

# FARRUKH RAFIQ AHMED, PHD

Assistant Professor

Department of Pharmaceutics

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[LinkedIn](#), [Google Scholar](#)

## EDUCATION

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- PhD** University of Karachi, (Pharmaceutical Technology/Formulation Science) Dec 2018  
Department of Pharmaceutics, Faculty of Pharmacy and Pharmaceutical Sciences  
Dissertation: "Development and evaluation of halloysite nanotubes (HNTs) based oral formulations"  
CGPA: 4/4  
Advisor: Prof. Muhammad Harris Shoaib, PhD; Chair - Dept. of Pharmaceutics, Univ. of Karachi.  
Examiners: Prof. Sangyong Jon, PhD; Chair Prof. and PI Bio-Nano Medicine Lab, KAIST, South Korea  
Prof. Mohtashim Shamsi, PhD; PI Shamsi Lab. School of Chem. and Bio Mol. Sciences, SIU, USA
- MS** Gwangju Institute of Science and Technology, (Nanomaterials/Drug Delivery Science) Aug 2009  
Department of Materials Sciences and Engineering  
Dissertation: "Preparation and characterization of halloysite composites for drug delivery"  
CGPA: 4.17/4.5  
Advisor: Prof. Kurt E. Geckeler, PhD; Chair Prof. and PI Applied Macromolecular Lab, GIST, South Korea  
Examiners: Prof. Young Ha Kim, PhD, PI Biomaterials Lab., GIST, South Korea  
Prof. Sangyong Jon, PhD; PI Nanomedicine Lab., GIST, South Korea
- BPharm** University of Karachi, (Pharmacy and Pharmaceutical Sciences) July 2006  
Faculty of Pharmacy and Pharmaceutical Sciences  
Graduated with distinction and honor of 3<sup>rd</sup> merit position.  
CGPA: 3.61/4

## TEACHING EXPERIENCE

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I have taught the following courses with respect to job assignments with an average of 120 students per course per semester at the University of Karachi, and 60 and more students at Ziauddin University at the undergraduate level.

Have been constantly revising the syllabus on an annual basis and have developed lesson plans and assignments, accordingly.

The tasks also include preparation and conduct of the examinations along with assessments and grading. Importantly, I have employed various strategies such as to reduce the 'Cognitive Load' while teaching complex topics. I have also practiced elements of 'Case Based Learning' (CBL) and 'Team Based Learning' (TBL) approaches at various instances and opportunities while teaching these courses, didactically.

I have also extensively used and trained other fellows (as a Master Trainer) on various online platforms such as ZOOM, Google classroom and Meet, Facebook Groups for class tutorials and lectures during COVID pandemic (Feb 2020 to Oct 2020 and then Nov 2020 – Mar 2021).

**University of Karachi, Pakistan**

Dec 2018 to Present

**Assistant Professor BPS-19, Department of Pharmaceutics**

**MPhil course: Computer Applications in Pharmaceutical Research\*** (PHT-822) Instructions include various software applications such as experimental designing through designs in Design Expert 10, pharmacokinetics through PK solver and Phoenix WinNonlin, drug dissolution kinetics through DD solver, stability studies through Minitab v.17, SPSS v.18, Boolean and Advanced Search tools on various platform (Scopus, PubMed, Google Scholar etc), Origin Lab and Microsoft Excel 365 for data analysis and charting scientific graphs. (\* course in-charge)

**PharmD courses:**

**Quality Assurance and Quality Control\*** (PHT-708; theory); course outline includes ICH-Q2 (analytical process validation), Q8 (product development), Q9 (Quality Risk Management) and Q10 (Pharmaceutical Quality Systems), process validation (life cycle approach), qualifications (DQ-IQ-OQ-PQ-PPQ), USP (pharmacopeial tests and procedures) and GMPs. Also includes change management, OOS and OOT etc.

**Industrial Pharmacy-Pharmaceutical Engineering\*** (PHT-603; theory), course outline includes pharmaceutical plant layout, building plans and finishes (oral solid dosage products and sterile products facilities); GMPs related to plants and operations,

fundamentals of HVAC systems, environmental control parameters etc. Cleanroom classifications (US-FDA, EU and WHO grades), ISPE classification of areas and control strategy etc. MAL and PAL plans and types.

**Biopharmaceutics and Pharmacokinetics Lab.#** (PHT-701, lab.), course outline includes theory and experiments on determination of dissolution rate constants of various BCS class drugs in pH 1.2, 4.5 and 6.8 buffers and simulated gastric and intestinal fluids; 1-compartment and 2-compartment PK models, disintegration and dissolution lag-times for different dosage forms etc. Data fitting for various mechanistic and non-mechanistic drug release kinetic models.

**Industrial Pharmacy Lab** (PHT-605; lab.), course outline includes theory and experiments on tablet manufacturing by wet and dry granulation and direct compression, preparation of emulsions, creams, ointments, granules etc., various QC tests, and QC charts, etc.

**Pharmaceutical Technology Lab.#** (PHT-614), course outline includes the theory and experiments on various aspects of pharmaceutical product development as per ICH-Q8 guidance (design of experiments, design space), compression profiling of powders for compaction, micromeritics and powder technology, development of capsules formulations etc.

**Computer Applications in Pharmacy Lab.\*** (PHT-513; lab.) course outline includes fundamental aspects of hardware components and requirements for personal and mobile computing, GUI, UI, security, basic to advanced user instruction about MS office 365 products (Excel, Word, PowerPoint, One Note etc). The instructions on MS Excel include problem solving skills such as budgeting, data analysis and charting etc.

(\* course in-charge; #helped in designing the curriculum of the labs.)

**University of Karachi, Pakistan**

Sep 2016 to Dec 2018

**Lecturer BPS-18, Department of Pharmaceutics**

**PharmD Courses:**

All of the PharmD courses explained above in the Assistant Professor section and including the following course.

**Pharmaceutical Technology** (PHT-613, shared theory) course outline includes the science and technology behind various conventional and novel DDS such as osmotic tablets, transdermal DDS, microneedles-based DDS, gastro-retentive DDS, multi-unit DDS (pellets and minitables), SeDeM expert system, bi-layered tablets etc.

**Ziauddin University, Pakistan**

July 2011 to Aug 2016

**Assistant Professor, Department of Pharmaceutics**

**MPhil courses:**

**Advanced Biopharmaceutics and Pharmacokinetics** (836; theory) course outline included advanced topics in pharmacokinetics such as compartmental and non-compartmental PK analysis and non-linear PK (Michaelis-Menten kinetics), population PK studies, BE studies and designs, and principles of PBPK.

[This course was designed by me and was the first instructor to teach the course till my departure from the university]

**Nano-Chemistry** (nanomaterials for drug delivery) (820; theory) course outline included various topics such as chemistry and examples of one-, two- and three-dimensional nanomaterials, chemical and physical properties of various DDS, bioconjugation techniques, active and passive targeting, EPR effect, *in-vivo* stability (stealth effect) and lysosomal escape system (proton sponge effect) etc.

[This course was co-designed by me and was the first instructor to teach the course till my departure from the university]

**PharmD courses:**

**Biopharmaceutics and Pharmacokinetics\* – I and II** (2 theory-based courses: no. 601 and 602) course outline included basic and applied concepts in biopharmaceutics such as various routes of drug administrations and barrier systems to their systemic availability (including mechanisms); drug and dosage form factors affecting BA, concepts of pharmaceutical and therapeutic equivalents, regulatory standards etc. PK modules of the courses include basic concepts of compartmental and non-compartmental PK of oral, IV and infusion administrations, concepts of absolute and relative BA, BE studies, non-linear PK (Michaelis-Menten kinetics), protein binding of drugs, PK of multiple dose administrations. The course required extensive calculations and graphing as well for all the concepts discussed above.

**Biopharmaceutics and Pharmacokinetics Lab.\* – I and II** (2 lab. courses: no. 613 and 614) course outline included practicals related to drug dissolution rate constant determinations in various buffers (pH 1.2, 4.5, 6.8, 7.4). Also, the difference of rates between different dosage forms and calculation and fitting various mechanistic and non-mechanistic kinetic models etc.

**Physical Pharmacy** (503; shared theory course) the outline assigned included concepts of disintegration and dissolution phenomena of dosage forms and drugs, colloids and disperse systems and suspensions.

(\* course in-charge)

**Ziauddin University, Pakistan**

April 2011 to June 2011

**Senior Lecturer, Department of Pharmaceutics**

**PharmD Courses:**

**PharmD Courses:**

All the PharmD courses explained above in the Assistant Professor section.

## ADMINISTRATIVE EXPERIENCE

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- December 2019 – July 2023: ‘**Convenor and Chief Organizer – KUAPC Fair**’ (Annual Graduate Job and Placement Fair of the PharmD Graduates), Faculty of Pharmacy and Pharmaceutical Sciences, University of Karachi.
- January 2023 – Onwards: ‘**Departmental Focal Person – ORIC**’ [Office of Research, Innovation and Commercialization] – University of Karachi’
- August 2020 – January 2021: ‘**Master Trainer - Online Teaching**’ (online Teaching Platforms; Zoom, Google Classroom, Microsoft Teams, Facebook Groups etc), Department of Pharmaceutics, Faculty of Pharmacy and Pharmaceutical Sciences, University of Karachi, Pakistan.
- November 2018 – July 2023: ‘**Faculty Student Advisor**’ (student counseling, disciplinary affairs, academic advisory etc), Department of Pharmaceutics, Faculty of Pharmacy and Pharmaceutical Sciences, University of Karachi, Pakistan.
- January 2013 – September 2015: ‘**Quality Enhancement Cell (QEC), ‘Team Leader PG Program**’ (developed the SAR of the post-graduate program at the college), Ziauddin College of Pharmacy, Ziauddin University, Karachi, Pakistan.
- January 2012 – February 2012: ‘**Post Graduate Program Coordinator (Acting)**’ (coordinated and conducted the entrance test and interviews for MPhil and PhD programs at the college), Ziauddin College of Pharmacy, Ziauddin University, Karachi, Pakistan.
- August 2011 – January 2012: ‘**Quality Enhancement Cell (QEC) Member**’ (co-developed the SAR of the PharmD program at the college), Ziauddin University, Karachi, Pakistan.
- July 2011 – July 2013: ‘**Procurement Coordinator**’ (developed the transparent and hierarchical mechanism of purchasing of instrument and chemical at the college), Ziauddin College of Pharmacy, Ziauddin University, Karachi, Pakistan.

## RESEARCH EXPERIENCE

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### Assistant Professor, Department of Pharmaceutics, University of Karachi, Pakistan

Dec 2018 to Present

I have been leading various research projects and experimentally guiding research students enrolled in the department, some of the projects are listed below,

1. Powder based modified-release intranasal delivery of sumatriptan (MPhil project advisor) #
2. Development of mini-tablets (multiple unit) based dosage forms (MPhil project advisor) #
3. Development of halloysite nanoclay (excipient) based modified release tablet formulations\*
4. Compression and compaction analysis of various materials for tableting\*
5. Development of nanotubes based transdermal patch systems for drug delivery\*
6. Development of microneedles-based insulin delivery platform and *in-vivo* assessment\*
7. PBPK modeling and simulation using GastroPlus suite\*
8. Taste masking of drugs (azithromycin and ciprofloxacin) for pediatric use by polymeric resin complexation\*

# Projects that I am currently supervising for MPhil research work

\* Projects that have been completed in the past and have been published (see publications list)

Have co-authored (major participation in experimental, compilation and final write-up) over **15 publications** in SCI indexed reputable journals of the subject during this period with 3 more under review. Moreover, 3 book chapters have also been published during this period.

### Graduate Researcher [PhD-Part-Time], Dept. of Pharmaceutics, University of Karachi, Pakistan

Feb 2012 to Dec 2018

Advisor: Prof. Mohammad Harris Shoaib, PhD

Worked extensively on novel nano clay mineral, halloysite, with nanotubular particulate morphology. Initially I worked towards assessing its toxicity profile via *in-vitro* cytotoxicity studies and later conducted *in-vivo* acute and sub-acute toxicity profiling of the material. SeDeM associated QbD approach was employed to develop directly-compressible and modified release tablet systems using halloysite, demonstrating for the first time the commercial viability of such material. Two research studies were published directly from the work with one more study published as an extension of the work demonstrating the feasibility of use of model BCS class drugs with halloysite. Through these works we laid the foundation model for use of halloysite to be used for development of oral dosage form for drugs having varied solubilities and permeation profiles. All the 3 studies have garnered respectable no. of citations since their publication.

### Graduate Researcher, Department of Materials Science and Engineering, GIST, South Korea Applied Macromolecular Chemistry Lab. (MS; 2007 – 2009)

Sep 2007 to Feb 2011

Advisor: Prof. Kurt E Geckeler, PhD

Worked on developing halloysite nanotubes-based composites for drug delivery applications. Performed *in-vitro* cytotoxicity and cellular uptake studies for pristine as well as multifunctional ter-block polymer coated nanotubes. Developed delivery

system for doxorubicin and 5-FU for colorectal site-specific delivery. Beside successful loading of drug in mesopores and lumen, used (primary amine-carboxylic acid) conjugation technique to conjugate FITC and folic acid to the ter-polymer and chitosan, respectively. The work involved the use of various characterization studies such as fluorescence microscopy, TEM, FTIR, XRD and TGA.

**Biomimetic and Bioinspired Materials Lab.** (Project on Biomimetic Neutrophil Sys. for Hepatocellular Carcinoma; Year 2010)

Advisor: Prof. Soong Ho Um, PhD

Worked towards developing targeted liposomes with encapsulated ZnO nanoparticles as a biomimetic neutrophil system for eliciting ROS based immune response against hepatic carcinoma (HepG2) cells.

Also extensively co-worked toward synthesizing cellulose nano-crystals by acid-hydrolysis of microcrystalline cellulose and performed *in-vitro* size and dose dependent cytotoxicity studies against fibroblast (NIH3T3) and colon carcinoma (HCT116) cell lines. The projects yielded 2 research publications in the area with respectable no. of citation and thus paving the way for many works later.

**Junior Research Fellow, International Center for Chemical and Biological Sciences, Univ. of Karachi** Oct 2006 to Aug 2007  
**Pharmacology Lab. and Cell Culture Lab., Panjwani Center for Molecular Medicine and Drug Research.**

Advisor: Prof. Ahsana Dar, PhD

Performed high-through put screening cell cytotoxicity experiments in a team for an NCI-NIH, USA collaborative project on cytotoxicity evaluation of plant extracts and constituents for determination of new lead molecules for cancer chemotherapeutic. Also performed *in-vivo* anti-inflammatory evaluation of plant-based constituents on Wistar rats.

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### SKILLS ACQUIRED

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**I have acquired the following diverse skill set during my research career.**

1. Mentoring and supervising research students, project planning, experimental guidance, and write-up of research publications.
2. Extensive expertise on compression and compaction profiling (USP-1062, Heckel eq. etc) of pharmaceutical materials using Natoli RD-10A and AIM software, multi-tester (tensile and shear analysis), tablet multi-tester (hardness, diameter and thickness analysis).
3. SeDeM expert tool for tableting via direct compression. Computational designing and optimization of experiments (DoE)-ICH-Q8 approach
4. Preparation of polymeric composite materials and their conjugates with drugs and fluorescent molecules.
5. Solid-state reactions using high energy ball-milling.
6. Liposomal formulation and encapsulation using tip ultrasonication.
7. Fabrication of transdermal and microneedles patch systems.
8. *in-vitro* dissolution and permeation studies using Franz-diffusion and USP dissolution apparatus and 1 & 2.
9. Expertise on phase contrast, compound and stereomicroscopy, and moderate expertise on fluorescence microscopy.
10. Hands-on experience on characterization techniques such as FTIR, DSC, TGA, UV-visible spectroscopy, fluorescence spectroscopy, powder-XRD etc.
11. Cell culturing (NIH-3T3, HepG2, HCT116, HeLa cells etc.) and high-throughput *in-vitro* cytotoxicity studies.
12. *in-vivo* experimentation on Wistar rats and albino mice (inflammatory models, perfusion fixation, PK blood sampling etc).
13. HPLC-UV based analytical method development-ICH-Q2 approach.

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### HONORS, GRANTS AND AWARDS

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- Express News' 'Aao Parhao' "**Teacher's Recognition Award**" – Awarded as "**Teaching Excellence Award**" at the Faculty of Pharmacy, Ziauddin University, 2015.
- **1<sup>ST</sup> class 3<sup>rd</sup> merit position in B. Pharm.**, 2006, Faculty of Pharmacy, University of Karachi, Pakistan.
- **Dean's Research Grant** – "Development of Halloysite Nanotubes Based Electro-responsive Transdermal Drug Delivery System", worth 0.15 million PKR (approved 2022)
- '**HEC Indigenous Scholarship**' worth 1 million PKR for PhD studies – 2012 (declined)
- '**Gwangju Institute of Science and Technology – Full Funding (Scholarship) for MS Studies**, September 2007 – August 2009, South Korea.
- '**Brain Korea 21**' Financial Support Fund for M.S. Research, September 2008 – August 2009, South Korea.
- Participation in the Project Development (PC-1) entitled '**Formulation Development and Advanced Drug Delivery Laboratory - Improvement of Academic Facilities at University of Karachi** worth **43.06 Million Rupees (PKR) [Equivalent ~345,000 USD; 2018] (Approved by Ministry of Planning, Development and Reform for the Year 2018-19 onwards)**
- Participation in the Project (PC-1) "**Department of Pharmaceutics - Improvement of Academic Facilities at University of Karachi**" worth **49.80 Million Rupees (PKR) [Equivalent ~400,000 USD; 2018] (Approved by Ministry of Planning, Development and Reform for the Year 2018-19 onwards)**

## PROFESSIONAL AFFILIATIONS

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- Member **International Society for Pharmaceutical Engineering (ISPE)** (2023-Onwards)
- Member of the 'Korean Chemical Society till (2007-2011)
- Member of IBRO (International Brain Research Organization) (2006-Present)
- Registered Pharmacist (2008), Pharmacy Council of Sindh, Pakistan. (Reg. No. 3818)
- Member of **Departmental Research Committee (DRC)**, Department of Pharmaceutics, Faculty of Pharmacy and Pharmaceutical Sciences, University of Karachi: June 2019 - Present
- Member of **Board of Studies**: March 2013 – June 2016, Ziauddin Faculty of Pharmacy, Ziauddin University.
- Member of **Post Graduate Committee**: October 2012, Ziauddin College of Pharmacy, Ziauddin University.
- Quality Enhancement Cell (QEC) **Team Leader for PG Program**: January 2013 – August 2013, Ziauddin College of Pharmacy, Ziauddin University.
- **PG coordinator**: 26 December 2011 – 26 February 2012, Ziauddin College of Pharmacy, Ziauddin University.
- Quality Enhancement Cell (QEC) **Member for Undergraduate Program**: August 2011 – January 2012, Ziauddin College of Pharmacy, Ziauddin University.

## PROFESSIONAL SERVICES

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**Associate Editor: Biointegration** (<https://bio-integration.org/>)

**Head - Board of Directors (Research) – Giving Back to Pharmacy in Pakistan** (An expat-based association for improving standards of pharmacy practice in Pakistan (<https://www.linkedin.com/company/giving-back-to-pharmacy-in-pakistan/>))

**Founding Partner “Academic and Industrial Research Consultants”** (<https://www.linkedin.com/company/airconsultants/>)

**Peer-Reviewed Articles for:**

- Journal of Biological Macromolecules
- Biointegration
- Bulletin of World Health Organization
- Pakistan Journal of Pharmaceutical Sciences

## PUBLICATIONS

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### *Journal Publications*

- Rehman, R., Shoaib, M.H., **Ahmed, F.R.**, Yousuf, R.I., et al., “*SeDeM expert system with I-optimal mixture design for oral multiparticulate drug delivery: An encapsulated floating minitabets of loxoprofen Na and its in silico physiologically based pharmacokinetic modeling*”, **Frontiers in Pharmacology**, 14 (2023)
- Khan, M.Z., Yousuf, R.I., Shoaib, M.H., **Ahmed, F.R.**, et al., “*A hybrid framework of artificial intelligence-based neural network model (ANN) and central composite design (CCD) in quality by design formulation development of orodispersible moxifloxacin tablets: Physicochemical evaluation, compaction analysis, and its in-silico PBPK modeling*”, **Journal of Drug Delivery Science and Technology**, 104323, 82 (2023)
- Saleem, M.T., Shoaib, M.H., Yousuf, R.I., **Ahmed, F.R.**, et al., “*SeDeM tool-driven full factorial design for Osmotic drug delivery of Tramadol HCl: Formulation development, physicochemical evaluation, and in-silico PBPK modeling for predictive pharmacokinetic evaluation using GastroPlus™*”, **Frontiers in Pharmacology**, 3633 (2022)
- Irshad, A., Yousuf, R.I., Shoaib, M.H., Qazi, F., Saleem, M.T., Siddiqui, F., **Ahmed, F.R.**, et al., “*Effect of starch, cellulose and povidone based superdisintegrants in a QbD-based approach for the development and optimization of Nitazoxanide orodispersible tablet*”. **Journal of Drug Delivery Science and Technology**, 104079 (2022)
- Siddiqui, F., Shoaib, M.H., **Ahmed, F.R.**, Qazi, F., et al., “*Formulation development and optimization of taste-masked azithromycin oral suspension with ion exchange resins: Bioanalytical method development and validation, in vivo bioequivalence study, and in-silico PBPK modeling for the paediatric population*”, **Journal of Drug Delivery Science and Technology**, 104048 (2022)
- Sikandar, M., Shoaib, M.H., Yousuf, R.I., **Ahmed, F.R.**, et al., “*Nanoclay-Based Composite Films for Transdermal Drug Delivery: Development, Characterization, and in silico Modeling and Simulation*”, **International Journal of Nanomedicine** 17, 3463-3481 (2022)
- Ali, F.R., Shoaib, M.H., Ali, S.A., Yousuf, R.I., Siddiqui, F., Raja, R., Hafiza, S.J., Saleem, M.T., Ahmed, K., Imtiaz, S.I., Ahmad, M., Sarfaraz, S., **Ahmed, F.R.**, “*A nanoemulsion based transdermal delivery of insulin: Formulation development, optimization, in-vitro permeation across Strat-M® membrane and its pharmacokinetic/pharmacodynamic evaluation*”, **Journal of Drug Delivery Science and Technology**, 71, 103338 (2022)

- Hussain, T., Shoaib, M.H., **Ahmed, F.R.**, Yousuf, R.I., et al., “Investigating Halloysite Nanotubes as a Potential Platform for Oral Modified Delivery of Different BCS Class Drugs: Characterization, Optimization, and Evaluation of Drug Release Characteristics”, **International Journal of Nanomedicine**, 16, 1725-1741 (2021)
- Shoaib, M.H., **Ahmed, F.R.**, Sikandar, M., Yousuf, R.I., Saleem, M.T., “A Journey from SARS-Cov-2 to COVID-19 and Beyond: A Comprehensive Insight of Epidemiology, Diagnosis, Pathogenesis and Overview of the Progress into its Therapeutic Management”, **Frontiers in Pharmacology** 12, 72 (2021)
- Usmani, M.T., Shoaib, M.H., Siddiqui, F., **Ahmed, F.R.**, et al., “Modification and validation of liquid chromatographic method for the quantification of ciprofloxacin in human plasma and its application to a bioavailability study”, **Pakistan Journal of Pharmaceutical Sciences**, 34 (2), 767-772 (2021)
- Iffat, W., Shoaib, M.H., Yousuf, R.I., Qazi, F., Mahmood Z.A., Muhammad, I.N., Ahmed, K., **Ahmed, F.R.**, & Imtiaz, M.S., “Use of Eudragit RS PO, HPMC K100M, Ethyl Cellulose and their Combination for Controlling Nicorandil Release form Bilyer Tablets with Atorvastatin as an Immediate Release Layer”, **Journal of Pharmaceutical Innovation** (2020)
- Habib, R., Shoaib, M.H., **Ahmed, F.R.**, Siddiqui, F., et al., “HPLC-UV method for simultaneous quantitation of artemether and lumefantrine in fixed dose combination oro-dispersible tablet formulation”. **Pakistan Journal of Pharmaceutical Sciences** 33 (4), 1561-1567 (2020)
- Qazi, F., Shoaib, M.H., Yousuf, R.I., Siddiqui, F., Nasiri, M.I., Ahmed, K., Muhammad, I.N., **Ahmed, F.R.**, “QbD based Eudragit coated Meclizine HCl immediate and extended release multiparticulates: Formulation, characterization and pharmacokinetic evaluation using HPLC-Fluorescence detection method”, **Scientific Reports** 10 (1), 1-20 (2020)
- Yasmin, R., Shoaib, M.H., **Ahmed, F.R.**, Faaiza Qazi, et al., “Aceclofenac Fast Dispersible Tablet Formulations: Effect of different concentration levels of Avicel PH102 on the compactional, mechanical and drug release characteristics”, **PLOS One** 15 (2), e0223201 (2020)
- Ahmed, K., Shoaib, M.H., Yousuf, R.I., Siddiqui, F., Qazi, F., Iftikhar, J., **Ahmed, F.R.**, and Nasiri, I., “Comparative pharmacokinetics of osmotically controlled Eperisone with immediate release oral formulation using sensitive LC/MS/MS-ESI quantitation in healthy human subjects”, **Scientific Reports** 10 (1), 1-11 (2020)
- **Ahmed, F.R.**, Shoaib, M.H., Yousuf, R.I., Geckeler, K.E., et al., “Clay nanotubes as a novel multifunctional excipient for the development of directly compressible diclofenac potassium tablets in a SeDeM driven QbD environment”, **European Journal of Pharmaceutical Sciences**, 133, 214-227 (2019)
- Khan, N., Naqvi, A.A., Ahmad, R., **Ahmed, F.R.**, McGarry, K., et. al., “Perceptions and Attitudes of Medical Sales Representatives (MSRs) and Prescribers Regarding Pharmaceutical Sales Promotion and Prescribing Practices in Pakistan”, **Journal of Young Pharmacist**, 8, 244-250 (2016)
- Tanwir, S., Sabah, A., Subhani, S., Jaffery, R., Zeb, M., Haroon, S., Hashmi, S., & **Ahmed, F.R.**, “Resistance Pattern of Clinical Isolates of Enterococcus SPP. Against Vancomycin and Various Selected Antimicrobials Over 4 Years in A Multicenter Tertiary Care Hospital in Karachi”, **Annals of Punjab Medical College**, 11(1), 10-14. (2016)
- **Ahmed, F.R.**, Shoaib, M.H., Azhar, M., Um, S.H., Yousuf, R.I., et al., “In-vitro Assessment of Cytotoxicity of Halloysite Nanotubes Against HepG2, HCT116 and Human Peripheral Blood Lymphocytes”, **Colloids and Surfaces B: Biointerfaces**, 135, 50-55 (2015)
- Abbas, A., **Ahmed, F.R.**, Yousuf, R., Khan, N., et al., “Prevalence of Self-Medication with Psychoactive Stimulants and Antidepressants among Undergraduate Pharmacy Students in Twelve Pakistani Cities”, **Tropical Journal of Pharmaceutical Research**, 14, 1319-1326 (2015)
- Sultan, F., Shoaib, M.H., **Ahmed, F.R.**, Salam, F.A., et al., “Simultaneous quantitation of apirin, amlodipine and simvastatin in a formulation by an HPLC-UV based method”, **Pakistan Journal of Pharmaceutical Sciences**, 27 (5) 1553-1558, (2014)
- Ali, T., Shoaib, M.H., Yousuf, R.I., Siddiqui, F., Ali, H., **Ahmed, F.R.**, et al., “Development and validation of a reverse phase high performance liquid chromatography (HPLC) method for determination of tizanidine in human plasma”, **African Journal of Pharmacy and Pharmacology**, 8, 175-181 (2014)
- Hanif, Z., **Ahmed, F.R.\***, Shin, S.W., Kim, Y.K., Um, S.H., “Size- and dose-dependent toxicity of cellulose nanocrystals (CNC) on human fibroblasts and colon adenocarcinoma”, **Colloids and Surfaces B: Biointerfaces**, 19, 162-165 (2014)

- A Ra Kim, **Ahmed, F.R.**, \*, Jung, G.Y., Cho, S.W., Dong-Ik Kim, and Um, S.H., “Hepatocyte cytotoxicity evaluation with zinc oxide nanoparticles” **Journal of Biomedical Nanotechnology**, 9, 926-929 (2013)
- Khan, M.U., Khan, N., **Ahmed, F.R.**, Feroz, Z., et al., “Patients' opinion of pharmacists and their roles in health care system in Pakistan”, **Journal of Young Pharmacists**, 5, 90-94 (2013)

#### **Journal Papers in Review**

- Ali, F.R., Shoaib, M.H., Ali, S.A., Yousuf, R.I., **Ahmed, F.R.**, et. al., “Fabrication and evaluation of nanoemulsion based insulin loaded microneedles for transdermal drug delivery: In-vitro release, permeation and in-vivo PK/PD studies”, (under review in *European Polymer Journal*)
- Hussain, T., Shoaib, M.H., **Ahmed, F.R.**, Yousuf, R.I., et al., “Halloysite nanotubes based composite matrix, a potential sustained release agent for BCS class I drug verapamil hydrochloride: compression characterization, in-vitro release kinetics, and in-vivo mechanistic PBPK modeling studies” (under review in *Journal of Drug Delivery Science and Technology*)
- **Ahmed, F.R.**, Shoaib, M.H., Yousuf, R.I., Kurt E Geckeler, Fahad Siddiqui, Shadab Ahmed, Tazeen Hussain, Kamran Ahmed and Faaiza Qazi, “Facile development of halloysite nanotubes based oral sustained release formulations” (submission stage)

#### **Book Chapters**

- **Farrukh Rafiq Ahmed, Muhammad Sikandar, Muhammad Harris Shoaib, Rabia Ismail, Kamran Ahmed.** “Halloysite-Starch based Nano-Composites and Applications”. In Book **Advanced Applications of Micro and Nano Clay: Biopolymer-based Composites**. Materials Research Forum LLC, Millersville, PA United States
- Muhammad Harris Shoaib, **Farrukh Rafiq Ahmed**, Rabia Ismail Yousuf, Muhammad Sikandar, Muhammad Talha Saleem “Application of Polysaccharides in Controlled Release Drug Delivery System”. In Book “Polysaccharides: Properties and Applications”. John Wiley & Sons., Hoboken, United States
- Muhammad Harris Shoaib, Rabia Ismail Yousuf, **Farrukh Rafiq Ahmed**, Fatima Ramazan, Faaiza Qazi, Kamran Ahmed and Fariya Zafar, “Polymer Coatings for Pharmaceutical Applications”. In Book “Polymers Coatings: Technology and Applications”. John Wiley & Sons, p 275. Hoboken, United States

#### **Selected Posters and Presentations**

- **Farrukh R. Ahmed** and Kurt E. Geckeler, “A Novel Inorganic Nanotube-Biopolymer Composite for Colon-Specific Anticancer Drug Delivery”, *3<sup>rd</sup> Symposium of the World Class University*, Sep 2010, Oryong Hall, Gwangju Institute of Science and Technology, Gwangju, South Korea (oral and poster presentation).
- **Farrukh R. Ahmed** and Kurt E. Geckeler, “A Novel Inorganic Nanotube-Biopolymer Composite for Colon-Specific Anticancer Drug Delivery”, *105<sup>th</sup> National Meeting of the Korean Chemical Society*, April 2010, Songdo Convensia, Incheon, South Korea (poster presentation).
- [Best Poster Award]. Yeonju Lee, **Farrukh R. Ahmed**, Dongku Kim, Young Joo Moon, Sangyong Jon and Kurt E. Geckeler, Dispersion of Carbon and Non-Carbon Nanotubes and their Cytotoxicity Study *in-vitro*”, *Joint Symposium on Materials Science and Engineering for the 21<sup>st</sup> Century*, September 2008, Dream Center, Gyeongju, South Korea (poster presentation)

#### **SELECTED PRESENTATIONS AND INVITED LECTURES**

- Delivered an Invited Lecture “Nanomaterials based Drug Products: Safety Considerations and Regulatory Landscape” at Symposium entitled ‘Advances in Nanobiotechnology’, Department of Biotechnology, University of Karachi, November 2022
- Delivered an Invited Lecture “Software Tools in Drug Product Development and Bioequivalence Studies” at Symposium entitled ‘Perspective and Dimensions of Drug Product Bioequivalence in 21<sup>st</sup> Century’, Karachi, Pakistan, December 2015
- Delivered an Invited Lecture “Therapeutic Drug Monitoring of Narrow Therapeutic Index Drugs” at a course on Clinical Pharmacy held at National Institute of Bone Marrow Transplantation and Blood Diseases, Karachi, Pakistan, February 2014
- Delivered an Invited Talk “Nexus of Pharmaceutical Biotechnology and Nanotechnology: Current and Future Applications” at a Seminar entitled **New Horizons of Biotechnology**, held at Aga Khan University, Karachi, Pakistan from 7<sup>th</sup> September 2013.
- Delivered an Invited Talk “Halloysite Nanotubes Based Composites for Drug Delivery” at **Pakistan-US Workshop (National Science Foundation USA and ICCBS Pakistan)** on Applications of Nanotechnology, held at International Center for Chemical and Biological Sciences (HEJ Research Institute of Chemistry) Karachi, Pakistan from 29-30<sup>th</sup> May 2012.

- Delivered a Presentation “*A Novel Inorganic Nanotube-Biopolymer Composite for Colon-Specific Anticancer Drug Delivery*” at **3rd Symposium of the ‘World Class University’** held at Oryong Hall, Gwangju Institute of Science and Technology, Gwangju, South Korea from 2-4<sup>th</sup> September 2010.

#### STUDENT SUPERVISED

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##### Masters (MPhil) students advised

1. Sidra Tanwir\* - “Evaluation of Vancomycin Utilization at Tertiary Care Hospitals in Karachi Using SMART-PROCAM Strategy”, Dec 2016
2. Razia Jaffery\* - “Evaluation of population pharmacokinetics of vancomycin in preterm and full-Term neonates”, March 2022

##### Masters (MPhil) students under supervision

1. Sadaf Hina – “Development and evaluation of oral modified-release formulation of rebamipide”, graduation expected in Nov 2023
2. Rabia Imran – “Development and characterization of *in-situ* mucoadhesive powder formulation for modified-release intranasal delivery of sumatriptan succinate”, graduation expected in Dec 2023
3. Sana Masood\* – “Antibacterial Efficacy of Triphala Tooth Wipes in Reduction of Streptococcus mutans Colonies in Intellectually Disabled Individuals- A Randomized Clinical Trial”, graduation expected in Feb 2024 from Dow University of Health Sciences (co-advising)

#### SELECTED WORKSHOPS

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- April 2019: (2-Day Workshop; 12 Credits) **Generic Drug Forum 2019** – Small Business and Industry Assistance, Center for Drug Evaluation and Research, Food and Drug Administration, USA. (Web Based Live Attendance)
- September 2018: (2-Day Workshop; 12 Credits) **2018 Complex Generic Drug Product Development Workshop** – Small Business and Industry Assistance, Center for Drug Evaluation and Research, Food and Drug Administration, USA. (Web Based Live Attendance)
- November 2014: ‘EVONIK - Eudragit Workshop and Its Use in Sustained Release and Enteric Coating, ii) Taste masking’, Organized by Evonik Polymers – Morgan Chemicals, Marriot Hotel, Karachi, Pakistan.
- October 2012: (Participated) ‘**Workshop on SPSS**’, Ziauddin College of Pharmacy, Ziauddin University, Karachi, Pakistan.
- May 2012: (Participated) ‘**Workshop on Plagiarism**’, Ziauddin College of Pharmacy, Ziauddin University, Karachi, Pakistan.
- March 2007: (Participated in 4 workshops) ‘PCR’, ‘**Stem cell culturing**’, ‘**DIC and Phase contrast microscopy**’ and ‘**Simulation Studies for Drugs Action on Ion Channels**’, ‘International Brain Research Organization Associate School of Neuroscience 2007-Karachi’, Pakistan.
- January 2007: (Coordinated in organizing workshop) ‘*In-vitro Screening of Medicinal Plants for their Anti-cancer activity using Cell Culture Technique*’, ‘1<sup>st</sup> International Symposium and Training Workshop on Molecular Medicine and Drug Research’, Dr. Panjwani Center for Molecular Medicine and Drug research, I.C.C.B.S, University of Karachi, Pakistan.

#### COMMUNITY SERVICES

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**Volunteer for Earth-Quake Victims 2005** – Duties for Managing Pharmaceutica Supplies, Strategic-Hub PAF Base Faisal, October 2005

**Founder and Partner** – ‘Dawaa Mart’ Pharmacy Services – (<https://web.facebook.com/dawaamart19>)

**Awareness and guidance sessions during COVID-19 Pandemic:** (<https://web.facebook.com/philoscipher>)

#### LANGUAGES

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Urdu: Native Language

English: Listening (Superior), Speaking (Superior), Reading (Superior) and Writing (Superior)

Korean: Listening (Novice), Speaking (Novice), Reading (Intermediate) and Writing (Intermediate)

\*Levels: Novice, Intermediate, Advanced, Superior, and Distinguished levels (DL)

#### COMPUTER SKILLS

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- Competent with GastroPlus<sup>TM</sup>, Certara Phoenix<sup>TM</sup> NLME, SimBiology (MATLAB ver. R2018b), Design Expert 11, Minitab 17, SPSS ver. 22, MS office 365 programs, endnote X9, Zotero, Adobe Professional 9, Origin Professional 7 (data analysis and graphing software).



- Competent with various online teaching platforms such as ZOOM, Google Classroom, Google Meet, Microsoft Teams, facebook groups and live sessions etc.
- Competent with various online scientific searching databases and tools like ISI Web of Knowledge, Journal Citation Reports (JCR), Scopus, PubMed, SCImago Journal and Country Rank and Scientific Journal Ranking (SJR) etc.

#### **OTHERS**

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- Sports: Cricket and Football
- Citizenship: Pakistani
- Appeared as a guest on Health TV Program ‘Pharmawatch’ to discuss the topic ‘Drug-Drug Interaction’ on Thursday 16 February 2012. (URL: <http://www.youtube.com/watch?v=ZZKXkIPD5VU>)
- Science communication social media channel: PhiloScipher (<https://web.facebook.com/philoscipher>)

#### **REFERENCES**

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- 1) Prof. Dr. Muhammad Harris Shoaib  
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