

Tyler Perini

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EDUCATION

- Rice University**, Texas *Present*
Computational and Applied Mathematics Department
Pfeiffer Postdoctoral Instructor
- Georgia Institute of Technology**, Georgia *2021*
H. Milton Stewart School of Industrial and Systems Engineering
Ph.D. in Operations Research
- College of Charleston**, South Carolina *2016*
B.S. in Applied Mathematics

DISSERTATION

Improved multiobjective optimization algorithms for integer programs: criterion space search, weight space decomposition, and dynamic programming. (Recorded Defense)
Committee: Natasha Boland*, M. Savelsbergh, S. Dey, P. Van Hentenryck, A. Langville

RESEARCH EXPERIENCE

Multiobjective Optimization

- Developing algorithms for multiobjective (mixed) integer linear programs with optimization software and efficient implementation.
- Focus on dimension-reduction approaches, including criterion space search, weight space decomposition, and dynamic programming.

Epidemiological Modeling

- Simulation models, such as agent-based methods, for testing hypotheses about the transmission of disease.
- Ranking, forecasting, now-casting, and hot-spot detection for COVID-19 in Georgia counties.

PUBLICATIONS

Refereed journal articles:

- 2020** An agent-based simulation for Guinea worm infections in dogs.
The American Journal of Tropical Medicine and Hygiene.
Tyler Perini, Julie Swann, Pinar Keskinocak, Ernesto Ruiz-Tiben, and Zihao Li.
- 2020** A criterion space method for biobjective mixed integer programming: the boxed line method.
INFORMS Journal on Computing. 32:1, pgs. 16-39.
Tyler Perini, Natasha Boland, Diego Pecin, and Martin Savelsbergh.
- 2019** A data-driven support strategy for a sustainable research software repository.
Concurrency Computational Practical Experience. 31:20.
M. Belgin, **T. Perini**, F. Liu, N. Zhang, S. Sarajlic, A. McNeill, P. Manno, and N.C. Bright.

Manuscripts submitted:

- 2020** Book chapter: A Survey of Progress in Algorithms for Multiobjective [MIP].
Handbook on Multi-objective Combinatorial Optimization
Natashia Boland, Banu Soylu, and **Tyler Perini**.
- 2021** The weighted Tchebycheff weight set decomposition for multiobjective discrete optimization.
Journal of Global Optimizaiton.
Stephan Helfrich, **Tyler Perini**, Pascal Halfmann, Natashia Boland, and Stefan Ruzika.
- 2021** Case study of county-level racial disparities of COVID-19 outcome rates: Georgia.
Proceedings of the National Academy of Sciences.
Tyler Perini, Akane Fujimoto, Pinar Keskinocak, Dima Nazzal.

Manuscripts in preparation:

- 202-** A fast and robust algorithm for solving biobjective mixed integer programs.
Ian Herszterg, **Tyler Perini**, Diego Pecin, Natashia Boland, and Martin Savelsbergh.
- 202-** Evaluating the Effectiveness of Potential Intervention Methods for Guinea Worm Disease.
Yifan Wang, **Tyler Perini**, Pinar Keskinocak, Julie Swann.
- 202-** Dual perspective of multiobjective integer programs and practical applications
Tyler Perini, Stephan Helfrich, Pascal Halfmann, Natashia Boland, and Stefan Ruzika.
- 202-** Dynamic Programming with Argument Bounds: Binary Knapsack for Pack-and-Cover.
Tyler Perini, Peter Stuckey, and Natashia Boland.

PRIZES & FELLOWSHIPS

- 2020** Student Paper Prize for “A criterion space method... (2019)”
INFORMS Computing Society
Best paper at the interface of computing and operations research with student author.
- 2019** Graduate Research Opportunities Worldwide
National Science Foundation
Funding for NSF GRFP Fellows to be used for international research collaboration.
- 2017** Graduate Research Fellowship Program
National Science Foundation
- 2016** Presidential Fellowship
Georgia Tech H. Milton Stewart School of Industrial and Systems Engineering

TEACHING EXPERIENCE

- 2021** Instructor for Intro. to O.R. and Optimization (RU: CAAM 378).
40 students.
Course in progress.
- 2021** Graduate Student Instructor for Engineering Optimization (GT: ISYE 3133).
2 sections of 30 students each. Fully Virtual.
Student Recognition of Excellence in Teaching: Spring 2021 CIOS Honor Roll.
- 2021** Tech to Teaching Certification. (GT)

2020 Center for the Integration of Research, Teaching, and Learning Associate Level Certification.
(GT)

2016 Teaching Assistant for Probability with Applications (GT: ISYE 2027).
Grading and office hour responsibilities. 59 students.
13 CIOS scores: range 3.8-4.4 out of 5 (interpolated mean, 95% response rate).

CONFERENCE ACTIVITY

Invited talks:

- 2020** A Weight Set Decomposition Algorithm for the Weighted Tchebycheff Scalarization.
Recent Advances in Multiobjective Optimization.
Tyler Perini, Stephan Helfrich, Pascal Halffman, and Natasha Boland.

Sessions organized:

- 2019** Simulation models in healthcare.
INFORMS Annual Meeting.
Tyler Perini, Pinar Keskinocak, and Julie Swann.

Presentations:

- 2019** Enhanced algorithms for mixed integer biobjective optimization.
INFORMS Computing Society Conference.
Tyler Perini, Ian Herszterg, Diego Pecin, Natasha Boland, and Martin Savelsbergh.
- 2019** An agent-based simulation for Guinea worm infections in dogs.
Institute of Industrial and Systems Engineers (IISE) Annual Expo.
Tyler Perini, Pinar Keskinocak, and Julie Swann.
- 2018** Approximation of the frontier for a BOMILP: Comparing methods.
International Symposium on Mathematical Programming (ISMP).
Tyler Perini, Diego Pecin, Natasha Boland, and Martin Savelsbergh.
- 2017** The boxed line algorithm for mixed integer biobjective optimization.
International Federation of Operations Research Societies (IFORS).
Tyler Perini, Natasha Boland, Martin Savelsbergh, and Diego Pecin.

UNIVERSITY SERVICE

Graduate Student Advisory Council	2019 - 2021
Student Assistant to Faculty Diversity and Inclusion Council	2019

REFERENCES

1. Natasha Boland. Georgia Institute of Technology. PhD advisor; Fouts Family Professor. natashia.boland@isye.gatech.edu
2. Pinar Keskinocak. Georgia Institute of Technology. 2020 INFORMS president; William W. George Chair and Professor, ISyE; ADVANCE Professor, College of Engineering; Director of the Center for Health and Humanitarian Systems. pinar@isye.gatech.edu
3. Martin Savelsbergh. Georgia Institute of Technology. James C. Edenfield Chair and Professor; Co-Director Supply Chain and Logistics Institute. martin.savelsbergh@isye.gatech.edu
4. Julie Swann. North Carolina State University. Head of Fitts Department of Industrial and Systems Engineering; A. Doug Allison Distinguished Professor. j1swann@ncsu.edu
5. Amy Langville. College of Charleston. Professor; undergraduate advisor. langvillea@cofc.edu

PUBLICLY AVAILABLE TOOLS

COVID-19 Dashboard	perinigraphics.shinyapps.io/coviddashboard/
Teaching Dashboard	perinigraphics.shinyapps.io/teachingdashboard/
Biobjective MIP Instances	github.com/perinita/BOMIPresearch