggregation problems at scale", INFORMS Computing Society Conference, Tampa FL, Jan 2022.
- S. Akbari*, A. R. Escobedo, "Lower bounds on Kemeny rank aggregation with non-strict rankings", IEEE Symposium Series on Computational Intelligence, virtual conference, December 2021.
- R. Yasmin*, J. Grassel, H. Mahmudulla, O. Fuentes, A. R. Escobedo, "Enhancing image classification capabilities of crowdsourcing-based methods through expanded input elicitation", AAAI Conference on Human Computation and Crowdsourcing, virtual conference, November 2021.
- A. R. Escobedo*, "Rank-one updates for the roundoff-error-free LU and Cholesky factorizations", INFORMS Annual Meeting, virtual conference, Oct 2021.
- Y. Yoo*, A. R. Escobedo, "Overcoming anchoring effects in multimodal input elicitation to extract more accurate crowd estimates", INFORMS Annual Meeting, virtual conference, Oct 2021.
- J. Grassel*, R. Yasmin, A. R. Escobedo, "Enhancing object detection using wisdom of crowds", INFORMS Annual Meeting, virtual conference, Oct 2021.
- J. K. Skolfield*, A. R. Escobedo, "Robust power systems planning against rising temperatures with discrete transmission considerations", INFORMS Annual Meeting, virtual conference, Oct 2021.
- Z. Kassem*, A. R. Escobedo, "Binary programming formulation and logic-based cuts for edge-based districting without predetermined centers", INFORMS Annual Meeting, virtual conference, Oct 2021.
- R. Yasmin*, J. Grassel, A. R. Escobedo, 'A wisdom of crowds approach for enhancing object detection capabilities", 22nd IFORS Conference, virtual conference, Aug 2021.
- Y. Yoo*, A. R. Escobedo, "Overcoming anchoring effects in multimodal input elicitation to extract more accurate crowd estimates", 22nd IFORS Conference, virtual conference, Aug 2021.
- A. R. Escobedo, Z. Kassem*, "A binary programming formulation and logic-based cuts for edge-based districting without Predetermined centers", 22nd IFORS Conference, virtual conference, Aug 2021.
- A. R. Escobedo, R. Yasmin*, "Derivations Of large classes Of facet-defining inequalities of the weak order polytope using Ranking Structures", INFORMS Annual Meeting, virtual conference, Nov 2020.
- J. K. Skolfield*, A. R. Escobedo, "Generation of bus angle-difference valid inequalities for transmission expansion planning and optimal transmission switching", INFORMS Annual Meeting, virtual conference, Nov 2020.
- Y. Zhang*, M. Bansal, A. R. Escobedo, "Risk-neutral and risk-averse transmission switching for load shed recovery with uncertain renewable generation and demand", INFORMS Annual Meeting, virtual conference, Nov 2020.
- Z. Kassem*, A. R. Escobedo, "Logic-based cuts for arc-based districting", INFORMS Annual

Meeting, virtual conference, Nov 2020.

- Y. Yoo*, R. Kemmer, A. R. Escobedo, R. Maciejewski, and E. Chiou, "Enhancing the wisdom of crowds through multimodal input elicitation and principled aggregation models", INFORMS Annual Meeting, virtual conference, Nov 2020.
- R. Kemmer*, Y. Yoo, A. R. Escobedo, and R. Maciejewski, "Enhancing collective estimates by aggregating cardinal and ordinal inputs", AAAI Conference on Human Computation and Crowdsourcing, virtual conference, Oct 2020.
- J. K. Skolfield*, R. Yasmin, A. R. Escobedo, L. M. Huie, "A comparison of axiomatic distance-based collective intelligence methods for wireless sensor network state estimation with false data injection" IEEE World Forum on Internet of Things, virtual conference, June 2020.
- Y. Zhang*, M. Bansal, A. R. Escobedo, "Topology control for load shed recovery under uncertainty", INFORMS Annual Meeting, Seattle WA, Oct 2019.
- J. K. Skolfield*, A. R. Escobedo, "Derivation and generation of path-based valid inequalities for transmission expansion planning and optimal transmission switching", INFORMS Annual Meeting, Seattle WA, Oct 2019.
- A. R. Escobedo*, D. S. Hochbaum, E. Moreno-Centeno, "Joint aggregation of cardinal and ordinal evaluations", INFORMS Computing Society Conference, Knoxville TN, Jan 2019.
- J. K. Skolfield*, L. M. Escobar, A. R. Escobedo, "Generation of bus-angle difference valid inequalities for transmission expansion planning", INFORMS Computing Society Conference, Knoxville TN, Jan 2019.
- Y. Yoo*, A. R. Escobedo, "A new binary programming formulation and refined social choice property for Kemeny ranking aggregation", INFORMS Computing Society Conference, Knoxville TN, Jan 2019.
- C. Lourenco*, A. R. Escobedo, E. Moreno-Centeno, T. Davis, "An asymptotically optimal LU factorization algorithm for the exact solution of sparse linear systems with applications in linear programming basis validation", INFORMS Computing Society Conference, Knoxville TN, Jan 2019.
- A. Sarabi*, A. R. Escobedo, "Developing a continuous location routing model", INFORMS Annual Meeting, Phoenix AZ, Nov 2018.
- A. R. Escobedo*, D. S. Hochbaum, E. Moreno-Centeno, "Axiomatic joint aggregation of cardinal and ordinal evaluations", INFORMS Annual Meeting, Phoenix AZ, Nov 2018.
- J. K. Skolfield*, L. M. Escobar, A. R. Escobedo, R. Romero, "Derivation and generation of angular valid inequalities for transmission expansion planning", INFORMS Annual Meeting, Phoenix AZ, Nov 2018.
- Y. Yoo*, A. R. Escobedo, "A new binary programming formulation and social choice property for expediting the solution to Kemeny ranking aggregation", INFORMS Annual Meeting, Phoenix AZ, Nov 2018.
- L. M. Escobar*, A. R. Escobedo, D. Escobar, R. A. Romero Lázaro, "Bus-angle difference structural cuts for transmission system expansion planning with L-1 reliability",IEEE Electrical Power and Energy Conference, Toronto Canada, Oct 2018.
- A. R. Escobedo*, L. M. Escobar, J. K. Skolfield, "Generation of angular valid inequalities for Transmission Expansion Planning", International Symposium on Mathematical Programming, Bordeaux, France, July 2018.
- Y. Yoo*, A. R. Escobedo, "A computationally expedient social choice-related property for group

decision-making", International Symposium on Aggregation and Structures, Valladolid Spain, July 2018.

- A. Dean*, A. R. Escobedo, W. Campbell, "A decision support tool for circular economy development", International Symposium on Sustainable Systems and Technology, Buffalo, NY, June 2018.
- Y. Yoo*, A. .R. Escobedo, "An improved ranking aggregation algorithm using a new extended Condorcet criterion", IISE Annual Conference & Expo, Orlando FL, May 2018.
- Y. Yoo, A. R. Escobedo*, "An Improved Branch and Bound Algorithm for Robust Ranking Aggregation", INFORMS Optimization Society Conference, Denver CO, Mar 2018.
- C. Lourenco*, A. R. Escobedo, E. Moreno-Centeno, T. A. Davis, "Roundoff-Error-Free Framework for the Exact Solution of Sparse Linear Systems", INFORMS Optimization Society Conference, Denver CO, Mar 2018.
- A. R. Escobedo*, Y. Yoo, J. K. Skolfield, "A new correlation coefficient for aggregating non-strict and incomplete rankings equitably", INFORMS Annual Meeting, Houston TX, Oct 2017.
- C. Lourenco*, A. R. Escobedo, E. Moreno-Centeno, T. A. Davis, "Roundoff-Error-Free Framework for the Exact Solutions of Sparse Linear Systems", INFORMS Annual Meeting, Houston TX, Oct 2017.
- A. R. Escobedo*, J. K. Skolfield, "A new correlation coefficient for aggregating incomplete rankings equitably", 21st IFORS Conference, Quebec City, July 2017.
- A. R. Escobedo*, J. K. Skolfield, "A rank-correlation coefficient for aggregating non-strict and incomplete preferences equitably", IISE Annual Conference & Expo, Pittsburgh PA, May 2017.
- A. R. Escobedo*, E. Moreno-Centeno, "Efficient Validation of Basic Solutions via the Roundoff-Error-Free Factorization Framework," INFORMS Annual Meeting, Nashville TN, Nov 2016.
- A. R. Escobedo*, E. Moreno-Centeno, "Efficient Validation of Basic Solutions via the Roundoff-Error-Free Factorization Framework," 5th International Congress on Mathematical Software, Berlin, July 2016.
- A. R. Escobedo*, E. Moreno-Centeno, "Update algorithms for the roundoff-error-free LU and Cholesky factorizations," INFORMS Optimization Society Conference, Princeton NJ, March 2016.
- A. R. Escobedo*, E. Moreno-Centeno, "Update algorithms for the roundoff-error-free LU and Cholesky factorizations," INFORMS Annual Meeting, Philadelphia PA, Nov 2015.
- A. R. Escobedo*, E. Moreno-Centeno, "Efficient update algorithms for the roundoff-error-free LU and Cholesky factorizations," International Symposium on Mathematical Programming, Pittsburgh PA, July 2015.
- A. R. Escobedo*, E. Moreno-Centeno, "Roundoff-error-free algorithms for solving linear systems via Cholesky and LU factorizations," INFORMS Computing Society Conference, Richmond VA, Jan 2015.
- A. R. Escobedo*, E. Moreno-Centeno, K. W. Hedman, "Topology control for load shed recovery," INFORMS Annual Meeting, Minneapolis MN, Oct 2013.

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