ICS Business Meeting

Simge Küçükyavuz

INFORMS 2021

ICS Officers

Chair: Simge Küçükyavuz (2020-2021)

Vice Chair/Chair-Elect: Akshay Gupte (2020-2021)

Secretary/Treasurer: Mary Fenelon (2018-2021)

Newsletter Editor and Webmaster: Hamed Rahimian (2021-)

Board of Directors

Willem-Jan van Hoeve (2019-2021)

Juan Pablo Vielma (2019-2021)

Bjarni Kristjansson (2020-2022)

Yongjia Song (2020-2022)

Fatma Kılınç-Karzan (2021-2023)

Siqian Shen (2021-2023)

Meeting agenda

- 2021~~1~~2 ICS Conference updates
- INFORMS 2021 cluster report
- Quantum Computing Working Group report
- IJOC report
- Award ceremony
- Officer nominations
- Treasurer’s report
- Discussion

2022 ICS Conference in Tampa, Florida

- Originally scheduled for January 2021; postponed to 2022.
- Program Committee Co-Chairs:
  - Hadi Charkhgard (University of South Florida)
  - Tapas Das (University of South Florida)
  - Changhyun Kwon (University of South Florida)
- Venue:
  - Hilton Tampa Downtown
- Date:
  - January 23–25, 2022

Confirmed Speakers

- Keynote/Tutorial
  - Katya Scheinberg (Cornell University)
  - Andrea Lodi (Polytechnique Montreal)
  - Illya V. Hicks (Rice University)
  - Bistra Dilkina (University of Southern California)
  - Ojas D. Parekh (Sandia National Laboratories)

- A special panel on publishing, reviewing, and editing happenings and opportunities in IJOC
  - Organized by Alice Smith (Auburn University)

Cluster Chairs

- **Constraint Programming:** Laurent Michel, *University of Connecticut*
- **Computational Optimization and Solvers :** Oliver Hinder, *University of Pittsburgh*
- **Decision Diagrams :** Willem-Jan van Hoeve, *Carnegie Mellon University*
- **Integer Programming :** Merve Bodur, *University of Toronto*
- **Interface between Optimization and Artificial Intelligence :** Elias Khalil, *University of Toronto*
- **Modeling Systems and Languages :** Benoît Legat, *Massachusetts Institute of Technology*
- **Multi-objective Optimization :** Hadi Charkhgard, *University of South Florida*
- **Network Applications :** Austin Buchanan, *Oklahoma State University*
- **Optimization Methods in Machine Learning :** Thiago Serra, *Bucknell University*
- **Power Systems :** Kibaek Kim, *Argonne National Laboratory*
- **Quantum Computing :** Giacomo Nannicini, *IBM*
- **Reinforcement Learning :** Jinkyoo Park, *KAIST*

Current Status

- Website: https://ics2022tampa.eng.usf.edu
- The submission deadline is extended to November 1, 2021.
- 100% in-person
- 103 submissions so far (as of October 16)
- Sponsored by: (total $9,500, more to come…)

UNIVERSITY of SOUTH FLORIDA
College of Engineering
Department of Industrial and Management Systems Engineering

Northwestern | McCORMICK SCHOOL OF ENGINEERING™
Industrial Engineering and Management Sciences

- Things to do in Tampa: https://www.visittampabay.com

Meeting agenda

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ICS Cluster at INFORMS 2021

- Organized by Akshay Gupte (Vice-Chair and Chair-Elect)
- 28 sessions (up from 15 last year), approx. 112 talks
- 5 Joint sessions (w/ OPT society), 4 In-person, 2 Hybrid
- Topics include: computational optimization, modeling software, applications, machine learning
- Big emphasis on Quantum Computing
  - 7 sessions in a mini-cluster
  - Formed by Giacomo Nannicini (IBM) and Ilya Safro (Delaware)
  - Includes a tutorial session by Ilya and co-authors

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WG on Quantum Computing

Group members:

- Swati Gupta (Georgia Tech)
- Sven Leyffer (Argonne National Laboratory)
- Giacomo Nannicini (IBM T. J. Watson) - chair
- Jim Ostrowski (University of Tennessee Knoxville)
- Luis Zuluaga (Lehigh University)

We started activities in November 2020.

List of activites

Education:

- We wrote an OR/MS column on “OR/MS and Quantum Computing Education”, see https://pubsonline.informs.org/do/10.1287/orms.2021.04.22/full/

Conferences:

- Various activities to organize talks on quantum computing at the INFORMS annual meeting and at the next ICS conference.
- Together with Merve Bodur (University of Toronto) and Ashley Montanaro (University of Bristol), we are organizing a workshop on “Quantum Computing and Operations Research”, to be held at the Fields Institute on April 18-19, 2022.

Activities (cont'd)

Community resources:

- We prepared a document listing various useful links and resources on quantum computing.
- Examples are: teaching material, programming languages, available online courses, seminar series, mailing lists.
- The document should be available by the time the business meeting takes place or shortly afterward.

Future plans:

- Write a survey for researchers who want to know about recent research efforts in the area of quantum computing and OR.
- We considered proposing a special issue on the topic in a journal (IJOC?), but decided to reconsider at a future time.

Other items for discussion:

- Are INFORMS journals well-equipped to deal with submissions on quantum computing?
- Any suggestions?

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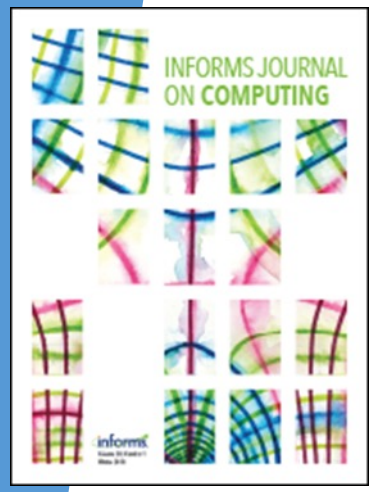
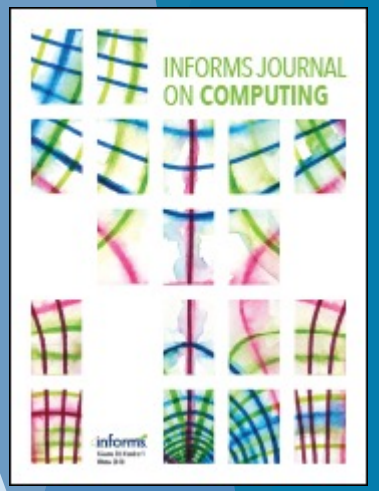




INFORMS Journal on Computing

INFORMS Annual Conference

October 2021

Journal Background

First published in 1989 as *ORSA Journal on Computing*

1546 total papers published so far

The theory and practice of computing and operations research are necessarily intertwined. The INFORMS Journal on Computing publishes high quality papers that expand the envelope of operations research and computing. We seek original research papers on relevant theories, methods, experiments, systems, and applications. We also welcome novel survey and tutorial papers, and papers describing new and useful software tools. We expect contributions that can be built upon by subsequent researchers or used by practitioners.

2013–2018: David L. Woodruff

2007–2012: John W. Chinneck (term began July 2007)

2007–2007: W. David Kelton (April–May 2007, interim)

2007–2007: Prakash Mirchandani (January–March 2007)

2000–2006: W. David Kelton

1992–1999: Bruce Golden (term began with Issue 3 of 1992)

1987–1992: Harvey J. Greenberg (founding editor)

IJOC was originated in 1987 via the ORSA Computer Science Technical Section, and is still affiliated with that group's successor, the INFORMS Computing Society.

Leadership Team

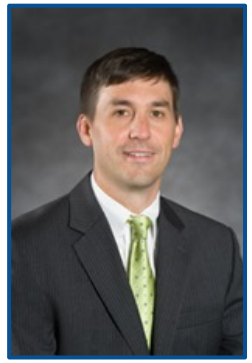
EIC, Alice Smith

Managing Editor, Kelly Kophazi

Advisory Board

- John Chinneck
- Bill Cook
- Bruce Golden
- Jim Orlin
- Pascal Van Hentenryck
- David Woodruff

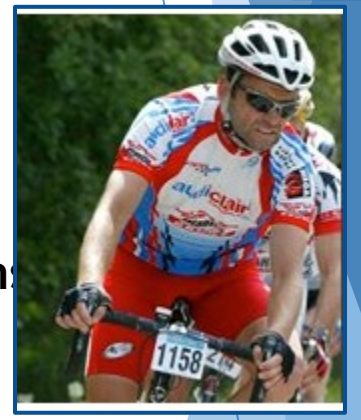
Areas and Area Editors




- **Applications in Biology, Medicine, and Healthcare**, Paul Brooks
- **Design and Analysis of Algorithms - Continuous**, Antonio Frangioni
- **Design and Analysis of Algorithms - Discrete**, Andrea Lodi
- **Heuristic Search**, Erwin Pesch



- **Knowledge Management and Machine Learning**, Ram Ramesh
- **Modeling: Methods and Analysis**, Pascal Van Hentenryck
- **Network Optimization: Algorithms and Applications**, David Alderson
- **Simulation**, Bruno Tuffin
- **Software Tools**, Ted Ralphs
- **Stochastic Models and Reinforcement Learning**, Nicola Secomandi




More on Editors

- Editors from U.S., Canada, Brazil, Italy, France, Germany, Great Britain, Austria, Belgium, Belarus, Turkey, China, Singapore, Australia, The Netherlands
- ~ 80% INFORMS members (or lapsed INFORMS members)
- Increase in Computing Society memberships

- **New associate editors:**
  - Giancarlo Bigi, *University of Pisa*
  - Andre Cire, *University of Toronto*
  - Carleton Coffrin, *Lawrence Livermore Laboratories*
  - Michael Hahsler, *Southern Methodist University*
  - Monika Hu, *Vassar College*
  - Fatma Kilinc-Karzan, *Carnegie Mellon University*
  - Markus Leitner, *Free University Amsterdam*
  - Miles Lubin, *Google Research*
  - Bethany Nicholson, *Sandia National Laboratories*
  - Ilya Ryzhov, *University of Maryland*
  - Tolga Tezcan, *Rice University*
  - Marc Uetz, *University of Twente*
  - KZ Zhang, *University of Maryland*

Associate Editors and Papers Handled by Area

Area	#
Applications in Biology, Medicine, and Healthcare	7
Design and Analysis of Algorithms - Continuous	5
Design and Analysis of Algorithms - Discrete	15
Heuristic Search	4
Knowledge Management and Machine Learning	11
Modeling: Methods and Analysis	7
Network Optimization: Algorithms and Applications	6
Simulation	5
Software Tools	6
Stochastic Models and Reinforcement Learning	6
Grand Total	72

Editor	Area	2020	2021
Alderson, David	Network Optimization: Algorithms and Applications	36	41
Brooks, Paul	Applications in Biology, Medicine, and Healthcare	40	45
Frangioni, Antonio	Design and Analysis of Algorithms – Continuous	37	50
Lodi, Andrea	Design and Analysis of Algorithms – Discrete	149	124
Pesch, Erwin	Heuristic Search	37	30
Ted Ralphs	Software Tools	13	20
Ramesh, Ram	Knowledge Management and Machine Learning	70	71
Secomandi, Nicola	Stochastic Models and Reinforcement Learning	13	35
Tuffin, Bruno	Simulation	32	24
Van Hentenryck, Pascal	Modeling: Methods and Analysis	45	51
Smith, Alice	No Area Chosen or Other Reason	7	7
Grand Total		479	**498**

Key Statistics 2021 through 3Q

- Acceptance rate 2021 = **26.6%**, down from 35.6%
- Downloads = **34,722**, up from 30,512, highest ever
- Impact Factor = **2.276**, up from 1.541,highest ever
- Backlog = ~**21** months, one of the highest of INFORMS journals (spoiler alert – relief is coming)
- Median days to first decision **128**, down from 132
- New submissions **262**, up from 228

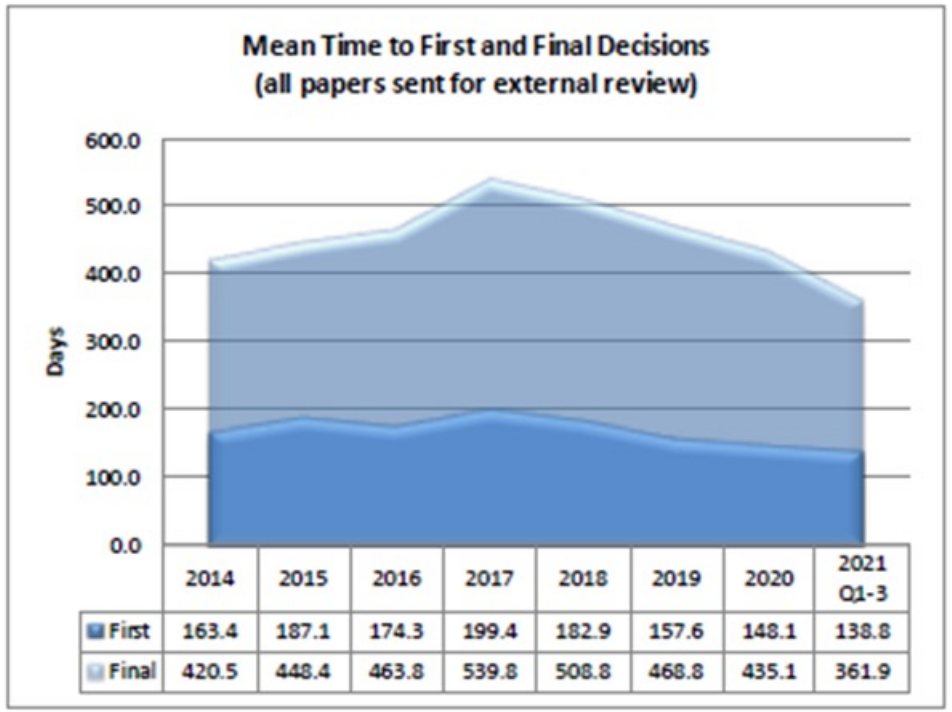
Year	Median of # Days Between Original Submission & First Decision	Median of # Days Between Original Submission & Final Decision
2013	148	382
2014	145	362
2015	161	406
2016	153	421
2017	170	519
2018	163	474
2019	146	394
2020	132	386
2021	**128**	**337**

Area	% Desk Rejects 2021
Applications in Biology, Medicine, & Healthcare	42%
Design & Analysis of Algorithms – Continuous	50%
Design & Analysis of Algorithms – Discrete	13%
Heuristic Search & Approximation Algorithms	67%
Knowledge Management & Machine Learning	37%
Modeling: Methods & Analysis	44%
Network Optimization: Algorithms & Applications	62%
Other	57%
Simulation	17%
Software Tools	57%
Stochastic Models & Reinforcement Learning	55%
Grand Total	42%

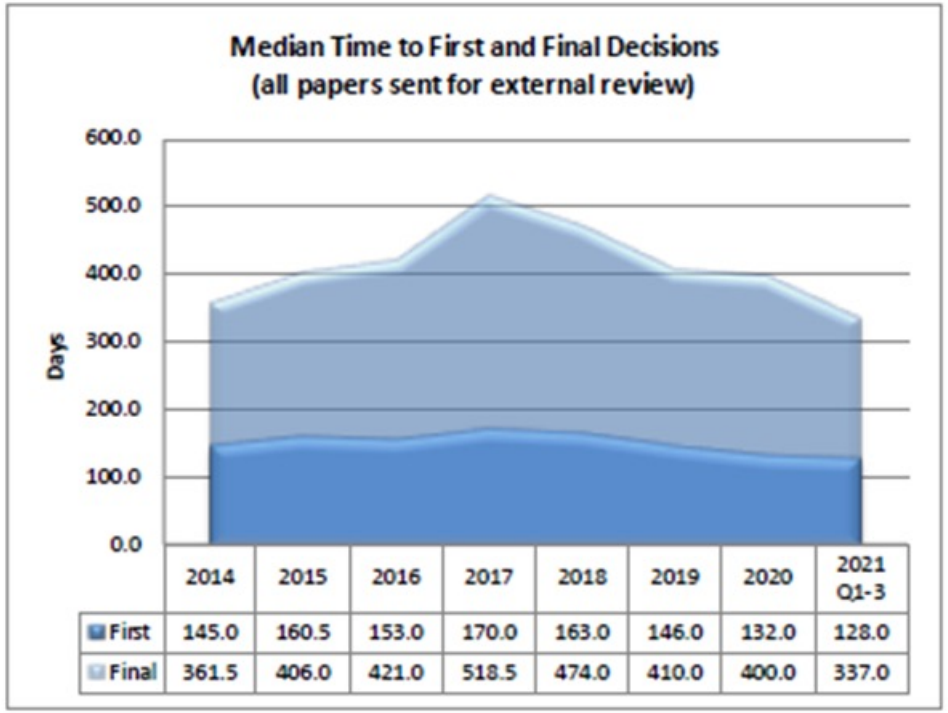
Percent desk rejects is 42%, up from 33%, and ranged from 13% to 67%

Time in Review (does not include Desk Rejects)

Year Over Year Time in Review



	2014	2015	2016	2017	2018	2019	2020	2021 Q1-3
First	163.4	187.1	174.3	199.4	182.9	157.6	148.1	138.8
Final	420.5	448.4	463.8	539.8	508.8	468.8	435.1	361.9

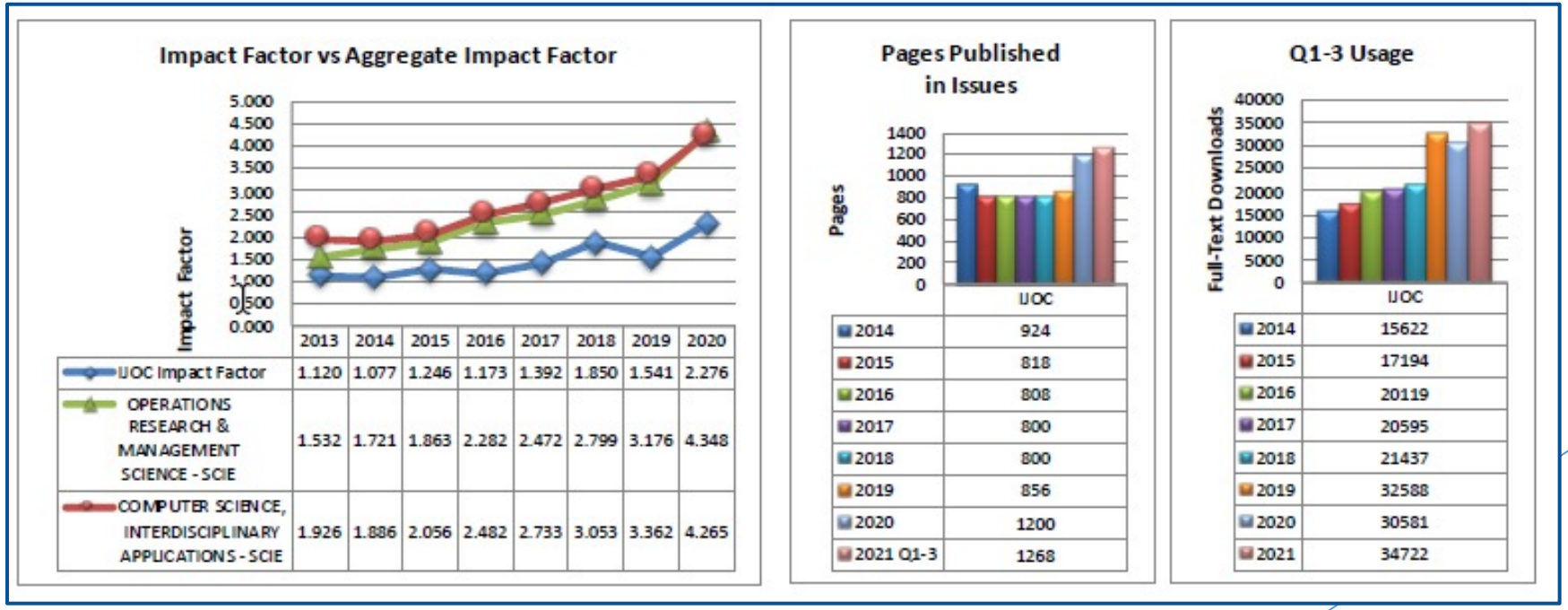


	2014	2015	2016	2017	2018	2019	2020	2021 Q1-3
First	145.0	160.5	153.0	170.0	163.0	146.0	132.0	128.0
Final	361.5	406.0	421.0	518.5	474.0	410.0	400.0	337.0

Area	2020	2021
Applications in Biology, Medicine, and Healthcare	22	22
Design and Analysis of Algorithms – Continuous	18	22
Design and Analysis of Algorithms – Discrete	67	51
Heuristic Search	23	24
Knowledge Management and Machine Learning	32	39
Modeling: Methods and Analysis	25	32
Network Optimization: Algorithms and Applications	16	22
Simulation	7	11
Software Tools	6	9
Stochastic Models and Reinforcement Learning	8	25
No Area Chosen or Other Reason	4	5
Grand Total	228	**262**

New Submissions through 3rd quarter

Year over Year Comparisons



Some Accomplishments of 2021

- **Moving to bimonthly format in 2022 (with INFORMS BOD approval)! This will be an increase of yearly issues from 4 to 6 and will help our visibility and our backlog**
- IJOC news regularly posted to INFORMS listservs
- Renamed and enlarged Stochastic Models to include Reinforcement Learning. This has motivated a large increase in activity of this area
- The GitHub repository / Zenodo DOI for data/software originated by Software Tools has been expanded to Heuristic Search and Design and Analysis of Algorithms – Continuous
- Awarded three Test of Time Paper awards this year (still working on backlog)
- Awarded three Meritorious Paper awards – these are fast tracked for publication and the distinction is noted on the published paper pdf
- No Meritorious Reviewer awards this year
- Still trying (unsuccessfully) to get the 1989 to 1999 papers indexed by Web of Science

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ICS Prize

Winners:

Adolfo R. Escobedo, Erick Moreno-Centeno, Christopher Lourenco, and **Timothy Davis** for their pioneering work on roundoff-error-free matrix factorization, as detailed in the papers:

- Adolfo R. Escobedo and Erick Moreno-Centeno, "Roundoff-Error-Free Algorithms for Solving Linear Systems via Cholesky and LU Factorizations", INFORMS Journal on Computing, 27 (2015), pp. 677-689
- Adolfo R. Escobedo and Erick 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 (2017), pp. 829-853
- Adolfo R. Escobedo, Erick Moreno-Centeno, and Christopher Lourenco, "Solution of Dense Linear Systems via Roundoff-Error-Free Factorization Algorithms: Theoretical Connections and Computational Comparisons", ACM Transactions on Mathematical Software, 44 (2018), pp. 1-24
- Christopher Lourenco, Adolfo R. Escobedo, Erick Moreno-Centeno, and Timothy 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 (2019), pp. 609-638

COMMITTEE:

Ignacio Grossmann, Katya Scheinberg (Chair), Suvrajeet Sen

Citation

Linear Programming, the basis of operations research, is considered a solved problem by most researchers and practitioners. Yet, due to round-off errors in underlying linear algebra solvers, such as LU factorization, current algorithms and solvers are inadequate for large-scale problems requiring exact solutions. Such problems arise in a plethora of applications including computer-assisted mathematical proofs, healthcare, national defense, and generating stable MIR cuts. State-of-the-art algorithms present a dichotomy: inexact solutions obtained quickly or exact solutions with excessive run times. The nominated papers show that the currently-used rational-arithmetic approaches are inefficient, and propose a framework to exactly solve rational systems of linear equations (SLEs) via integer-preserving, roundoff-error-free (REF) LU factorizations. These papers form the new foundation of exact LP by modernizing integer-preserving Gaussian elimination (IPGE) and developing new theory.

Harvey J. Greenberg Research Award

The award honors research excellence in the field of computation and operations research applications, especially those in emerging application fields. Honored research would focus on contributions that exhibit the promise of making a significant impact in the scope of OR/MS/Analytics practice.

With generous support from:

Drs. William and Carol Pierskalla Endowment, Georgia Tech, Texas A&M University, AMPL, Lehigh University, Northwestern University, Southern Methodist University, Syracuse University, University of Arizona, University of Pittsburgh, University of Southern California, University of Wisconsin Madison Virginia Tech, Clemson University, University of Colorado Denver, University of Washington, Allen and Leanne Holder; Ellie, Chari, and Ari Greenberg

Harvey J. Greenberg Research Award

Winners:

Hamidreza Validi, Austin Buchanan, and **Eugene Lykhovyd**

for their paper "Imposing contiguity constraints in political districting models," to appear, Operations Research, 2021.

COMMITTEE:

Pascal van Hentenryck (Chair), Sven Leyffer, Alice Smith

Citation

A classical problem in operations research that concerns the generation of political districting maps; early approaches using integer programming date back to the 1960s. In this well-rounded and timely paper, the authors survey modern attempts to add contiguity constraints to these classical models and propose two new formulations that are shown to impose contiguity in an easier way. The authors investigate the theoretical relationships between these models, discover new sets of cutting planes, and develop Lagrangian techniques to fix variables. With these innovations, they solve, for the first time, optimally compact districting maps for 21 US states at the census tract level. Their source code, models, and data are publicly available. The selection committee believes that this paper represents the spirit of Harvey Greenberg's work: tackling problems of societal impact with real-life data using state-of-the-art operations research techniques, providing an intriguing example of OR in practice.

ICS Distinguished Service Award

Winner:

David L. Woodruff

COMMITTEE:

Dick Barr, Kevin Furman, Ariela Sofer (Chair)

Citation:

Professor David Woodruff has rendered dedicated and outstanding service to the INFORMS Computing Society for over 25 years. His impact began when he was General Chair of the successful INFORMS Computer Science Technical Section (CSTS, the predecessor of ICS) meeting held in Monterey in January 1998 and he edited the associated conference book. This was followed by his leadership as Chair of ICS (2001-2003) and society representative on the INFORMS Subdivision Council. But among his deepest contributions was his service as Editor-in-Chief of the INFORMS Journal on Computing (2013-2018). Under his leadership, the journal grew in stature, quality, and importance within the INFORMS community. Prior to this, he served the journal as an Associate Editor and the Area Editor for Heuristic Search and Learning.

Dave's continuous dedication to ICS encompassed many other supporting activities: Acting Editor in Chief of the ICS Newsletter for three years, Chair of the ICS Student Paper Award Committee, and a member of the ICS Service Award and the IJoC Test of Time Paper Prize committees. Throughout, Dave was always a moving spirit and enlivened the ICS Business meetings.

We are grateful to Dave for his many years of leadership and dedicated service to ICS, and for his notable contributions to the Society.

ICS Student Paper Award

Runner up:

Yongchun Li

for the paper "Beyond Symmetry: Best Submatrix Selection for the Sparse Truncated SVD."

COMMITTEE:

Merve Bodur, Andres Gomez, Ruiwei Jiang (Chair), Gonzalo Munoz, Eunhye Song

ICS Student Paper Award

Winner:

Aras Selvi

for the paper "Convex Maximization via Adjustable Robust Optimization."

Citation:

The paper presents a novel connection between (linear and nonlinear) convex maximization, which arises in a wide range of challenging theoretical and application domains, and adjustable robust optimization (ARO). This leads to a unified scheme that recasts convex maximization as an ARO model and produces lower and upper bounds using ARO techniques. This scheme applies to, for example, quadratic, geometric, and sum-of-max-linear-terms optimization models with multiple constraints. Extensive numerical results demonstrate that the proposed scheme can provide tight lower and upper bounds to multiple classes of convex maximization problems. In addition, it does so in computation time that is comparable to, and in many cases significantly shorter than, that consumed by state-of-the-art solvers.

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Officer Nominations

Thanks to our outgoing officers for their service

- Simge Küçükyavuz (Chair)
- Mary Fenelon (Treasurer/Secretary)
- Willem-Jan van Hoeve (ICS Board)
- Juan Pablo Vielma (ICS Board)
- Yongjia Song (Webmaster/Newsletter Editor)

Officer Nominations

- Vice-Chair/Chair-Elect
- Secretary/Treasurer
- Board of Directors - two positions

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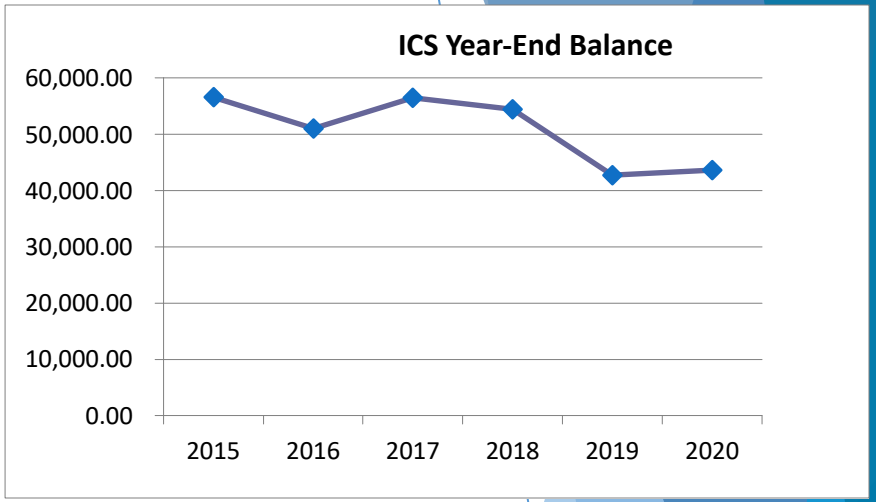
Treasurer's Report

Membership	2021	2020
Total	643	679



	2015	2016	2017	2018	2019	2020
Dues Revenue	$4,765	$4,815	$4,540	$4,750	$4,615	$3,092
Other Revenue	$338	$129	$451	$803	$767	$2,018
Expense	$4,404	$4,749	$3,443	$4,087	$6,979	$2,473
Meeting Profit	$12,603	($5,721)	$3,927	($3,504)	($10,142)	($1,785)
P/L	$13,303	($5,526)	$5,475	($2,038)	($11,739)	$852
Balance	$56,543	$51,017	$56,492	$54,454	$42,715	$43,567

Treasurer's Report

COVID effect: Dues not meeting expenses

Dues revenue

- Historic: $4500
- 2020: $3000

Historic expenses

- Business meeting: $2000
- Award expenses: $1500
- Administrative Expense: $900

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Discussion

- Next ICS Conference in 2025?
  - Out of sync
  - Timing: January?
  - Location
  - Competing conferences
  - Finances
  - Due increases?

Getty Image

Please give ICS conferences a high priority. We need your support and engagement!

Thank you and have a wonderful conference!

See you in Tampa at ICS 2022!