

## *Curriculum Vitae*

---

### **Dr. Ghulam Mustafa**

PhD Biochemistry

Assistant Professor

Department of Biochemistry

Government College University, Faisalabad

Faisalabad-38000, Pakistan

**Cell:** +92 322 6043114

**Email:** [drghulammustafa@gcuf.edu.pk](mailto:drghulammustafa@gcuf.edu.pk)

### **SUMMARY**

- A scientist with a strong biochemistry background, having extensive research and technology development experience in biochemistry, biotechnology, microbiology and bioinformatics
- Experience in drug discovery, new product formulation and development
- Strong background in molecular biology with hands on experience with standard Molecular biology techniques such as nucleic acid purification and analysis, recombinant DNA technology, PCR, RT-PCR, cloning and gene expression
- Excellent command on bioinformatics techniques such as homology modeling, phylogenetic systematics, gene cluster analysis, whole genome analysis, data mining, primer designing, comparative sequence analyses and many others
- Excellent project management skills with fast results including planning and executing experiments; maintaining laboratory notebooks and databases; analyzing and reporting data and technical writing skills to produce reports and product documents
- Hands on experience on phytochemical screening of medicinal plants from different regions of Pakistan to explore their secondary metabolites
- Studied antimicrobial, antioxidant and cytotoxic activities of different medicinal plants
- Other skills include; database search, project management, technical writing, critical thinking, problem solving, multitasking, job prioritizing and excellent interpersonal communication skills.
- Published research articles in leading journals, presented posters and given oral talks in scientific meetings

### **TECHNICAL SKILLS**

- Experience with aerobic and anaerobic culturing of bacteria
- Enzyme production, purification and characterization from fungi
- Qualitative and quantitative analysis of biological samples to get their amino acid profile using amino acid analyzer
- Experience in mutagenesis of different fungi to get hyper-expressed enzymes
- DNA and RNA assay and manipulations, cloning, expression and purification
- Standard bacterial identification via 16S ribosomal method, standard fungal identification via 18S ribosomal and/or ITS method

- Phylogenetic analysis, gene predictions and protein 3D structure predictions using different bioinformatics tools

## **Research Experience**

**2013-2014**

**Visiting Graduate Scholar**

**Scripps Institution of Oceanography, University of California San Diego, USA**

- Developed drug discovery from Natural Products to treat infectious diseases
- Production and optimization of bioactive molecules/antibiotics in liquid state and solid-state fermentation from bacteria and fungi
- Large-scale microbial culture production for producing bioactive molecules
- Developed an overlay assay for screening for secondary metabolites from marine microorganisms
- Developed small-scale and large-scale purification strategies to obtain highly purified proteins
- Developed bioactivity guided screening for novel compounds from fungi and bacteria
- Lead new product research and develop its commercial applied aspects
- Standard antimicrobial assays to deduce the activity of antibacterial peptides: Plate dilution assays and disc diffusion assays
- Identification of biosynthetic gene clusters of antibiotics by using bioinformatics and standard molecular biology techniques
- Worked on bacterial type-II polyketide synthase genes involved in the biosynthesis of different antibiotics, studied and compared their gene clusters to find out the differences among various classes of antibiotics
- Up-gradation of NaPDoS: a bioinformatics tool for the rapid detection and analysis of secondary metabolite genes

**2006- 20016**

**Researcher**

**Department of Biochemistry, University of Agriculture Faisalabad, Pakistan**

- Microbial strains development and characterization for industrial applications
- Optimized production of enzymes using fermentation biotechnology techniques
- Isolated and characterized culturable bacteria from rhizospheric soil of Cholistan desert to study effect of microbial population on environment
- Optimization of fungal and bacterial culturing in various media both aerobic and anaerobic
- Laboratory and large-scale fermentation for production of enzymes and bioactive molecules
- Optimization of fungal and bacterial culturing in various media both aerobic and anaerobic
- Performed hyper-expression of citrate synthase and performed its comparative sequence analyses
- Served as a scientist for molecular diagnosis of various human and animal diseases for two years
- Production, optimization, cloning and expression of genes from different fungal, bacterial, animal and plant species

- Experience in fungal biomass protein production
- Molecular identification techniques of bacteria and fungi, and DNA barcoding of plants
- Experience of DNA fingerprinting techniques to study polymorphism among various DNA samples
- Predicted 3D structures of different proteins to study their structural relationships with their respective homologues
- Phylogenetic analyses of different genes and proteins to study their inter-species and intra-species evolutionary relationships

## **EDUCATION**

- **PhD** (Biochemistry) from University of Agriculture Faisalabad, Pakistan (with research work from **University of California, San Diego, USA**), **Thesis Topic:** Biochemical profiling of medicinal plants and bioinformatics of bacterial polyketide synthases in drug discovery perspective (completion: 10 February 2016)
- **MPhil** (Biochemistry) from University of Agriculture Faisalabad, Pakistan, **Thesis Topic:** Isolation and cloning of *ACT* and *GAPDH* partial genes from some medicinal plants (completion: 31 August 2009)
- **MSc** (Biochemistry) from University of Agriculture Faisalabad, Pakistan, **Thesis Topic:** PCR amplification of  $\beta$ -actin gene from *Trichoderma harzianum* (completion: 31 August 2007)
- **BSc** (Biology group) from University of the Punjab-Lahore, Pakistan, Courses studied: Chemistry, Zoology, Botany (completion: 30 August 2005)

## **EMPLOYMENT RECORD**

- **Assistant Professor** (TTS): Department of Biochemistry, Government College University, Faisalabad, Pakistan (From December 11, 2017 – To date)
- **Assistant Professor** (IPFP): Department of Bioinformatics and Biotechnology, Government College University, Faisalabad, Pakistan (From October 4, 2016 – October 3, 2017)

## **POSTGRADUATE STUDENTS PRODUCED:**

|                  | PhD | MPhil/MS | BS (Hons) with report |
|------------------|-----|----------|-----------------------|
| As Supervisor    | -   | 07       | 10                    |
| As Co-Supervisor | -   | 03       | -                     |
| As Member        | 02  | 10       | 11                    |

## **RESEARCH PROJECTS AS PI**

- Identification and characterization of phytochemicals to explore their antibacterial and antiviral activities using molecular docking and simulation approaches. Startup Research Grant Program (SRGP) from Higher Education Commission (HEC) Pakistan.

## **COUNTRIES VISITED**

| Country | Duration |          | Purpose           | Funded by     |
|---------|----------|----------|-------------------|---------------|
|         | From     | To       |                   |               |
| USA     | Sep 2013 | May 2014 | PhD research work | HEC, Pakistan |

|                    |            |            |                               |            |
|--------------------|------------|------------|-------------------------------|------------|
| <b>Spain</b>       | 14-07-2015 | 18-07-2015 | Participation in a Conference | AAAS       |
| <b>South Korea</b> | 24-04-2019 | 03-05-2019 | Participation in a Conference | KSELS 2019 |

#### **Book(s):**

- Ali, M., **G. Mustafa** and S.A. Bukhari. (2019). A Practical Manual of Experimental Biochemistry and Biotechnology (Series II). Sunder Publishers.
- Ali, M., S. Kamal, **G. Mustafa** and S.A. Bukhari. (2018). A Practical Manual of Experimental Biochemistry and Biotechnology (Series I). Sunder Publishers. (ISBN: 978-969-23317-0-8)

#### **Book Chapter(s):**

- Book – Recombinant DNA Technology, Chapter – Bioinformatics tools: From basics to advanced (In process)

#### **Sequences deposited in Nucleotide databases**

- Sequences deposited in primary databases of nucleotides with accession numbers:  

|          |          |          |          |
|----------|----------|----------|----------|
| KC847093 | KF997092 | HQ222609 | JF415912 |
| JN559866 | JN587346 | JN587347 | JN594666 |
| JQ915139 | JX307081 | JX307082 | JX307083 |
| KC923285 | KC923286 | KU061247 | KU836597 |
| KX879552 | MG597035 | MG597036 | MG597037 |
| MG597039 | MG597040 | MG597041 | MG597047 |
| MF663770 | MH512000 | MN149619 | MN149620 |
| MN149621 | MN265367 | MN399883 | MN399884 |
- Deposited sequences of mitochondrial Cytochrome C Oxidase subunit 1 (*CO1*) of *Leucauge decorata*, *Oxyopes javanus* and *Pardosa timidula*, the **first ever spiders** whose **any gene sequences were deposited in nucleotide databases**
- Deposited nucleotide sequence of neural protease B from *Streptomyces thermovulgaris*. **The only protease gene sequence deposited in nucleotide databases from this species.**

#### **Awards/Scholarships/Distinctions/Co-curricular activities**

- Award of scholarship under PhD fellowship for “Indigenous 5000 PhD Fellowship Program Batch-VII (Phase-I)” from Higher Education Commission (HEC) government of Pakistan
- Award of scholarship under PhD fellowship for “International Research Support Initiative Program (IRSIP)” from Higher Education Commission (HEC) government of Pakistan
- Certificate of Participation in the seminar on “Personality Grooming and Enlightenment” on June 17, 2015 organized by Character Building Society & Quiz Club, University of Agriculture, Faisalabad, Pakistan
- Regular reviewer of different International Scientific Journals

#### **Abstracts/ Conference Presentations**

1. **Mustafa, G.** and R. Arif. 2019. Phylogenetic Analyses and Characterization of Growth Differentiation Factor 11 of *Oryctolagus cuniculus* using Bioinformatics Tools. The 44<sup>th</sup> Congress of KSELS and 9<sup>th</sup> International Symposium, Grand Walkerhill, **Seoul, Korea.**

2. Arif, R. and **G. Mustafa**. 2019. *In silico* study to reveal significant protein interactions of tumor suppressor antigen p53. The 44<sup>th</sup> Congress of KSELS and 9<sup>th</sup> International Symposium, Grand Walkerhill, **Seoul, Korea**.
3. Arif, R., A. Atta, R. Mehmood and **G. Mustafa**. 2019. Phylogeny and interaction studies of actin gene from plants of selected families. 1<sup>st</sup> International Conference on "Agricultural and Biological Sciences" focusing food security and climate change. Faculty of Basic & Applied Sciences, The University of Haripur, Pakistan.
4. Arif, R. and **G. Mustafa**. 2019. Phylogeny and *in silico* study to reveal interactions of napin-like protein with other proteins. 1<sup>st</sup> International Conference on "Agricultural and Biological Sciences" focusing food security and climate change. Faculty of Basic & Applied Sciences, The University of Haripur, Pakistan.
5. Arif, R. and **G. Mustafa**. 2018. Phylogeny and an *in silico* study to reveal all potential and tolerated single-site mutations with increased stability of streptokinase c. International Conference of Biochemistry, Biotechnology and Biomaterials. Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan.
6. Attique, S.A., Qurat-ul-Ain, S.A.A. Shah and **G. Mustafa**. 2018. A computational nanotechnology approach for screening potential therapeutic nanoparticles against Alzheimer's disease. International Conference of Biochemistry, Biotechnology and Biomaterials. Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan.
7. Zahra, S.S., N. Naz, G. Afzal, **G. Mustafa** and S. Kiran. 2018. Assessment of Medicinal Impact of Calotropis Procera Supplemented Diet through Haematology, Gut Microbial Diversity and Immune Response in Broiler Chicks. International Conference of Biochemistry, Biotechnology and Biomaterials. Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan.
8. Afzal, G., **G. Mustafa** and S. Kiran. 2018. Toxicological Effect of Ethanol on the Development of Chicken Embryo in Ovo. 1<sup>st</sup> International Conference on Applied Zoology (ICAZ-2018). Department of Zoology, Government College University, Faisalabad, Pakistan
9. **Mustafa, G.** and R. Arif. 2018. Molecular evolution and comparative sequence analysis of ketosynthase chain length factors and 16S ribosomal DNA genes from various *Streptomyces* species. 2<sup>nd</sup> National Conference on Emerging Trends in Bioinformatics and Biosciences. Department of Bioinformatics, Hazara University, Mansehra, Pakistan
10. Hassan, M., **G. Mustafa**, S. Kousar and A. Jamil. 2016. Molecular Studies of GDF-11 gene from *Oryctolagus* Species. 27<sup>th</sup> National and 15<sup>th</sup> International Chemistry Conference, University of Malakand, Pakistan
11. Muqadas, M., **G. Mustafa** and A. Jamil. 2016. Isolation and Sequence Analysis of Defensin-Like Gene from *Medicago sativa*. International Conference of Biochemistry, Biotechnology and Biomaterials, University of Agriculture, Faisalabad, Pakistan.
12. Hassan, M., **G. Mustafa**, S. Kousar and A. Jamil. 2016. Isolation and cloning of GDF-11 gene from *Oryctolagus* Species. International Conference of Biochemistry, Biotechnology and Biomaterials, University of Agriculture, Faisalabad, Pakistan.
13. **Mustafa, G.**, M. Asgher, Mehboob-ur-Rahman and A. Jamil. 2014. Citrate synthase gene comparison and use of RAPD genomic fingerprinting to study relatedness among different *Aspergillus* sp. Experimental Biology (EB), San Diego Convention Center, **San Diego, California, USA**

14. Faiz, N., S. Falak, **G. Mustafa**, A. Jamil and S. Ali. 2012. Gene expression profiling of *Capsicum frutescence* under fungal stress. National Science Conference, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan
15. Tahir, A., **G. Mustafa** and A. Jamil. 2011. Molecular identification and phylogenetic analysis of different fungal species. 10th International and 22nd National Chemistry Conference, University of Agriculture, Faisalabad, Pakistan
16. Jilani, K., Z. Mushtaq, **G. Mustafa**, A. Jamil and M. Asgher. 2011. Molecular identification and phylogenetic analysis of *Rhodotorula mucilaginosa* from Pakistan by using ITS sequence. 10th International and 22<sup>nd</sup> National Chemistry Conference, University of Agriculture, Faisalabad, Pakistan
17. **Mustafa, G.**, Z. Mushtaq and A. Jamil. 2011. Isolation and cloning of *actin* and *GAPDH* genes from *Solanum nigrum*, *Tamarindus indica* and *Coriandrum sativum*. 10<sup>th</sup> International and 22<sup>nd</sup> National Chemistry Conference, University of Agriculture, Faisalabad, Pakistan
18. **Mustafa, G.**, N. Aslam and A. Jamil. 2008. Isolation and cloning of  $\alpha$ -actin gene from *Trichoderma harzianum*. 9th PSBMB Conference, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan
19. **Mustafa, G.**, N. Aslam and A. Jamil. 2008. PCR amplification of  $\beta$ -actin gene from *Trichoderma harzianum*. Abstract ICPS-458. International Conference of Plant Scientists, University of Agriculture, Faisalabad, Pakistan

#### **Workshops/ Training Courses**

1. Participated in “Train the Trainer Workshop - Bio Prism Laboratory Safety Training” held on November 6-10, 2017 at COMSTECH Building, 33 Constitution Avenue Sector G-5/2, Islamabad, Pakistan
2. Participated in one day international training workshop on “Application of computational biology in biotechnology” held on July 31, 2017 at National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad, Pakistan
3. Participated in a training workshop on “Computational Biology” under 41<sup>st</sup> International Nathiagali Summer College (INSC) on physics and contemporary needs, Nathiagali, Pakistan held on 25-30 July, 2016 at National Center for Physics, Islamabad, Pakistan
4. Got an opportunity for taking a practical course “SIO147/SIO293-**Applications in Phylogenetics**” for whole quarter (2013-14) from a well-known scientist in the fields of phylogeny, biodiversity and taxonomy **Prof. Greg Rouse** from Scripps Institution of Oceanography, **University of California, San Diego, USA**
5. Participated in Biosafety Training Workshop for Young Scientists held on June 13, 2015 at Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan
6. Participated in 4th National Training Course on “Bacterial Identification & Metagenomics” held from March 16-20, 2015 at National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad, Pakistan
7. Attended Comstech-Siut Workshop On Bioinformatics entitled Ensembl Database Mining and Whole Genome Sequencing Analyses held in December 16-18, 2014 at COMSTECH Building, 33 Constitution Avenue Sector G-5/2, Islamabad, Pakistan
8. Participated in Training Course on Diagnosis of Viral Diseases held on 17-20 November, 2014 at Nuclear Institute for Agriculture & Biology (NIAB), Faisalabad, Pakistan

9. Participated in Continuing Medical Education (CME) activity on “Emerging Superbugs-Standardizing Antimicrobial Susceptibility Testing, Surveillance and Lab Biosafety Hands-On Workshop” held at Aga Khan University, Karachi, Pakistan, on February 25-27, 2013
10. Attended the workshop on “Emerging Superbugs-Standardizing Antimicrobial Susceptibility Testing, Surveillance and Lab Biosafety” held on February 25-27, 2013 in Microscopy Lab., Aga Khan University, Karachi, Pakistan
11. Participated in “First National Workshop/Conference on Computational Tools” held on April 8-12, 2013 at National Centre for Physics, Islamabad, Pakistan
12. Attended one day workshop on “Genotyping by Sequencing: Overview and Application in Crop Improvement” held on February 07, 2013 at National Institute for Biotechnology and Genetic Engineering (NIBGE) Faisalabad, Pakistan
13. Participated in one week training workshop on HPLC held on July 30 - August 04, 2012 at central Hi-Tech Lab., University of Agriculture, Faisalabad, Pakistan
14. Participated in “1st National Training Workshop on Chromatography and Mass Spectrometry” held on April 2-6, 2012 at National Institute for Biotechnology and Genetic Engineering (NIBGE) Faisalabad, Pakistan
15. Attended two day workshop on “Application of Biotechnology for Wheat Improvement” held on 09-10 May, 2011 at National Institute for Biotechnology and Genetic Engineering (NIBGE) Faisalabad, Pakistan
16. Participated in one day training workshop on “Varietal purity testing through DNA markers” held on May 4, 2011 at National Institute for Biotechnology and Genetic Engineering (NIBGE) Faisalabad, Pakistan

**Participation in training workshops/ conferences/ symposia as a resource person**

1. Delivered training in “1<sup>st</sup> National Hands-on Training Workshop on Bioinformatics Basics” held on December 6-8, 2018 in the Department of Biochemistry, Government College University, Faisalabad
2. Delivered training in “5<sup>th</sup> National Hands-on Training workshop on Bioinformatics” held on February 15, 2018 in the Department of Allied Health Sciences, Superior College Lahore, University Campus
3. Delivered training on “Bioinformatics Tools for Research in Life Sciences” in GC Women University Faisalabad on January 19, 2018
4. Certificate of participation as resource person in the workshop on “Recent Trends in Molecular Diagnosis of Viral Diseases” held on January 12-14, 2017 organized by Molecular Care, University of Agriculture, Faisalabad, Pakistan
5. Certificate of participation as resource person in the workshop on “Bioactive Peptides/ Proteins” held on March 27-28, 2015 organized by Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan under Auspices of Pak-US Science & Technology Program Higher Education Commission
6. Letter of Appreciation for imparting practical training on DNA isolation, PCR and agarose gel electrophoresis during workshop on “Imparting Practical Training in Molecular and Biochemical Techniques” held on June 08-14, 2011 organized by Department of Chemistry and Biochemistry, University of Agriculture Faisalabad, Pakistan

7. Certificate of Appreciation as resource person (for imparting practical training on Bioinformatics tools) and member organizing committee in the “HEC Workshop on Imparting Practical Training in Molecular and Biochemical Techniques” held on November 27 to December 1, 2012 organized by Department of Chemistry and Biochemistry, University of Agriculture Faisalabad, Pakistan

#### **Participation in training workshops/ conferences/ symposia as an organizer**

1. Member organizer committee of “One-day International Symposium on CRISPR Based Genome Editing and Future of Precision Medicine” held on December 18, 2018 organized by Department of Biochemistry, Government College University, Faisalabad, Pakistan
2. Member organizer committee of “2<sup>nd</sup> International Conference of Biochemistry, Biotechnology and Biomaterials” held on December 09-11, 2018 in the Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan
3. Principal organizer of “1<sup>st</sup> National Hands-on Training Workshop on Bioinformatics Basics” held on December 6-8, 2018 in the Department of Biochemistry, Government College University, Faisalabad, Pakistan
4. Member organizing committee of “International Symposium on Health and Nutrition” held on October 30, 2017 organized by Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan
5. Member organizing committee of “2<sup>nd</sup> National Training Course on “Molecular Methods in Biotechnology” held on March 13-17, 2017 organized by Department of Bioinformatics and Biotechnology, Government College University Faisalabad, Pakistan
6. Member organizing committee of “3<sup>rd</sup> National Symposium on Advancements in Biotechnology” held on December 19-23, 2016 organized by Department of Bioinformatics and Biotechnology, Government College University Faisalabad, Pakistan
7. Member organizing committee of “International Conference of Biochemistry, Biotechnology and Biomaterials” held on February 22-24, 2016 organized by Department of Biochemistry, University of Agriculture, Faisalabad, Pakistan
8. Certificate of Appreciation and Acknowledgment for managing the activities of “10th International and 22nd National Chemistry Conference” held on November 21-23, 2011 organized by Department of Chemistry and Biochemistry, University of Agriculture Faisalabad, Pakistan
9. Certificate of Appreciation for managing the activities of a workshop on “Imparting Practical Training in Molecular and Biochemical Techniques” held on June 08-14, 2011 organized by Department of Chemistry and Biochemistry, University of Agriculture Faisalabad, Pakistan

#### **Participation in international conferences**

1. Participated in 44<sup>th</sup> Congress of KSELS and 9<sup>th</sup> International Symposium, held on April 25-27, 2019 at Grand Walkerhill, **Seoul, Korea**.
2. Attended the International Conference on Biotechnology and Bioengineering (ICBB’15) held on July 15-17, 2015 at Hotel Alimara, **Barcelona, Spain**
3. Participated in Experimental Biology (EB) 2014 held on April 26-30, 2014 at San Diego Convention Center, **San Diego, California, USA**

#### **Participation in national conferences/ symposia/ lectures**

1. Attended a lecture by Sean Kaufman on “A Safer Sacrifice: Eid ul-Adha” date of completion June 28, 2019
2. Attended a lecture by Sean Kaufman on “The Human Risk Factor in Biological Laboratories” date of completion May 30, 2019.
3. Attended “13<sup>th</sup> Biennial Conference on Recent Advances & Challenges in Molecular Biology, Biochemistry & Biotechnology” held on August 25-27, 2016 at COMSATS Institute of Information Technology, Abbottabad, Pakistan
4. Attended “One Day Awareness & Research Symposium on Diabetes, Heart Disease and Related Metabolic Disorders” held on November 5, 2015 at National Institute for Biotechnology and Genetic Engineering (NIBGE), Faisalabad, Pakistan
5. Attended “2<sup>nd</sup> Conference on Frontiers of Nanoscience and Nanotechnology” held on September 08-10, 2015 at Pakistan Institute of Nuclear Science & Technology (PINSTECH) Islamabad, Pakistan
6. Attended “12<sup>th</sup> International Conference of Pakistan Society of Biochemistry and Molecular Biology” held in December 4-7, 2014 at The Islamia University of Bahawalpur, Bahawalpur, Punjab, Pakistan
7. Attended “National Conference on Trends in Biochemistry and Molecular Biology” held in February 21, 2012 at Department of Biochemistry, Quaid-i-Azam University, Islamabad, Pakistan
8. Attended “National Science Conference” held in January 10-12, 2012 at Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan
9. Attended “International Conference on Applied Genetics and Biotechnology” held in December 8-10, 2011 at Centre of Agricultural Biochemistry and Biotechnology (CABB) and Office of Research, Innovation and Commercialization, University of Agriculture Faisalabad, Pakistan
10. Attended “10<sup>th</sup> International and 22<sup>nd</sup> National Chemistry Conference” held in November 21-23, 2011. Organized by Department of Chemistry and Biochemistry, University of Agriculture, Faisalabad, Pakistan
11. Attended “9<sup>th</sup> PSBMB Conference” held in December, 2008 at Department of Biochemistry, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan
12. Attended “International Conference of Plant Scientists held in April, 2008 in Department of Botany, University of Agriculture, Faisalabad, Pakistan

#### **Memberships of Professional Societies**

1. American Society for Biochemistry and Molecular Biology (ASBMB)
2. International Society for Infectious Diseases
3. Institute for Computer Sciences, Social Informatics and Telecommunications Engineering
4. Society for Science-Based Medicine
5. The Council for Agricultural Science and Technology (CAST)
6. The European Biotechnology Network AISBL
7. The American Society for Microbiology (ASM)
8. The Oceanography Society (TOS)
9. ITHEA International Scientific Society (ITHEA ISS)

10. The Association of Genetic Technologists
11. The Association of Biomolecular Resource Facilities
12. International Union of Biochemistry and Molecular Biology
13. IAENG International Association of Engineers
14. Pakistan Biological Safety Association (PBSA)
15. International Scientific Organization, Pakistan (ISOP)