# Modeling and Simulation in Medicine (MSM 2019)

2019 Spring Simulation Multi-Conference (SpringSim'19)

Simulation Series Volume 51 Number 5

Tucson, Arizona, USA 29 April – 2 May 2019

ISBN: 978-1-5108-8477-9

### Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 www.proceedings.com



Some format issues inherent in the e-media version may also appear in this print version.

#### © 2019 SIMULATION COUNCILS, INC.

Responsibility for the accuracy of all statement in each paper rests solely with the author(s). Statements are not necessarily representative of, nor endorsed by, The Society for Modeling and Simulation International.

Printed by Curran Associates, Inc. (2019)

Permission is granted to photocopy portions of this publication for personal use and for the use of students provided credit is given to the conference and publication. Permission does not extend to other types of reproduction nor to copying for incorporation into commercial advertising nor for any other profit-making purpose. Other publications are encouraged to include 300- to 500-word abstracts or excerpts from any paper contained in this book, provided credits are given to the author and the conference. For permission to publish a complete paper write: The Society for Modeling and Simulation International (SCS), 2598 Fortune Way, Suite I, San Diego, CA 92081, USA.

#### Additional copies of the Proceedings are available from:

or

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571 curran@proceedings.com www.proceedings.com/0128.html

The Society for Modeling and Simulation International 11315 Rancho Bernardo Road, Suite 139 San Diego, CA 92127 USA www.scs.org

ISBN: 978-1-5108-8477-9 PRINTED IN THE UNITED STATES

## TABLE OF CONTENTS

| Simulation Model of the Control System of Portable Boxes for Blood Bags Transport   | 1   |
|---|-----|
| Applying Support Vector Machine to Electronic Health Records for Cancer Classification  | 12  |
| Proficiency Based Planner for Safe Path Planning and Applications in Surgical Training  | 21  |
| An Analysis on the Research Orientations in Healthcare Simulation Modeling  | 33  |
| Single Shot State Detection in Simulation-based Laparoscopy Training  | 45  |
| Comparison of Different Machine Learning Approaches to Model Stroke Subtype Classification and Risk Prediction  | 57  |
| Luis García Terriza, José L. Risco-Martín, Jose L. Ayala, Gemma Reig Roselló, Juan Miguel Camarasaltas<br>Window-based Statistical Analysis of Timing Subcomponents for Efficient Detection of Malware in |     |
| Life-critical Systems Nadir Carreon Rascon, Allison Gilbreath, Roman Lysecky  | 67  |
| On Autistic Behavior Model  Przemyslaw Sliwinski  | 79  |
| When Hollywood Inspires Medicine: New Concepts in the Design and Architecture of Medical Simulation Facilities to Support Inter-professional Healthcare Education and Training                            | 87  |
| Evaluation of Learning Curve and Peripheral Awareness Using a Novel Multiresolution Foveated  Laparoscope   | 00  |
| Marissa Lovett, Jeremy Katz, Sangyoon Lee, David Biffar, Mike Nguyen, Allan Hamilton  Predictive Diagnosis of Fatal Heart Rhythms Using Wearables   |     |
| Jeno Szep, Zain Khalpey, Salim Hariri   |     |
| Cell Nuclei Detection and Segmentation for Computational Pathology Using Deep Learning  | 118 |
| The Use of Remote and Traditional Faciliation to Evaluate Telesimulation to Support  Interprofessional Education and Processing in Healthcare Simulation Training   | 124 |
| A Machine Learning Model to Predict Seizure Susceptibility from Resting-state fMRI Connectivity   | 131 |
| Towards Musculoskeletal Simulation-aware Fall Injury Mitigation: Transfer Learning with Deep<br>Cnn for Fall Detection  | 142 |
| Haben Yhdego, Jiang Li, Christopher Paolini, Mahasweta Sarkar, Steven Morrison, Hamid Okhravi, Michel Audette   |     |
| Enhancing a Laparoscopy Training System with Augmented Reality Visualization  | 154 |
| Author Index  |     |