

**Brief Resume of Irshad Hussain, Assistant Professor of Chemistry, LUMS SSE, Lahore.**



**1. Personal Information:**

Date of Birth: October 10, 1967  
Nationality: Pakistani  
Marital Status: Married, having three children

**2. Contact Details:** Tel: +92 (42) 5722670 (ext. 2414), Cell: +92 3016042336  
Fax: +92 (42) 5722694, Email: [ihussain@lums.edu.pk](mailto:ihussain@lums.edu.pk)

**3. Educational information:**

PhD. University of Liverpool, UK.  
MSc. Quaid-i-Azam University, Islamabad.  
BSc. Govt. College Bosan Road Multan.

**4. Research interests:**

Nanotechnology – Nanomaterials synthesis and applications.

**5. Job History:**

- I **1995-96**, Lecturer of Chemistry in a Govt. Degree College near T.T. Singh.
- II. **1996-1997**, Computer Trainee Fellow at Computer Training Center, Pakistan Atomic Energy Commission (PAEC), Islamabad.
- III. **1997-2001**, Scientific Officer, National Institute for Biotechnology & Genetic Engineering (NIBGE), PAEC, Faisalabad.
- IV. **2001-2008**, Senior Scientific Officer, National Institute for Biotechnology & Genetic Engineering (NIBGE), PAEC, Faisalabad.
- V. **2004-2005**, Senior Research Associate, Department of Chemistry, The University of Liverpool, UK.
- VI. **2005-08**, Project Director, Nanobiotech project at NIBGE, Faisalabad.
- VII. **2008 - to date**, Assistant Professor of Chemistry at LUMS School of Science & Engineering (SSE) D.H.A., Lahore Cantt - 54792.

**6. Personal Biography:**

Irshad Hussain received PhD degree from The University of Liverpool, UK, in 2005 on the synthesis of metal nanoparticles and their subsequent use as building

blocks to design and fabricate new materials such as porous metals, nanocomposites, nanochains and polyelectrolyte-metal nanoparticle films etc. Before his PhD, he has been working at National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad, to work out biotechnological solutions to various environmental problems. He had also worked on biotransformation in the group of Professor Dr. Atta-ur-Rehman and Professor Dr. M. Iqbal Chaudhary at HEJ Research Institute of Chemistry (HEJRIC) during 1994-95, immediately after his MSc from Quaid-i-Azam University, Islamabad.

Dr. Hussain is the pioneer to develop nanobiotech research in Pakistan and has already established a nanobiotech group at NIBGE to develop the synthesis of metal nanoparticles and explore their applications in biotechnology and advanced materials fabrication. He has published several research articles in prominent journals including **Nature Materials**, *Angewandte Chemie*, *Advanced Materials*, **Journal of the American Chemical Society**, *Small*, *ChemCommun* and *Langmuir* etc. He has delivered several lectures at national and international forums to highlight the potentials of nanotechnology in various disciplines with particular reference to his own research achievements in this emerging field. His current research interests include synthesis and applications of metal/semiconductor nanoparticles/quantum dots in disease diagnostics and treatment, catalysis and new materials fabrication.

In 2007, Dr. Hussain was awarded a **Professor Atta-ur-Rehman Gold Medal/Prize** in chemistry by **Pakistan Academy of Sciences** to acknowledge his achievements in this field during the last five years.

Current **impact factor** of Dr. Hussain is ~ **97**, Hirsh factor is **09**, and total citation over **380** as on ISI Web of Knowledge dated 10-04-2009.

7. **Ongoing Research Activities:** In addition to his current assignments at LUMS SSE, Dr. Hussain is also casually guiding his previous nanobiotech research group at NIBGE on the synthesis of metal nanoparticles and to explore their applications in PCR diagnostics, fingerprinting, gene delivery, catalysis and new materials fabrication (for applications in optics and electronics).

8. **Research Publications:**

**2009**

- Roger Ristau, Ramchandra Tiruvalam, Patrick L. Clasen, Edward P. Gorskowski, Martin P. Harmer & Christopher J. Kiely, and Irshad Hussain & Mathias Brust. Thermal Stability Studies of Self-Assembled Arrays of Gold Nanoparticles. (Submitted to *Gold Bulletin*).

- XXV. Irshad Hussain, Mathias Brust, Justas Barauskas and Andrew I. Cooper. Controlled step growth of molecularly linked gold nanoparticles – from metallic monomers to dimers to polymeric nanoparticle chains. *Langmuir*, 2009, 25, 1934.

#### **2008**

- XXIV. Haifei Zhang, Jun-Young Lee, Adham Ahmed, Irshad Hussain, and Andrew I. Cooper. Freeze-align and heat-fuse: Microwires and networks from nanoparticle suspensions. *Angew. Chem. Int. Ed.* 2008, 47, 4573.
- XXIII. Muhammad Afzal, Ghulam Shabir, Irshad Hussain, Zafar M. Khalid. “Paper and board mill effluent treatment with the combined biological–coagulation–filtration pilot scale reactor”. *Bioresource Technology* 2008, 99, 7383

#### **2007**

- XXII. Antonios G. Kanaras, Zhenxin Wang, Irshad Hussain, Mathias Brust, Richard Cosstick, and Andrew D. Bates. “Site-specific ligation of DNA-modified gold nanoparticles activated by the restriction enzyme StyI”. *Small*, 2007, 1, 67.
- XXI. Zhenxin Wang, Bien Tan, Irshad Hussain, Nicholas Schaeffer, Mark Wyatt, Mathias Brust and Andrew I. Cooper. “Design of polymeric stabilizers for size-controlled synthesis of mono-disperse gold nanoparticles in water”. *Langmuir*, 2007, 2, 885.
- XX. Zhenxin Wang; Bien Tan; Irshad Hussain; Nicolas Schaeffer; Mathias Brust and Andrew I. Cooper. “Combinatorial design of polymeric stabilizers for size-controlled synthesis of monodisperse gold nanoparticles in water”. *Polymer Preprints* (American Chemical Society, Division of Polymer Chemistry) (2007), 48(2), 442-443. Publisher: American Chemical Society, Division of Polymer Chemistry.
- XIX. Haifei Zhang; Irshad Hussain; James Long; Bien Tan; Mathias Brust; Matthew Rosseinsky; Steven Rannard; Michael Butler and Andrew I. Cooper. “Synthesis of porous materials via multiscale templating approaches: emulsions, nanoparticles, supercritical fluids, and directional freezing”. *Materials Research Society Symposium Proceedings* (2007), Volume Date 2006, 988E (Solid-State Chemistry of Inorganic Materials VI), Paper #: 0988-QQ05-03.

#### **2006**

- XIII. Irshad Hussain, Zhenxin Wang, Andrew I. Cooper and Mathias Brust. Formation of spherical nanostructures by controlled aggregation of gold colloids. *Langmuir*, 2006, 22, 2941.
- XVII. Haifei Zhang, Irshad Hussain, Mathias Brust, and Andrew I. Cooper. “Synthesis of hierarchically porous inorganic–metal site-isolated nanocomposites”. *Chemical Communications*, 2006, 24, 2539.

## 2005

- XVI. C.J. Kiely, M. Watanabe, A. Burrows, P. Clasen, M.P. Harmer, B. Rodríguez-González, L. Liz-Marzán, I. Hussain, J. Fink and M. Brust. “What are the Limitations in the Characterization of Self-Assembled Metamaterials using Advanced Microscopy Techniques”? *Microscopy and Microanalysis*, 2005, 11 (suppl2), 204.
- XV. Haifei Zhang, Irshad Hussain, Mathias Brust, Micheal F. Butler, Steven P. Rannard and Andrew I. Cooper. “Aligned two and three-dimensional structures by directional freezing of polymers and nanoparticles”. *Nature Materials*, 2005, 4, 787.
- XIV. Christina Roth, Adam J. Papworth, Irshad Hussain, Richard J. Nichols and David J. Schiffrin. “A new Pt-Ru model system to study the bifunctional mechanism of electrocatalysis”. *Journal of Electro-analytical Chemistry*, 2005, 581, 79.
- XIII. Irshad Hussain, Susan Graham, Zhenxin Wang, Bien Tan, Steven P. Rannard, David C. Sherrington, Andrew I. Cooper and Mathias Brust. “Size-controlled synthesis of near-monodisperse gold nanoparticles in the 1-4 nm range using polymeric stabilizers”. *Journal of the American Chemical Society*, 2005, 127, 16398.

## 2004

- XII. Haifei Zhang, Irshad Hussain, Mathias Brust and Andrew I. Cooper. “Emulsion-templated gold beads using gold nanoparticles as building blocks”. *Advanced Materials*, 2004, 16, 1, 27.
- XI. Christina Roth, Irshad Hussain, Maryam Bayati, Richard J. Nichols and David J. Schiffrin. “Fullerene-linked Pt nanoparticle assemblies”. *Chemical Communications*, 2004, 1532.
- X. Raphael Levy, Nguyen T. K. Thanh, Christopher R. Doty, Irshad Hussain, Richard J. Nichols, David J. Schiffrin, Mathias Brust, and David G. Fernig. “Rational and combinatorial design of peptide capping ligands for gold nanoparticles”. *Journal of the American Chemical Society*, 2004, 126, 10076.
- IX. R. A. Ristau, C. J. Kiely, M. P. Harmer, I. Hussain and M. Brust. “Fundamental sintering studies of 2-dimensional gold nanoparticle arrays”. *Microscopy and Microanalysis*, 2004, 10 (suppl2), 384.

## 2003 and before:

- VIII. Irshad Hussain, Mathias Brust, Adam J. Papworth and Andrew I. Cooper. “Preparation of acrylate-stabilized gold and silver hydrosols and gold-polymer composite films”. *Langmuir*, 2003, 19, 4831.

- VII. Bien Tan, Huiming Pan, Irshad Hussain, Xiaohui Chen. "Synthesis of ultraviolet-curable modified polysiloxane and its surface properties". *Journal of Applied Polymer Science*, 2002, 86, 2135.
- VI. M. Anwer, Irshad Hussain, S. Sarwar Alam and Feroza Baig. "Effects of NaCl salinity on seed germination, growth and yield of two varieties of Chickpea (*Cicer arietinum* L.)". *Pakistan Journal of Biological Sciences*, 2001, 4, 124.
- V. M. Anwer, Irshad Hussain, T. McNeilly and P.D. Putwain (2001). "Amelioration of NPK on metal polluted bare and vegetative sites of Trelogen mines". *Pakistan Journal of Biological Sciences*, 2001, 4, 280.
- IV. Q.M. Khan, D.H. Philips, F.L. Martin, K.J. Cole, A. Hewer, I. Hussain & Z.M. Khalid. "Detection of DNA damage by the comet assay in MCL-5 cells exposed to extracts of urban air particulate matter". *Mutagenesis*, 2000, 15, 5, 44.
- III. Muhammad Anwer, Irshad Hussain and Tom McNeilly (2000). "Assessment of zinc tolerance of pasture and mine populations of *A. odoratum* by charcoal staining method". *Pakistan Journal of Biological Sciences*, 2000, 3, 1, 78.
- II. Irshad Hussain, Qaiser M. Khan, Zafar M. Khalid, Mariam Faiz, Samina Iqbal and Kausar A. Malik. "Decolorization of aqueous dye- solutions and textile effluents using industrial waste biomass". *Biologia*, 1997, 44, 1 & 2, 218.
- I. Aamer Saeed, Irshad Hussain, and Nasim H. Rama. "A simplified synthesis of peniolactol". *Journal of Chemical Society of Pakistan*, 1996, 18, 1, 48.

## **9. Funded Research Projects**

- I. Development of nanobiotechnological research at NIBGE "Synthesis of metal nanoparticles and their applications in biotechnology and advanced materials fabrication. This project was funded by Ministry of Science and Technology, Govt. of Pakistan (Rs. 155.00 Million), 2005-09.

**PI/PD** - Dr Irshad Hussain from 2005 to Feb 2008 (before joining LUMS SSE).

- II. Synthesis of plasmon resonance particles for bio-analytical applications. Funded by TWAS (5000 USD), 2006-07.

**PI** - Dr Irshad Hussain

## **10. Workshops/Conferences Conducted:**

- I. One day national seminar on Nanobiotechnology – The role of nanoparticles in disease diagnostics and treatment (September 10, 2007) sponsored by Pakistan

Association for Advancement of Science (PAAS). Dr Hussain's role was as an organizing secretary.

- II. An international Nanomedicine workshop at COMSTECH (March 13-20, 2008) sponsored by COMSTECH-HEC. Dr Hussain's role was as a local resource person and a technical organizer.
- III. A university – industry workshop at LUMS School of Science & Engineering (SSE) on “The role of nanomaterials in drug delivery and cancer treatment” on July 28-29, 2008 sponsored by HEC and private vendors. Dr Hussain's role was as a Principal organizer.

#### **11. Theses Supervised**

MSc	03 Theses completed
M.Phil	01 Theses completed and one in progress
PhD	03 Theses in progress

#### **12. Conference/Workshop/Special Oral Presentations**

- I. “Nanotechnology and its applications in biotechnology and advanced materials fabrication”. A talk presented at Pakistan Academy of Sciences, Islamabad, Pakistan on April 15, 2004.
- II. “Synthesis of metal nanoparticles and their applications in advanced materials fabrication”. A talk presented at the postgraduate conference at the University of Liverpool, UK, in July 2004.
- III. “Gold nanoparticles as building blocks for advanced materials fabrication”. A talk presented at International Conference on Nanotechnology, Science and Applications, held in Luxor, Egypt, on February 20-25, 2005.
- IV. “Synthesis of metal nanoparticles and their applications in advance materials fabrication”. A talk presented at 30<sup>th</sup> International Nathiagalli Summer College on Physics and Contemporary Needs, at Nathiagalli, Pakistan on July 5-9, 2005.
- V. “Metal nanoparticles as building blocks to fabricate porous metal, composites and nanochains”. A talk presented at a Symposium on Nanochemistry at University of Karachi, Pakistan on January 7-9, 2006.
- VI. “Synthesis and applications of metal nanoparticles in biotechnology”. An invited talk presented at Biosciences/Physics department, COMSATS institute of information technology, Islamabad, Pakistan on April 06, 2006.

- VII.** “Metal nanoparticles as building blocks for advance materials fabrication”. A talk presented at 31<sup>st</sup> International Nathiagalli Summer College on Physics and Contemporary Needs, at Nathiagalli, Pakistan on July 2 - 8, 2006.
- VIII.** “Synthesis of metal nanoparticles and their applications in biotechnology and advanced materials fabrication”. A talk presented at National Symposium on Biotechnology for Economic Prosperity held on July 24 – 26, 2006 at Nathiagalli, Pakistan.
- IX.** “Nanoparticles applications in biotechnology”. A talk presented at “International Symposium of Nanochemistry etc.” held on September 20-21, 2006 at SBS, Punjab University, Lahore.
- X.** “Gold nanoparticles as building blocks for new materials fabrication”. A talk presented at CIIT – ISESCO International School on Surfaces, Thin Films, Nanostructures and Applications, Oct. 27 – Nov. 01, 2006, Lahore, Pakistan.
- XI.** “Viruses and DNA as templates for nanomaterials synthesis”. A talk presented at an International symposium on virology at NIBGE on November 20-23, 2006.
- XII.** “Nanotechnology – Nanoparticles as building blocks for advanced materials fabrication. A PLENARY lecture delivered at 7<sup>th</sup> International & 17<sup>th</sup> National Chemistry Conference on February 26 – 28, 2007 at Gomal University, DI Khan.
- XIII.** An introduction to Nanotechnology. A Lecture delivered at Divisional Model College (DMC), Faisalabad in April 2007.
- XIV.** Microbial nanobiotechnology – biomediated self assembly and bioanalytical applications of nanoparticles. A talk presented at an international symposium on Plant – microbial interaction at NIBGE on March 12 – 16, 2007.
- XV.** Role of nanobiotechnology for the molecular detection of viruses. A lecture delivered at National Training Course on “Molecular Detection of RNA Viruses” at NIBGE on April 24-26, 2007.
- XVI.** “Synthesis of metal nanoparticles and their applications in biotechnology and advanced materials fabrication”. An invited lecture delivered at Deptt. of Chemistry, Quaid-i-Azam University, Islamabad on May 23, 2007.
- XVII.** “Synthesis of metal nanoparticles and their applications in biotechnology and advanced materials fabrication”. An lecture delivered at Lahore University of Management Sciences (LUMS), Lahore on May 28, 2007.

- XVIII.** “Nanobiotechnology – an overview”. A lecture delivered at 5<sup>th</sup> National Training Course on Modern Techniques in Biotechnology held at NIBGE on May 28 – June 01, 2007.
- XIX.** “Role of nanoparticles in disease diagnostics and treatment”. A lecture delivered at One day national seminar on Nanobiotechnology – The role of nanoparticles in disease diagnostics and treatment (September 10, 2007) sponsored by Pakistan Association for Advancement of Science (PAAS).
- XX.** “Nanomaterials Applications in Nanomedicine”. A series of three lectures delivered at an international Nanomedicine workshop at COMSTECH (March 13-20, 2008) sponsored by COMSTECH-HEC.
- XXI.** “Gold nanoparticles: Synthesis and applications in drug delivery and cancer treatment”. A lecture delivered at a university – industry workshop at LUMS School of Science & Engineering (SSE) on “The role of nanomaterials in drug delivery and cancer treatment” on July 28-29, 2008 sponsored by HEC and private vendors.
- XXII.** “Metal nanoparticles based new materials/catalysts”. An invited lecture at “First NCP (National Centre for Physics) Scientific Spring 2009, April 6-9, 2009 at National Centre for Physics, Quaid-i-Azam University, Islamabad, Pakistan.