**APPLICATION DEADLINE**

**Application deadline: 26th June 2020**
Event Dates: 7-11 September 2020
Chelyabinsk, Russia

**BACKGROUND**

The themes for the 5th BRICS YSF are focusing on 3 thematic areas:

(i) Ecology,  
(ii) Materials Science,  
(iii) and Application of Artificial Intelligence in the areas of Ecology and Materials Science,

will highlight the strategic importance of science, technology and innovation as key drivers of youth entrepreneurship and leadership.

The themes are explored in detail below and more information can be found in the attached booklet.

i) Ecology

1) **Clean air**: condition monitoring, sensors, measurements of pollution in atmospheric air and emissions, modeling and predicting the state of atmospheric air using digital twins, air quality control;  
2) **Pure water**: development of the best available water purification technologies, technological rehabilitation of water bodies, hybrid technologies for transferring industrial and agricultural enterprises to a closed water cycle;  
3) **An integrated solid waste management system**: developing the best available technologies for processing solid industrial waste, designing finished products based on the life cycle, taking into account the subsequent collection and disposal, technology of biodegradable materials to reduce the overall load on the ecosystem;  
4) **Natural resources management**, including the development of algorithms for the rational use of planetary resources, energy and resource-saving technologies, production and microchipping of organic products for use by a traceability system;  
5) **Bioecology**: the study of the relationships of living organisms with their environment, study of the influence of certain groups of animals, insects, microorganisms on environmental changes, developing ways of reducing the risks of human intoxication with mycotoxins of plant materials; autecology: the study of the individual relationships of individual species of organisms on the environment; the study of biological methods of controlling plant pests (the study of the ecological mechanisms of the influence of the locust family on the fauna and environmental situation of the regions; the influence of the river beaver population on the change in the physical, geographical and environmental characteristics of their habitats, etc.);  
6) **Virus and pathogen ecology**: the impact of viruses and bacteria on the planet, in particular, the impact of the COVID-19 pandemic on the environmental situation in the world; issues of the emergence, spread, and possible mechanisms for stopping disease outbreaks. Emergency preparedness and response;
7) **Human ecology**, including the development of technical and methodological systems for improving the physical and psychological state of a person in the short and long term, as well as the development of environmentally friendly materials and design solutions for creating environmentally friendly housing, including eco-settlements;

8) **Environmental compliance**: the ability of an organization, city, region to comply with environmental norms and rules, both external and internal, including assessment, management and control systems associated with the risks of non-compliance with regulatory documents, rules and standards of supervisory authorities, legislation requirements.

**ii) Materials science**

1) New metallic materials, as well as the new generation metal-matrix composite materials (both construction and functional); the development of methods for designing automotive, aerospace, and construction products using aforementioned materials;

2) Materials for additive manufacturing, including gas-dynamic spraying and laser surfacing; nano and microadditives in alloys, prediction of the properties of metals and alloys with additives, technology for the production of innovative steels and products from them;

3) New functional materials, including nanomaterials, whose operational characteristics (magnetic, electrophysical and optical properties, catalytic activity) can be changed using quantitative control;

4) Materials resistant to extreme conditions, including new polymers and nanomaterials, for energy sector (including nuclear energy, as well as actively developing sectors of alternative energy) and for space sector;

5) **Nature-like medical materials** (including hybrid and nanostructured), in particular, innovative polymers and the creation of artificial organs based on them;

6) New composite materials resistant to extreme conditions (including Arctic conditions), for use in the construction industry;

7) New functional and construction materials, including nanomaterials containing carbon, namely: fullerenes, carbon nanotubes, graphene, glassy carbon, etc.;

8) Nature-like materials for use in modern electro-chemical energy sector: magnetic, ferroelectric, luminescent and ion-conducting mineral-like functional materials, including new mineral-like piezoelectric and optical materials;

9) Minerals and mineral-like compounds as components of heat-resistant ceramics and matrix-immobilizers of toxic and radioactive elements.

**iii) Artificial Intelligence**

1) Development and application of artificial intelligence methods for solving the digital industry challenges (sensorics of industrial facilities, creation of digital twins, energy saving, information security of industrial facilities);

2) Creation of a multi-biometric information system using artificial intelligence methods, surpassing in its capabilities all known biometric systems in the world;

3) The use of artificial intelligence to solve the environmental problems of large industrial agglomerations;

4) Creation of advanced computer vision systems for solving a wide range of tasks (control of production processes, medical diagnostics, adaptive traffic control, safety and counter-terrorism, production of autonomous robotic devices);

5) Development of methodology and algorithms for the classification and formation of forecasts based on the analysis of Big Data;

6) Machine learning methods for solving combinatorial optimization challenges (application of combinatorial optimization: to develop the optimal air traffic network; to develop the best way to deliver goods; in applied sociology; in business research – to predict the behavior and preferences of consumers, competitors and markets, etc.);

7) Development of algorithms for creating synthetic images based on the architecture of generative-competitive neural networks (creation of technology for improving Deep HD images based on generative-competitive neural networks);

8) Development of a unified payment system based on cryptocurrency; improvement of national payment systems and their continuous implementation as an element of economic cooperation between the BRICS countries in the face of growing market risks of the global payment infrastructure.
Funding offered.
International air travel related expenses (airfare, medical insurance etc.) shall be met by the DSI whereas local hospitality i.e. food, accommodation and local transport in Russia will be supported by the host country for the duration of the conference. We request those applying to be in possession of a Passport (or apply for one sooner) for ease of logistics. This will be obtained at own cost but does not mean automatic selection.

ELIGIBILITY CRITERIA

To be considered eligible a candidate must:

– Be a South Africa citizen
– Be under the age of 40
– Must be a Doctoral student or Post-Doctoral Fellow or a young faculty member who has completed a masters or a PhD degree in one of the above-mentioned thematic areas
– Have research interests in the conference themes
– Commit to be present and active for the duration of the conference

HOW TO APPLY

Applicants are asked to submit an abstract which will be the basis of the presentation at the conference. Abstracts should follow the following format:

• Must not be more than 300 words (excluding Title, Author and Institution) in the online application form
• Must be written in English
• The title must be in boldface, capital letters (lowercase) and centered
• The font must be in font size 11

Must include the following information:

• Title, Author(s), Institution(s)
• Name of first author should be underlined (Please do not underline co-authors)
• Institutional affiliations for all authors
• The superscript numbering must be in front of each initial and surname of each author

Where appropriate, the text may be structured using the following headings:

• Introduction or Objectives
• Discussion
• Recommendations
• Conclusion

In addition to the abstract, applicants should submit a short motivation (1 page at most). The chosen presenters are asked to not simply focus on their research but should engage with the theme(s) and answer its requirements. Presentations that address challenges pertaining to BRICS countries and provide possible recommendations are preferable. The conference format is a Forum, which is a discussion group, where ideas related to a subject under discussion can be raised and evaluated on a (more-or-less) equal and informal basis.

Applications are submitted online at: https://forms.gle/stnLWqvsKvsbBbKS6

Please send a complete copy with all supporting documents, that you have submitted online to the Faculty Research Office – natasha.jeftha@up.ac.za
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CONTACTS FOR CALL QUERIES

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