

Curriculum Vitae

Name: Muhammad Akram Raza
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EDUCATION

- Ph.D.** **2007-2012**, Physics, Nanotechnology
Physics of Interfaces and Nanomaterials (PIN) group
University of Twente, The Netherlands
Ph.D thesis title: Colloidal routes to functional substrates: From selective metallization to superhydrophobicity
Supervisors: Prof. Dr. Ir. Bene Poelsema and Dr. Stefan Kooij
- M.Phil.** **2002-2004**, Physics
Department of Physics, University of the Punjab, Lahore, Pakistan
M.Phil. thesis title: Irradiation effects on microstructure and tensile behaviors of high purity nickel
Supervisors: Prof. Dr. Khadum Hussain and Prof. Dr. Ijaz Mujtaba Ghauri
- M.Sc.** **1999-2001**, Physics,
University of the Punjab, Lahore, Pakistan
Special subject: Advanced Electronics

PROFESSIONAL ACHIEVEMENTS

- 12 years post PhD Research and Teaching experience at University Level
- Total Publications: **56** (ISI Impact Factor Journal Publications: **36**, Non-Impact Factor Journal Publications: **02**, Book Chapters: **1**, Conference Proceedings: **17**),
- Accumulative Impact Factor: **96.836**, Total Citations: **1650**, h-index: **17**, i10-index: **24**(Google Scholar)
- **04** Research Projects of worth **PKR: 8.483502 million**
- MPhil/MS Research Students supervised: **57**, under supervision PhD students: **03**
- Credit hours of teaching at Ph.D./MS/M.Phil. level: **80**
- Participation in National and International Conferences/ Seminars/ Workshops: **31** (USA, Netherlands, Czech Republic, China, South Korea, Pakistan), Invited Talks: **04**

ACADEMIC /RESEARCH EXPERIENCE

- **Associate Professor** June 2024- Present
Centre of Excellence in Solid State Physics, University of the Punjab, Quaid-e-Azam Campus, Lahore, Pakistan
- **Assistant Professor** August 2016- June 2024
Centre of Excellence in Solid State Physics, University of the Punjab, Quaid-e-Azam Campus, Lahore, Pakistan
- **Senior Research Associate** March 2013- August 2016
Centre of Excellence in Solid State Physics, University of the Punjab, Quaid-e-Azam Campus, Lahore, Pakistan

- **Assistant Professor (IPFP)** March 2012- March 2013
Centre of Excellence in Solid State Physics, University of the Punjab,
Quaid-e-Azam Campus, Lahore, Pakistan
- **Lecturer /Research Officer** Jan 2006 - Sep 2007
Centre for advanced studies in Physics (CASP),
Government College University (GCU) Lahore, Pakistan

COURSES TAUGHT TO M.PHIL./PH.D. STUDENTS

- Chemical Synthesis of Nanostructures
- Experimental Characterization Techniques
- Bio-nanotechnology
- Characterization of Nanostructures
- Chemical Synthesis and Simulation Lab
- Nanomaterials- A Theoretical Approach
- Defects in Solids

RESEARCH PROJECTS /GRANTS

- HEC-NRPU project titled “Fabrication of Superhydrophobic Coatings on Textiles using Metallic Nanoparticles for Self-cleaning and Antibacterial Applications” Worth, **PKR: 7.583502 million**. (Project # HEC/R&D/NRPU/2017/8019) (2019-2022, Status: **Completed**)
- Project titled “Synthesis and optical characterization of gold nanospheres, nanostars and nanorods” **granted** by HEC under Startup Research Grant Program (SRGP) for Assistant Professors Joining under IPFP/TTS (Worth: **PKR: 0.5 million**). (2012-2013, Status: **Completed**)
- Project titled “Fabrication of Functional Clothing using the Green Synthesized Nanoparticles” **granted** by University of the Punjab, Lahore, (Worth **PKR: 0.2 million**). (2020-2021, Status: **Completed**)
- Project titled “Medicinal plant based Synthesis and Characterization of metallic nanoparticles for biomedical applications” **granted** by University of the Punjab, Lahore, (Worth **PKR: 0.2 million**). (2022-2023, Status: **Completed**)

RESEARCH STUDENTS SUPERVISION

- MPhil/MS Research Students supervised: **57**
- Under supervision PhDs Students : **03**

RESEARCH INTRESTS

- Green Synthesis, Characterization and In-vitro and In-vivo Antimicrobial analysis of Nanoparticles.
- Preparation and Characterization Multifunctional Coatings on Textiles for daily-life Applications
- Fabrication of Gas Sensors using Metallic Nanoparticles based HeteroNanostructured Thin Films
- Wetting Physics, Omniphobicity, Oil-water separation, Ultraviolet Protection, Self-Cleaning properties.

COMPUTER SKILLS

- Have hands-on experience of using GraphPad Prism, Gaussian software, CorelDraw, Origin, Database, Emails, Web based applications, research data analysis using Microsoft Word, PowerPoint, Microsoft Excel, Google Docs and Google Sheets for manuscript writing and presentations.

RESEARCH COLLABORATIONS

- School of Biological Science, University of the Punjab, Lahore, Pakistan
- Institute of Microbiology and Molecular Genetics, University of the Punjab, Lahore, Pakistan

- Department of Zoology, Lahore College for Women University, Lahore, Pakistan
- Department of Chemistry, National University of Sciences and Technology, Islamabad, Pakistan
- GIK Institute of Engineering Sciences and Technology, Sawabi, Pakistan

EXPERIMENTAL RESEARCH EXPERIENCE

Have a hands-on and/or data analysis experience of the following techniques.

- **Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), X-ray Photoelectron Spectroscopy (XPS), X-ray Diffraction (XRD)** technique.
- **Atomic absorption spectroscopy (AAS-Perkin Elmer AAnalyst 100, Atomic Absorption Spectrometer, USA)** to estimate of released Ag content
- **Fourier Transform Infrared Spectroscopy (FTIR, IRTracer-100, shimadzu, Japan)** for composition analysis and identification of materials
- **Surface Profilometer** to measure the surface topography such as waviness, roughness, and finish.
- **Goniometer (Dataphysics OCA15+)** for static, advanced and receding contact angle measurements.
- **High speed camera (Photron SA3)** operated by Photron Fastcam Viewer3 software for high-speed imaging during droplet impact studies.
- **UV-Vis Spectrophotometer (Varian Inc.)** for optical characterization of different colloidal samples.
- **Variable Angle Spectroscopic Ellipsometer (Woollam, VASE)** for optical characterization of prepared samples.
- **Vibrating Sample Magnetometer (VSM:7407, Lakeshore, USA)** to measure the magnetic properties of materials, such as magnetic moment, coercivity, and hysteresis loop **Spin coater (WS-400B-6NNP-Lite Spin Processor, Laurell-USA)** for the fabrication of silica spheres arrays.
- **RF magnetron sputtering** technique for the fabrication of thin films of various thickness.
- **Clean room facility** and chemistry lab (fumed hood and glove box) for nanoparticle synthesis and chemical film deposition to modify the surface chemistry of prepared substrates.
- **Langmuir Blodgett Trough (KSV Mini)** to deposit mono/multilayer of silica spheres.
- **Centrifuge (Z36HK centrifuge, Hermle-Germany)** for the centrifugation of micro/nanoparticles.
- **Universal Testing Machine (Autograph AG-1S, Shimadzu, Japan)** to study the tensile behavior of samples.
- **Vickers Hardness Tester (HMV-2, Shimadzu, Japan)** to test the hardness of different materials
- **High temperature furnace (Nabertherm-LHT-02/18-Germany)** for annealing the sample to relieve internal stresses caused during sample preparation.

REVIEWING OF INTERNATIONAL JOURNALS

Served as the reviewer to the following international journals

- Bioscience Reports, Portland Press, UK
- Inorganic Chemistry Communications, Elsevier, UK
- International Journal of Photoenergy, Hindawi, USA
- Applied Physics A, Springer, Germany
- Beilstein Journal of Nanotechnology, Germany
- Biofouling, Taylor & Francis, UK
- Biological Trace Element Research, Springer Nature, Switzerland
- Environmental Science and Pollution Research, Springer Nature, Switzerland
- Journal of Inorganic Materials, China
- Journal of Materials Science, Springer, Germany
- Journal of Nanoscience and Nanotechnology, USA
- Nuclear Materials and Energy, Elsevier, UK
- Progress in Organic Coatings, Elsevier, UK
- Surface and Interface Analysis, John Wiley & Sons, USA

- Vacuum, Elsevier, UK

CONFERENCES/SEMINARS/WORKSHOPS ORGANIZED

Member of organizing committee:

- **International Conference on Solid State Physics (ICSSP'21)**
Januray 21-24, 2022, University of the Punjab, Lahore, Pakistan
- **International Conference on Solid State Physics (ICSSP'19)**
December 08-12, 2019, University of the Punjab, Lahore, Pakistan
- **International Conference on Solid State Physics (ICSSP'17)**
December 10-14, 2017, University of the Punjab, Lahore, Pakistan
- **International Conference on Solid State Physics (ICSSP'15)**
December 13-17, 2015, University of the Punjab, Lahore, Pakistan

CONFERENCE PRESENTATIONS

1. Presentation titled "Silver Nanoparticles based durable Functional Coatings on textiles for Self-cleaning and Antibacterial Applications" presented at *2nd International Conference on Emerging Trends and Innovation in Nanotechnology (Nano-Pak 2023)*, Lahore, **Pakistan**, June 17-18, **2023**.
2. Presentation titled "Medicinal plant mediated Biosynthesis of Silver nanoparticles and their bactericidal potential against fish pathogen *Aeromonas hydrophila*" presented at *2nd International Conference on Emerging Trends in Physics*, Lahore, **Pakistan**, March 20-22, **2023**.
3. Presentation titled "Bactericidal and anticancer activity of biosynthesized silver nanoparticles using fruit extract of *Citrullus colocynthis*" presented at *International Conference on Research Advancements in Chemistry – 2022 (ICRA-C-2022)*, Islamabad **Pakistan**, August 24-25, **2022**.
4. Presentation titled (invited talk) "Fabrication of Stable Multifunctional Coatings on Cotton Fabric using Silver Nanoparticles for Self-cleaning and Antibacterial Applications" presented at *International Conference on Solid State Physics (ICSSP'21)*, Lahore, **Pakistan**, February 21-24, **2022**
5. Presentation titled "Green Synthesis of Nanoparticles, a potentially safe route towards Biomedical Applications" presented at *Nano-Pak 2021- International E-Conference on Emerging Trends and Innovations in Nanotechnology*, Lahore **Pakistan**, April 09-11, **2021**.
6. Presentation titled "Self-cleaning and Antibacterial potential of Superhydrophobic Cotton Fabric decorated with Silver Nanoparticles" presented at *7th International Symposium on Advanced Materials (ISAM-2021)*, Islamabad, **Pakistan**., October 18-22 **2021**.
7. Presentation titled "Anticancer potential of *Citrullus colocynthis* extract mediated silver nanoparticles against human breast cancer cells (MCF-7)" presented at *1st International Webinar on "Nanotechnology in Current Era"*, Lahore, **Pakistan**, September 07-09, **2020**.
8. Presentation titled (invited talk) "Green Synthesis, Characterization and Biomedical Potential of *Citrullus colocynthis* extract mediated Silver Nanoparticles" presented at *International Conference on Solid State Physics (ICSSP'19)*, Lahore, **Pakistan** December 08-12, **2019**.
9. Presentation titled "Plants Extract mediated Synthesis and Characterization of Silver Nanoparticles and their Biological applications" presented at *2nd International Conference: New Trends in Natural Sciences II Public Health, Food Nutrition and Safety*, Lahore, **Pakistan**, October 24-26, **2018**.
10. Presentation titled (invited talk) "Synthesis, characterization and bactericidal activity of drug loaded silica modified Fe₃O₄ nanoparticles" presented at *International Conference on Solid State Physics (ICSSP'17)*, Lahore, **Pakistan**, December 10-14, **2017**.
11. Presentation titled "Impact of Chromium Nanoparticles on Haematological, Immunological and Histological Parameters of *Labeo Rohita*" presented at *2016 World Congress on Advances in Civil, Environmental, and Materials Research (ACEM16)*, Jeju Islands, **South Korea**, August 28-September 01, **2016**.

12. Presentation titled "Nano-Antibacterial Metallic Particles: Potential Alternatives to Antibiotics" presented at '5th International Symposium on Biomedical Materials (ISBM 2016), Lahore, **Pakistan**, December 14-16, **2016**.
13. Presentation titled "Synthesis, Characterization and Antibacterial Activity of Nano-sized Metallic Particles" presented at 'One Day symposium on Nanotechnology Research in Pakistan', Faisalabad, **Pakistan**, November 7-9, **2016**.
14. Presentation titled "Effect of Calcination on Structural and Magnetic Properties of Co doped ZnO Nanostructures", presented at *IEEE International Magnetics Conference (INTERMAG 2015)*, Beijing, **China** May 11-15, **2015**.
15. Presentation titled (invited talk) "Size and shape dependent Antibacterial Studies of Silver Nanoparticles Synthesized by Wet Chemical Routes" presented at *International Conference on Solid State Physics (ICSSP'15)*, December 13-17, **2015**.
16. Presentation titled "Optical sensing of carbon dioxide based on colloidal gold nanoparticles" presented at *2014 World Congress on Advances in Civil, Environmental and Materials Research (ACEM14)*, Busan, **South Korea**, August 24-28, **2014**.
17. Presentation titled "Bio-inspired superhydrophobic surfaces by colloidal routes" presented at *Bio-physicochemical basis for Technopreneurship*, Lahore, **Pakistan**, April 2-3, **2013**.
18. Presentation titled "Bio-inspired hierarchical superhydrophobic films with tunable water adhesion via colloidal routes", presented at *International Conference on Solid State Physics (ICSSP-13)*, Lahore **Pakistan**, December 1-6, **2013**.
19. Presentation titled "A facile colloidal route for superhydrophobic films with hierarchical roughness" presented at *National Symposium on Frontiers in Nanotechnology*, Islamabad, **Pakistan**, May 21, **2012**.
20. Presentation titled "Superhydrophobic surfaces by anomalous fluoroalkylsilane self-assembly on silica nanosphere arrays" presented at *Physics@FOM Veldhoven*, Veldhoven, **The Netherlands**, January **2011**.
21. Presentation titled "Sticky and non-sticky superhydrophobic surfaces and role of hierarchical roughness" presented at *64th annual meeting of American Physical Society division of Fluid Physics Dynamics*, Baltimore, Maryland, **USA**. November 20-22, **2011**.
22. Presentation titled Superhydrophobicity of self-assembled PFDS nanostructures" presented at *24th Conference of the European Colloid and Interface Society*, Prague, **Czech Republic**., September, **2010**
23. Presentation titled "Wettability and nature of surfaces with multi-scale roughness" presented at *Physics@FOM Veldhoven*, **The Netherlands**, January **2010**.
24. Presentation titled "Chemical manufacture of surfaces with multi-scaled roughness" presented at *MicroNano Conference*, Ede, **The Netherlands**, November **2008**.
25. Presentation titled "Wettability and chemical manufacture of surfaces with multi-scaled roughness" presented at *MESA+ meeting*, Enschede, **The Netherlands**, September 23, **2008**.

COURSE/WORSHOPS ATTENDED

- "National Training Workshop on Nanomaterials and One Day symposium on Nanotechnology Research in Pakistan", on November 7-9, **2016**, at National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad – Pakistan
- PSF workshop on 'Establishing and Leading Research Lab" on May 02-03, **2016**, at Department of Chemical Engineering, COMSATS institute of Information Technology Lahore – Pakistan
- "Capillarity and Wetting Phenomena course" by Prof.Dr. F. Mugele , University of Twente, The Netherlands
- "Advanced Experimental Methods course" by Dr. R. van Gastel and Dr.Ir. H. Wormeester, University of Twente, The Netherlands
- "Surfaces and Thin Layers course" by Prof.Dr.Ir. B. Poelsema and Dr.Ir. H. Wormeester, University of Twente, The Netherlands
- "Surface Science course" by Prof.Dr.Ir. H.J.W. Zandvliet, Dr. R. van Gastel, Dr. E.S. Kooij and Dr.ir. H. Wormeester, University of Twente, The Netherlands
- PhD Network Workshop "Photons and Matter", June 29-July 4, 2008, Hollum, Ameland, The Netherlands

- “Workshop on Contact Line Instability at the Lorentz Centre” January 4-8, 2010, Leiden, The Netherlands

ADVISORY / ADMINISTRATIVE SERVICES RENDERED

- **Member Departmental Admission Committee**, Centre of Excellence in Solid State Physics, University of the Punjab, Lahore, Pakistan
- **Member of Anti-dengue Team**, Centre of Excellence in Solid State Physics, University of the Punjab, Lahore, Pakistan (April 04, 2016 - September 05, 2018)
- **Incharge Library**, Centre of Excellence in Solid State Physics, University of the Punjab, Lahore, Pakistan
- **Member Departmental Admission Committee**, Centre of Excellence in Solid State Physics, University of the Punjab, Lahore, Pakistan
- **Member Departmental Tender /Purchase Committee**, Centre of Excellence in Solid State Physics, University of the Punjab, Lahore, Pakistan
- **Departmental Focal Person and Program Team Members (PTs) for Quality Enhancement Cell (QEC)**, Centre of Excellence in Solid State Physics, University of the Punjab, Lahore, Pakistan
- **Member of the Board of Faculty of Science**, University of the Punjab Lahore, Pakistan (since September 24, 2020)
- **Member Security and Safety Team**, Centre of Excellence in Solid State Physics, University of the Punjab Lahore, Pakistan
- **Member of disciplinary Committee and Allotment Committee of Boys Hostel No.7**, University of the Punjab, Quaid-e-Azam Campus, Lahore, Pakistan (2012-2013)
- **Member ORIC Advisory Committee**, Centre of Excellence in Solid State Physics, University of the Punjab Lahore, Pakistan
- **Member of the Committee (Quality Enhancement Cell, QEC)**, Centre of Excellence in Solid State Physics, University of the Punjab Lahore, Pakistan
- **Member Seminar Organizing Committee**, Centre of Excellence in Solid State Physics, University of the Punjab Lahore, Pakistan
- **Focal Person Annual report Committee**, Centre of Excellence in Solid State Physics, University of the Punjab Lahore, Pakistan
- **Focal Person National Enrollment Drive in the country**, Centre of Excellence in Solid State Physics, University of the Punjab, Lahore, Pakistan

REFERENCES

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| <p>1. Prof. Dr. Ir. Bene Poelsema (Bene)
Professor
Physics of Interfaces and Nanomaterials (PIN) group, University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands
Contact: +31534893060, +31534893147
E-mail: b.poelsema@utwente.nl</p> | <p>2. Dr. E.S. Kooij (Stefan)
Associate Professor
Physics of Interfaces and Nanomaterials (PIN) group, University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands
Contact : +31534893106, +31534893147
E.mail: e.s.kooij@utwente.nl</p> |
| <p>3. Prof. Dr. Shahzad Naseem
Professor/ Ex-Director
Centre of Excellence in Solid State Physics
University of the Punajab, Lahore-54590, Pakistan
Contact: +924299233133-5
E.mail: shahzad.cssp@pu.edu.pk</p> | <p>4. Prof. Dr. Saira Riaz
Professor/ Director
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