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Topic of the Speech:
Bio-inspired Nano-textiles for Combating Future Challenges

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Professor Rajesh Mishra works at the Czech University of Life Sciences Prague, Czech Republic. His research areas are nanomaterials and nano-textiles, textile structural composites, green composites, nanocomposites, biomechanical engineering of fibrous structures, thermo-mechanical characterization of materials etc.

He has about 165 publications in international journals and about 270 presentations in international conferences. His teaching and research activities include subjects based on nanotechnology, bio-materials, structural mechanics of fibrous structures in general and 3D woven structures in particular, textile quality characterization, engineering of textile structures, biomechanics of apparel textiles etc. He is responsible for internationals students education and research at the faculty of engineering. Till date he has successfully guided 5 PhD candidates leading to award of title. The graduates are highly placed in academia and industry around the world. At present a few more are continuing research in leading areas of technology. He has also developed educational and research cooperation with many organizations around the globe.

ABSTRACT SUBMISSION
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ABSTRACT (NO MORE THAN 500 WORDS:)

Important properties of materials, such as the magnetic, electric, optical, thermal, and mechanical properties, are determined by the way molecules and atoms assemble at the nanoscale. Nanoscience and nanotechnology are at the forefront of modern research, and they are considered the new revolution for the 21st century. Nanoscience education is still emerging, and unlike other areas of science education, there are some gaps to fill and explore the crucial ideas of nanoscience and nanotechnology. The continuous advance of nanomaterials science and its unprecedented application in more and more nanotechnology-based consumer products indicate that nanomaterials are crucial to develop new applications: biological challenges, medical diagnostics and treatment, solar energy harvesting, catalysis, and electro-optical applications. Given the expected economic and social impact of nanotechnology products and the fact that many areas of application are still scarcely explored, it can foresee that industrial use of nanomaterials will continue to increase in the future. Some nanomaterials (as nanofibrous assemblies) have some limitations for practical use because they are too weak and too sensitive to abrasion to be outer or inner part of structures in conditions of using and maintenance, they have some effect on nanolevel only, and they have serious limits for longer time durability in common conditions. Their effects are often only temporarily. Till now, there is unprecise information oriented to highlight "nano" from the point of view of scientific content and to suppress weakness in real conditions. Instead of seriousness, there are appeared "newspaper stories" oriented to dazzle customers (nanolayers with extremely thermal insulation, extreme surface area of nanolayers, nano is equivalent to stronger, etc.). Of course, there are some big advantages of nano, but there are serious limitations as well. Nanotechnology is one of the major worldwide research initiatives of the twenty-first century. They are applied to cross industrial problems and are a general purpose technology that acts as both a basis for technology solutions and at the convergence of other enabling technologies, like biotechnologies, computational sciences, physical sciences, communication technologies, cognitive sciences, social psychology, and other social sciences. Nanoporous materials, for example, aerogels, being the lightest solid materials known and given the great variety of possible chemistries capable of yielding wet gels, aerogels and composite aerogel materials have a tremendous potential in a wide range of applications, where high pore volume and high surface area play major roles. Nanotechnologies are pervasive solution vectors in modern economic environment. It is necessary to develop new methods to assess nanotechnology development to better understand nanotechnology-based innovation. Current nanotechnology developments have been successful up to a point: textile products incorporating nanotechnology are on the market. Nanoscience and nanotechnology research related to textile is rapidly advancing, the rate of growth of the scientific production remains up to 10% per year, and nanotechnology-based textile innovations are increasing. Nanotechnology has been seen as critical to twenty-first century scientific advancement, technology development, product innovation, and social innovation. In the future, it will be necessary to develop new methodologies for evaluating nanotechnologies applicable in textile field.