

# **2017 9th International Workshop on Resilient Networks Design and Modeling (RNDM 2017)**

**Alghero, Italy  
4-6 September 2017**



**IEEE Catalog Number: CFP1774Y-POD  
ISBN: 978-1-5386-0672-8**

**Copyright © 2017 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:	CFP1774Y-POD
ISBN (Print-On-Demand):	978-1-5386-0672-8
ISBN (Online):	978-1-5386-0671-1

**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

# Proceedings of RNDM 2017 – Table of Contents

## Technical Session I – Theory of Network Resilience

An Optimization Model for Affine Flow Thinning – a Traffic Protection Mechanism for FSO Networks – **Invited**

*Michał Pióro, Ilya Kalesnikau, Michael Poss*

Building Uniformly Most-Reliable Networks by Iterative Augmentation

*Pablo Gabriel Romero*

Column Generation Technique for Optimization of Survivable Flex-grid SDM networks

*Roza Goscién, Piotr Lechowicz*

## Technical Session II – Methods for Measurement, Evaluation, or Validation of Resilience

Network Robustness Simulator: a Case Study on Epidemic Models – **Invited**

*Jose Luis Marzo, Sergio Gomez Cosgaya, Caterina M. Scoglio*

Variations in Graph Energy: A Measure for Network Resilience

*Tristan Shatto, Egemen K. Cetinkaya*

Empirical Evaluation of Network Optimization via Graph Spectra and Energy

*Richard Snyder, Tristan Shatto, Egemen K. Cetinkaya*

Modeling Link Weights in Backbone Networks

*Ian Pittwood and Egemen K. Cetinkaya*

## Technical Session III – Disaster Resilience

Minimizing the Network Availability Upgrade Cost with Geodiversity Guarantees

*Amaro F. de Sousa, Teresa Gomes, Rita Girão-Silva, Lucia Martins*

On Centrality-Related Disaster Vulnerability of Network Regions

*Farabi Iqbal, Fernando A. Kuipers*

Resilient IoT eHealth Solutions in Case of Disasters

*Marjan Gusev, Sasko Ristov, Radu Prodan, Matija Dzanko, Ivana Bilic*

## Technical Session IV – Resilience of Optical Networks

Smart City and IoT Resilience, Survivability, and Disruption Tolerance: Challenges, Modelling, and a Survey of Research Opportunities – **invited**

*James P. G. Sterbenz*

Connectivity Orchestration in Multi-Provider Elastic Optical Networks – **Invited**

*Alessio Giorgetti, Francesco Paolucci, Piero Castoldi*

On Robust FSO Network Dimensioning

*Fabio D'Andreagiovanni, Michal Pioro, Michael Poss, Marinela Shehaj, Artur Tomaszewski*

Link Addition Framework for Optical CDNs Robust to Targeted Link Cut Attacks

*Carlos Natalino, Aysegul Yayimli, Lena Wosinska, Marija Furdek*

Device Reliability Performance Awareness: Impact of RWA on EDFA Failure Reparation Cost in Optical Networks

*Pawel Wiatr, Jiajia Chen, Paolo Monti, Lena Wosinska, Di Yuan*

EFAH: An Energy and Fatigue Aware Heuristic for Provisioning Highly Available Connections in Optical Backbone Networks

*Carlos Natalino, Filip Idzikowski, Luca Chiaraviglio, Lena Wosinska, Paolo Monti*

## **Technical Session V – Resilient Cloud Computing Architectures/Solutions**

On the Initialization in Column Generation for Cloud-Ready and Survivable EONs – **Invited**

*Roza Gosien*

Toward Resilient Networks with Fog Computing

*Amir Modarresi, James P. G. Sterbenz*

Failure Process Characteristics of Cloud-Enabled Services

*Besmir Tola, Yuming Jiang, Bjarne E. Helvik*

## **Technical Session VI – Resilience of SDN Networks**

Optimising Microservice-based Reliable NFV Management & Orchestration Architectures

*Thomas Soenen, Wouter Tavernier, Didier Colle, Mario Pickavet – **Invited***

Machine Learning Aided Traffic Tolerance to Improve Resilience for Software Defined Networks

*Siddharth Gangadhar, James P. G. Sterbenz*

A Framework for Improving Network Resilience Using SDN and Fog Nodes

*Amir Modarresi, Siddharth Gangadhar, James P. G. Sterbenz*

Characterization of Failure Dynamics in SDN Controllers

*Petra Vizarreta, Poul E. Heegaard, Bjarne E. Helvik, Wolfgang Kellerer, Carmen Mas Machuca*