



# PROCEEDINGS OF THE 6<sup>TH</sup> WORLD CONGRESS ON RECENT ADVANCES IN NANOTECHNOLOGY (RAN'21)

June 14, 2021 - June 16, 2021 | LISBON, PORTUGAL  
Virtual Conference

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# TABLE OF CONTENTS

<b>Welcome Message from the Conference Chair.....</b>	<b>3</b>
<b>About RAN'21.....</b>	<b>4</b>
<b>Scientific Committee.....</b>	<b>5</b>
<b>Keynote Speakers.....</b>	<b>6</b>
<b>List of Papers .....</b>	<b>14</b>
<b>Sponsors .....</b>	<b>17</b>
<b>Journal Publication.....</b>	<b>18</b>
<b>RAN'22 .....</b>	<b>19</b>
<b>Ethics &amp; Malpractice .....</b>	<b>20</b>
<b>Contact Us .....</b>	<b>25</b>

# WELCOME MESSAGE FROM THE CONFERENCE CHAIR

**On behalf of the International Academy of Science, Engineering and Technology (International ASET Inc.), the organizing committee would like to welcome you to the 6<sup>th</sup> World Congress on Recent Advances in Nanotechnology (RAN 2021).**

RAN is aimed to become one of the leading international annual congresses in the field of nanotechnology. This congress will provide excellent opportunities to the scientists, researchers, industrial engineers, and university students to present their research achievements and to develop new collaborations and partnerships with experts in the field.

While each conference consists of an individual and separate theme, the 2 conferences share considerable overlap, which prompted the organization of this congress. The goal of this undertaking is to bring together experts in each of the specialized fields, and at the same time allow for cross pollinations and sharing of ideas from the other closely related research areas.

We thank you for your participation and contribution to the 6<sup>th</sup> World Congress on Recent Advances in Nanotechnology (RAN 2021). We wish you a very successful and enjoyable experience.

**Dr. Wolfgang Ensinger**

*Congress Chair and Proceedings Editor  
RAN 2021*

**Dr. Josef Jampilek**

*Congress Co-Chair and Proceedings Editor  
RAN 2021*

**Dr. João Manuel Cunha Rodrigues**

*Congress Local Co-Chair  
RAN 2021*

**Return to Top**

# ABOUT RAN 2021

**RAN is aimed to become one of the leading international annual congresses in the field of nanotechnology.**

This congress will provide excellent opportunities to the scientists, researchers, industrial engineers, and university students to present their research achievements and to develop new collaborations and partnerships with experts in the field.

There are 2 conferences included in the RAN Congress:

**[ICNNFC 2021](#)** - 6<sup>th</sup> International Conference on Nanomaterials, Nanodevices, Fabrication and Characterization

**[NDDTE 2021](#)** - 6<sup>th</sup> International Conference on Nanomedicine, Drug Delivery, and Tissue Engineering

While each conference consists of an individual and separate theme, the 2 conferences share considerable overlap, which prompted the organization of this congress. The goal of this undertaking is to bring together experts in each of the specialized fields, and at the same time allow for cross pollinations and sharing of ideas from the other closely related research areas.

**RAN** is an acronym for **R**ecent **A**dvances in **N**anotechnology.

The proceedings is published in Ottawa, Canada.

- All papers were peer-reviewed
- The congress proceedings is published under an ISSN and ISBN number
- Each paper is assigned a unique DOI number by [Crossref](#)
- The conference proceedings is indexed by [Scopus](#) and [Google Scholar](#)
- The proceedings is permanently archived in [Portico](#) (one of the largest community-supported digital archives in the world)

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[Return to Top](#)

# SCIENTIFIC COMMITTEE

We would like to thank the following for accepting to act as a member of the Scientific Committee for the RAN 2021 Congress:

## Scientific Committee Members for ICNNFC 2021

- Dr. Erik Díaz-Cervantes, Universidad de Guanajuato, Mexico
- Dr. Bilgin Kaftanoğlu, Atilim University, Turkey
- Dr. Byeong Hee Kim, Kangwon National University, South Korea
- Dr. Thirumany Sritharan, Nanyang Technological University, Singapore
- Dr. Muhammad Maqbool, The University of Alabama at Birmingham, USA
- Dr. Dongyang Li, University of Alberta, Canada

## Scientific Committee Members for NDDTE 2021

- Dr. Todd Giorgio, Vanderbilt University, USA
- Dr. Jingjiao Guan, Florida State University, USA
- Dr. Mariko Kawai, Kansai Women's University, Japan
- Dr. Dejian Zhou, Leeds University, UK
- Dr. Swadeshmukul Santram, University Of Central Florida, USA
- Dr. Jonathan Coulter, Queen's University Belfast, UK

[Return to Top](#)

# KEYNOTE SPEAKERS

The keynote information for the 6th World Congress on Recent Advances in Nanotechnology (RAN 2021) is as follows:

## Plenary Speaker



**Dr. Elena Batrakova**

The University of North Carolina, USA  
NDDTE 2021 Plenary Speaker

## Keynote Speakers



**Dr. Ian Manners**

University of Victoria, Canada  
ICNNFC 2021 Keynote Speaker



**Dr. Swadeshmukul Santra**

University Of Central Florida, USA  
NDDTE 2021 Keynote Speaker



**Dr. Dongyang Li**

University of Alberta, Canada  
ICNNFC 2021 Keynote Speaker



**Dr. Dejian Zhou**

Leeds University, UK  
NDDTE 2021 Keynote Speaker



**Dr. Seongtae Bae**

University of South Carolina, USA  
NDDTE 2021 Keynote Speaker



**Dr. Jonathan Coulter**

Queen's University Belfast, UK  
NDDTE 2021 Keynote Speaker

## NDDTE 2021 PLENARY SPEAKER



**Dr. Elena Batrakova, The University of North Carolina, USA**

**Topic of Plenary:** Using Extracellular Vesicles for Brain Delivery of Therapeutic Proteins

[View Abstract](#)

[Return to Top](#)

Elena V. Batrakova obtained Ph.D. in Polymer chemistry at the Department of Polymers, M.V. Lomonosov Moscow State University (MSU), Russia. Since 2012, she is an Associate Professor of Pharmaceutical Sciences at the University of North Carolina at Chapel Hill, USA. For more than twenty years, she has been studying the assembly and applications of drug-loaded nanocarriers. Recently, the main focus of Dr. Batrakova's group is on the development of personalized drug delivery systems by loading therapeutics into immune response cells or extracellular vesicles (EVs) released from these cells. Specifically, her group developed and characterized EV-based drug delivery systems for therapeutic proteins, nucleic acids, and low molecular chemotherapeutics to treat Parkinson's disease, stroke, ALS, HIV-related dementia, and cancer. Overall, she has published over 130 papers and filed 20+ US and foreign patents on the application of drug delivery systems of biologically active molecules. She is a highly cited of total 10 scientists at UNC, and a Thomson Reuters agency named her top 1% Highly Cited Researcher.

## NDDTE 2021 KEYNOTE SPEAKER



### **Dr. Jonathan Coulter, Queen's University Belfast, UK**

**Topic of Keynote:** Development And Pre-Clinical Validation Of Multi-Functional Radiosensitising Nanoparticles - Successes And Challenges

[View Abstract](#)

[Return to Top](#)

Dr. Coulter is a Senior Lecturer, working within the Nanomedicine and Biotherapeutics research group at the School of Pharmacy, Queen's University Belfast. His research has always had a focus on developing strategies to overcome treatment resistance in cancer, with a specific focus on radiotherapy. His work has spanned approaches that include the use of suicide gene therapy and more recently exploiting the unique physical properties of high atomic number nanoparticles as radiosensitisers. Recent iterations have been developed as biologically active formulations, designed to overcome tumour microenvironment properties which are known to confer treatment resistance, in addition to the core particle acting as a radiation dose modifier. This presentation aims to outline some of the successes we have experienced in this space while looking to spark discussion around the key challenges that have limited clinical translation to date.



## NDDTE 2021 KEYNOTE SPEAKER



### **Dr. Swadeshmukul Santra, University Of Central Florida, USA**

**Topic of Keynote:** Quantum Dot Nanotechnology for Bioimaging and Drug Delivery Applications

[View Abstract](#)

[Return to Top](#)

Swadeshmukul Santra, PhD received his Ph. D. degree in chemistry from the Indian Institute of Technology Kanpur, India and postdoctoral study at the University of Florida.

Dr. Santra is a Professor at UCF holding a joint appointment with the NanoScience Technology Center and the Department of Chemistry. He is the Director of UCF Materials Innovation for Sustainable Agriculture (MISA) Center. He has been actively working in the field of Nanoscience and Nanotechnology for over 20 years. He has published 78 peer-reviewed research articles, 7 review articles, 11 book chapters and delivered 96 invited talks. He has been awarded 31 patents including 26 US patents. His research has been funded by NSF, USDA, Citrus Research and Development Foundation, Environmental Research and Education Foundation and several industries with a portfolio of over \$5.6M research funding.

## NDDTE 2021 KEYNOTE SPEAKER



**Dr. Dejian Zhou, Leeds University, UK**

**Topic of Keynote:** Polyvalent Multifunctional Nanoparticles: A Powerful Tool to Address Various Biomedical Challenges

[View Abstract](#)

[Return to Top](#)

Dejian Zhou is full Professor of Nanochemistry at University of Leeds, UK. He obtained his BSc and PhD in Chemistry both from Peking University, China. Following postdoctoral research at Cranfield University and University of Cambridge, he was appointed to a Senior Lecturer at University of Leeds in 2007 and promoted to Professor of Nanochemistry in 2018.

He is pursuing a polyvalent multifunctional nanoparticle strategy to address some important biomedical challenges, e.g. early detection and targeted multimodal treatment of cancer; probing structural mechanisms and developing new therapeutics targeting specific lectin-glycan interactions. He has published 4 book chapters and ~150 research papers (including 2 research highlights on the BBC) in some leading journals, e.g. *Nature Nanotech.*, *Adv. Mater.*, *JACS*, *Angew. Chem.*

He has received several awards and recognitions, *Young Chemist Award* (Chinese Chemical Society, 1996), *National Excellent PhD Thesis Award* (Ministry of Education, China, 1999) and *Fellow of the Royal Society of Chemistry* (FRSC, 2016). He is an Associate Editor of *Computational and Structural Biotechnology Journal* (Elsevier, IF: 6.02), and sits on the Editorial Board of *Sensors* (MDPI, IF: 3.28) and Advisory Board of *Particle & Particle System Characterization* (Wiley-VCH, IF: 3.83).

## NDDTE 2021 KEYNOTE SPEAKER



### **Dr. Seongtae Bae, University of South Carolina, USA**

**Topic of Keynote:** Colossal Magnetic Heat Induction Of Magnesium Shallow Doped  $\Gamma$ - $\text{Fe}_2\text{O}_3$  Nanofluids And Somatically Safe AC Magnetic Field Generator System For Clinical Safe Hyperthermia

[View Abstract](#)

[Return to Top](#)

He is currently working as an assistant professor and a director of “Nanobiomagnetics and Bioelectronics Laboratory (NB2L)” in the department of electrical engineering at the University of South Carolina (UofSC), Columbia, USA. In addition, he has a joint appointment with biomedical engineering program in the college of engineering and computing at UofSC. Prior to joining the UofSC, he was an associate professor in the department of neurosurgery at the Seoul National University (SNU) college of medicine, Seoul, KOREA, and he was also an assistant professor in the department of electrical and computer engineering at the National University of Singapore (NUS) (Singapore) for 9 years before joining SNU. While he was at the SNU, he was doing clinically translatable biomedical researches to develop magnetic nanofluid hyperthermia systems for brain tumors and bioelectronics engineering researches to design and commercialize new types of bioinstrumentations and medical devices/electronics for neurodegenerative diseases, neuromodulation, and cancers. Furthermore, while he was at the NUS, he established “Biomagnetics Laboratory (BML)” in 2005 to support basic applied researches and education in the field of biomagnetics, nanomedicine, and applied biospintronics.

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[https://avestia.com/RAN2021\\_Proceedings/](https://avestia.com/RAN2021_Proceedings/)

# ICNNFC 2021 KEYNOTE SPEAKER



## **Dr. Ian Manners, University of Victoria, Canada**

**Topic of Keynote:** Functional Nanoparticles via “Living” Crystallization-Driven Self-Assembly

[View Abstract](#)

[Return to Top](#)

Ian Manners is Canadian and British. He was born in London, England and, after receiving his B.Sc. and Ph.D. in the UK he conducted postdoctoral work in Germany and then in the USA. He joined the University of Toronto, Canada as an Assistant Professor in 1990 and was promoted to Full Professor in 1995 and was made a Canada Research Chair in 2001. In 2006 he returned to the UK to take up a Chair at the University of Bristol in Inorganic, Macromolecular and Materials Chemistry supported by an EU Marie Curie Chair. In 2018 he was awarded a Canada 150 Research Chair at the University of Victoria, Canada on Vancouver Island where he has set up a new research group.

Ian's research interests broadly focus on synthetic problems at molecular, macromolecular, and longer length scales. His current research projects include: catalytic main group chemistry and main group polymers, functional metallopolymers, crystallization-driven self-assembly of polymers, and nanoelectronics, catalysis, and nanomedicine with soft materials. He is the recipient of a wide range of national and international awards including a Alfred P. Sloan Fellowship (from the US), the Steacie Prize (from Canada), the RSC Award in Main Group Chemistry, and a Humboldt Research Award from Germany. Most recently he received the RSC de Gennes Prize (2017) and a 1000 Talents Award from China (2018) to support a Distinguished Visiting Professorship and satellite lab at Shanghai Jiao Tong University.

Form more information Please visit:

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## ICNNFC 2021 KEYNOTE SPEAKER



### **Dr. Dongyang Li, University of Alberta, Canada**

**Topic of Keynote:** Explore the Application of Electron Work Function in Material Design towards “Electronic Metallurgy”

[View Abstract](#)

[Return to Top](#)

Dr. Dongyang Li is a Professor at Dept. of Chemical & Materials Eng., University of Alberta. His interests of research include materials design, nano-materials, wear and corrosion, and computational materials science. Dr. Li is on the editorial board for eighteen technical journals and is the recipient of MetSoc 2020 Distinguished Materials Scientist Award in recognition as a renowned scientist and innovative researcher in tribo-materials (The Metallurgy and Materials Society). Dr. Li has in excess of 370 technical publications, including more than 330 journal publications. He is an invited contributor for authoritative handbooks (Elsevier, Springer, and ASM International). Dr. Li is a Fellow of the Institute of Materials, Minerals & Mining (FMMM) and a Fellow of the Institute of Physics (FInstP).

# LIST OF PAPERS

The following papers were presented at the 6th World Congress on Recent Advances in Nanotechnology (RAN 2021).

## Nanomaterials, Nanodevices: Fabrication, Characterization and Application

**Titles:** Multilayer Graphene Encapsulation on the Fe Nanoparticles Starting from Fe Chloride Precursors

**Authors:** Siddika Mertdinç, M. Lütfi Öveçoğlu, Duygu Ağaoğulları

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**Titles:** Electroless Nano-Plating in Ion-track Etched Polymers: Iridium- and Bismuth-coated Membranes for Catalysis and Sensing Applications

**Authors:** Martin Christoph Scheuerlein, Wolfgang Ensinger

[View Paper](#)

**Titles:** Tio<sub>2</sub> as a Nanocarrier of Antibiotics (Quinolones): A Molecular Docking Assay

**Authors:** Esthela Paola García-Tejada, Ángel Albino-Flores, Jorge Emmanuel Mejía-Benavides, Lucero Fuentes-Ocampo, Erik Diaz-Cervantes

[View Paper](#)

[Return to Top](#)

# LIST OF PAPERS

## Nanomaterials, Nanodevices: Fabrication, Characterization and Application

**Titles:** Reduction of Pneumatic Pressure Loss in Nanoporous Media Using Vertically Aligned Nanochannels

**Authors:** Byeong Hee Tae, Woong Ki Jang, Byeong Hee Kim, Young Ho Seo

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**Titles:** Investigation of the Metal Cations Adsorption Selectivity Using Nanocavities-Rich Polyamine-Cross-Linked PMVEAMA

**Authors:** Mateusz Pawlaczyk, Grzegorz Schroeder

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**Titles:** Stability of Copper Nanoparticles in Media Imitating the Real Environment

**Authors:** Zuzana Bytešníková, Martina Koláčková, Pavel Švec, Anna Jánová<sup>1</sup>, Dalibor Húska, Vojtěch Adam, Lukáš Richtera

[View Paper](#)

[Return to Top](#)

# LIST OF PAPERS

## Nanomedicine, Drug Delivery, and Tissue Engineering

**Titles:** Toxic Metals Chelation by 18-Crown-6 Ethers in Multiple Solutions and Quantification by Spectroscopic Techniques

**Authors:** Andrew L Cook, Fan Xue, Todd D Giorgio

[View Paper](#)

**Titles:** A New Generation of Biomolecular Sensors Based on Polymeric Ion Conducting Nanopores for Medical Diagnostics

**Authors:** Wolfgang Ensinger

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**Titles:** Impact of Nanoparticles on Bacteria and Mycobacteria

**Authors:** Josef Jampilek, Martin Pisarcik

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**Titles:** Tracking Phagosome-Derived Vesicles in Macrophages with Microfabricated Microparticles

**Authors:** Wenhao Cheng, Sundol Kim, Sandra Zivkovic, Yi Ren, Hoyong Chung, Jingjiao Guan

[View Paper](#)

**Titles:** pH-Sensitive Hybrid Nanoparticles for the Controlled Release of Tyrosine Kinase Inhibitors

**Authors:** Andra-Sorina Tatar, Simion Astilean, Sanda Boca

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[Return to Top](#)



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International ASET Inc. would like to thank the following sponsors for their support of RAN 2021:



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[Return to Top](#)

# JOURNAL PUBLICATION

Selected articles from the congress will be published in the following journal after a secondary review process:

[IJTAN - International Journal of Theoretical and Applied Nanotechnology](#)

**The publication fee will be waived for papers that win the Best Paper Award. Other attendees will receive a 25% discount towards the publication fee of the journal.**

This journal has adopted to the open-access model, meaning all free access to the journal's articles and content with no need for subscription. This ensures larger audience and therefore higher citations.

Users are allowed to read, download, copy, distribute, print, search, or link to the full texts of the articles in this journal without asking prior permission from the publisher or the author. This is in accordance with the BOAI definition of open access.

All published papers of IJTAN will be submitted to Google Scholar, Microsoft Academic Search, Open J-Gate, Mendeley, Index Copernicus International, Academic Index, Mendeley, Primo Central, and Genomics JournalSeek for possible indexing. Additionally, they will be permanently archived in Portico (one of the largest community-supported digital archives in the world) and will be assigned unique DOIs.

[Return to Top](#)

# RAN'22

The 8th World Congress on Recent Advances in Nanotechnology (RAN 2022) will be held on April 07 - 09, 2022 in Lisbon, Portugal.



For inquiries and to obtain further information on the congress, please visit the [website](https://lisbon2022.rancongress.com)

You can also email [info@rancongress.com](mailto:info@rancongress.com) or call us

at: +1-613-834-9999

[Return to Top](#)

# ETHICS & MALPRACTICE

## Publication Ethics and Publication Malpractice Statement

The following statement is mainly based on the [Code of Conduct and Best-Practice Guidelines for Journal Editors](#) (Committee on Publication Ethics, 2011).

### Scientific Committee

#### ***Scientific Committee***

Scientific committees consisting of experts in the fields are established. The committees oversee the peer-review and publication process. To see the scientific committee members, please follow the link below.

#### [Scientific Committee](#)

#### ***Equality and Decisions***

One or more reviewer, scientific committee member, or chair, (internal or external), are responsible for evaluating the relevance of the submitted manuscripts to the proceedings, technical and scientific merit, originally, and impact. These evaluations are to be carried out regardless of ethnicity, religion, gender, sexual orientation, political beliefs, and institutions. Successive to peer-review, the Chair has full authority and is solely responsible for the published content and the process thereof.

#### ***Confidentiality***

Scientific committee member(s) and publishing staff may not disclose manuscripts or their content, directly or indirectly, to anyone other than individuals invited to review the manuscript (whether they accept or not), other reviewers of the same publications, and publishing staff.

#### ***Conflicts of Interest***

Scientific committee member(s) and publishing staff may not utilize the contents of submitted manuscripts whether accepted or rejected, directly or indirectly for their own research purposes without prior written consent by the authors.

# ETHICS & MALPRACTICE

## Reviewers

### ***Contribution to Decisions***

In order for final decisions to be made regarding acceptance or rejection of papers, we rely on peer-review. Peer-review is the process of experts in the field reading, understanding, and objectively commenting on submitted papers. Through peer-review, scholars give back to the academic and scientific community by helping the chair(s) make decisions regarding manuscripts.

### ***Promptness***

Reviewers should promptly notify the chair(s) if they are unable or unqualified to carry out their reviewing duties. Reviewers should do their best to provide the reviews to the chair(s) as promptly as possible, and within the designated time-frame.

### ***Confidentiality***

Reviewers must not share the contents of the manuscripts they receive for review, regardless of their decision to review or contents of the review, directly or indirectly, with anyone other than the person who has assigned the review.

### ***Fairness***

Reviewers should review manuscripts fairly and objectively, with supporting evidence or arguments, regardless of personal feelings or biases.

### ***Thoroughness***

Reviewers should thoroughly read, understand, and provide constructive feedback with the aim of improving the manuscript. Reviewers should aim to identify and report technical issues, irregularities, mistakes, missing citations, and similarity to other published work.

### ***Conflicts of Interest***

Invited reviewers should immediately inform the chair(s) in case of a conflict of interest based on competitive, collaborative, personal, family, and other relationships with the authors or people involved in the work.

# ETHICS & MALPRACTICE

## Authors

### ***Authorship***

Only persons who have significantly contributed to the work and the manuscript can be named authors on a paper. These contributions include the idea/concept, design, experiments, evaluation, analysis, drafting or revision of the manuscript, and others. Authors must all have agreed to be named as such and for the manuscript to be submitted. Anyone who has contributed based on the above, but the level of contribution is not significant, may appear in the acknowledgement section of the manuscript.

### ***Accuracy, Originality, and Plagiarism***

Authors should describe their work and the results of their work accurately and in full. The level of provided accuracy and detail should be such that a reader can replicate the work independently. Inaccurate, incomplete, fraudulent, and misleading statements are considered unacceptable and unethical. Direct or indirect use of other people's work is not allowed, unless properly cited. Previous works that have influenced the current work should also be cited. Presenting someone else's work as one's own is strictly prohibited and is considered plagiarism.

### ***Data and Material***

Authors are encouraged to share their data, software, or other sharable material online, provided copyright and ownership laws surrounding that particular project permit. Authors may also be asked to share such material with the chair(s), and/or reviewers, and must be willing to do so if asked.

### ***Dual Submissions***

Submitting a manuscript to more than one venue (conference, journal, etc) simultaneously is not allowed. Presenting previously published work to be considered as a new submission, without a significant new interpretation or analysis, is prohibited.

# ETHICS & MALPRACTICE

## ***Conflicts of Interest***

Authors must notify the chair(s) at the time of submission, if any factor outside the scope of the research has influenced any step of the work and manuscript writing. Examples of such factors include but are not limited to funding, grants, advisory and consultancy, stock ownership, current or past employment, and memberships, among others. All funding sources should be disclosed in the manuscript.

## ***Animal and Human Subjects***

Works involving human and/or animal subjects must ensure that the work has abided by institutional guidelines, and pre-approved by required bodies. Moreover, consent must be acquired from participants, and privacy of subjects must be ensured. All of the above must be specified with clear statements in the manuscript.

## ***Hazardous Material***

It should clearly be identified in the manuscripts if the works have involved hazardous chemicals and material, or devices that can be harmful.

## ***Reporting of Mistakes, Errata, and Retractions***

If an author identifies a major error in a published paper, he/she must immediately identify the publisher. Regardless of whether a significant error is reported by the authors of the work or other readers, authors are obligated to take the necessary steps to correct the issue. It is decided on a case-by-case basis whether an erratum will be submitted to notify future readers of the error and correction, or whether the paper will be retracted.

Unethical/plagiarism issues mostly result in a retraction, while unintended mistakes will mostly result in the publication of an erratum.

# ETHICS & MALPRACTICE

## **Publisher**

### ***Errata and Retractions***

The publisher takes the necessary steps to prevent mistakes, academic and scientific misconduct, and unethical behavior, both intended and unintended. When mistakes are reported, the publisher works with chair(s) and authors to publish an erratum clarifying the issue. In cases where the mistakes are severe and significant, the paper might be retracted. If unethical behavior, plagiarism, academic and scientific misconduct, or other such activities are proven to have taken place by an author or authors, the publisher will retract the paper.

### ***Content and Archiving***

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### ***Ownership and Management***

This conference-proceedings is managed and operated by the International ASET (International Academy of Science, Engineering, and Technology) and Avestia Publishing (the publishing arm of ASET).

### ***Schedule***

This conference proceeding accompanies the conference, meaning a new proceedings will be published every year for the corresponding annual conference of this series.



# CONTACT US

The 6<sup>th</sup> World Congress on Recent Advances in Nanotechnology (RAN 2021) consist of 2 conferences. You can contact each conference using the information below.



6<sup>th</sup> International Conference on Nanomaterials,  
Nanodevices, Fabrication and Characterization

Email: [info@icnnfc.com](mailto:info@icnnfc.com)

Website: <https://lisbon2021.icnnfc.com>



6<sup>th</sup> International Conference on Nanomedicine,  
Drug Delivery, and Tissue Engineering

Email: [info@nddte.com](mailto:info@nddte.com)

Website: <https://lisbon2021.nddte.com>

For inquiries and to obtain further information on the congress, please visit the [website](#)

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[Return to Top](#)