

# Tyler Perini

perinita@gatech.edu  $\diamond$  www.tylerperini.com  $\diamond$  678-736-1278  
Georgia Institute of Technology  $\diamond$  755 Ferst Dr NW Atlanta, GA 30332

## EDUCATION

---

**Georgia Institute of Technology**, Georgia *expected summer 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.*  
Committee: Natasha Boland\*, M. Savelsbergh, S. Dey, P. Van Hentenryck, A. Langville

## RESEARCH EXPERTISE

---

### 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*  
Natasha 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, Natasha 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, Natasha 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, Natasha Boland, and Stefan Ruzika.

**202-** Dynamic Programming with Argument Bounds: Binary Knapsack for Pack-and-Cover.  
**Tyler Perini**, Peter Stuckey, and Natasha 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** Graduate Student Instructor for Engineering Optimization (ISYE 3133).  
2 sections of 30 students each.  
Course in progress.

**2021** Tech to Teaching Certification.

**2020** Center for the Integration of Research, Teaching, and Learning Associate Level Certification.

**2016** Teaching Assistant for Probability with Applications (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

---

<b>Graduate Student Advisory Council</b>	2019 - 2021
<b>Student Assistant to Faculty Diversity and Inclusion Council</b>	2019

## REFERENCES

---

1. Natasha Boland. Georgia Institute of Technology. PhD advisor; Fouts Family Professor. [natashia.boland@isye.gatech.edu](mailto: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](mailto: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](mailto: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](mailto:j1swann@ncsu.edu)
5. Amy Langville. College of Charleston. Professor; undergraduate advisor. [langvillea@cofc.edu](mailto:langvillea@cofc.edu)

## PUBLICLY AVAILABLE TOOLS

---

<b>COVID-19 Dashboard</b>	<a href="https://perinigraphics.shinyapps.io/coviddashboard/">perinigraphics.shinyapps.io/coviddashboard/</a>
<b>Teaching Dashboard</b>	<a href="https://perinigraphics.shinyapps.io/teachingdashboard/">perinigraphics.shinyapps.io/teachingdashboard/</a>
<b>Biobjective MIP Instances</b>	<a href="https://github.com/perinita/BOMIPresearch">github.com/perinita/BOMIPresearch</a>