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Rutgers University, USA

**Shigeru Yamada**
Tottori University, Japan

Program Chairs

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National Chiao Tung University, Taiwan

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Tesla Motors, USA

Arrangements Chair

**Zhenmin Chen**
Florida International University, USA

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- Min Xie (Hong Kong)
- Shigeru Yamada (Japan)
- Ruey Huei Yeh (Taiwan)
- Songlin Zheng (China)
- Ming J. Zuo (Canada)
Lifetime Achievement Award

Professor Toshio Nakagawa *(Aichi Institute of Technology, Japan)*

Research Award

Professor Yi-Kuei Lin *(National Chiao Tung University, Taiwan)*

Dr. Kazuhira Okumoto *(Nokia Bell Labs, USA)*

Service Award

Dr. Feng-Bin Sun *(Tesla Motors, USA)*

Reliability Achievement Award

Professor Balbir S. Dhillon *(University of Ottawa, Canada)*

RQD 2018 Best Paper Award

*A Generalized Martingale-Based Software Reliability Model Considering Multiple Environmental Factors*

Mengmeng Zhu *(Rutgers University, USA)*

Hoang Pham *(Rutgers University, USA)*

RQD 2018 Best Student Paper Award

*A Survey of Changepoint Software Reliability Growth Models*

Vidhyashree Nagaraju *(University of Massachusetts Dartmouth, USA)*

Lance Fiondella *(University of Massachusetts Dartmouth, USA)*

Thierry Wandji *(Naval Air Systems Command, USA)*

RQD 2018 Best Paper Honorable Mention

*Risk Based Bayesian Design for Fatigue Reliability for Implantable Medical Devices*

Mingxiao Jiang *(Medtronic Plc., USA)*

Haitao Zhang *(Medtronic Plc., USA)*
## Conference at a Glance

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<thead>
<tr>
<th>Time</th>
<th>Thursday, August 1</th>
<th>Friday, August 2</th>
<th>Saturday, August 3</th>
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<tr>
<td>8:00 - 9:00</td>
<td>Registration / Continental Breakfast</td>
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<tr>
<td>9:00 - 9:45</td>
<td>Welcome - Awards Presentation</td>
<td>8:45 - 10:00 Technical Sessions</td>
<td>8:45 - 10:00 Technical Sessions</td>
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<tr>
<td>9:45 - 10:30</td>
<td>Keynote Speech</td>
<td>10:00 - 10:15 Coffee Break</td>
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<tr>
<td>10:30 - 11:00</td>
<td>Coffee Break</td>
<td>10:15 - 11:45 Technical Sessions</td>
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<tr>
<td>11:00 - 11:45</td>
<td>Keynote Speech</td>
<td>12:00 - 1:00 Conference Luncheon</td>
<td>11:45 Adjourn!</td>
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<td>Las Vegas 1 &amp; 2 &amp; 3</td>
<td>Skyview 2 (Resort Tower)</td>
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<tr>
<td>5:30 - 7:00</td>
<td>Welcome Reception</td>
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# Technical Sessions at a Glance

<table>
<thead>
<tr>
<th>Date</th>
<th>Session No.</th>
<th>Title</th>
<th>Las Vegas 1</th>
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<tr>
<td><strong>Thursday, Aug. 1</strong></td>
<td>1</td>
<td>Keynote: Predicted Reliability - A Key Deliverable for Medical Devices</td>
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<td>2</td>
<td>Keynote: Automated Machine Learning (AutoML), What It Is and How It Is Democratizing Machine Learning</td>
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<td>3</td>
<td>Mechanical Reliability Modeling &amp; Prediction</td>
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<td>Network Reliability Modeling &amp; Optimization</td>
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<td>5</td>
<td>Human Reliability &amp; Safety Analysis</td>
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<td>Reliability / Maintenance Modeling &amp; Applications</td>
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<tr>
<td><strong>Friday, Aug. 2</strong></td>
<td>7</td>
<td>Reliability in Design and Optimization</td>
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<td>Maintenance Optimization &amp; Applications</td>
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<td>Reliability, Statistics &amp; Applications</td>
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<td>Maintenance Policies</td>
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<td>Reliability Testing and Prediction and Warranty Policies</td>
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<tr>
<td><strong>Saturday, Aug. 3</strong></td>
<td>15</td>
<td>Reliability Modeling and Prediction and Applications</td>
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<td>17</td>
<td>Fatigue Reliability Design &amp; Assessment</td>
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<td>Statistical Distributions and Reliability Analysis</td>
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</table>
Technical Sessions

SESSION 1: Keynote Speech
Chair: Dr. Feng-Bin Sun (Tesla Motors, USA)

Predicted Reliability - A Key Deliverable for Medical Devices

Eric Maass
Technical Fellow
Senior Director for Medtronic Restorative Therapy Group
Medtronic, USA

Developing and producing medical devices involves two deliverables - the medical device and trust that the medical device will function reliably and free of harm. Predicted reliability melds engineering and probability - stochastic modeling of the functionality over a range of stresses, uses, misuses, and off-label uses. Whether the medical device is for single use or spanning years of medical application, providing this trust is both a duty for the patients and an opportunity for innovative approaches.

SESSION 2: Keynote Speech
Chair: Dr. Suprasad Amari (BAE Systems, USA)

Automated Machine Learning (AutoML), What It Is and How It Is Democratizing Machine Learning

Krishna Anumalasetty
Principal Product Manager
Microsoft, USA

For a long time, building Machine Learning solutions required an Advance degree such as Ph.D. in Mathematics, Computer Science or Statistics etc. Recent innovations and advent of AutoML is revolutionizing the way Machine Learning solutions are built. AutoML is enabling domain experts with little knowledge of ML build ML-based solutions for their problems getting the most of the vast amounts of data residing in the organizations. In addition, AutoML is powering many applications, such as Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP) applications, to offer Artificial Intelligent (AI) based solutions within their systems. Learn what AutoML is, and how Microsoft is leveraging AutoML to infuse AI into all its products.

SESSION 3: Mechanical Reliability Modeling & Prediction
Chair: Prof. D. Gary Harlow (Lehigh University, USA)

Study on Fatigue Property of the Overlap Weldments in the Vehicle Frame
Shuo Weng (University of Shanghai for Science and Technology, China)
Da-Ang Li (University of Shanghai for Science and Technology, China)
Chun-Xiang Ren (China National Accreditation Service for Conformity Assessment, China)
Li-Hui Zhao (University of Shanghai for Science and Technology, China)
Song-Lin Zheng (University of Shanghai for Science and Technology, China)

Optimization of a PM Model for a Hybrid Power System
Chun-Ho Wang (National Defense University, Taiwan)
Chao-Hui Huang (R.O.C. Naval Academy, Taiwan)

Fatigue Life Distribution Estimation
D. Gary Harlow (Lehigh University, USA)

SESSION 4: Network Reliability Modeling & Optimization
Chair: Prof. Yi-Kuei Lin (National Chiao Tung University, Taiwan)

A Novel Algorithm with Heuristic Rules to Lower Boundary Points Generation for Network Reliability Evaluation
Ding-Hsiang Huang (National Chiao Tung University, Taiwan)
Cheng-Fu Huang (Feng Chia University, Taiwan)
Yi-Kuei Lin (National Chiao Tung University, Taiwan)

A Way from Adjacency Matrix to Linked Path Structure
Shin-Guang Chen (Tungnan University, Taiwan)

Reliability for a Stochastic Flow Computer Network subject to Time Constraint and Correlated Failures
Ping-Chen Chang (National Quemoy University, Taiwan)
Yi-Kuei Lin (National Chiao Tung University, Taiwan)
Ding-Hsiang Huang (National Chiao Tung University, Taiwan)
SESSION 5: Human Reliability & Safety Analysis  
Chair: Prof. B.S. Dhillon (University of Ottawa, Canada)

Workers’ Availability Definition through the Energy Expenditure Evaluation  
Serena Finco (University of Padova, Italy)  
Ilenia Zennaro (University of Padova, Italy)  
Daria Battini (University of Padova, Italy)  
Alessandro Persona (University of Padova, Italy)

A DD-SHELL HF Model for Bus Accident  
Kelvin K.F. Po (The Hong Kong Polytechnic University, China)  
Eric T.T. Wong (The Hong Kong Polytechnic University, China)

Estimation of Balance-ability on Healthy Subjects Using Postural Stability Index  
Nurul Retno Nurwulan (National Taiwan University of Science and Technology, Taiwan)  
Bernard C. Jiang (National Taiwan University of Science and Technology, Taiwan)  
Vera Novak (Harvard Medical School, USA)

Human Error in Aviation Maintenance: An Investigative Study  
B.S. Dhillon (University of Ottawa, Canada)

SESSION 6: Reliability / Maintenance Modeling & Applications  
Chair: Prof. Mitsutaka Kimura (Gifu City Women’s College, Japan)

Optimal Monitoring Policy for a Server System Considering Signature Update  
Mitsuhiro Imaizumi (Aichi Gakusen University, Japan)  
Mitsutaka Kimura (Gifu City Women’s College, Japan)

Optimal Structure of Computing-Nodes with Limited Number  
Kenichiro Naruse (Nagoya Sangyo University, Japan)  
Kazunori Iwata (Aichi University, Japan)  
Toshio Nakagawa (Aichi Institute of Technology, Japan)

Optimal Maintenance Models of Social Infrastructures Considering Natural Disasters  
Takumi Kishida (Tottori University, Japan)  
Kodo Ito (Tottori University, Japan)  
Yoshiyuki Higuchi (Fukushima University, Japan)  
Toshio Nakagawa (Aichi Institute of Technology, Japan)

Reliability of Window Flow Control based on Packet Transmission Interval with ECN Considering Packet Loss  
Mitsutaka Kimura (Gifu City Women’s College, Japan)  
Mitsuhiro Imaizumi (Aichi Gakusen University, Japan)  
Toshio Nakagawa (Aichi Institute of Technology, Japan)

SESSION 7: Reliability in Design and Optimization  
Chair: Prof. Gordon J. Savage (University of Waterloo, Canada)

The Evaluation and Improvement Methods for Robotic Arms by Using Key Precision Gears of Manufacturing Process  
Ching-Te Wang (National Chin-Yi University of Technology, Taiwan, ROC)  
Ching-Hsin Wang (National Chin-Yi University of Technology, Taiwan, ROC)  
Cheng-Yi Chang (National Chin-Yi University of Technology, Taiwan, ROC)  
Jen-Huang Tu (National Chin-Yi University of Technology, Taiwan, ROC)

System Reliability Modeling of Hardware, Software, and Interactions of Hardware and Software  
Mengmeng Zhu (North Carolina State University, USA)  
Hoang Pham (Rutgers University, USA)

Reliability-Based Design Optimization of Systems with Deterministic Degradation Using a Meta-Model of the System Reliability  
Gordon J. Savage (University of Waterloo, Canada)  
Young Kap Son (Andong National University, South Korea)

SESSION 8: Decision Making Assessment & Failure Analysis  
Chair: Prof. Kuen-Suan Chen (National Chin-Yi University of Technology, Taiwan)

A Decision-Making Approach to Selecting Supplier Based on the Quality Evaluation of Process  
Kuen-Suan Chen (National Chin-Yi University of Technology, Taiwan)  
Chiao-Tzu Huang (National Chin-Yi University of Technology, Taiwan)  
Tsang-Chuan Chang (National Taichung University of Science and Technology, Taiwan)
### SESSION 9: Maintenance Optimization & Applications

Chair: Prof. Mingchih Chen *(Fu Jen Catholic University, Taiwan)*

- **Reliability Properties of Hierarchical Redundant Systems**
  - Kodo Ito *(Tottori University, Japan)*
  - Shigeshi Yamashita *(Mitsubishi Heavy Industries, Ltd., Japan)*
  - Toshio Nakagawa *(Aichi Institute of Technology, Japan)*

- **Independent Damage Models with Failure Level Declined by Heavy Damage**
  - Satoshi Mizutani *(Aichi Institute of Technology, Japan)*
  - Xufeng Zhao *(Nanjing University of Aeronautics and Astronautics, China)*
  - Toshio Nakagawa *(Aichi Institute of Technology, Japan)*

- **Replacement Models with Non-replacement Intervals**
  - Xufeng Zhao *(Nanjing University of Aeronautics and Astronautics, China)*
  - Satoshi Mizutani *(Aichi Institute of Technology, Japan)*
  - Toshio Nakagawa *(Aichi Institute of Technology, Japan)*

- **Age Replacement Models with First, Last and Middle Policies**
  - Mingchih Chen *(Fu Jen Catholic University, Taiwan)*
  - Xufeng Zhao *(Nanjing University of Aeronautics and Astronautics, China)*
  - Toshio Nakagawa *(Aichi Institute of Technology, Japan)*

### SESSION 10: Reliability / Measurement and Assessment

Chair: Prof. Shinji Inoue *(Kansai University, Japan)*

- **Reliability for Systems with Simultaneous Failure on Consecutive Components**
  - Tetsushi Yuge *(National Defense Academy, Japan)*

- **Improvement Ideas of GA-Based Algorithm for Obtaining Quasi-Pareto Solution of Bi-Objective Networks**
  - Natsumi Takahashi *(Aoyama Gakuin University, Japan)*
  - Tomoaki Akiba *(Chiba Institute of Technology, Japan)*
  - Hisashi Yamamoto *(Tokyo Metropolitan University, Japan)*

- **Flexible Jump Diffusion Process Modeling for Open Source Project Assessment**
  - Shigeru Yamada *(Tottori University, Japan)*
  - Yoshinobu Tamura *(Tokyo City University, Japan)*

### SESSION 11: Reliability, Statistics & Applications

Chair: Dr. Mingxiao Jiang *(Medtronic, Plc., USA)*

- **Universal Form of Bivariate Reliability Functions**
  - Jerzy K. Filus *(Oakton College, USA)*
  - Lidia Z. Filus *(Northeastern Illinois University, USA)*

- **Clustering Based on Data Envelopment Analysis: Application to Management Research and Practice**
  - Valentina Kuskova *(National Research University Higher School of Economics, Russia)*
  - Dmitry Zaytsev *(National Research University Higher School of Economics, Russia)*

- **Reliability Improvement Analysis using Fractional Failure**
  - Mingxiao Jiang *(Medtronic, Plc., USA)*
  - Feng-Bin Sun *(Tesla, Inc., USA)*

### SESSION 12: Software Reliability & Prediction

Chair: Dr. Kazuhira Okumoto *(Bell Labs, USA)*

- **Improving Software Quality by New Computational Intelligence Approaches**
Florin Popentiu-Vladicescu (Politehnica University of Bucharest & Academy of Romanian Scientists, Romania)
Grigore Albeanu (“Spiru Haret” University, Romania)
Henrik Madsen (Danish Technical University, Denmark)

A Study on the NHPP Software Reliability Model with the Weibull Fault Detection Rate in the Operating Environments using the Exponential Distribution
Kwang Yoon Song (Rutgers University, USA)
In Hong Chang (Chosun University, Korea)
Hoang Pham (Rutgers University, USA)

Towards Automated, End-to-End Software Defect Prediction
Rashid Mijumbi (Bell Labs, Ireland)
Kazuhira Okamoto (Bell Labs, USA)
Abhaya Asthana (Bell Labs, USA)

SESSION 13: Maintenance Policies
Chair: Prof. Xufeng Zhao (Nanjing University of Aeronautics and Astronautics, China)

Implementation of Imperfect Inspection by Considering System Structure
Takashi Satow (Kobe Gakuin University, Japan)

An Optimal Road Maintenance by Markov Process with Increase of Road Data
Yuta Kikuchi (Tottori University, Japan)
Junji Koyanagi (Tottori University, Japan)

Several Properties of an Optimal Maintenance Policy for a Semi-Markovian Deteriorating System with Major Minor Failures
Nobuyuki Tamura (Hosei University, Japan)

Optimum Backup Policies with Duplicated Data
Syouji Nakamura (Kinjo Gakuin University, Japan)
Xufeng Zhao (Nanjing University of Aeronautics and Astronautics, China)
Miwako Arafuka (Kinjo Gakuin University, Japan)

SESSION 14: Reliability Testing and Prediction and Warranty Policies
Chair: Prof. Tzong-Ru Tsai (Tamkang University, Taiwan)

Accelerated Life Testing Models for an Acrylic-Based Pressure Sensitive Adhesives in Consumer Electronics Applications
Victoria C. Robles (Google LLC, USA)

Swanand Vaidya (Google LLC, USA)

Forecasting Demand of Aircraft Oxygen Cylinder
Chun Yuen Cheung (The Hong Kong Polytechnic University, China)
Ho Yin Alvin Chow (The Hong Kong Polytechnic University, China)
T. T. Eric Wong (The Hong Kong Polytechnic University, China)

Warranty Policy for Repairable Items with Repair Service and Refund Based on Lemon Law
Minjae Park (Hongik University, Korea)
Ki Mun Jung (Kyungmusung University, Korea)
Dong Ho Park (Hallym University, Korea)

Model Selection Methods for Reliability Assessment Based on Interval-Censored Field Failure Samples
Tzong-Ru Tsai (Tamkang University, Taiwan)
Sih-Hua Wu (Tamkang University, Taiwan)
Yan Shen (Xiamen University, China)

SESSION 15: Reliability Modeling and Prediction and Applications
Chair: Prof. Suk Joo Bae (Hanyang University, Korea)

SIF calculation of Car Body Based on Sub-model Method
Ruijin Zhang (Northeastern University, China)
Shaodong Wei (Northeastern University, China)
Shuo Zhao (Northeastern University, China)
Haichao Tang (Northeastern University, China)

Developing Alert Level for Aircraft Components
Wai Yeung Man (The Hong Kong Polytechnic University, China)
T.T. Eric Wong (The Hong Kong Polytechnic University, China)

Step-down Approach for Wavelet Thresholding
Munwon Lim (Hanyang University, Korea)
Byeong Min Mun (Hanyang University, Korea)
Suk Joo Bae (Hanyang University, Korea)

SESSION 16: Reliability and Data Analytics and Process Optimization
Chair: Prof. Tongdan Jin (Texas State University, USA)

Reliability Assessment for Stress Relaxation Considering Heteroscedasticity among Accelerating Levels
Xinlei Wen (Beihang University, China)
Huimin Fu (Beihang University, China)
Zhihua Wang (Beihang University, China)
Efficient Marketing Strategy: Application of Data Envelopment Analysis as an Optimization Tool
Dmitry Zaytsev (National Research University Higher School of Economics, Russia)
Valentina Kuskova (National Research University Higher School of Economics, Russia)

Semiconductor Process Variation Analysis using Implicit Differentiation Chain Rule
Tongdan Jin (Texas State University, USA)
Qiyu Huang (Shanghai Jiao Tong University, China)
Xiulan Cheng (Shanghai Jiao Tong University, China)
Yisha Xiang (Texas Tech University, USA)

SESSION 17: Fatigue Reliability Design & Assessment
Chair: Prof. Mengmeng Zhu (North Carolina State University, USA)

Automatic Squid Fishing Machine
Ho Yin Alvin Chow (The Hong Kong Polytechnic University, China)
Eric T. T. Wong (The Hong Kong Polytechnic University, China)

Fatigue Fixture Design and Structure Simulation Analysis for Side Beams of High-speed Train
Wenxue Qian (Northeastern University, China)
Shuai Song (Northeastern University, China)
Ying Zhang (Northeastern University, China)
Xiaowei Yin (Shenyang Institute of Engineering, China)
Liyang Xie (Northeastern University, China)

Fatigue Reliability Analysis on TC4 Blade Based on Stress Strength Interference Model
Changlu Wang (Sanming University, China)
Long Wu (Sanming University, China)
Fei Li (Beihang University, China)

Fatigue Reliability Analysis of Drive Axle Housing under the Bench Test Loading
Lei Wang (Northeastern University, China)
Jia Li (Northeastern University, China)
Lian Duan (Northeastern University, China)
Jian Gu (Northeastern University, China)
Liyang Xie (Northeastern University, China)

SESSION 18: Statistical Distributions and Reliability Analysis
Chair: Prof. Minjae Park (Hongik University, Korea)

An Approach to Estimate the Location Parameter of Weibull Distributed Product Life Based on Simulated Big Data
Liyang Xie (Northeastern University, China)
Chenggang Li (Northeastern University, China)
Ningxiang Wu (Northeastern University, China)

Pyramidal Distribution and Up-Side-Down Pyramidal Distribution
Zhenmin Chen (Florida International University, USA)

A New Fitting Method for Probabilistic Stress-Life (P-S-N) Curve with Three Parameter Weibull Distribution
Ningxiang Wu (Northeastern University, China)
Liyang Xie (Northeastern University, China)

The Compound Class of Weibull Power Series for Reliability Application
Minjae Park (Hongik University, Korea)
Hoang Pham (Rutgers University, USA)

Thank you for contributing and participating in the 25th ISSAT RQD conference
We hope you enjoy the entire program!