

# **2018 Systems and Information Engineering Design Symposium (SIEDS 2018)**

**Charlottesville, Virginia, USA  
27 April 2018**



**IEEE Catalog Number: CFP18SIE-POD  
ISBN: 978-1-5386-6344-8**

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18SIE-POD
ISBN (Print-On-Demand):	978-1-5386-6344-8
ISBN (Online):	978-1-5386-6343-1

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

<b>Title</b>	<b>Authors</b>	<b>Page number in proceedings</b>
<i>Spatial Modeling and Analysis of Chloride Contamination Due to Deicing Agents</i>	Austin Fruchter; Brandon Chapman; Clayton Caliendo; Erin Oliva; Joseph Barbera; Thomas Mazzuchi; Joost Santos	1
<i>Fuel for a Better Future at UVA</i>	Oktay Ege Duran; Alfredo Preciado; Hazen Dean; Benjamin Weinberg; Mackenzie Hodgson; Reid Bailey; Michael Smith	7
<i>Energy Monitoring and Control Using Internet of Things (IoT) System</i>	Wesley T Hartman; Alexander R Hansen; Erik Vasquez; Samy S. El-Tawab; Karim Altaï	13
<i>A Demographics-based Mass Load Model for Estimating Community Drug Use</i>	Sheree Pagsuyoin; Jiayue Luo	19
<i>Data Analysis and Information Security of an Internet of Things (IoT) Intelligent Transit System</i>	Zachary Yorio; Raymond Oram; Samy S. El-Tawab; Ahmad Salman; M. Hossain Heydari; B. Brian Park	24
<i>The University of Virginia as a Complex System of Systems Abstract</i>	Margarette McSpedon; Alik Bourenin; Tyler Sudbrink; Christopher Mooney	30
<i>Design and Construction of a Modular 155V 40Ah Lithium Polymer Tractive Battery Pack</i>	Peter Condro; Robert Prins; Curtis Hendrick	36
<i>Test Automation Through Robotic Actuation and Image Analytics</i>	Rebecca Towler; James Johnston; Joshua Roy; Spencer Rubin; Reid Bailey	42
<i>Computational Simulation to Determine the Optimal Energy Requirement in a Process Using the Improved and Simplified String Method</i>	Juan Floriano; Ulises Martinez-Contreras; Marco Gallo	48
<i>Investigating the Effectiveness of Virtual Reality for Cross-Cultural Competency Training</i>	Martha Sheridan; Brian An; Donald Brown; Martin Bolger; Matthew Epstein; Forrest Matteo; Robel Semunegus; James Daniel; Christopher Clarkin; George Grindley; Jacob Roberts; Thomas Schafer	53
<i>Examining the Driverless Future</i>	John Rowley; Steven Sandry; Josh Gross; Christopher Anton; Ann Liu; Melvin Salvador; Cody Fleming	58
<i>Design of a Ski Lift Inspection and Maintenance System</i>	Katherine Barthelson; Pritika Sondhi; Miguel Mitra; Shallu Darhele	64
<i>Toward Attack-Resilient State Estimation and Control of Autonomous Cyber-Physical Systems</i>	Victoria Marquis; Rebecca Ho; Matthew Kimpel; Joseph Ghiorzi; William Rainey; William Cricchi; Nicola Bezzo	70
<i>Development of a Quality Assurance Tool for Additive Manufacturing</i>	Amanda Crowell; Stephanie Cramer; Jordan Lopez; Erika Rashka; Rosalie Reuss; Virginia Wordsworth; Gregory C Lewin	76

<i>Decision Support Tool for Strategic National Stockpile (SNS) Supply Chain Policies</i>	Kiren Ajrawat; Alyson Fintzy; Jillian Miles; Christopher Shaffer; Joseph Barbera; Thomas Mazzuchi; Joost Santos; Erica Gralla	82
<i>Social Media in Product Development</i>	Sabreena Abedin; George Ingber; Justis Midura; Maxwell Pederson; Timothy Sander; Douglas Sandor; Liam Wolf; Reid Bailey; Abigail Flower	88
<i>Design of a Decision Support System for the Scheduling of a Workflow Process for a Water Utility Company</i>	Christopher Pertsch, V; Jose Soberanis; Wisal Mohamed; Jomana Bashatah	94
<i>School Meals: Breaking the Cycle of Hunger &amp; Poverty</i>	Taylor Aroesty; Shareen Arshad; Eunice Chun; Jamie Gordon; Noah Green; Steven Hume; Garrick Louis	100
<i>Using Autoencoders and Text Mining to Characterize Single Cell Populations in the Hippocampus and Cortex</i>	Morgan Wall; Caitlin Dreisbach; Ali Zaidi; Abigail Flower; Christopher Overall	106
<i>Using Machine Learning to Predict Near-Term Mortality in Cirrhosis Patients Hospitalized at the University of Virginia Health System</i>	Elizabeth Harrison; Myron Chang; Yi Hao; Abigail Flower	112
<i>Detecting Fraud in Adversarial Environments: A Reinforcement Learning Approach</i>	Adrian Mead; Tyler Lewris; Sai Bollempalli; Stephen Adams; Loreto Alonzi; Peter Beling	118
<i>Analyzing National and State Opioid Abuse Treatment Completion with Multilevel Modeling</i>	Huitong Pan; Sally Gao; Kennan Grant; Hyojung Kang; Wendy Novicoff	123
<i>Deep Learning Detecting Fraud in Credit Card Transactions</i>	Abhimanyu Roy; Jingyi Sun; Rob Mahoney, Jr.; Loreto Alonzi; Stephen Adams; Peter Beling	129
<i>User Experience Design to Enhance the Effectiveness of Mobile Technologies for Treatment of Mental Health</i>	Ryley Stevens; Kristin Polk; Colette Merrill; Fan Feng; Maxwell Weiss; Elise Brosnan; Matthew Gerber; Laura E Barnes	135
<i>Actigraphy-Based Modeling of Patient Recovery Following Breast Reconstruction Surgery</i>	Lauren Schneider; Alden Kessenich; Brett Libowitz; Dylan Hazlett; Akshat Pendharkar; Brooke Dickie; Laura E Barnes; Matthew Gerber	141
<i>Security Analysis of an IoT System Used for Indoor Localization in Healthcare Facilities</i>	Cole Bradley; Samy S. El-Tawab; M. Hossain Heydari	147
<i>Evidence-Based Practice for Managing the Mentally Ill Inmate Population</i>	Paul Dalton; Kathryn Murray; Thomas Owen; Charles Rowe; Ashwin Sundaram; Adam Will; Neal Goodloe; Michael Smith; K. Preston White	153
<i>Using Voice Recognition Enabled Smartwatches to Improve Nurse Documentation</i>	Keith O'Connor; Saad Awan; Katherine Genuario; Edward Dunoyer; Ann Levy; Safir Serhatli; Gregory Gerling	159

<i>Sensor Embedded Knee Sleeve for Post- Operative ACL Patients</i>	Samreen Islam; Henry Licht; Alexander Sarris; Caroline Twigg; Nathan England	165
<i>The Effect of Different Loading Scenarios on Deformation Shape and Fatigue Life of Plastics</i>	Clay Bomberger; Connor Scott; Robert Nagel; Robert Prins	171
<i>Design of a 3D Printed Unmanned Ground Vehicle</i>	William Snipes; James Stapleton; Michael Yuan; Benaiah Walters; Gregory C Lewin	176
<i>Low-Cost Drone System for Analyzing Elevation</i>	William Metzler; Daniel Pinson; Austen Hendrickson; Richard Xu; Justin Henriques	182
<i>Assessment of Human Driver Safety at Dilemma Zones with Automated Vehicles Through a Virtual Reality Environment</i>	Brady Brown; Daniel Park; Brenna Sheehan; Shaina Shikoff; Jeffrey Solomon; Jonathan Yang; Inki Kim	185
<i>Madison Academic Brewery: Engineering the Better Brewer</i>	Aaron Sloss; Steven Harper; Samuel A Morton, III	191
<i>A Model-Based Systems Approach to Radar Design Utilizing Multi-Attribute Decision Analysis Techniques</i>	Jonathan Moore; Brandon Hull; Luke Kuza	197
<i>A Case Study Using Ant Colony Optimization Approach to Provide a Shortest Route Plan to Evaluate the Maintenance Needs in Elementary Schools in Northern Chihuahua Mexico</i>	Gabriela Fuentes; Ulises Martinez-Contreras; Mirella Parada-González; Arturo Woocay-Prieto	203
<i>Geographic Information Systems: Proposal for the Relocation of a Central Distribution Point Through the Centroid Method</i>	Edgar Sosa-Terrazas; Mirella Parada-González; Ulises Martinez-Contreras	209
<i>Evaluation of Traffic Mitigation Strategies for Pre-Hurricane Emergency Evacuation</i>	Elizabeth Harten; Roma Patel; Lindsay Ryan; Joshua Sawyer; Joseph Barbera; Thomas Mazzuchi; Joost Santos	214
<i>Exploring the Use of Adaptive Gradient Methods in Effective Deep Learning Systems</i>	Luke Merrick; Quanquan Gu	220
<i>Unsupervised Surface Classification to Enhance the Control Performance of a UGV</i>	Ryan Rosenfeld; Mark Restrepo; William Gerard; Walter Bruce, IV; Atiena Branch; Gregory C Lewin; Nicola Bezzo	225
<i>Statistical Analysis of Building Energy Load Profiles to Assess Site-Specific Feasibility of Demand Charge Management</i>	Isabelle Walton; Stephen Lockett; John O'Rourke, IV; Trisha Sinha; Kurt Diduch; Andrew Kim; Colin J. Steers; John Wheeler; James H. Lambert; Anna Bella Korbatov; David Slutzky	231
<i>A Utilitarian Approach to Adversarial Learning in Credit Card Fraud Detection</i>	Tyler Cody; Stephen Adams; Peter Beling	237

<i>Predictive Analytics for University of Virginia Football Recruiting</i>	Jonathan Cooke; Annie Crockett; Austin Foster; Kunrui Peng; Jacob Rue, VI; John Shin; John Valeiras; Roby Williams; Chris Tuttle; Mark Rhodes; William Scherer; Stephen Adams	243
<i>Developing Analytical Tools to Impact U.Va. Football Performance</i>	Connor Hagan; Erik Magnusson; Reece Echelberger; Ross Eastman; Henry Corscadden, IV; Clark Kipp; Christopher Muller; Stephen Adams; William Scherer	249
<i>Integrated System Design for Vertical Takeoff-Landing of Small Unmanned Aerial Vehicles</i>	James Rau; Radu F. Babiceanu	255
<i>A Comparison of Language-Dependent and Language-Independent Models for Violence Prediction</i>	Benjamin Greenawald; Yingjie Liu; Gregory Wert; Mohammad Al Boni; Donald E Brown	260
<i>Identifying Malicious Botnet Traffic Using Logistic Regression</i>	Abhijith Mandya; Rohan Bapat; Isabelle Liu; Brendan Abraham; Donald Brown; Hyojung Kang; Malathi Veeraraghavan	266
<i>Developing a Spatial Clustering Model to Identify Dangerous Intersections in Virginia</i>	Boh Young Suh; Jung Bok Park; James Xie; Quanquan Gu	272
<i>Social Pressure Analysis of Local Events Using Social Media Data</i>	William Rule; Wanyi Duan; Nitesh Prakash; Ni Zhuang; Rafael Alvarado; Donald E Brown	277
<i>Quiet Agent Detection Through Simulation and Classification</i>	Jennifer Cruser; Andrew Haworth; Rafael Alvarado; Loreto Alonzi	282
<i>Editor Matching for Academic Journals Through Rich Semantic Network Development</i>	Jack Prominski; Pragati Shah; Rafael Alvarado	287