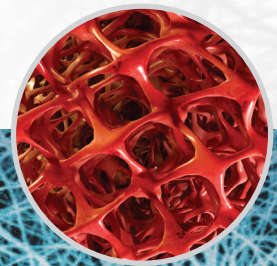


***NART 2015***  

---

*NANOFIBERS, APPLICATIONS  
AND RELATED TECHNOLOGIES*

August 31 -  
September 2, 2015  
Liberec,  
Czech Republic



**Conference Proceedings**

*Edited by  
Stanislav Petřík*

Liberec 2015

**Reviewer(s):**

Papers individually double-blind peer reviewed.

© Technical University of Liberec, 2015

ISBN 978-80-7494-265-5

## Contents

<b>Foreword</b> .....	5
<b>Micro and Nanofiber Technology and Trends</b> .....	<b>7</b>
Homogeneity of finest fiber media for separation and filtration .....	9
Laser anemometry based measurement of electric wind generated by AC power source .....	17
Fabrication of nanofiber mats using novel bubble spinning technique .....	23
Improved fiber diameter determination of nanofibers through image analysis using a hierarchical scaling approach.....	29
Visualization of electrospinning process.....	37
Encapsulation and controlled release of bacteriophages for food protection using electrospun nanofibers.....	49
Wavelength transformation during electrospinning process .....	57
Scale-up of nozzle electrospinning plant.....	61
Nanofibers as a holder for increasing the immobilization and enhancements of microorganisms behavior.....	69
A visualization of rising fibres from wire technology process.....	75
Porous electrospun PCL fibres in a single step by phase separation.....	87
Structure and morphology of PLA porous nano/microfibers layers .....	95
Melt centrifugal spinning of biocompatible and biodegradable polymers.....	103
<b>Micro and Nanofibers and Related Materials</b> .....	<b>111</b>
Functional nanofibers for practical applications.....	113
Preparation of polylactide-based nano- and microfibers with antibacterial properties.....	121
Enhanced photocatalytic activity of electrospun TiO <sub>2</sub> /ZnO nanofibers.....	131
Combination of electrospun nanofibers and surface modified 3D printing for knee cartilage tissue engineering .....	135
Ultraporous interweaving electrospun microfibers from PCL–PEO binary blends and their cellular response.....	143
Fabrication and characterization of electrospun PCL/C60/MWCNTs nanofibers for microelectronic devices.....	147
PHBV/Sisal fiber/nano clay composites produced by casting technique.....	157
Mathematical estimation of web from nanofibres.....	165
New possibilities for the laboratory study of the migration of zero-valent nanoiron .....	169
Preparation of iron gall nut ink and study of the nanoparticles stability .....	173
Bioactive coating of silica nanofibers and its influence on different types of cell cultures .....	181
Fibre reinforcement effect on plaster composite properties.....	189
Silica nanofibers, their preparation and properties .....	197
Experimental investigation on continuous filtration of nano-aerosols by filter composed of dual-layers including a nanofiber layer.....	205

<b>Micro and Nanofibers and Other Nanomaterials in Products.....</b>	<b>211</b>
Nanofiber drain for glaucoma drainage implants .....	213
2D and 3D structured nanofibrous scaffolds by electrospinning/electrospraying for tissue engineering.....	219
Electrospinning of a combined chromophore and protein patch to improve laser tissue soldering.....	225
Natural materials with a high content of SiO <sub>2</sub> nanoparticles and the methods of their extraction.....	233
Protein-based nanofiber membranes with functional nanoparticles.....	243
Optimizing scattering layer for efficient dye sensitized solar cells based on TiO <sub>2</sub> nanofibers .....	251
<i>In vitro</i> study of SiO <sub>2</sub> -based electrospun nanofibers.....	257
Medical and biochemical applicability of silica nanofibers .....	263
<b>Authors Index .....</b>	<b>271</b>

## Foreword

Micro- and nanofibers are materials which drive dramatic innovations in many application fields. The “Nanofibers, Applications and Related Technologies – NART 2015” conference, co-organized by Technical University of Liberec, Czech Republic, and North Carolina State University, NC, USA, brought together experts from universities, research institutes and industry who share passion for innovative solutions involving micro- and nanofibers and other related nanomaterials. The scope of the event is broad and caters to both academic and industrial interests. The objective of the conference is to accelerate adoption of micro- and nanofibers and related (nano)technologies in a wide range of applications.

NART 2015 was the first in a series of conferences which will be organized annually on both sides of the Atlantic Ocean. Technical University of Liberec is known as the birthplace of a new era in industrial technology for nanofibers. The reputation of the Nonwovens Institute at North Carolina State University comes from its commitment to industrial application of fine fibers. The essential condition for the success of both institutions is sustained and continuous attention to scientific research in the field of micro- and nanofiber technology, materials and their applications.

This Proceedings is a representative collection of full peer-reviewed papers submitted and presented by attendees from more than 20 countries. The contents of the publication follow the thematic structure of the conference program: 1. Micro- and Nanofiber Technology and Trends; 2. Micro- and Nanofibers and Related Materials; and 3. Micro- and Nanofibers and Other Nanomaterials in Products.

I want to thank all who contributed to the success of the conference: attendees, the organizing committee, staff members, authors and reviewers of the papers.

May NART 2016 in Raleigh, North Carolina, be the next “Nanofiber Event of the Year”!

Stanislav Petřík  
Editor

## Authors Index

- Adlhart, 29  
Ahirwal, 219  
Beran, 37  
Besenbacher, 143  
Bílek, 37  
Blažková, 103  
Blosi, 243  
Born, 49  
Carletto, 61, 243  
Constantinescu, 225  
Costa, 243  
Černík, 169  
Dangtungee, 157  
Danilová, 263  
Dauner, 9  
Deuber, 29  
Erben, 103, 189  
Escobar, 147  
Exnar, 197, 263  
Fieseler, 49  
Frenz, 225  
Fuchs, 49  
Georgiadou, 87  
Hančil, 75  
Hartig, 213  
Hébraud, 219  
Horáková, 135  
Hung, 205  
Chase, 113  
Chen, 143  
Chudoba, 257  
Chvojka, 23, 135  
Jašíková, 17, 75  
Kabra, 225  
Kalous, 17, 57, 189  
Katsogiannis, 87  
Kejzlar, 95  
Klápšťová, 213  
Kolčavová Sirková, 69  
Komárek, 37  
Kopecký, 75  
Kotek, 17, 75  
Krenek, 75  
Kroisová, 233  
Kryšková, 189  
Kříž, 135  
Křížová, 173  
Kuželová Košťáková, 103, 135  
Lachman, 135  
Lederer, 69  
Leung, 131, 205, 251  
Li, 143  
Lovětinská-Šlamborová, 197, 263  
Lukáš, 17, 37, 57, 213  
Macajová, 95  
Malašauskienė, 165  
Manolova, 121  
Martinová, 181  
Mazel, 257  
Mazzuchetti, 243  
Medrano, 147  
Mikeš, 213  
Milašius, 165  
Molinari, 147  
Moll, 225  
Monsalve, 147  
Mrazík, 169  
Nedjari, 219  
Novák, 23  
Ortelli, 243  
Paneva, 121  
Parma, 169  
Pavlovic, 49  
Pechočiaková, 189  
Pei, 131  
Pelcl, 135  
Petráň, 233  
Pokorný, 17, 189  
Poláková, 181, 257  
Puchalová, 103  
Pytlik, 257  
Ramirez, 61, 243  
Rampichova, 135  
Rashkov, 121  
Rysová, 181, 257  
Samková, 189  
Sanetrník, 23, 69  
Schlatter, 219  
Schönfeld, 225  
Siengchin, 157  
Skřivánek, 37  
Soukupová, 17, 37, 57  
Spasova, 121  
Srisuk, 157

Svobodová (Křiklavová), 69  
Srová, 181, 257  
Šafka, 135  
Tensuthiwat, 157  
Tonetti, 243  
Toncheva, 121  
Ullrich, 9  
Valtera, 37  
Varesano, 61, 243  
Veverková, 263

Vineis, 243  
Vladisavjevic, 87  
Vysloužilová, 37  
Wiener, 173  
Windschiegl, 9  
Wittmer, 219  
Yang, 251  
Yuen, 205  
Žabka, 37

Liberec, Czech Republic, August 31 – September 5, 2015

Title	Nanofibers, Applications and Related Technologies - NART 2015, Conference Proceedings
Editor	Stanislav Petrík
Publisher	Technical University of Liberec, Czech Republic
Approved by	Rector's Office TU Liberec on December 18, 2015, Document No. RE 90/15
Published	December 2015
No. of Pages	274
Edition	1 <sup>st</sup>
Publication No.	55-090-15

---

ISBN 978-80-7494-265-5