



## Dr. Behrouz Ghorani

Assistant Professor

Director of International Scientific Cooperation Office  
Editorial Board Member of American Journal of Food Science & Health

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### Research Interest

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- *Electrospinning (Nanofibres)*
- *Electrospraying (Nanocapsuls)*
- *Drug Delivery Systems*
- *Encapsulation*
- *Molecular Imprinting Technique*
- *Filtration*

### EDUCATION

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2008-2012

UNIVERSITY OF LEEDS

Leeds, UK

*Provisional PhD in the School of Design (Nonwovens Research Group –NRG)*

- Production and Properties of Electrospun Webs For Therapeutic Applications

**Project Summary:** The research concerns the formation and structure–property relationships of nanofibrous nonwoven fabrics formed by various techniques including electrospinning and fluid jet entanglement. The field of research in therefore nanotechnology in technical textile materials and will span natural and synthetic polymer materials. The research is principally concerned the electrospinning and properties of fibrous webs containing drugs, biomolecules and other potentially therapeutic compounds. Using the same electrospinning production platform and solvent systems, the research was then extended to investigate the feasibility of a second technology. The molecular imprinting of electrospun fibres was investigated using the metabolite, creatinine as the template molecule. The study was extended to explore the feasibility of molecular-imprinting polysulphone electrospun fibres using the same template molecule. To facilitate this, a new solvent system was developed for electrospinning polysulphone that enabled low-temperature solvation of the polymer. Both of technology platforms (molecular-loading and molecular-imprinting of electrospun fibres) were relevant to the design of improved therapeutic products for applications in healthcare.

- 2003-2006      **SCIENCE & RESEARCH UNIVERSITY**      Tehran, IRAN  
*Candidate for Master of Textile Engineering*
- Blending behavior of fibers during processing of Mélange worsted yarns using image processing technique
  - Honors Degree
- 1999-2003      **UNIVERSITY OF KASHAN (ISLAMIC AZAD UNI)**      Kashan, , IRAN  
*Bachelor degree Textile Engineering*
- Honors Degree

### **Academic & Research Experience**

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2015- Date      **EDITORIAL BOARD MEMBER**

*American Journal of Food Science & Health  
American Institute of Science (AIS)*

2012-Date      **THE RESEARCH INSTITUTE OF FOOD SCIENCE & TECHNOLOGY**      Mashhad-IRAN  
*Assistance Professor  
Team Leader of Electrospinning Research Group*

2012-Date      **Academic Teaching Experience (RIFST):**  
*Course: Fundamentals of Electrospinning and Electrospaying techniques and their utilizations  
in food Science & technology.*

### **Research Projects (RIFST):**

1. Preparation of odor absorbent nanofilters by incorporating Cyclodextrin into electrospun cellulose acetate webs, Fully Funded by Iran National Science Foundation (INSF)
2. Preparation of nebulised powder of Saffron bioactive compounds, Fully Funded by Esfedan saffron trading Co. (**Patent Pending**)
3. Encapsulation of probiotic bacteria in hydrocolloid/protein networks by Electrospinning, International Joint Project / Funded by King Mongkut's University of Technology Thonburi, KMUTT –Thailand.
4. Sustained release of caffeine by microencapsulation in hydrogels using electrodynamic atomization, International Joint Project, Funded by The New Zealand Institute for Plant and Food Research Limited.
5. Encapsulation of probiotic bacteria in prebiotic networks of resistant starch & alginate- Chitosan hydrogel by electrospaying technique, International Joint Project : Funded by NIZO food research, Netherlands .
6. Developing a novel pH-responsive electrospun nanosensor for monitoring the fish spoilage, **Young Scientist Awards 2013**, From ISESCO Center for Promotion of Scientific Research.
7. Production of electrospun protein-based nanocarriers for vitamin C, Funded by Department of Food Science & Technology of Ferdowsi University of Mashhad.

8. Synthesis of Mecoprop Imprinted Polymer and its Adsorption Performance for Phenoxy Acids, Funded by Research Institute of Food Science & Technology (RIFST).
9. The Development of Thermochromic Electrospun Nanofibres for Monitoring of Temperature, **Prize winner of The Third World Academy of Sciences (TWAS)** , 2016

2011-2012	<p><b>NONWOVEN RESEARCH GROUP (NRG)</b>  <b>Centre for Technical Textiles (CTT)</b>  <i>Researcher</i></p> <ul style="list-style-type: none"> <li>• Responsible to develop a new therapeutic medical product (<b>Patent Pending</b>)</li> </ul>	Leeds, LS2 9JT
2009-2012	<p><b>MSC PROJECT SUPERVISOR</b>  <i>Nonwoven Research Group (NRG), University of Leeds</i></p> <ul style="list-style-type: none"> <li>• Electrospinning Chitosan- Cellulose acetate blends ion exchange nanofibres, George Salihu, B.Ghorani and S.J. Russell.</li> <li>• Novel Molecular Recognition sites in Electrospun polymer Nanofibres via alternative molecular imprinting, Mitej Gala, B.Ghorani , S.J. Russell and P. Goswami.</li> <li>• Assembling of electrospun PCL based fabric for functional tissue engineering, Zohreh Gharaei, S.J Russell and B.Ghorani.</li> </ul>	Leeds, LS2 9JT
2008-2012	<p><b>LAB DEMONSTRATOR</b>  <i>University of Leeds</i></p> <ul style="list-style-type: none"> <li>• Responsible for preparing of instructional materials for lab.</li> <li>• Assist student with assignments &amp; demonstrate techniques in the use of specialized equipment</li> </ul>	Leeds, LS2 9JT
2008-2012	<p><b>TEACHING ASSISTANT</b>  <i>University of Leeds</i></p> <ul style="list-style-type: none"> <li>• Obliging students to better understand the course material.</li> <li>• Responsible of marking/grading papers or tests</li> <li>• Lecture : Principles of Electrospinning</li> </ul>	Leeds, LS2 9JT
2008-2012	<p><b>UNIVERSITY OF LEEDS</b>  <i>Chief Invigilator</i></p> <ul style="list-style-type: none"> <li>• Responsible for ensuring that external assessments, including those for Assessment Arrangements candidates, are conducted in accordance with university policy and instructions.</li> <li>• Responsible for delegating the respective tasks including allocating the areas of the venue to be observed and looked after.</li> </ul>	Leeds, LS2 9JT

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|-----------|--|----------------|
| 2008-2009 | <b>NONWOVENS INNOVATION AND RESEARCH INSTITUTE LTD (NIRI)</b><br><i>Technical Project Coordinator</i>  | Leeds, LS2 9JT |
|           | <ul style="list-style-type: none"> <li>• Responsible for a Company Project : Increasing the quality and structure of depilatories</li> </ul>   |                |
| 2006-2007 | <b>JAMEE SPINNING &amp; WEAVING CLOTHES FACTORIES</b><br><i>Designer, Spinning Team Leader</i>   | Mashhad, IRAN  |
|           | <ul style="list-style-type: none"> <li>• Responsible for designing fabrics</li> <li>• Responsible for managing spinning unit with 150 labors</li> <li>• Responsible for quality control and delivery garments to customers.</li> </ul> |                |

### **Students under my Supervision**

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1. Electrospinning Chitosan- Cellulose acetate blends ion exchange nanofibres, George Salihu, MSc student (2010), University of Leeds.
2. Electrospinning of Cyclodextrin functionalized Cellulose acetate nanofibres for fluid filtration, Mitej Gala, MSc student (2011), University of Leeds.
3. Assembling of electrospun PCL based fabric for functional tissue engineering, Zohreh Gharaei, MSc student (2012), University of Leeds.
4. Production of electrospun protein-based nanocarriers for vitamin C, Mohamad Amin Miri, PhD student (2014), Ferdowsi University of Mashhad.
5. Sustained release of caffeine by microencapsulation in hydrogels using electrodynamic atomization, Alireza Mehragan Nikoo ,PhD student (2014), RIFST.
6. Synthesis of Mecoprop Imprinted Polymer and its Adsorption Performance for Phenoxy Acids, Elaheh Mansouri, PhD student (2014), RIFST.
7. Microencapsulation of probiotic bacteria with Inulin-Resistant starch via electrohydrodynamic atomization & study on the survival of bacteria, Davood Zaeim, PhD student (2014), RIFST.
8. Antibacterial effect of encapsulated Nisin in electrospun porous membranes on growing of " Listeria Monocytogenes ATCC: 7644, Mohiadin Kazemi, MSc student (2014), Faculty of Veterinary Medicine, Ferdowsi University of Mashhad.
9. Encapsulation of probiotic bacteria in hydrocolloid/protein networks by Electrospinning, Ali Alehosseini, PhD student (2015), RIFST.
10. Developing a novel pH-responsive electrospun nanosensor for monitoring the fish spoilage, Zahra Aghaei, PhD student (2015), RIFST.
11. Synthesis and study of holocromic behavior of electrospun proteins, Narges Arman ,MSc student (2015) Department of Physics, Faculty of Science, Ferdowsi University of Mashhad.

1. **B. Ghorani**, S. J. Russell, and P. Goswami, “*Controlled Morphology and Mechanical Characterisation of Electrospun Cellulose Acetate Fibre Webs*,” International Journal of Polymer Science, vol. 2013, 12 pages.
2. **B. Ghorani** & Nick Tucker, “*Fundamentals of electrospinning as a novel delivery vehicle for bioactive compounds in food nanotechnology*”, Food Hydrocolloids, Volume 51, October 2015, Pages :227-240
3. B. Emadzadeh and **B. Ghorani**,, *5 - Oils and fats in texture modification*, In Woodhead Publishing Series in Food Science, Technology and Nutrition, edited by Jianshe Chen Andrew Rosenthal, Woodhead Publishing, 2015, Pages 99-112, Modifying Food Texture, ISBN 9781782423331.
4. Nikoo AM, Kadkhodae R, **Ghorani B**, Razzaq H, Tucker N (2015) “*Electrohydrodynamic Atomization Assisted Encapsulation of Bioactive Compounds*”. MOJ Food process Technol 1(2): 00010. DOI: 10.15406/mojfpt.2015.01.00010.
5. N. Tucker & **B. Ghorani**, “*Delivery of nano-tech food ingredients*”, Food Science and Technology, Vol. 29, Issue 4, December 2015.
6. **B.Ghorani**, N. Tucker & M. Yoshikawa,” *Approaches for the assembly of molecularly imprinted electrospun nanofibre membranes and consequent use in selected target recognition*”, Food Research International, Volume 78, December 2015, Pages 448-464.
7. **B.Ghorani**, P. Goswami and S.J. Russell, “*Parametric Study of Electrospun Cellulose Acetate (CA) in Relation to Fiber Diameter*”, Research Journal of Textile and Apparel, Vol. 19 ,No. 4 2015 .
8. Nikoo AM, Kadkhodae R, **Ghorani B**, Razzaq H, Tucker N , “*Control of swelling and release rate of electrospun fabricated calcium alginate microparticles by freeze-thaw cycles*” ,Journal of Food Science & Technology (In Persian Language) ,2016, No.13,Pages: 37-49.
9. **B. Ghorani**, “*Introducing Electrospinning as a New Approach in Food and Nutraceuticals Industry*”, Journal of Food Science & Technology (In Persian Language), 2016, No.13, Pages: 51-62.
10. E.Mansouri, M.Sarabi, **B.Ghorani** & S. A. Mohajeri,” *Molecular imprinting technique and its application in food sample analyses*’, Journal of Food Science & Technology (In Persian Language), 2016, Vo.13, Issue 61, Page: 67-87.
11. **B.Ghorani**, S.J. Russell, A .J. Hebden and P. Goswami, “*Single step assembly of biomolecule-loaded sub-micron polysulfone fibers* “, Textile Research Journal, 2016 (In Press).
12. Miri, M. A., Movaffagh, J., Najaf, M. B. H., Najafi, M. N., **Ghorani, B.** & Koocheki, A. 2016. “*Optimization of electrospinning process of zein using central composite design*”. Fibers and Polymers, 17, 769-777.
13. **B.Ghorani**, A.Alehosseini & N.Tucker, *12- Electrospinning as a novel delivery vehicle for bioactive compounds in food nanotechnology*, Innovative Processing Technologies for Foods with Bioactive Compounds, Edited by Jorge J. Moreno , CRC Press (In Press).

14. **B.Ghorani**, A.Alehosseini & N.Tucker , 8- Nano-Capsules Formation by Electrospinning, Nanoencapsulation Technologies for the Food and Nutraceutical Industries, In Woodhead Publishing Series in Food Science, Technology and Nutrition, edited by Mariana Kühl Leme & S.M.Jafari , Woodhead Publishing (In Press).
15. **B.Ghorani**, R.Kadkhodae & A. Alehosseini, ‘ *The Effect of Biopolymer Type, Temperature and Relative Humidity on the Physicochemical Characteristics and Stability of Microencapsulated Bioactive Compounds of Saffron*, Journal of Food Science & Technology (In Persian Language)- In Press.
16. **B.Ghorani**, R.Kadkhodae & B.Emadzadeh , ‘ *Optimization and Evaluation of the saffron extraction condition in the Binary and Ternary Solvent systems*’ ,Journal of Food Technology & Nutrition (In Persian Language)/ In Press.
17. Nikoo AM, Kadkhodae R, **Ghorani B**, Razzaq H, Tucker N , ‘ *Controlling the morphology and material characteristics of electrospray generated calcium alginate microhydrogels*’ ,Journal of Microencapsulation (In Press).

#### **Conference Presentation**

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1. *Factorial Study of Nanofibrous Cellulose Acetate Web Production using the Electrospinning Technique*, **B. Ghorani** & S.J. Russell, ICCE-18, July 4-10,2010,Anchorage,Alaska, USA.
2. *Approaches for the Assembly of Molecular Imprinted Nonwoven Materials and their Utilization in Selected Target Recognition*, **B.Ghorani**, S.J. Russell & R.S. Blackburn, Nonwoven Research Academy, EDANA 2010, Nov 16-17, Aachen, Germany.
3. *Electrospinning of Cyclodextrin of Functionalised Cellulose Acetate Nanofibres*, **B.Ghorani** & R.Kadkhodae , 14th International Nutrition & Diagnostics Conference (INDC 2014),2-5 September, Czech Republic.
4. *Fundamentals of Molecular Imprinting Technique and their Utilisation in Selected Target Recognition in Food Sample Analysis*, **B.Ghorani**, 14th International Nutrition & Diagnostics Conference (INDC 2014),2-5 September, Czech Republic.
5. *Electrospraying: a novel route toward synbiotic production*, **B.Ghorani**, M.Sarabi & D.Zaeim, 14th International Nutrition & Diagnostics Conference (INDC 2014), 2-5 September, Czech Republic.
6. *Fundamentals of Electrospinning, a Novel Delivery Vehicle for Encapsulation of Bioactive Compounds by Hydrocolloids* , **B. Ghorani** ,The 1st International Conference on Natural Food Hydrocollides , Mashhad- Iran ,2014 ( **Received Top Poster Award**).
7. *The Influence of Acacia Gum and Whey Protein on the Stability of Microencapsulated Bioactive Compounds of Saffron*, **B. Ghorani**, R. Kadkhodae & A. Sadeghian , The 1st International Conference on Natural Food Hydrocollides , Mashhad- Iran ,2014 ( **Received Top Poster Award**).
8. *Parametric study of Zein (food-grade protein) in relation to fibre diameter and as carrier for drugs and bioactive compounds* , M.Kazemi,J.Movafagh,A.Jamshidi,**B.Ghorani**,M.A.Miri &M.Azizzadeh, 3<sup>th</sup> National Congress on Food Science & Technology,Isfahan,Mashhad,Iran,2015.

9. *An Introduction to Electrospinning for Food Industry & Drug Delivery ,Challnges and Futrue Trends , B.Ghorani (Keynote speaker) ,23<sup>th</sup> National Congress on Food Science & Technology , Mashhad,Iran,2015.*
10. *Improving the release and swelling behavior of the electrospray fabricated calcium alginate microparticles by chitosan coating, A.M.Nikoo,R.Kadkhodae,B.Ghorani,N. Tucker & H.Razzaq, 23<sup>th</sup> National Congress on Food Science & Technology , Mashhad,Iran,2015.*
11. *Development of pH sensing electrospun nanofibers & its application for detecting food spoilage ,Z.ghaie, B.Ghorani, B. Emadzadeh & R. Kadkhodae , 23<sup>th</sup> National Congress on Food Science & Technology , Mashhad,Iran,2015.*
12. *Electrospinning for bioactives in foodstuffs, N.Tucker & B.Ghorani , International Conference on Electrospinning : Electrospinning ,Principles, Possibilities & Practice,IOP Institute of Physics,3-4 December 2015,Hallam Conference Centre , London,UK.*

### Workshops

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- Principles of electrospinning and its applications in food science & technology, **B.Ghorani**

#### Attendance Workshops:

- Physical and functional properties of natural hydrocolloids , jointly presented by Prof. Glyn O. Phillips, Prof.Katsuyoshi Nishinari,and Prof. Yapeng Fang, The 1st International Conference on Natural Food Hydrocollides , Mashhad- Iran ,2014 .
- Designing superior dispersants for food emulsions and colloids-alternative approaches and challenges, presented by Dr. Rammile Ettelaie , The 1st International Conference on Natural Food Hydrocollides , Mashhad- Iran ,2014 .
- Food Colloids & Oral Processing ,jointly presented by Prof. Jianshe Chen & Dr. Rammile Ettelaie ,Research Institute of Food Science & Technology (RIFST),Mashhad-Iran,2015.

### Honour & Awards

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1. 2011-2012: Obtained private funding from a charitable organization (cloths workers) to commence additional studies on developing a new therapeutic medical product.
2. 2002-2003: Won top student award and received the recognition certificate from the university chancellor.
3. 2002: 4<sup>th</sup> place in the MSc entry exam in IRAN.

### Skills & Activities

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- Certificate of training on full operation of **Elmarco Nanospider** technology.



- Certificate of training on full operation of scanning electron microscope (**SEM**), University of Leeds, UK.
- Certificate of attendance in various workshops on laboratory analytical equipment (**DSC, FTIR, HPLC, UV-VIS Spectrometer, Mastersizer**), University of Leeds, UK.
- Professional knowledge in different softwares and computer programming (Cybernetics, Image Pro-Plus 7, SPSS, Mat lab, Minitab, Microsoft Office & End Note).
- Good experience in image processing techniques.
- Fluent in written and spoken English.

## References

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### **Dr. Rassoul Kadkhodae**

*Associate Professor*

*President of Research Institute of Food science & Technology (RIFST)*

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### **Professor. S.J. Russell**

*Chair of Textile Materials & Technology*

*Deputy Director of the centre for Technical Textiles*

University of Leeds

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UK

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### **Dr. Bahareh Emadzadeh**

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### **Dr. Nick Tucker**

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