

## KD Tocher Medal – Previous Winners

- [2019-20](#) - Eric Applegate, Guy Feldman, Susan Hunter, Raghu Pasupathy
- [2017-18](#) - M Cabrera-Rios, D Arias Gonzalez, E Niño-Pérez and Y M Méndez-Vázquez
- [2015-16](#) - J Xu, E Huang, L Hsieh, L H Lee and Q Jia, C Chen
- [2013-14](#) - K-H Chang, A-L Chang, C-Y Kuo
- [2011-12](#) - Dr Csaba Boer, Dr Yvo Saanen
- [2009-10](#) - Dr Trika Pitana, Professor Eiichi Kobayashi
- [2007-08](#) - K Kotiadis

## Citations

### Citation for Tocher Medal 2019-2020

Eric Applegate, Guy Feldman, Susan Hunter, Raghu Pasupathy

Multi-objective ranking and selection: Optimal sampling laws and tractable approximations via SCORE

*Journal of Simulation* Volume 14 (1) 21-40

<https://doi.org/10.1080/17477778.2019.1633891>

This year's medal is awarded to Eric A. Applegate, Guy Feldman, Susan R. Hunter and Raghu Pasupathy, who are based across the School of Industrial Engineering and Department of Statistics at Purdue University.

The paper considers the multi-objective ranking and selection problem for a finite set of systems evaluated on three or more stochastic objectives. Within this setting comes the issue of how to allocate a given simulation budget across competing systems in order to efficiently identify the Pareto set whilst minimising the likelihood of misclassifying any of the systems.

Towards this issue, the paper presents two simulation-budget allocations, called MO-SCORE and iMO-SCORE, which maximise the misclassification-probability decay rate. Derivation of the allocations and a sequential algorithm to aid practical implementation are presented, alongside an extensive numerical evaluation that illustrates how the allocations can be used to reliably solve MORS problems in three or more objectives.



From left to right: Eric Applegate, Guy Feldman, Raghu Pasupathy, Susan Hunter

## Citation for Tocher Medal 2017-2018

Mauricio Cabrera-Rios, Dick E Arias Gonzalez, Esmeralda Niño-Pérez and Yaileen M. Méndez-Vázquez

A simulation-optimization strategy to deal simultaneously with tens of decision variables and multiple performance measures in manufacturing.

*Journal of Simulation* 12 (3): 258-270

The medal is awarded to Mauricio Cabrera-Rios, Dick Gonzalez, Esmeralda Nino- Perez and Yaileen Mendez- Vazquez all of whom are based in Puerto-Rico. The work concerns a problem common to simulation application, namely addressing multiple criteria. Although the paper presents it singularly as "optimization" in a particular problem, rather than other perceptions of "best", it demonstrates an optimization strategy for manipulating the parameters of a model in the presence of conflicting performance measures. It exploits Pareto Efficiency conditions in an iterative framework, improving upon previous use of Data Envelopment Analysis, with a rapid convergence. . Application to a problem with fifty decision variables is demonstrated.

## Citation for Tocher Medal 2015-16

J Xu, E Huang, L Hsieh, L H Lee and Q Jia, C Chen

Simulation optimization in the era of Industrial 4.0 and the Industrial Internet

*Journal of Simulation*, (2016) 10 (4), 310-320

<https://doi.org/10.1057/s41273-016-0037-6>

The paper exploits simulation in a "frontier" topic, Industry 4.0, offering [once again] a distinctively powerful tool for decision makers in organizations across the globe. The authors' approach leverages the increased data available with Industry 4.0, optimization techniques and computing power with a blend of simulation models of different granularity ["fidelity", in the author's terminology] to enable smart decisions in an industrial context. The paper explains the context showing simulation becoming increasingly relevant to Industry 4.0 and is well written and presented.

## Citation for Tocher Medal 2013-14

K-H Chang, A-L Chang and C-Y Kuo

A Simulation-Based Framework for Multi-Objective Vehicle Fleet Sizing of Automated Material Handling Systems: an Empirical Study

*Journal of Simulation*, (2014) 8 (4), 271-280

<https://doi.org/10.1057/jos.2014.6>

We congratulate Professor Kuo-Hao Chang of the National Tsing Hua University, Hsinchu, Taiwan and his co-authors whose paper "A simulation-based framework for multi-objective vehicle fleet sizing of automated material handling systems: an empirical study" has been selected for the KD Tocher award for the best paper in the Journal of Simulation 2013-14.

Vehicle fleet sizing in automated material handling systems is a long-standing area of application for simulation. This paper outlines an interesting systematic framework pursuing fleet size decisions in the midst of the combinatorial complexity of design options and the varied stakeholder interests. Beyond basic first steps in model creation, the approach adopts a purposeful combination of an optimisation algorithm and data envelopment analysis. This approach is designed to address the drawback that can come with the adoption of a simulation based optimisation approach, which is the thorough evaluation of a huge number of potential solutions. The paper includes the successful demonstration of the methodology in a semi-conductor plant presented as a case study to prove the value in the real world.

## Citation for Tocher Medal 2011-12

Dr Csaba Boer and Dr Yvo Saanen

Improving container terminal efficiency through emulation

*Journal of Simulation*, (2012) 6 (4), 267-278

<https://doi.org/10.1057/jos.2012.10>

We are delighted to award the Tocher medal to Dr Boer and Dr Saanen of TBA BV Netherlands for the best paper in the Journal of Simulation 2011-12. Their paper "Improving container terminal efficiency through emulation" describes the very effective combination of simulation with the actual container terminal control system to improve terminal efficiency. The Tocher Medal is awarded in recognition of the most outstanding contribution to the philosophy, theory or practice of simulation published in Journal of Simulation. Their approach is well proven in practice and avoids the difficulties of having to replicate the essentials of the control system within the actual simulation software and all the difficulties that brings in terms of knowledge transfer and validation. The paper is clearly presented and engages the reader at many levels.



*Dr Csaba Boer*

## Citation for Tocher Medal 2009-10

Dr Trika Pitana and Professor Eiichi Kobayashi

Optimization of ship evacuation procedures as part of tsunami preparation

*Journal of Simulation*, (2009) 3 (4), 235-247

<https://doi.org/10.1057/jos.2009.20>

We congratulate Dr Trika Pitana and Professor Eiichi Kobayashi of Kobe University, Japan whose paper "*Optimization of ship evacuation procedures as part of tsunami preparation*" is awarded the Tocher prize for the best paper in the *Journal of Simulation* 2009-10. Discrete event simulation has been used numerous times in the past in planning and managing port activity, going back to studies in the 1960s or earlier. Such studies focused on normal port operations. This work is distinctive in addressing exceptional, indeed disastrous, circumstances where the value of simulation's application is potentially not only financial but also in saving lives. The study uses Osaka Bay and Port as a Case and, after considering the particular value of simulation in this context, goes on to use it to systematically assess alternative ship evaluation procedures against a range of scenarios. The paper is clearly presented and well organised, discussing data collection, model parameters and structure, and results.

## Citation for Tocher Medal 2007-08

K Kotiadis

Using Soft Systems Methodology to determine the simulation study objectives

*Journal of Simulation*, (2007) 1 (3), 215-222

<https://doi.org/10.1057/palgrave.jos.4250025>

This paper has been chosen as the first winner of the Tocher prize for the best paper in the *Journal of Simulation* 2007-2008. The paper tackles a very important aspect of simulation project work, namely how to get the objectives correctly set and clearly elicited. This stage is fundamental in virtually all projects and contributes in a major way to the overall impact and value of a project. The paper looks towards Soft Systems Methodology for help in this area, and progresses earlier ideas using a real life situation as a test case. It provides potentially valuable creative thinking in this area which could be exploited in the future. It was a feature of Tocher's own work that he sought not only competence and integrity but also applicability. The work is systematic and the paper is well organised and clearly communicates the research and the conclusions of the author. We are pleased to award this prize to Kathy and congratulate her as the first winner of the Tocher prize.



*Kathy Kotiadis with Sue Merchant (President of The OR Society)*