

SAMIR IQBAL, PhD, PE

Fellow Royal Society of Chemistry

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EDUCATION:

- * **Ph.D. (Direct)**, Electrical and Computer Engineering, Purdue University, West Lafayette, Indiana, USA. (2007).
- * **B.S.**, Electrical Engineering, NED University of Engineering and Technology, Karachi, Pakistan. (1996).

PROFESSIONAL EXPERIENCE:

Professor and Former Chair	Department of Electrical Engineering School of Medicine University of Texas Rio Grande Valley Edinburg, Texas, USA	2017 – Current
US Air Force Faculty Fellow Visiting Scientist	Biological Interaction of Nanomaterials Group Wright-Patterson Air Force Base, Dayton, Ohio, USA	May – Aug 2015
Associate Professor	Department of Bioengineering Department of Electrical Engineering University of Texas at Arlington (UT-Arlington) Arlington, Texas, USA	2013 – 2017
Assistant Professor	Department of Electrical Engineering Department of Bioengineering (C) UT-Arlington, Arlington, Texas, USA	2007 – 2013 2010 – 2013
Post-Doctoral Research Associate	Birck Nanotechnology Center, Discovery Park Purdue University, West Lafayette, Indiana, USA	Feb – July 2007
Research/Teaching Assistant	Purdue University, West Lafayette, Indiana, USA	2002 – 2007
Consultant	International Management Group (IMG), Pakistan	1996
Electrical Engineering Officer	Pakistan Navy, Karachi, Pakistan	1992 – 2000

LEADERSHIP:

- **Department Chair**, Electrical Engineering, University of TX Rio Grande Valley, USA (2017 – 2018).
- **General Chair**, *3rd US International Conference on Surfaces, Coatings and Nanostructured Materials—NANOSMAT-USA 2016*, Arlington, TX, USA, (May 18 – 20, 2016).
- **Member Executive Team**, Planning and designing 200,000-square-foot *Science and Engineering Innovation and Research Building* at UT-Arlington, Texas, USA (2015 – 2017).
- **Co-Founder**, *VisioSound Inc.*, Start-up developing tools for foreign language learning (Aug 2015).
- **General Co-Chair**, *Third Conference on Nanotechnology for Biological and Biomedical Applications (Nano-Bio-Med 2015)*, the Indian Institute of Technology-Bombay (IIT-B), Mumbai, India (December 1 – 4, 2015). <https://www.ee.iitb.ac.in/~nanobiomed/>
- **Chair**, Publicity Committee, *IEEE-EMBS Technical Committee on BioMEMS*, 2015 – 2016
- **General Co-Chair** and Member Organizing Committee, *2nd US International Conference on Surfaces, Coatings and Nanostructured Materials—NANOSMAT-USA 2014*, Houston, TX, USA, (May 19 – 22, 2014).
- **Secretary**, *Sigma Xi* – UT-Arlington Chapter, Texas, USA, 2014 – 2017
- **Vice President**, *Pakistan American Association of Texas*, Dallas, Texas, USA, 2014 – 2017.
- **General Co-Chair**, *Second Conference on Nanotechnology for Biological and Biomedical Applications (Nano-Bio-Med 2013)*, the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy (October 14 – 18, 2013). <http://indico.ictp.it/event/a12217/>
- **Co-Founder** and **General Co-Chair** of *Conference on Nanotechnology for Biological and Biomedical Applications (Nano-Bio-Med)*, the Abdus Salam ICTP, Trieste, Italy, (October 10 – 14, 2011). <http://indico.ictp.it/event/a10173/>

AREAS OF EXPERTISE

Flow of suspensions; Granular and granular-fluid flows; Micro- and nanostructured fluids; Self-assembly/directed-assembly processes with particulates; Polymer-particle complexes with engineered properties; Cells in fluids; Functionalized and flexible substrates; Data analytics; Nanoporous particles; Cell capture; Machine learning algorithms for image analysis for cancer detection; Microencapsulations for cell confinement; Nanopore systems; Single molecule biophysics.

AWARDS:

- *Distinguished Lecturer*, IEEE Nanotechnology Council, 2018.
- *Distinguished Lecturer*, IEEE — Engineering in Medicine and Biology Society (IEEE-EMBS), 2016 – 2018.
- *Education Award*, Tarrant County Asian American Chamber of Commerce, Arlington, Texas, 2017.
- *Presidential Research Fellow*, University of Texas at Arlington, 2017-18. \$20,000 Prize.
- *Fellow*, The NANOSMAT Society, UK, 2017.
- *Fellow*, Royal Society of Chemistry, UK, 2016.
- *Excellence in Research Award 2016*, UT-Arlington College of Engineering. \$5,000 Prize.
- *Best Research Advisor Award 2015*, Sigma Xi Scientific Research Society.
- *Outstanding ACES Mentor Award 2014*, Sigma Xi Scientific Research Society.
- *Recognized Professor*, Phi Kappa Phi, 2011.
- *Best Poster Award* at "From DNA-Inspired Physics to Physics-Inspired Biology" Conference, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, 2009.
- *CAREER Award*, National Science Foundation, 2009: "Nanoelectronic Microfluidic Biochip for Ultrasensitive Detection of Selective Protein Biomarkers." Grant \$468,000.
- *2003-2004 Magoon Award for Excellence in Teaching*. Award carried cash prize, certificate and a citation. Awardees were chosen from the teaching assistants of 13 engineering schools.

HONORS:

- *Fellowship* to present at the *Micro Nano Technology education (MNTE) Special Interest Group (SIG) and High Impact Technology Exchange Conference (HI-TEC)*, Miami, FL, USA (July 23 – 26, 2018).
- *Fellowship* to present at the *Micro Nano Technology (MNT) Special Interest Group (SIG) and High Impact Technology Exchange Conference (HI-TEC)*, Salt Lake City, UT, USA (July 18 – 20, 2017).
- *Excellence in Doctoral Student Mentoring Award*, UT-Arlington, Finalist, 2017.
- *Doctoral Student Mentoring Award*, UT-Arlington, Finalist, 2015.
- *President's Award for Excellence in Teaching*, Electrical Engineering Nominee, UT-Arlington, 2014.
- *Fellowship* to attend the European Summit for Clinical Nanomedicine 2013, Basel, Switzerland.
- *Eminent Engineer*, Tau Beta Pi, National Engineering Honor Society, 2013
- *Best Academic Advisor 2012-13*, UT-Arlington, Honorable Mention, 2013.
- *President's Award for Excellence in Teaching*, College of Engineering Nominee, UT-Arlington, 2013.
- *Fellowship* for "NSF Summer Institute: The Materials Genome: Current Practice and Future Promise" at Northwestern University, Evanston, IL, USA, 2013.

SELECTED JOURNAL PUBLICATIONS: (*h*-index = 20, *i10*-index = 33, Citations = 1767)

1. **S. M. Iqbal**, G. Balasundaram, S. Ghosh, D. E. Bergstrom and R. Bashir, "Direct Current Electrical Characterization of ds-DNA in Nanogap Junctions," *Applied Physics Letters*, vol. 86, no. 15, p. 153901 (3 pp) (2005). DOI: 10.1063/1.1900315
2. **S. M. Iqbal**, D. Akin and R. Bashir, "Solid-state Nanopore Channels with DNA Selectivity," *Nature Nanotechnology*, vol. 2, no. 4, pp. 243-248 (2007).
3. M. R. Noor, S. Goyal, S. M. Christensen and **S. M. Iqbal**, "Electrical Detection of Single-base DNA Mutation using Functionalized Nanoparticles," *Applied Physics Letters*, vol. 95, no. 7, p. 073703 (3 pp) (2009). **COVER ARTICLE.**
4. Y. Wan, Y.-T. Kim, N. Li, S. K. Cho, R. Bachoo, A. D. Ellington and **S. M. Iqbal**, "Surface Immobilized Aptamers for Cancer Cell Isolation and Microscopic Cytology," *Cancer Research*, vol. 70, no. 22, pp. 9371-9380 (2010).
5. W. Asghar, A. Ilyas, J. A. Billo and **S. M. Iqbal**, "Shrinking of Solid-State Nanopores by Direct Thermal Heating," *Nanoscale Research Letters*, vol. 6, no. 1, p. 372 (6 pp) (2011). DOI:10.1186/1556-276X-6-372.
6. W. Asghar, A. Ilyas, R. R. Deshmukh, S. Sumitsawan, R. B. Timmons and **S. M. Iqbal**, "Pulsed plasma polymerization for controlling shrinkage and surface composition of nanopores," *Nanotechnology*, vol. 22, no. 28, p. 285304 (8 pp) (2011). DOI: 10.1088/0957-4484/22/28/285304
7. Y. Wan, J. Tan, W. Asghar, Y.-T. Kim, Y. Liu and **S. M. Iqbal**, "Velocity Effect on Aptamers-based Circulating Tumor Cell Isolation in Microfluidic Devices," *Journal of Physical Chemistry B*, vol. 115, no. 47, pp. 13891–13896 (2011). DOI: 10.1021/jp205511m
8. J. S. Sankaran, S. Goyal, W. T. Kahsai, U. H. T. Pham and **S. M. Iqbal**, "Hydrophilic Interfacing for Thermal Micro Assembly of Polymers (HITMAP)," *Advanced Science Letters*, vol. 4, no. 11-12, pp. 3464-3469 (2011).
9. Y. Wan, M. A. I. Mahmood, N. Li, P. B. Allen, Y.-T. Kim, R. Bachoo, A. D. Ellington and **S. M. Iqbal**, "Nano-textured Substrates with Immobilized Aptamers for Cancer Cell Isolation and Cytology," *Cancer*, vol. 118, no. 4, pp. 1145-1154 (2012). Appeared online: 15 Jul 2011. DOI: 10.1002/cncr.26349

10. W. Asghar, M. Islam, A. S. Wadajkar, Y. Wan, A. Ilyas, K. T. Nguyen and **S. M. Iqbal**, "PLGA Micro and Nanoparticles Loaded into Gelatin Scaffold for Controlled Drug Release," *IEEE Transactions on Nanotechnology*, vol. 11, no. 3, pp. 546-553 (2012). **COVER ARTICLE**. DOI: 10.1109/TNANO.2012.2183004.
11. W. Asghar, Y. Wan, A. Ilyas, R. Bachoo, Y.-T. Kim and **S. M. Iqbal**, "Electrical Fingerprinting, 3D Profiling and Detection of Tumor Cells with Solid-state Micropores," *Lab on a Chip*, vol. 12, no. 13, pp. 2345-2352 (2012). **COVER ARTICLE**. DOI: 10.1039/C2LC21012F
12. W. T. Kahsai, U. H. T. Pham, J. S. Sankaran and **S. M. Iqbal**, "Self-assembled Synthesis and Characterization of Microchannels in Polymeric Membranes," *Journal of Applied Physics*, vol. 112, no. 2, p. 024701 (8 pp) (2012).
13. Y. Wan, Y. Liu, P. B. Allen, W. Asghar, M. A. I. Mahmood, J. Tan, H. Duhon, Y.-T. Kim, A. D. Ellington and **S. M. Iqbal**, "Capture, Isolation and Release of Cancer Cells with Aptamer-functionalized Glass Beads," *Lab on a Chip*, vol. 12, no. 22, pp. 4693-4701 (2012). **COVER ARTICLE**.
14. Y. Wan, D. Tamuly, P. B. Allen, Y.-T. Kim, R. Bachoo, A. D. Ellington and **S. M. Iqbal**, "Proliferation and migration of tumor cells in tapered channels," *Biomedical Microdevices*, vol. 15, pp. 635-643 (2013). DOI: 10.1007/s10544-012-9721-0.
15. A. Ilyas, M. Islam, W. Asghar, J. U. Menon, A. S. Wadajkar, K. T. Nguyen, **S. M. Iqbal**, "Salt-Leaching Synthesis of Porous PLGA Nanoparticles," *IEEE Transactions on Nanotechnology*, vol. 12, no. 6, pp. 1082-1088 (2013). **COVER ARTICLE**.
16. Q. Zheng, **S. M. Iqbal** and Y. Wan, "Cell Detachment: Post-isolation Challenges," *Journal of Biotechnology Advances*, vol. 31, no. 8, pp. 1664-1675 (2013).
17. M. A. I. Mahmood, W. Ali, A. Adnan and **S. M. Iqbal**, "3D Structural Integrity and Interactions of Single-stranded Protein-binding DNA in a Functionalized Nanopore," *The Journal of Physical Chemistry*, vol. 118, no. 22, pp. 5799-5806 (2014). DOI: 10.1021/jp411820w
18. A. Ilyas, W. Asghar, S. Ahmed, Y. Lotan, J.-T. Hsieh, Y.-T. Kim and **S. M. Iqbal**, "Electrophysiological Analysis of Biopsy Samples using Elasticity as an Inherent Cell Marker for Cancer Detection," *Analytical Methods*, vol. 6, pp. 7166-7174 (2014). **COVER ARTICLE** DOI: 10.1039/C4AY00781F.
19. H. Ma, L. Wang, M. M. Ali, M. A. I. Mahmood, L. Labanieh, M. Mu, **S. M. Iqbal**, Q. Zhang, W. Zhao, and Y. Wan, "Nucleic Acid Aptamers in Cancer Research, Diagnosis and Therapy," *Chemical Society Reviews*, vol. 44, pp. 1240-1256 (2015). DOI: 10.1039/C4CS00357H
20. M. Islam, M. M. Bellah, A. Sajid, M. R. Hasan, Y.-T. Kim and **S. M. Iqbal**, "Effects of Nanotexture on Electrical Profiling of Single Tumor Cell and Detection of Cancer from Blood in Microfluidic Channels," *Scientific Reports*, 5, 13031 (9 pp) (2015). DOI: 10.1038/srep13031
21. W. Ali, A. Ilyas, L. Bui, B. Sayles, Y. Hur, Y.-T. Kim and **S. M. Iqbal**, "Differentiating Metastatic and Non-metastatic Tumor Cells from their Translocation Profile through Solid-state Micropores," *Langmuir*, vol. 32, no. 19, pp 4924-4934 (2016). DOI: 10.1021/acs.langmuir.6b00016
22. M. Hanif, A. Hafeez, Y. Suleman, M. M. Rafique, A. R. Butt and **S. M. Iqbal**, "Accelerated Framework for the Classification of Biological Targets from Solid-state Micropore Data," *Computer Methods and Programs In Biomedicine*, vol. 134, pp. 53-67 (2016). DOI: 10.1016/j.cmpb.2016.06.001
23. M. U. Raza, S. Saleem, W. Ali and **S. M. Iqbal**, "Crosstalk between adjacent nanopores in a solid-state membrane array for multi-analyte high-throughput biomolecule detection," *Journal of Applied Physics*, vol. 120, p. 064701 (8 pp) (2016). DOI: 10.1063/1.4958673
24. M. Islam, R. Atmaramani, S. Mukherjee, S. Ghosh and **S. M. Iqbal**, "Enhanced proliferation of PC12 neural cells on untreated, nanotextured glass coverslips," *Nanotechnology*, vol. 27, no. 41, pp. 415501 (2016). DOI: 10.1088/0957-4484/27/41/415501
25. N. Mansur, M. R. Hasan, Y.-T. Kim and **S. M. Iqbal**, "Functionalization of Nanotextured Substrates for Enhanced Identification of Metastatic Breast Cancer Cells," *Nanotechnology*, vol. 28, no. 38, pp. 385101 (11 pp) (2017). DOI: 10.1088/1361-6528/aa7f84
26. M. R. Hasan, N. Hassan, R. Khan, Y.-T. Kim, and **S. M. Iqbal**, "Classification of Cancer Cells using Computational Analysis of Dynamic Morphology," *Computer Methods and Programs in Biomedicine*, vol. 156, pp 105-112 (2018). Available Online 7 Dec 2017. DOI: 10.1016/j.cmpb.2017.12.003
27. M. R. Hasan, S. S. S. Peri, V. P. Sabane, N. Mansur, J. Gao, K. T. Nguyen, J. A. Weidanz, **S. M. Iqbal** and V. V. Abhyankar, "One-Step Fabrication of Flexible Nanotextured PDMS as a Substrate for Selective Cell Capture," *Biomedical Physics & Engineering Express*, vol. 4, no. 2, pp. 025015 (11 pp) (2018). DOI: 10.1088/2057-1976/aa89a6
28. N. Mansur, M. R. Hasan, Z. I. Shah, F. J. Villarreal, Y.-T. Kim, and **S. M. Iqbal**, "Discrimination of metastatic breast cancer cells from indolent cells on aptamer-functionalized surface with imaging-based contour-following techniques," *Biomedical Physics & Engineering Express*, vol. 4, no. 2, pp. 025038 (12 pp) (2018). DOI: 10.1088/2057-1976/aa942a
29. M. U. Raza, S. S. S. Peri, L.-C. Ma, ***S. M. Iqbal**, and G. Alexandrakakis, " Self-Induced Back Action Actuated Nanopore Electrophoresis (SANE)," *Nanotechnology*, Accepted (2018). *Contact Author

FUNDED PROJECTS: ~\$5 million as PI and Co-PI. Average \$500,000/year.
PLENARY, KEYNOTE, INVITED TALKS AND SEMINARS: 109 in 20+ countries
PEER-REVIEWED CONFERENCE PROCEEDINGS (Full Paper): 34
PEER-REVIEWED CONFERENCE PRESENTATIONS (Abstract Only): 107

PATENTS:

1. S. A. Mian, Z. M. Din and **S. M. Iqbal**, "Controlled Protein Adhesion for Critical Biomedical Application using Mussel based Adhesive Protein and Electrical Stimulation," Provisional patents filed in Pakistan and USA (2018).
2. G. Alexandrakakis, **S. M. Iqbal**, S. M. Chowdhury, J. A. Weidanz, M. U. Raza, L.-C. Ma, "Nanosensors and Methods of Making and using Nanosensors," U.S. Provisional Patent, Filed 12/12/2017 (2017).
3. Md. Motasim Bellah, J. M. Tommerdahl, M. R. Hasan and **S. M. Iqbal**, "Systems and Methods for Human Speech Training," International Patent Application Number PCT/US2016/041765 filed 11 Jul 2016.
4. M. M. Bellah, J. M. Tommerdahl, M. R. Hasan and **S. M. Iqbal**, "Systems, Methods, and Apparatuses for Audio Signal Processing," U.S. Provisional Application No. 62/190,606 (2015).
5. **S. M. Iqbal**, Swati Goyal, Y.-T. Kim, Yuan Wan, Mohammed A.I. Mahmood, Umair J.M. Khan, "Methods of Detecting Tumor Cells," Patent #US 2015/0010912 A1 issued on 8 Jan 2015.
6. **S. M. Iqbal**, S. Goyal, S. M. Christensen and M. R. Noor, "Nano-Scale Biosensors," US Patent #8,283,936 issued on 9 Oct 2012.
7. K. A. Schug, S. Spencer, Y.-T. Kim and **S. M. Iqbal**, "Method, Apparatus and Compositions for Imaging Proteins from Polymer Membranes by Mass Spectrometry," U.S. Prov. Patent App. No. 61/303,661 (2010).
8. **S. M. Iqbal**, S. Christensen, S. Goyal, M. R. Noor, and P. P. Ramachandran, "Methods, Compositions and Apparatus for Nanoscale Biosensors," U.S. Provisional Patent Application No. 61/321770 (2010).
9. **S. M. Iqbal**, Y.-T. Kim, and S. Goyal, "Method and Apparatus for Making Channels in Polydimethylsiloxane (PDMS) using Self-assembly," U.S. Provisional Patent Application No. 61/390398 (2010).

KNOWLEDGE EXCHANGE ACTIVITIES:

- **Workshop** at the *Second Annual IEEE Life Sciences Conference (LSC)*, Montreal, Canada 28-30 October (October 28 – 30, 2018).
- Invited **Tutorial** at *Second NANOSMAT School*, Warsaw Univ. of Tech, Poland (September 11 – 14, 2018).
- Invited **Tutorial** on "Nanotextured Systems" at *NANOSMAT School*, Pierre Marie Curie University, Paris, France, (September 5 – 8, 2017).
- Developed/taught **Workshop** "Academic Publishing for Student Researchers" for *2017 Summer Research Academy*, UT System Louis Stokes Alliance for Minority Participation, Arlington, TX, USA (June 30, 2017).
- Developed and team-taught two-part online **Workshop** "Developing a CV or Resume" for *Center for the Integration of Research, Teaching and Learning (CIRTL) Network*, Arlington, TX, USA, (June 22/29, 2017). <http://go.wisc.edu/y538kt>
- Developed and team-taught "Writing an Academic Resume" Cross-Network **Workshop** for *Center for the Integration of Research, Teaching and Learning (CIRTL) Network*, Arlington, TX, USA (June 14, 2016).
- Developed/taught **Tutorial** "Nanotextured Microfluidic Substrates to Mimic Structured Hierarchy of Living Systems" at *15th International Conf. on Nanotechnology (IEEE NANO 2015)*, Rome, Italy (Jul 27–30 2015).
- Developed and taught one-week **Applications of Nanotechnology** workshop at GITAM University, Visakhapatnam, India (August 2014).
- **Biomedical Engineering Society Webinar Series:** Nation-wide web-based seminars titled:
 - Grant Writing: Practical Approaches for Preparing and Managing Grants in BME (March 27, 2013)
 - Effective Strategies for Teaching BME (May 16, 2013)
 - Best Practices for Running & Managing a Lab (November 7, 2013)
- Speaker and Panelist at CAREER **Grant Writing Workshops** at UT-Arlington (Every Spring since 2009).
- Initiator of "Nano-Bio Seminar Series" and "Trax4Grads" program in Electrical Engineering Department.
- "Academic Integrity," Three-session **Lecture Series** for new graduate students, College of Engineering, The University of Texas at Arlington, Arlington, TX, USA (Aug 19, Aug 23 and Aug 25, 2011).

YouTube OUTREACH (Title + Links):

- *IEEE-EMBS Distinguished Lecture* (April 21, 2017): <https://youtu.be/DH8qRP5oXDE>
- *TEDxUTA* (April 4, 2017): <https://youtu.be/ciaWN0kLg2A>
- *Focus On Faculty Speaker Series* (October 8, 2014): <https://youtu.be/7-XbFVDWLSE>
- UT-Arlington College of Engineering *Promo* (2012): <https://youtu.be/yOqYKo0qbnw>
- UT-Arlington *Engineering Research Building Promo* (2011): <https://youtu.be/QIDF-6YpoWA>
- Anti-EGFR Aptamer - Single Tumor Cell (2010): <https://youtu.be/9R-RhNH5-U>
- *Summer Camp* in UT-Arlington (2009): <https://youtu.be/X2JGv-zTxq8>