

PROF. MOHAMMED ZOUROB

Group Leader of Biosensors BioMEMS and Bionanotechnology Lab (BBBL).
Department of chemistry, Alfaisal University, Riyadh, KSA
E: mzourob@alfaisal.edu

Research interest and skills:

- ◇ Chemical/Biosensors
- ◇ Recognition receptors (bacteriophages, phage display, aptamers, MIPS,...)
- ◇ Lab on a chip
- ◇ Sample processing techniques
- ◇ Diagnostic technologies
- ◇ Surface immobilization techniques and patterning
- ◇ Polymer micro/nanofabrication techniques
- ◇ Highthroughput screening for “Omics” applications
- ◇ Biological particles detection and manipulation
- ◇ Miniaturized Analytical Instrumentation for Micro Total Analysis Systems (μ -TAS)
- ◇ Biotechnology

EDUCATION

- 2003 Ph.D. in Biosensors from Department of Chemical Engineering and Analytical Science (DIAS)-University of Manchester, UK.
- 1999 MSc from Al-Azhar Univ and the University of Manchester, UK (Joint program).
- 1997 BSC from IUG.

ACADEMIC WORK

- 08-2014 – Professor, Alfaisal University, KSA
- 02-2013 – 06/2015 Reader, Cranfield University, UK.
- 09-2010 to 11-2012 Associate professor Institut national de la recherche scientifique, University of Quebec, Canada
- 04-2009 to 08-2010 Director of R&D, GDG EnvironnementLtd, Trois-Rivieres, Canada.
- 08-2006 to 03 2009 Director of Biosensors Division, BiophageInc, Montreal, Canada
- 08-2005 to 08-2006 Research Associate
Institute of Biotechnology
Cambridge University
- 08-2004 to 08-2005 Research Associate
School of materials,
University of Manchester
- 01-2003 to 10-2004 Research Associate
Department of Instrumentation and Analytical
Science (DIAS)-UMIST
University of Manchester

PATENTS:

1. ‘Method and kit for the detection of microorganisms, US PATENT APPLICATION NUMBER: 14852526, 2015.
2. ‘A novel assay for early detection of a disease using a magnetic nanoparticle biosensor ’ US PATENT APPLICATION NUMBER: 14819195, 2015.
3. ‘Biosensor using magnetic particles for pathogen detection’, M. Zourob, US PATENT APPLICATION NUMBER: 14867353, 2015.

PROF. MOHAMMED ZOUROB

4. "Device for pathogens detection", M. Safavieh, M. Uddin Ahmed M. Zourob (US patent, application No. 13/987,392)
5. "Sensing platform for proteases detection and drugs screening", M. Zourob, C. Essieghier, A. Ng. (US patent, applications No. 61/655,720)
6. "Device for biosensing applications" M. Tolba, I. Statekina, F. Mouffouk, (US patent, applications No. 61/655,702)
7. "Electrochemical immunoassays based on polymeric nano-particles", F. Mouffouk, M. Zourob, *et al.* filed on July 27th 2009. Patent Application No. 104454C.
8. "Phage-based method for the detection of bacteria", A. Shabani, M. Zourob, B. Allain, M. R. Mandeville, filed on July 27th 2008. US Patent No.20090068638 .
9. "A waveguide structure (for detection of bacteria) WO2004031743", M. Zourob, N.J. Goddard, P.R. Fielden, S. Mohr, B. Treves Brown. Applicant: The Secretary of State for Defence, International application number PCT/GB02/045045, **AU** 2002334118, **CA** 2501267, **CN** 02829722.9, **EP** 02807883.0, **HK** GB02/004545, **JP** 2004-540911, **US** 10/259970.
10. "Apparatus for Detecting Particles (electric field based application) WO2004074819", M. Zourob, N.J. Goddard, P.R. Fielden, S. Mohr, B. Treves Brown, K. Hoettges, M. Hughes. Applicant: The Secretary of State for Defense, GB0303305.7, **EP** 04710423.7, **US**20060228257.

CONFERENCES: SELECTION (TOTAL 106)

Guest Speaker: (Total 62)

Publications: (SELECTION)

- 1 "A Rapid Colorimetric Assay for the Detection of typical biomarkers for Periodontitis Using a Magnetic Nanoparticle Biosensor", S. Wignarajah, G. Suaifan, F. Bikker, W. Kaman, M. Zourob, *Anal. Chem.* 2015, 87 (24), 12161–12168.
- 2 Sensitive Detection of ssDNA Using an LRET-Based Upconverting Nanohybrid Material, J. G. Jesu Raj, M. Quintanilla K. A. Mahmoud, A. Ng, F. Vetrone, M. Zourob, *ACS Applied Mater. Interfaces* 2015, 7 (33), 18257–18265
- 3 Selective Electrochemical Detection of 2,4,6-Trinitrotoluene (TNT) in Water based on Poly (styrene-co-acrylic acid) PSA/SiO₂/Fe₃O₄/AuNPs/Lignin-Modified Glassy Carbon Electrode, *Water Science and Technology* 2015, 72(10), 1780-1788.
- 4 "Development of an Anti-Vascular Cell Adhesion Protein-1 Aptamer for Molecular Imaging and inflammation detection in transgenic mouse model of Alzheimers disease" T. Simao, A. Ng, M. Zourob, *J. Biomedical Nanotechnology* 11 (12), 2015, 2264-2274.
- 5 DNA-Based Nanobiosensors as an Emerging Platform for Detection of Disease, KM Abu-Salah, MM Zourob, F Mouffouk, SA Alokayan, MA Alaamery, *Sensors* 15 (6),2015, 14539-14568.
- 6 Aptamer-based competitive electrochemical biosensor for brevetoxin-2, S. Eissa, M. Siaj, M. Zourob, *Biosensors and Bioelectronics* 69, 1,5 2015, 148-154
- 7 A flexible and low-cost polypropylene pouch for naked-eye detection of herpes simplex viruses, S. Nahar, M. U. Ahmed, M. Safavieh, A. Rochette, C. Toro, M. Zourob, *Analyst*, 2015, 2015,140, 931-937.
- 8 DNA aptamers selection and characterization for development of label-free impedimetric aptasensor for neurotoxin anatoxin-a, R. Elshafey, M. Siaj, M. Zourob, *Biosensors and Bioelectronics* 68, (15) 2015, 295-302.
- 9 Aptamer-Based Label-Free Impedimetric Biosensor for Detection of Progesterone, G. C. Jiménez, S. Eissa, A. Ng, H. Alhadrami, M. Zourob, M. Siaj, *Anal Chem.* 2015, 87 (2), pp 1075–1082.

PROF. MOHAMMED ZOUROB

- 10 In Vitro Selection, Characterization, and Biosensing Application of High-Affinity Cyndrospermopsin-Targeting Aptamers, R. Elshafey, M. Siaj, M. Zourob, *Anal. Chem.*, 2014, 86 (18), pp 9196–9203.
- 11 Functionalized CVD monolayer graphene for label-free impedimetric biosensing, S. Eissa, G. Contreras-Jimenez, F. Mahvash, A. Guermoune, C. Tlili, T. Szkopek, M. Zourob, M. Siaj, *Nano Research* 8 (5), 2014, 1698-1709.
- 12 A simple cassette as point-of-care diagnostic device for naked-eye colorimetric bacteria detection M. Safavieh, M. U. Ahmed, E. Sokullu, A. Ng, L. Braescu, M. Zourob, *Analyst*, 2014,139, 482-487.
- 13 Label-free voltammetric aptasensor for the sensitive detection of microcystin-LR using graphene-modified electrodes" S. Eissa, A. Ng, M. Zourob, *Anal Chem.* 86 (15) 2014,7551-7557.
- 14 Toward the development of smart and low cost point-of-care biosensors based on screen printed electrodes?, M. U. Ahmed, M. Safavieh, Y. L. Wong, I. Abd Rahman, M. Zourob, E. Tamiya, *Critical Review in Biotechnology* 1-11, 2014, 1549-7801.
- 15 High-throughput real-time electrochemical monitoring of LAMP for pathogenic bacteria detection, M. Safavieh, M. U. Ahmed, A. Ng, M. Zourob, *Biosensors and Bioelectronics* 2014,58, 1 101–106.
- 16 A Simple Cassette as Point-of-Care Diagnostic Device for Colorimetric Bacteria Detection, *The Analyst* 139, 2014, 482-487.
- 17 One-Step Sensor Monolayer Preparation for Optical Prostate Specific Antigen Biosensing, C. Esseghaier, G. A. R. Y. Suifan, A. Ng, M. Zourob, *J. Biomedical Nanotechnology* 10 (6), 2014, 1123-1129.
- 18 Design and fabrication of integrated multi-analyte sensing platform with magnetic micro-coils, I. Stateikina, S. Eissa, M. Zourob, *J. of Microelectromechanical systems* 22, Issue 6, 2013, 1339–1346.
- 19 Selection and identification of DNA aptamer against okadiac acid for biosensing application" S. Eissa, A. Ng, M. Zourob, *Anal. Chem* 85 (24), 2013, 11794–11801.
- 20 A novel and rapid assay for HIV-1 protease detection using magnetic bead mediation, C. Esseghaier, A. Ng, M. Zourob, *Biosensors and Bioelectronics* 41, 2013, 335-341.
- 21 Electrochemical Impedance Immunosensor based on gold nanoparticles-1 protein G for the detection of cancer marker epidermal growth factor 2 receptor in human plasma and brain tissue, *Biosensors and Bioelectronics*50, 2013, 143-149.
- 22 Recent progress in prostate-specific antigen and HIV proteases detection, G. ARY Suaifan, M. Shehadeh, H. Al-Ijel, A. Ng, M. Zourob, *Expert Rev Mol Diagn.* 2013 Sep;13(7):707-18
- 23 Graphene-based label-free voltammetric immunosensor for sensitive detection of the egg allergen ovalbumin, S. Eissa, L. L'Hocine, M. Siaj, M. Zourob, *Analyst* 7, 2013, 4378-84.
- 24 Ultra-rapid Colorimetric Assay for Protease Detection using Magnetic Nanoparticle-based Biosensor, G. A. R. Y. Suifan, C. Esseghaier, A. Ng, M. Zourob, *Analyst* 138, 2013, 3735-3739.
- 25 Bacteria screening, viability and confirmation assays using bacteriophage-impedimetric/LAMP dual-response, *Biosensors*, ChakerTlili, EsenSukullu, MohamedaliSafaviah, Mona Tolba, Mohammed Zourob, *Analytical Chemistry* 85, 2013, 4893-901.
- 26 Fe₃O₄/Au nanoparticles/lignin modified microspheres as effectual surface enhanced Raman scattering (SERS) substrates for highly selective and sensitive detection of 2,4,6-trinitrotoluene (TNT), K. A. Mahmoud, M. Zourob, *Analyst*138, 2013, 2712-2719.
- 27 A novel sensitive layer for rapid HIV-1 protease detection using magnetic bead mediation, C. Esseghaier†, A. Ng†, M. Zourob*, *Biosensors and Bioelectronics* 41, 2013, 335-341.

PROF. MOHAMMED ZOUROB

- 28 Real-time electrochemical detection of pathogens DNA using electrostatic interaction of a redox probe, Minhaz Uddin Ahmed, SharifunNahar, MohammedaliSafavieh and Mohammed Zourob, *Analyst* 138, 2013, 907-915.
- 29 Label-free impedimetric immunosensor for ultrasensitive detection of Murine Double Minute 2 in brain tissue", R. Elshafey†, C. Tlili†, A. Abulrob, Ana C. Tavares, M. Zourob*, *Biosensors and Bioelectronics* 39, 2013, 220-225.
- 30 Ultra-rapid colorimetric assay for protease detection using magnetic nanoparticle-based biosensors, G. AR Suaifan, C. Esseghaier, A. Ng, M. Zourob, *Analyst* 138, 2013, 3735-3739.
- 31 Microfluidic electrochemical assay for rapid detection and quantification of *Escherichia coli*, M. Safavieh, M.U. Ahmed, M. Tolba, M. Zourob, *Biosensors and Bioelectronics* 31 (1), 2012, 523-528.
- 32 A bacteriophage endolysin-based electrochemical impedance biosensor for the rapid detection of *Listeria* cells, M. Tolba, M.U. Ahmed, C. Tlili, F. Eichenseher, M.J. Loessner, M. Zourob, *Analyst* 137 (24), 2012, 5749-5756
- 33 Selection, Characterization and Biosensing Application of High Affinity Congener-Specific Microcystin-Targeting Aptamers", A. Ng†, R. Chinnappan†, C. Tlili†, H. Liu†, M. Chaker, M. Zourob*, *ACS J. Environ. Sci. Technol.*, 2012, 46 (19), pp 10697–10703.
- 34 Graphene-based electrochemical competitive immunosensor for the sensitive detection of okadaic acid in shellfish, S. Eissa, M. Zourob, *Nanoscale* 2012,4, 7593-7599.
- 35 Wash-less and highly sensitive assay for prostate specific antigen detection" G. A. R. Y. Suaifan, C. Esseghaier, A. Ng, M. Zourob, *Analyst*, 2012,137, 5614-5619.
- 36 Bacteriophage endolysin based electrochemical impedance biosensor for the rapid detection of *Listeria* cells", M. Tolba†, M. Uddin Ahmed†, C. Tlili†, F. Eichenseher, M. J. Loessner, M. Zourob*, *The Analyst* 2012,137, 5749-5756.
- 37 Electrochemical immunosensor for the milk allergen β -lactoglobulin based on electrografting of organic film on graphene modified screen-printed carbon electrodes, S. Eissa†, C. Tlili†, L. L'Hocine, M. Zourob*, *Biosensors and Bioelectronics* Volume 38, 2012, 308-313.
- 38 Long-period fiber grating based biosensor for the detection of *E. Coli*" S. M. Tripathi, W. J. Bock, P. Mikulic, R. Chinnappan†, A. Ng†, M. Tolba†, M. Zourob*, *Biosensors and Bioelectronics* 35, 2012, 308–312.
- 39 Label-free bacteria detection using evanescent mode of a suspended core terahertz fiber and bacteriophage as probes" A. Mazhorova, a. Markov, R. Chinnappan†, A. Ng†, O. Skorobogata, M. Zourob*, M. Skorobagati*, *OPTICS Express* 20, 2012, 5344-55.(Awarded FQRNT Étudiants-chercheursétoiles).
- 40 Rapid *Escherichia coli* detection using electrochemical assay in microfluidic", M. Safavieh†, M. Uddin Ahmed†, M. Zourob*, 2012, *Biosensors and Bioelectronics* 31, 523-528.
- 41 Development of a highly sensitive bacteria detection assay using fluorescent pH-responsive polymeric micelles" F. Mouffouk, A. M. Rosa da Costa, J. Martins, M. Zourob, *Biosensors and Bioelectronics* 26 (2011) 3517-3523.
- 42 Detection of bacteria using bacteriophages as recognition elements immobilized on long-period fiber gratings" M. Smietana, W. J. Bock*, P. Mikulic, A. Ng†, R. Chinnappan†, M. Zourob*, *Optics Express* 19, No. 9 (2011) 7971-7978.
- 43 Bacteriophage-Modified Microarrays for the Direct Impedimetric Detection of Bacteria, A. Shabani, M. Zourob, B. Allain, C. Marquette, M. Lawrence, R. Mandeville, *Analytical Chemistry* 80 (2008), 9475–9482.
- 44 Bacteria exposed, A. Shabani, M. Zourob, B. Allain, C. Marquette, M. Lawrence, R. Mandeville, *Analytical Chemistry* 81 (2009) issue 1, 5.

PROF. MOHAMMED ZOUROB

- 45 Surface plasmon resonance Biosensors, I. Abdulhalim, M. Zourob, A. Lakhtakia, J. Electromagnetics 28 (2008) 214-242. (Invited Review).
- 46 Opto-fluidic micro-ring resonator for sensitive label-free viral detection, H. Zhu, I. M. White, J. D. Suter, M. Zourob, X. Fan, Analyst, 133 (2008,) 356 – 360.
- 47 A wireless magnetoelastic biosensor for the Direct Detection of Organo-phosphorous Pesticides, M. Zourob, K. G. Ong, K. Zeng, C. A. Grimes, The Analyst 132 (2007) 338-343.
- 48 Refractometric Sensors for Lab-on-a-Chip Based on Optical Ring Resonators, I. M. White, H. Zhu, J. D. Suter, N. M. Hanumegowda, H. Oveys, M. Zourob, and X. Fan, IEEE Sensors Journal 7 (2007) 28-35.
- 49 Immobilization of biotinylated bacteriophages on biosensor surfaces, L. Gervais, M. Gel, B. Allain, M. Tolba, L. Brovko, M. Zourob, R. Mandeville, M. Griffiths, S. Evoy, Sensors and Actuators B 125 (2007) 615-621.
- 50 An Integrated Refractive Index Optical Ring Resonator Detector for Capillary Electrophoresis, H. Zhu, I. M. White, J. D. Suter, M. Zourob, X. Fan, Analytical Chemistry 79 (2007) 930-937.
- 51 Optical leaky waveguide biosensors for the detection of Organophosphorous pesticides, M. Zourob, N. J. Goddard, The Analyst 132 (2007) 114-120.
- 52 Micro-reactor for producing very uniform molecularly imprinted polymers beads, M. Zourob, S. Mohr, P. R. Fielden and N.J. Goddard, Lab-on-Chip 6 (2006) 296-301.
- 53 A micro-patterned hydrogel platform for chemical synthesis and biological analysis, M. Zourob, J.E. Gough, R. Ulijn, Advanced Mater. 18 (2006) 655-659.
- 54 K. G. Ong, J. M. Leland, K. Zeng, G. Barrett, M. Zourob, C. A. Grimes, A rapid highly-sensitive endotoxin detection system, Biosensors and Bioelectronics 21 (2006) 2270-2274.
- 55 An integrated metal clad leaky waveguide sensor for detection of bacteria. M. Zourob, S. Mohr and N.J. Goddard, Analytical Chemistry 77 (2005) 232-242.
- 56 An Optical leaky waveguide sensor for detection of bacteria with ultrasound attractor force, M. Zourob, J. Hawkes and N.J. Goddard, Analytical Chemistry 77 (2005) 6163-6168.
- 57 An integrated optical leaky waveguide sensors with electrically induced concentration system for the detection of bacteria, M. Zourob, S. Mohr and N.J. Goddard, Lab-on-Chip 5 (2005) 1360 - 1365.
- 58 An integrated disposable dye clad leaky waveguide sensor for μ -TAS applications. M. Zourob, S. Mohr, N.J. Goddard, Lab-on-chip, 5 (2005) 772 – 777.
- 59 Metal Clad Leaky Waveguides for Chemical and Biosensing Applications, M. Zourob, N. J. Goddard, Biosensors and Bioelectronics 20 (2005) 1718-1727.
- 60 Bacteria detection using an integrated disposable optical leaky waveguide sensor. M. Zourob, S. Mohr and N.J. Goddard, Biosensors and Bioelectronics, 21 (2005) 293-302.
- 61 The development of a metal clad leaky waveguide sensor for the detection of particles. M. Zourob, S. Mohr, B. J. Treves Brown, P.R. Fielden, M. McDonnell, N.J. Goddard, Sensors and Actuators B 90 (2003) 296-307.
- 62 Small-volume refractive index and fluorescence sensor for μ -TAS applications. M. Zourob, S. Mohr, N.J. Goddard, Sensors and Actuators B 94 (2003) 304-312.
- 63 Implantable Biosensors for Real-time Strain and Pressure Monitoring, E. L. Tan, B. D. Pereles, B. Horton, R. Shao, M. Zourob, K. Ghee Ong, Sensors Journal 8 (2008) 6396-6406.

PROF. MOHAMMED ZOUROB

BOOKS:

- 1- Mohammed Zourob, SounaElwary, Anthony A.F. Turner “Principles of Bacterial detection; Biosensors, Recognition receptors and Microsystems” Springer science+ business media, ISBN: 978-0-387-75112-2, 2008.
- 2- Mohammed Zourob, Akhlesh Lakhtakia “Optical Guided Wave Chemical sensors and Biosensors I” Springer, volume 7 in “Springer series in Chemical sensors and Biosensors”, ISBN 978-3-540-88241-1, April 2010.
- 3- Mohammed Zourob, Akhlesh Lakhtakia “Optical Guided Wave Chemical sensors and Biosensors II” Springer, volume 8 in “Springer series in Chemical sensors and Biosensors”, ISBN 978-3-642-02826-7, April 2010.
- 4- Mohammed Zourob “Recognition receptors in Biosensors” Springer science+ business media, ISBN 978-1-4419-0918-3, March 2010.
- 5- Ali Khademohosseni, K.Y. Suh, Mohammed Zourob. “Biological microarrays” Humana Press, USA, ISBN: 978-1-934115-95-4, December 2010.
- 6- Minhaz Uddin Ahmed, Mohammed Zourob, Tamiya, ‘Food Biosensors’ RSC, 2016 (In Press)

Book Chapters:

1. “Overview of Optical Biosensing Techniques”, I. Abdulhalim, M. Zourob, A. Lakhtakia, In handbook of Biosensors and Biochips, Robert Marks, David Cullen, Christopher Lowe, Howard H. Weetall, Isao Karube, John Wiley & Sons, ISBN: 978-0-470-01905-4, December 2007.
2. “Label-free detection using Resonant Mirror Biosensor” M. Zourob, Souna Elwary, X. Fan, Nicholas Goddard, Biosensors and Biodetection in Methods in Molecular Biology Vol. 503, Avraham Rasooly and Keith E., Herold, Humana Press Inc., New Jersey, ISBN: 978-1-60327-566-8, 2008.
3. “Integrated deep-probe optical waveguide microsystem for bacterial detection” M. Zourob, N. Skivesen, R. Horvath, S. Mohr, N.J. Goddard, In Principles of bacterial detection: Biosensors, recognition receptors and microsystems, M. Zourob, A.F. Turner, Springer science+ business media, ISBN: 978-0-387-75112-2, 2008.
4. “Label-free detection using liquid core optical resonator Biosensor” I. M. White, M. Zourob, X. Fan, Biosensors and Biodetection in Methods in Molecular Biology , Vol. 503, Avraham Rasooly and Keith E., Herold, Humana Press Inc., New Jersey, ISBN: 978-1-60327-566-8, 2008.
5. “Integrated deep-probe optical waveguide chemical and biosensors” M. Zourob, N. Skivesen, R. Horvath, S. Mohr, N.J. Goddard, In Advanced Photonic Structures for Biological and Chemical Sensing (Editor: Xudong Fan), part of Book Series on “Integrated Microanalytical Systems” by RadislavPotyraiilo, Springer 2009, ISBN: 978-0-387-98060-7.
6. "Rapid Label-Free Phage-Based Biosensors for Bacterial Detection" R. Mandeville, M. Zourob, A. Shabani, B. Allain, A. Martineau, Chapter 15: Biodetection Technologies 5th Edition *Technological Responses to Biological Threats*, Knowledge Foundation, ISBN: 9781594301379, November 2008.
7. “Bacteriophage based biosensors” M. Zourob, Steven Ripp, In “Recognition Receptors in Biosensors”, ISBN 978-1-4419-0918-3.Springer 2009.
8. "Current techniques for bacteria and large entities detection in water” M. Zourob, In “Nanomaterials for Water Management: Signal Amplification for Biosensing from Nanostructures” (Editors: R. Marks and I. Abdulhalim), Pan Stanford Publishing, 2015, ISBN 9789814463478.

PROF. MOHAMMED ZOUROB

9. 'Microfluidic biosensors for high-throughput screening of pathogens in food'' In High throughput screening for food safety assessment: biosensor technologies, hyperspectral imaging' M. Safavieh, S. Nahar, M. Zourob, M. Uddin Ahmed, Editors: Bhunia, Moon, Taitt, 2014, Pages 327–357, ISBN : 9780857098016.
10. 'Graphene-based biosensors for food analysis'' S. Eissa, M. Siaj, M. Zourob, In Food Biosensors, Minhaz U. Ahmed 2016 (In Press)
11. 'Biosensors for allergens detection in food'' S. Eissa, M. Siaj, M. Zourob, In "Food allergy-method of detection and clinical studies." Anas Abdul Rahman 2016 CRC Press (In press)