

# Division Newsletter

## Volume 14, Third Quarter

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SERAD membership statistics broken down and shown in graphical format.

#### Conference News

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#### Research News

Summary of recent TEC Talk by Andrey Morozov on artificial intelligence anomaly detection.

#### Journal News

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#### Call for Papers

Submit your new research and findings to Part A and Part B journal sections

#### Editorial Page

Thoughts on risk and energy policy as we move away from fossil fuels.

## Chair's Message

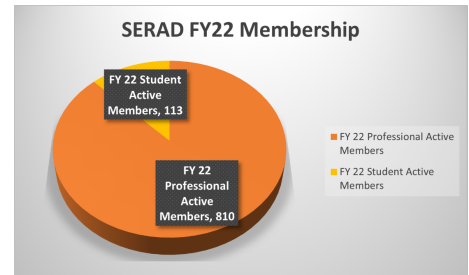
Dear SERAD Members,

Welcome to another edition of the SERAD newsletter. There are about a 1000 SERAD members, but I get to know only those who regularly attend our monthly meetings. Did you know? We have a [LinkedIn group](#). Come join us. Ask us how to attend our meetings. Get invited to an award ceremony and dinner event during [IMECE](#) conference. Talk about what you do at a virtual [ASME TEC talk](#) to a worldwide audience. Any time! Be a conference track chair. Lead some workshops. Be a volunteer, lead what you like as a risk, reliability, or safety analyst. Enhance SERAD's visibility and elevate your career!

It has been a busy quarter flooded with opportunities and enthusiastic ASME volunteers to lead and support them. Stephen Ekwaro-Osire, ASME Fellow, and [Professor at Texas Tech University](#) has been busy soliciting and ranking research papers from undergraduate and graduate students for the student competition. SERAD is excited to contribute to the [ASME robotics roadmap](#) report to set the

stride for the future of robotics safety. Mihai Diaconeasa, [Assistant Professor at North Carolina State University](#) is leading this effort while Bin Jou, a Principal Scientist from [FM Global](#) represented SERAD at the robotics road-mapping workshop sponsored by the robotics technology division (RTD). Andrey Morozov, [Associate Professor at Stuttgart](#) gave a TEC talk on anomaly detection in robotic systems. Alba Sofi, [Associate Professor at Mediterranea University of Reggio Calabria](#) has been coordinating between SERAD, [awards and recognition](#).

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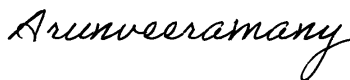


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... (Continued from previous page) ... [Mohammad Pourgol-Mohammad](#), ASME Fellow, Adjunct Associate Professor at [University of Maryland](#), and Senior Principal Reliability Engineer at [Teradyne](#) delivered a plenary keynote at the [International Symposium on Reliability Engineering and Risk Management](#). He has also signed up to be a Chair for risk, reliability, and safety track at the upcoming [Joint Rail Conference \(JRC\)](#). Bill Munsell, President of Munsell Consulting Services has been leading Safety Engineering, Risk and Reliability Analysis track for the [IMECE 2022](#) conference with support from Alice Sun, Andrey Morozov, Ernie Kee, John Weichel, and Mihai Diaconeasa. Ernie Kee, retired from [STPNOC](#) and now Associate Research Professor at [University of Illinois](#) has been soliciting updates from SERAD volunteers to make this wonderful newsletter happen for all of us. April Tone, [ASME Senior Technical Manager](#) and the primary liaison overseeing SERAD's administrative activities is making sure we are within the bounds of ASME rules and policies. Her support is essential in making most of our programs practically happen!

I, [Arun Veeramany](#), a Senior Scientist at the [Pacific Northwest National Laboratory \(PNNL\)](#) have been chairing SERAD making sure to grab opportunities and find volunteers to fulfill them. I serve as the primary conduit between [TEC Council](#) and the SERAD Committee. The team has been working on a strength, weaknesses, opportunities, and threat (SWOT) analysis to reflect upon the present and future of SERAD. The team is also busy drafting a strategic plan to cater to the short-term and long-term needs of SERAD members.

Please, come [join](#) us. Ask your colleagues and friends to choose SERAD as "primary interest" while renewing their ASME membership.



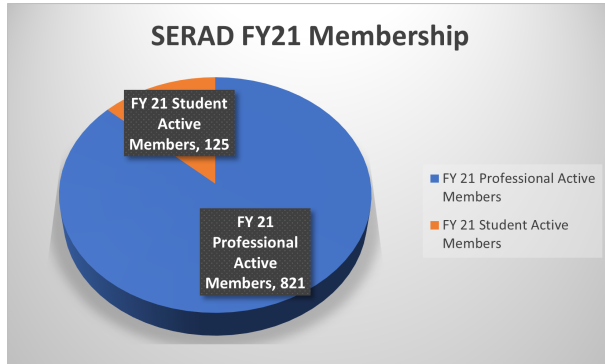
Arun Veeramany Chair for FY23, ASME SERAD

# SERAD Membership Statistics & Links to Activities

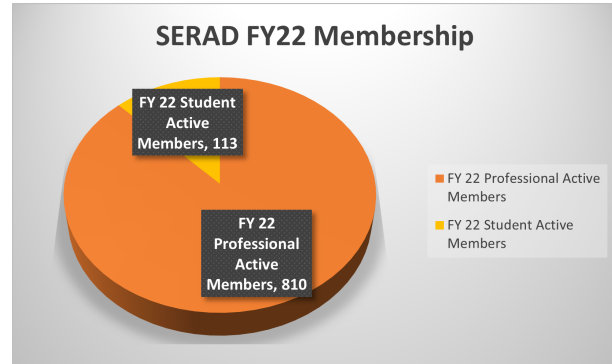
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## Membership Statistics

The total SERAD membership that includes both students and professionals has decreased slightly in the past two years (Figures 1a and 1b below) but continues to have over 900 members.



(a) The fiscal year 2021 breakdown of professional and student membership in SERAD



(b) The fiscal year 2022 breakdown of professional and student membership in SERAD

## Links to SERAD Activities



[LinkedIn: ASME Safety Engineering and Risk Analysis Division](#)

**The ASME SERAD Home page**

[ASME Safety Engineering & Risk Analysis Division Home Page](#)

**The Joint Rail Conference 2023 Track 5 Sponsored by SERAD**

[Joint Rail Conference 2023 Track 5](#)

**ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems. Part B: Mechanical Engineering**

[Mechanical Engineering](#)

**2022 2nd Quarter SERAD newsletter**

[Last quarter newsletter](#)

## Conference News

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The [International Mechanical Engineering Congress & Exposition](#) is being held in Columbus Ohio this year.



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## ASME SERAD Co-Sponsored International Symposium on Reliability Engineering and Risk Management (ISRERM 2022)

Hannover, Germany

Held on September 4-7, 2022

The 8<sup>th</sup> International Symposium on Reliability Engineering and Risk Management (ISRERM), co-sponsored by ASME SERAD, was held in Hannover, Germany, on 4 – 7 September 2022. ISRERM is a bi-annual international conference on topics which cross several engineering and civil disciplines, with the aim to advance the reliability engineering and risk management fields jointly with synergetic developments in applications. ISRERM was established in 2008, to promote the scientific development and innovative application of reliability-based, risk-based, and other uncertainty-informed decision-making theories and practices for addressing safety-related aspects in the design, operation and management of engineering systems, throughout their lifecycle. The symposium has previously been held in Tongji University, Shanghai, China (2008, 2010), Kanagawa University, Yokohama, Japan (2012), National Taiwan University of Science & Technology, Taiwan (2014), Yonsei University, Seoul, South Korea (2016), National University of Singapore, Singapore (2018) and Beijing University of Technology, China (2020). From the technical activity point of view, the objective of ISRERM 2022 was to provide an all-around inspiring environment and a multi-disciplinary forum for the exchange of knowledge and expertise on theories and methods in the field of Reliability Engineering and Risk Management, and on their application to a wide range of industrial and civil problem areas.



Opening Ceremony Addressed by Dr. Michael Beer, The Conference Chair



Professor Pourgol-Mohamad, past chair of ASME SERAD (2020-2021) and current chair for SERAD Committee for Awards and Fellowship Nominations addressed the conference on behalf of SERAD in the conference's opening ceremony. He emphasized SERAD's supports/sponsorship for conferences like ISRERM to provide risk/reliability/resilience engineering community with information from subject matter experts in various technical areas. Dr. Pourgol-Mohamad also briefly talked about SERAD history of formation and evolution over the areas since 1952 and provide an overview on SERAD organization structure and its vision and mission.

Professor Pourgol-Mohamad was the conference Keynote Speaker on the last day of the conference on Sept. 7. His title of speech was "Approaches and Trends in Reliability Qualification Techniques in Semiconductor Industry". He presented an overview of the analytical, simulation-based, and experimental advancements in electronics industry reliability analysis. He explained the tools, approaches and the trends in the industry for reliability qualification, including the classical techniques like Failure Mode and Effect Analysis (FMEA), Highly Accelerated Life Testing (HALT)/Highly Accelerated Stress Screening (HASS) testing, part stress and parts counts. He overviewed the recent advancements for reliability analysis based on physics of failure, prognostics health management (PHM), and dynamic reliability evaluation. Based on the recent significant advances in sensing and computing, Dr. Pourgol-Mohamad's speech covered the idea of an integrated sensory measurement-based health prognostic and degradation prediction system for electronics industry consisting of a method for measuring, gathering, and processing environmental and operation information and collating it into useful health metrics.



Opening Ceremony Addressed by Dr. Pourgol-Mohamad

## Joint Rail Conference

### Track 4 Sponsored by SERAD

To be held April 11 – 13, 2023 in Hannover, Germany



**Call for Extended Abstracts! Submission Deadline is October 24 SUBMIT YOURS TODAY at <https://event.asme.org/Joint-Rail-Conference><sup>1</sup>**

JRC 2023 is the major, multidisciplinary railroad conference encompassing all aspects of rail transportation and engineering research. You are invited to submit your extended abstracts for presentation consideration at the JRC 2023, the seminal U.S. railroad engineering event. The extended abstracts are submitted in two steps:

1. Submit a clear title, authors' names and affiliations, and brief abstract (no more than 400 words) within the theme of the conference, "Intelligent Railroading," at **SUBMIT ABSTRACT**. The brief abstracts due no later than October 24, 2022.

<sup>1</sup>For any website or paper-related questions, please contact Lori Lee, Web Tool Specialist, at [toolboxhelp@asme.org](mailto:toolboxhelp@asme.org). For any conference-related or logistical questions, contact Mary Jakubowski, Manager, Events Management, at [jakubowskim@asme.org](mailto:jakubowskim@asme.org). For any questions about topics, abstracts, tracks, or any other program-related inquiries, please contact Brian Donohue ([Brian.Donohue@wsp.com](mailto:Brian.Donohue@wsp.com)) or Mehdi Ahmadian ([Ahmadian@vt.edu](mailto:Ahmadian@vt.edu)), Technical Program Co-chairs.

2. Within one week of submission, the authors will be notified of a decision on their brief abstracts. The successful authors will be invited to submit a 3-page extended abstract (1000 words and graphics) for final selection to present at the conference. The extended abstracts must be detailed enough to allow evaluating the scientific merits and importance of the topic. The extended abstracts are due by November 30, 2022. At least one of the co-authors for each extended abstract agrees to register for the conference and attend the event to make a presentation. Failure to do so will result in rescinding the acceptance decision.
3. After the conference in April 2023, the extended abstracts that are selected for presentation at the conference will be invited to submit a full paper for publication consideration in a special issue of the ASME Open Journal of Engineering (<https://asmedigitalcollection.asme.org/openengineering>). The submitted full papers will undergo the customary peer review process for publication consideration in the journal. In recognition of the authors contribution to the JRC 2023, the publication charges for the accepted papers will be waived. The journal publication is not mandatory. The decision to submit a full paper to the journal is at the full discretion of the authors.

The submissions to the conference must explore topics related to railroad engineering related to the topics specified in the following conference tracks. Submissions must be on technical topics for existing, state-of-the-art, or future innovations. They can also have a focus on industry-relevant approaches for implementation such as system integration, configuration management, or technical project management.

### **Track 1: Track Systems, Structures, and Railway Infrastructure: (Sponsored by ASCE)**

**Chair: Dimitris Rizos, University of South Carolina**

Topics include, but are not limited to, intelligent technologies and innovations, materials, sustainability, resilience, vehicle-track interaction (VTI), track dynamics, health monitoring, condition assessment, change detection, track stability, and remote sensing.

### **Track 2: Mechanics of Rolling Stock (Sponsored by ASME RTD)**

**Chair: Mehdi Ahmadian, Virginia Tech; Co-Chairs: Abe Meddah, MxV Rail and Timothy Mast, Wabtec**

Includes topics related to locomotives, railcars, wheels, draft gears, suspensions, bearings, bogies, materials, onboard systems, onboard intelligent systems, and related matters.

### **Track 3: Electrical Signal, Communication, and PTC Systems (Sponsored by IEEE)**

**Chair: David Thurston, CP Rail; Co-Chair: Lamont Ward, Amtrak**

Includes topics related to Communications Based Signaling, The Internet of Railway Things (IoT), Asset Management, Health/Welfare and condition assessment, Wireless communications, Positive Train Control, Enhanced Train Control, Networks, Security, Automated Testing, Artificial Intelligent (AI) for safety systems, and related matters.

### **Track 4: Safety Engineering and Risk Analysis (Sponsored by ASME SERAD)**

**Chair: Mohammad Pourgol-Mohamad, University of Maryland; Magdy Elsibaie, University of Maryland**

Includes topics related to Mathematical Methods and Computations for Reliability and Safety; Reliability and Risk Analysis for Emerging Technologies and Intelligent Railroading; Failure and Forensic Analysis for Accidents and Trespassing; System and Structural Health Monitoring and Prognostics; Machine Learning and Big Data for Reliability, Maintenance, and Safety; Reliability Centered Maintenance; Resiliency and Sustainability Analysis; Human Factor; Reliability Analysis; and related matters.

### **Track 5: Electrification and Transit Systems**

**Chair: John Grantham, Atkins; Co-Chair: Brian Donohue, WSP**

Includes topics related to electrification systems overhead contact systems, third rail contact systems, traction power substations, stray current and corrosion control, electro-magnetic interference (EMI), transit systems, and passenger transportation.

### Artificial Intelligence-based Anomaly Detection of Technical Systems

*An ASME TEC Talk*

by **Andrey Morozov**,

*University of Stuttgart, Germany and Vice Chair, ASME Safety Engineering & Risk Analysis Division*

Historically signals collected from engineered systems have been reduced by humans who, given the signals, are trained to make control decisions based on their understanding of the physics that would dictate future system performance. As engineered systems become more and more complicated, faster moving, and more tightly inter-connected, the human operator is increasingly challenged to “keep up” with the physics. Up to the present, engineers have responded to this challenge by integrating automated control systems designed, for example, with reduced order physical models that can tune their parameters based on feedback. Such models, if found to be insufficiently efficacious, must be re-engineered and subsequently redeployed as a new integrated control system. Artificial Intelligence (AI) coupled with Machine Learning (ML) holds great promise to usher in a new era of engineered control systems that can help identify anomalous conditions outside the state of (engineering) knowledge at the time of deployment and correct the control system’s performance in the future. That is, AI coupled with ML can in effect redeploy engineered control systems “on the fly”.

The modern world is replete with examples of complex inter-connected engineered technical systems such as health care, transportation, and production facilities including chemical, pharmaceutical, oil & gas, and so forth. These systems include protections that would help prevent loss of life, injury, property damage, environmental damage, and so forth. However, protections can be compromised when signals coming from the system fail to comport with the physical understanding embedded in engineered control systems. In this TEC Talk, the author presents a substantial review of methods used to detect anomalous behavior in protective systems’ signal streams focusing on an approach that includes neural networks that would help enable so-called “deep learning”.

The deep learning method proposed by the author shows great promise for detection of anomalous signals that could cause loss of protection due to incorrect control response. The author believes the proposed method could be effective in detecting “unknown-unknowns” that would correspond to protective system states that lie outside the knowledge base embedded in the method as developed for a particular protection system. As such, the method could be highly beneficial to safer operations in the rapidly emerging fields of autonomous control such as those being deployed in land-based vehicles and other forms of transportation.

Andrey Morozov can be contacted at: [andrey.morozov@ias.uni-stuttgart.de](mailto:andrey.morozov@ias.uni-stuttgart.de).

Register for free to access the TEC talk at: [Artificial Intelligence-based Anomaly Detection of Technical Systems](#)

## Call for Papers



ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems  
More Information: <https://ascelibrary.org/journal/ajrub7> Contact Prof. Bilal M. Ayyub, Editor in Chief, [ba@umd.edu](mailto:ba@umd.edu)

## ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering, Part B: Mechanical Engineering

Alba Sofi, PhD

University “Mediterranea” of Reggio Calabria, Italy, e-mail: [alba.sofi@unirc.it](mailto:alba.sofi@unirc.it)

Established in 2014 by Professor Bilal M. Ayyub from the University of Maryland College Park, the [ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering and Part B: Mechanical Engineering](#) serves as a medium for dissemination of research findings, best practices and concerns, and for discussion and debate on risk and uncertainty-related issues in the areas of civil and mechanical engineering and other related fields. The journal addresses risk and uncertainty issues in planning, design, analysis, construction/ manufacturing, operation, utilization, and life-cycle management of existing and new engineering systems.

Starting with 2022, the editorship of the journal will be transferred from the Founding Editor-in-Chief, Professor Bilal M. Ayyub, to the Founding Associate Editor, The current Editor-in-Chief is the Founding Associate Editor, Professor [Michael Beer](#), from Leibniz Universität Hannover.

Both Part A and Part B are listed in the [Emerging Citation Sources](#) by [Clarivate Analytics](#), formerly Thomson Reuters, and are eligible for indexing in 2018. From 2016 onward, all articles will be included in [Web of Science](#). They are also included in [Scopus](#).

Part A has successfully secured an impact factor for 2021 of 3.084 based on the latest Journal Citation Reports by [Clarivate Analytics](#).

## Journal of Risk and Uncertainty contents

Issue	Latest Issues & (Issue Date)		
		<a href="#">Part B</a>	Volume 9-Issue 1 (March 2023, in progress)
<a href="#">Part A</a>	Volume 8-Issue 4 (December 2022, in progress)	<a href="#">Part B</a>	Volume 8-Issue 4 (December 2022, In progress)
<a href="#">Part A</a>	Volume 8-Issue 3 (September 2022)	<a href="#">Part B</a>	Volume 8-Issue 3 (September 2022)
<a href="#">Part A</a>	Volume 8-Issue 2 (June 2022)	<a href="#">Part B</a>	Volume 8-Issue 2 (June 2022)
<a href="#">Part A</a>	Volume 8-Issue 1 (March 2022)	<a href="#">Part B</a>	Volume 8-Issue 1 (March 2022)
	2021 Table of Contents		
<a href="#">Part A</a>	Volume 7-Issue 4 (December 2021)	<a href="#">Part B</a>	Volume 7-Issue 4 (December 2021, in progress)
<a href="#">Part A</a>	Volume 7-Issue 3 (September 2021)	<a href="#">Part B</a>	Volume 7-Issue 3 (September 2021)
<a href="#">Part A</a>	Volume 7-Issue 2 (June 2021)	<a href="#">Part B</a>	Volume 7-Issue 2 (June 2021)
<a href="#">Part A</a>	Volume 7-Issue 1 (March 2021)	<a href="#">Part B</a>	Volume 7-Issue 1 (March 2021)

## Latest State of the Art Reviews: Part A

“Resilience-Based Design of Infrastructure: Review of Models, Methodologies, and Computational Tools Resilience-Based Design of Infrastructure: Review of Models, Methodologies, and Computational Tools” by Mahdi Shadabfar,



Mojtaba Mahsuli, Yi Zhang, Yadong Xue, Bilal M. Ayyub, Hongwei Huang and Ricardo A. Medina

[“Time-Dependent Reliability of Aging Structures: Overview of Assessment Methods”](#) by Cao Wang, Michael Beer, and Bilal M. Ayyub

[“Structural System Reliability: Overview of Theories and Applications to Optimization”](#) by Junho Song, Won-Hee Kang, Young-Joo Lee, and Junho Chun

[“Emerging Technologies for Resilient Infrastructure: Conspectus and Roadmap”](#) by Mahmoud Reda Taha, Bilal M. Ayyub, Kenichi Soga, and Sherif Daghash

[“Probabilistic Inference for Structural Health Monitoring: New Modes of Learning from Data”](#) by Lawrence A. Bull, Paul Gardner, Timothy J. Rogers, and Elizabeth J. Cross

### **Latest Review Articles: Part B**

[“A Recent Review of Risk-Based Inspection Development to Support Service Excellence in the Oil and Gas Industry: An Artificial Intelligence Perspective”](#), by Taufik Adityawarman, Agus Paul Setiawan Kaban, Johny Wahyuadi Soedarsono

[“Prognostics and Health Management of Wind Energy Infrastructure Systems”](#), by Celalettin Yüce, Ozhan Gecgel, Oğuz Doğan, Shweta Dabetwar, Yasar Yanik, Onur Can Kalay, Esin Karpat, Fatih Karpat, Stephen Ekwaro-Osire

[“Uncertainty Quantification for Additive Manufacturing Process Improvement: Recent Advances”](#), by Sankaran Mahadevan, Paromita Nath, Zhen Hu

[“Optimizing Predictive Maintenance With Machine Learning for Reliability Improvement”](#), by Yali Ren

[“Path Integral Methods for the Probabilistic Analysis of Nonlinear Systems Under a White-Noise Process”](#), by Mario Di Paola and Gioacchino Alotta

[“Sensemaking in Critical Situations and in Relation to Resilience - A Review”](#) by Stine S. Kilskar, Brit-Eli Danielsen, and Stig O. Johnsen

### **Latest Special Collections: Part A**

[“Special Collection on Bayesian Learning Methods for Geotechnical Data”](#) Ka-Veng Yuen, Jianye Ching, and Kok Kwang Phoon

[“Special Collection on Resilience Quantification and Modeling for Decision Making”](#) Gian Paolo Cimellaro, and Nii O. Attoh-Okine

### **Latest Special Issues And Special Sections: Part B**

[“Special Section on Risk, Resilience, and Reliability for Autonomous Vehicle Technologies: Trend, Techniques, and Challenges”](#)

[“Special Section on Probabilistic Approaches for Robust Structural Health Monitoring of Wind Energy Infrastructure”](#)

[“Special Issue on Uncertainty Quantification and Management in Additive Manufacturing”](#) Zhen Hu, Saideep Nannapaneni, and Sankaran Mahadevan

[“Special Section on Risk and Uncertainties in Offshore Wind and Wave Energy Systems”](#) Vikram Pakrashi, Jimmy Murphy, and Budhaditya Hazra

[“Special Section: Nonprobabilistic and Hybrid Approaches for Uncertainty Quantification and Reliability Analysis”](#) by Matthias G. R. Faes, David Moens, Michael Beer, Hao Zhang, and Kok-Kwang Phoon

[“Special Section on Response Analysis and Optimization of Dynamic Energy Harvesting Systems in Presence of Uncertainties”](#) Agathoklis Giaralis, Ioannis A. Kougiumtzoglou, and Pol D. Spanos

## Recognitions & Awards

### Recognitions for Papers

Part A	
Editor's Choice Paper	<a href="#">“Time-Dependent Resilience of Repairable Structures Subjected to Nonstationary Load and Deterioration for Analysis and Design”</a> , by Cao Wang and Bilal M. Ayyub
Most Read Paper	<a href="#">“Time-Dependent Reliability Analysis Using a Vine-ARMA Load Model”</a> by Zhen Hu and Sankaran Mahadevan
Most Cited Paper	<a href="#">“Digital Twins: State-of-the-Art and Future Directions for Modeling and Simulation in Engineering Dynamics Applications”</a> by D. J. Wagg, K. Worden, R. J. Barthorpe, P. Gardner
Editor's Choice Collection	For each issue of the journal, the Chief Editor may select a paper to be featured on the journal homepage in the ASCE Library. The paper is available for free to registered users for 1 to 4 months, depending on how frequently the journal is published. A list of Editor's Choice selections is available <a href="#">here</a> .
Part B	
Most Read Paper	<a href="#">“Improving Site-Dependent Wind Turbine Performance Prediction Accuracy Using Machine Learning”</a> , by Sarah Barber, Florian Hammer, Adrian Tica
Most Cited Paper	<a href="#">“Structural Life Expectancy of Marine Vessels: Ultimate Strength, Corrosion, Fatigue, Fracture, and Systems”</a> by Bilal M. Ayyub, Karl A. Stambaugh, Timothy A. McAllister, Gilberto F. de Souza, David Web
Featured Article	<a href="#">“Resilience Decision-Making for Complex Systems”</a> , by Julian Salomon, Matteo Broggi, Sebastian Kruse, Stefan Weber, Michael Beer

### Outstanding Reviewers

Part A 2021 Outstanding Reviewers	Part B 2021 Reviewers of the Year
André T. Beck	Chen Jiang, <i>Huazhong University of Science and Technology, China</i>
Nicholas Chileshe	Imad Abdallah, <i>Eidgenössische Technische Hochschule Zürich, Switzerland</i>
You Dong	
Ketson Roberto Maximiano dos Santos	
Ao Du	
Cheng-Wei Fei	
Wenping Gong	
Cao Wang	
Jie Zhang	
Wengang Zhang	

### Best Paper Award\*

Starting in 2019, the Best Paper Award will be given annually to one paper in Part A and one paper in Part B appearing in the preceding volume year. Papers are evaluated by the Editorial Board members based on the following criteria:

- fundamental significance
- potential impact
- practical relevance to industry
- intellectual depth
- presentation quality.

#### 2021 Part A Recipients

Authors: Ali Khodam, Pooria Mesbahi, Mohsenali Shayanfar, Bilal M. Ayyub

Title: [“Global Decoupling for Structural Reliability-Based Optimal Design Using Improved Differential Evolution and Chaos Control”](#)

2021 Part B Recipient

Author: Panagiotis Alevras

Title: “[On the Effect of the Electrical Load on Vibration Energy Harvesting Under Stochastic Resonance](#)”

\* The award for the Best Paper published in 2021 in Part A and Part B will be presented to the authors in attendance at the ASME Safety Engineering and Risk Analysis Division (SERAD) award ceremony which will be held on November 2 during the International Mechanical Engineering Congress & Exposition (IMECE), October 30-November 3, 2022, Columbus, OH, <https://event.asme.org/IMECE>. The authors who will not be able to attend the ceremony in person will receive the award’s plaque by mail. ASME SERAD and the ASCE Infrastructure Resilience Division (IRD) will present the winners for Part A and Part B, respectively, with US \$1000 cash award (to be shared among authors) and subsidize the travel of one author up to US \$500.

SERAD is also organizing a virtual event during which the winners of the 2021 Best Paper Award for the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems (Part A and Part B), and of SERAD Student Contest 2022 will deliver a short presentation of their papers. The virtual event is scheduled on October 21<sup>st</sup> at 9:00 a.m. EST.

### Early Career Editorial Board

Starting in 2020, the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems in its two parts has implemented the [Early Career Editorial Board \(ECEB\)](#) program to bring onboard young members to its editorial board under the mentorship of the journal leadership.

The ideal ECEB member is within 1–3 years of having earned a doctorate degree. The term of an ECEB member is 2 years with the possibility of renewal for a second term. Based on the great success of the initial cycle of this pilot program, the [call](#) for applications to a new cycle has been released. The new ECEB members will be announced soon.

### Part A: active Calls for Special Collections

Special Collection on “[Extreme Damage Mechanics for Lifecycle Fatigue Resilience of Infrastructure Systems](#)”. Paper submission deadline: October 31, 2022.

Special Collection on “[Advances in Efficient Methods in Random Fields Modeling and Analysis](#)”. Paper submission deadline: March 31, 2023.

### Part B: active Calls for Special Issues

Special Issue on “[Special Issue on Digital Twins: A New Frontier in Critical Infrastructure Protection and Resilience](#)” (SI053B). Paper submission deadline: December 31, 2022.

Special Issue on “[Community Resilience to Disruptive Events: Models and Analyses, Lessons Learned, and Case Studies](#)” (SI055B). Paper submission deadline: February 28, 2023.

Special Issue on “[Uncertainty Quantification & Management in Nonlinear Dynamical Systems in Aerospace and Mechanical](#)” (SI058B). Paper submission deadline: March 31, 2023.

### Social media (Twitter and LinkedIn)

The ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems in its two parts is now also active on Social Media. Follow our pages on [Twitter](#) and [LinkedIn](#):



[Twitter: ASCE-ASME Journal of Risk and Uncertainty](#)



[LinkedIn: ASCE-ASME Journal of Risk and Uncertainty](#)



<https://chinahow.guide/wechat-registration-sign-up/>



to stay up-to-date on latest issues, highlighted journal content, active calls for special issues and special collections, recognitions and awards.

# Calls for Papers

## Submission

Part A: [Submit to Part A here](#)

Part B: [Submit to Part B here](#)

State-of-the-Art Reviews (Part A) and Review Articles (Part B) on topics of current interest in the field of risk and uncertainty are especially welcome.

Please contact the Editor or Managing Editors by email if you are interested in guest editing a Special Collection (Part A) or a Special Issue (Part B).

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Incoming	Michael Beer, from Leibniz Universität Hannover, <a href="mailto:beer@irz.uni-hannover.de">beer@irz.uni-hannover.de</a>
Outgoing	Bilal M. Ayyub, University of Maryland, <a href="mailto:ba@umd.edu">ba@umd.edu</a>
Managing Editors	Sankaran Mahadevan, Vanderbilt University, <a href="mailto:sankaran.mahadevan@vanderbilt.edu">sankaran.mahadevan@vanderbilt.edu</a> Kok-Kwang Phoon, National University of Singapore, <a href="mailto:kkphoon@nus.edu.sg">kkphoon@nus.edu.sg</a>
Associate Managing Editors	Eleni Chatzi, ETH Zurich, <a href="mailto:chatzi@ibk.baug.ethz.ch">chatzi@ibk.baug.ethz.ch</a> Ioannis Kougoumtzoglou, Columbia University, <a href="mailto:iak2115@columbia.edu">iak2115@columbia.edu</a> Alba Sofi, University Mediterranea of Reggio Calabria, <a href="mailto:alba.sofi@unirc.it">alba.sofi@unirc.it</a> Xiaobo Qu, Chalmers University of Technology, <a href="mailto:xiaobo@chalmers.se">xiaobo@chalmers.se</a>

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### The protective system challenge in the energy crisis

The world consumes a staggering amount of energy all of which effectively derives from some form of fossil fuel.<sup>2</sup> The current worldwide energy consumption amounts to about 420 EJ and is increasing year by year.<sup>3</sup> The modern history of atmospheric carbon dioxide reflects the large and increasing level of fossil fuel use worldwide.<sup>4</sup> In response, Western industrialized nations have been looking into ways to reduce fossil fuel use.<sup>5</sup> A relevant potential is use of modern large nuclear fission power plant that can generate up to about 1,500 MW continuously or about 0.0473 EJ per year. This means that it would require almost 8, 879 Large reactor plants = 420 EJ/0.0473 EJ/yr/plant to offset the worldwide carbon production from energy consumption.

Nuclear power plants generate thermal energy that is most commonly converted to electricity through a thermodynamic cycle. However, only about 20% of the total energy consumption comes from direct electrical loads.<sup>6</sup> The rest of energy consumption, such as heating, transportation, chemical processing, and so forth, is derived directly from “burning” fossil fuels. Of the 20% direct electrical consumption, a very small fraction is derived from nuclear fission. It could be said that, when built and operated to current Western standards of protections, nuclear fission-derived energy is currently the safest energy source against loss of life, injury, and environmental damage of all energy sources now available.<sup>7</sup> One of the advantages nuclear fission has over other energy sources is its density. A large nuclear power plant can generate about 1,000 MWe in about 640 acres of land surface. In comparison, a wind farm producing 1000 MWe would require about 230,000 acres.<sup>8</sup> In addition, long term risks to local climate, death, injury, fauna, and flora, associated with large scale land use (or near-land sea use) of wind farms as an example of one of the more popular CO<sub>2</sub>-free sources of energy, has not yet been fully explored.<sup>9</sup> Similarly, risk of radioactive material exposure from scale deployment of nuclear fission technology is not well understood.

US energy policy does not appear to track with the challenges associated with conversion of the energy supply with CO<sub>2</sub>-free technologies. For example the Energy Secretary has recently presented a program in 2021 to reduce the cost of hydrogen as a clean fuel.<sup>10</sup> Of course hydrogen must be isolated from for example, water, which takes energy. In fact much more energy is required to operate an automobile using hydrogen as fuel source as compared to gasoline or diesel due to the efficiencies associated with separating and recombining hydrogen with oxygen. Although technological advances are being made, the current “round trip” efficiency of hydrogen production and use is less than about 50%.<sup>11</sup> The conclusion is that conversion to hydrogen would require double the output from proposed clean energy sources. Risk for such large scale deployment (if physically possible) would need to be shown to offset the risk from continuing use of fossil fuels. Wearout and hopefully others, especially policy-makers in the public sector, are evaluating the risks and studying the feasibility of the ideas being proposed to replace world energy consumption with new technologies. In next quarter’s Newsletter, Wearout will explore the advantages and disadvantages of (human made) fusion technology as a sensible world energy source.

Let’s talk!

[Ernie Kee](#), SERAD Editor

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<sup>2</sup>See for example, <https://www.capp.ca/energy/world-energy-needs/>. Website accessed 11 September, 2022.

<sup>3</sup>See for example, <https://www.iea.org/data-and-statistics/charts/world-total-final-consumption-by-source-1971-2019>. Website accessed 11 September, 2022.

<sup>4</sup>See for example, Figure 2 in Houghton’s article: [https://www.researchgate.net/profile/Richard-Houghton/publication/28849045\\_Effects\\_of\\_Land-Use\\_Change\\_on\\_the\\_Carbon\\_Balance\\_of\\_Terrestrial\\_Ecosystems/links/54bf932f0cf2f6bf4e04feb0/Effects-of-Land-Use-Change-on-the-Carbon-Balance-of-Terrestrial-Ecosystems.pdf](https://www.researchgate.net/profile/Richard-Houghton/publication/28849045_Effects_of_Land-Use_Change_on_the_Carbon_Balance_of_Terrestrial_Ecosystems/links/54bf932f0cf2f6bf4e04feb0/Effects-of-Land-Use-Change-on-the-Carbon-Balance-of-Terrestrial-Ecosystems.pdf). Website accessed 11 September, 2022.

<sup>5</sup>For example, the US DOE: <https://www.utilitydive.com/news/doe-moves-to-fund-additional-nuclear-coupled-hydrogen-projects/631131/>. Website accessed 11 September, 2022.

<sup>6</sup>Again see for example, <https://www.iea.org/data-and-statistics/charts/world-total-final-consumption-by-source-1971-2019>. Website accessed 11 September, 2022.

<sup>7</sup>An example of Western standards is Title 10, Chapter 1 of the US Code of Federal Regulations (<https://www.ecfr.gov/current/title-10>). Website accessed 12 September, 2022.

<sup>8</sup>See for example <https://www.energy.gov/sites/default/files/2019/01/f58/Ultimate%20Fast%20Facts%20Guide-PRINT.pdf> for comparisons of land use. Website accessed 12 September, 2022.

<sup>9</sup>For example, effects on humans are starting to emerge. See <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3653647/>, micro climate <https://journals.ametsoc.org/view/journals/mwre/149/3/MWR-D-20-0186.1.xml>, <https://core.ac.uk/download/pdf/190019391.pdf>, and wildlife such as bats (for example) <https://www.usgs.gov/faqs/how-are-bats-affected-wind-turbines>. Website accessed 12 September, 2022.

<sup>10</sup>See 2021 initiative introduced by Granholm: <https://www.energy.gov/articles/secretary-granholm-launches-hydrogen-energy-earthshot-accelerate-breakthroughs-toward-net>. Website accessed 13 September, 2022.

<sup>11</sup>For example see the article by Bernier and others: [https://www.sciencedirect.com/science/article/pii/S0360319904001788?casa\\_token=uJhrfFFxo4AAAAA:0-5ofiBRo5ABzD18UMoyIyomVUCgLjxpNdB8joSb0\\_a70dOWgLQ64MczFNfCRI1pAFHchP5A](https://www.sciencedirect.com/science/article/pii/S0360319904001788?casa_token=uJhrfFFxo4AAAAA:0-5ofiBRo5ABzD18UMoyIyomVUCgLjxpNdB8joSb0_a70dOWgLQ64MczFNfCRI1pAFHchP5A). Website accessed 13 September, 2022.



# SERAD Committee

Table 1. 2021–2022 SERAD Committee Membership

Executive Committee		Appointments	
Position	Person	Position	Person
<b>Chair</b>	<a href="#">Arun Veeramany</a>	<b>Chair: Awards and Fellow Nomination Committee</b>	<a href="#">Mohammad Pourgol-Mohammad</a>
<b>1<sup>st</sup> Vice-Chair</b>	<a href="mailto:Stephen.Ekwaro-Osire@ttu.edu">Stephen.Ekwaro-Osire@ttu.edu</a>	<b>Newsletter Editor</b>	<a href="#">Ernie Kee</a>
<b>2<sup>nd</sup> Vice-Chair-Treasurer</b>	<a href="#">Mihai Diaconeasa</a>	<b>Webinars / Outreach Chair</b>	Open
<b>3<sup>rd</sup> Vice Chair-Membership</b>	<a href="#">Andrey Morozov</a>	<b>Student Program Coordinator</b>	<a href="#">Deivi Garcia</a>
<b>4<sup>th</sup> Vice-Chair-Secretary</b>	<a href="#">Dr. Alba Sofi</a>	<b>Track Co-Chairs</b>	<a href="#">Mihai Diaconeasa</a> <a href="#">Ernie Kee</a> <a href="#">John Wiechel</a> <a href="#">Alice Sun</a>
<b>Past Chair</b>	<a href="#">Xiaobin Le, Ph.D., PE</a>	<b>Technical Content Coordinator</b>	<a href="#">Giulio Malinverno</a>
<b>IMECE 2022 Track Chair</b>	<a href="#">Bill Munsell</a>	<b>IMECE 2022</b>	<a href="#">Andrey Morozov</a>