# Engr. Prof. Dr. Mohammad YOUNAS, PhD (Member University Syndicate 2017)

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## **Professional Preparation**

State Key Laboratory of Separation layers and Membrane Processes, School of Materials Science and Engineering, Tianjin Polytechnic University, Tianjin 300387, China, **Visiting Foreign Professor** 2019-2020 University of Eindhoven, The Netherlands, **Postdoc**, Chemical Engineering, 2011-2012 University of Montpellier2, France, **PhD**, Chemical Engineering, 2007-2011 University of Montpellier2, France, **M2R**, Chemical Engineering, 2006-2007 University of Engineering & Technology, Lahore, Pakistan, **MSc** Chemical Engineering, 2003-2004 University of Engineering & Technology, Peshawar, Pakistan, **BSc** Chemical Engineering, 1995-2000

### Trainings and skills

- 3 days Workshop on "Pakistan Chemical Secure Management for Chemical Incident Prevention and Response" MoFA Pakistan January 15-17, 2019
- Conference Chair, 2 days 4<sup>th</sup> Conference on Sustainability in Process Industry, UET Peshawar 24<sup>th</sup>-25<sup>th</sup> Oct 2018
- Short research visit under "Pakistan Program for Collaborative Research" for collaboration with Dr. Gary Glenn Lipscomb, University of Toledo, US, July-August 2017 and July 26 April 10 2018
- Short research visit as visiting fellow to Tianjin Polytechnic University China for Collaborative Research with Dr. Jianxin Li, April 11 20 2018
- Keynote Speaker International Symposium on Membrane Technology: One Belt One Road, Tianjin Polytechnic University China, April 13-18, 2018.
- Conference Chair, 2 days 3<sup>rd</sup> Conference on Sustainablity in Process Industry, UET Peshawar 19-20<sup>th</sup> Oct 2016
- Conference Co-Chair, 2 days 2<sup>rd</sup> Conference on Sustainablity in Process Industry, UET Peshawar 21-22<sup>nd</sup> May 2014
- 2-day workshop on Green chemistry and Green membrane engineering, Marcoule, France, 2009
- 2-day course on Introduction to finite element methods to solve the problems of energy and mass transport with reaction with Comsol Multiphysics<sup>TM</sup>, Montpellier, France, 2009
- 2-day course on Simulink for System and Algorithm Modelling, Toulouse, France, 2008
- 2-week workshop on Nanostructured materials and membrane modelling and simulation, Marie Curie Training Program, Patras, Greece, 2008
- 3 Day Seminar on Trends on Water Desalination, Peshawar, Pakistan, 2004
- 5 Day Operational / Trouble shooting course on Atomic Absorption Spectroscopy, PCSIR, Lahore, Pakistan, 2002
- 5 Day Operational / Trouble shooting course on Gas Chromatography, PCSIR, Islamabad, Pakistan, 2002

#### **Appointments**

Chairman (2015 - 2018); Department of Chemical Engineering, UET Peshawar Semester Coordinator (2014-2016); Department of Chemical Engineering, UET Peshawar Professor (08.02.2018-till date); Department of Chemical Engineering, UET Peshawar Associate Professor (21.1.2013-2018); Department of Chemical Engineering, UET Peshawar Postgraduate Advisor (2011-2015); Department of Chemical Engineering, UET Peshawar Assistant Professor (24.7.2004-20.1.2013); Department of Chemical Engineering, UET Peshawar Lecturer (22.3.2000-23.7.2004); Department of Chemical Engineering, UET Peshawar

Teaching Assistant (01.01.2000 – 21.03.2000); Department of Chemical Engineering, UET Peshawar Research Assistant (2008-2011), Chemical engineering of membrane processes, European membrane institute, Montpellier (France)

# **Funded Research Projects**

 Directorate of Science and Technology (DOST) project 2012-2013 on "Design and fabrication of a membrane processing plant for the clarification and the concentration of fruit juices" Rs: 0.56 million (2012 – 2013, completed)

- Directorate of Science and Technology (DOST) project on "An experimental investigation into the coal-briquettes design & manufacturing for Khyber Pakhtunkhwa coal" Rs: 0.36 million (2011 2012, completed)
- IEEE project on the design and fabrication of hybrid plant of photocatalytic reactor and membrane separation for water treatment in flood affected area. Rs: 2.1 million (2012 2013, completed)
- PAK-US S&T Ph VII Project on "Capacity building at UET Peshawar to Develop the Indigenous Technology in Membrane Technology on Water-Energy-Food Nexus for Society" RS: 42.3 million
- PAK-France Mobility Project PERIDOT on "Wastewater treatment through hybrid forward osmosis membrane bioreactor and reverse osmosis" RS: 30 million

## Postgraduate Research supervision:

MSc research supervision		PhD Research Supervision	
Completed	In progress	Completed	In Progress
16	5	2	2

## Msc research students' supervision:

- Development of Mixed Metal Oxide (MMO) resistive coating for corrosion protection using impressed current system (completed on 26/12/2018)
- Synthesis of polymeric nanocomposite membrane embedded with alumina nano particles for copper (II) removal from water (*Completed on 07/3/18*)
- Development of Carbon fiber reinforced composite CNG Cylinder/Pressure vessels (completed on 27/5/17)
- Experimental analysis of HFMC for power production through Pressure Retarded Osmosis (PRO) (completed on 20/10/16).
- Experimental analysis of CO2 capture from natural gas through HFMC (completed on 20/10/16).
- Concentration of pomegranate juice in HFMC through osmotic evaporation (completed on 20/10/16).
- Study of chemically synthesized rare-earth Terbium substituted Bam Hexaferrites completed on 2/1/16).
- Utilization of CO<sub>2</sub> for the production of Microalgae (completed on 20/12/15).
- Modelling and simulation of hollow fiber membrane contactor for fruit juice concentration by osmotic distillation (completed on 5/4/15).
- Strategy for optimal clarification of fruit juices using Cross Flow Microfiltration (completed on 1/4/15).
- Simulation of hollow fiber membrane contactor(HFMC) for copper extraction with chelating extractants (completed on 13/1/15).
- Synthesis and characterization of graphene oxide composite thin sheet (Completed on 18/8/2014).
- Numerical modelling and simulation of hollow fiber membrane contactors for liquid-liquid extraction (completed on 5/6/14).
- Efficiency optimization of household level Reverse Osmosis (RO) water treatment plant (completed on 2/1/14).
- Design and fabrication of a membrane processing plant for the clarification and concentration of fruit juices (completed on 5/12/13).
- Corrosion rates study of system materials and process analysis (completed on 5/12/13).

#### **Phd research students supervision:**

- Computational Fluid Dynamics modeling and simulation of hollow fiber membrane contactors for liquid-liquid extraction.
- Performance evaluation of membrane contactor for concentration of fruit juices through osmotic distillation.
- Development of green membrane and process for power generation through Pressure Retarded Osmosis (PRO)
- Experimental and theoretical analysis of post-combustion CO<sub>2</sub> Capture in membrane contactor with ionic liquids and sweep gas.

#### **Publications**

[41] I. Ali, S. Amiri, E. Jenab, N. Ullah, **M. Younas**, Electrochemical Regeneration of Reduced Cofactor NADH during Calvin Cycle (Artificial Photosynthesis) using Glassy Carbon Electrode, Chemical Engineering Journal (under review CEJ-S-19-08706)

[40] W. Rehman, A. Muhammad, Q. A. Khan, **M. Younas**, M. Rezakazemi, *Pomegranate Juice Concentration Using Osmotic Distillation with Membrane Contactor*, **Separation and Purification Technology** 224 (2019), 481-489. https://doi.org/10.1016/j.seppur.2019.05.055

[39] W. Rehman, A. Muhammad, M. Younas, C. Wu, Y. Hu, J. Li, Effect of membrane wetting on the performance of PVDF and PTFE membranes in the concentration of pomegranate juice through osmotic distillation, Journal of Membrane Science 584 (2019) 66–78. https://doi.org/10.1016/j.memsci.2019.04.042

- [38] M. B. Wazir, M. Daud, N. Ullah, A. Hai, A. Muhammad, M. Younas, M. Rezakazemi, Synergistic properties of molybdenum disulfide (MoS2) with electro-active materials for high-performance supercapacitors, International Journal of Hydrogen Energy 44 (2019), 17470-17492 https://doi.org/10.1016/j.ijhydene.2019.04.265
- [37] M. Ayaz, A. Muhammad, A.L. Khan, M. Younas, J. Li, Synthesis of polysulfone nanocomposite membrane embedded with nano alumina for copper ions removal from wastewater Macro Molecular Research 1 (2019)
- [36] A. Muhammad, M. Younas, M. Rezakazemi, CFD Simulation of Copper (II) extraction with TFA in non-dispersive Hollow Fiber Membrane Contactors, Env. Sc. & Poll. Res. 12 (25) (2018) 12053–12063 https://doi.org/10.1007/s11356-018-1282-1 (available online)
- [35] A. Muhammad, **M. Younas**, M. Rezakazemi, *Quasi-Dynamic modeling of dispersion-free extraction of aroma compounds through hollow fiber membrane contactors*, **Chem Engg Res & Des.** 127(2017) 52-61, https://doi.org/10.1016/j.cherd.2017.09.007
- [34] H. Khan, I. Swati, **M. Younas**, A. Ullah, *Chelated Nitrogen-Sulphur Codoped TiO2: Synthesis, Characterization, Mechanistic and UV/visible Photocatalytic Studies*, **International Journal of Photoenergy**, 3 (2017) 1-17, doi.org/10.1155/2017/7268641
- [33] A. Muhammad, **M. Younas**, S. Druon-Bocquet, J. Romero and J. Sanchez, *Numerical modelling and simulation of membrane-based extraction of copper (II) using hollow fiber contactors*, **Desalination and Water Treatment**, 63 (2017) 113-123, doi: 10.5004/dwt.2017.20169
- [32] A. Naveed, S. Gul, N. Ul. Amin, **M. Younas**, N. Ullah, *Synthesis and characterization of inorganic microfiltration membrane through Geopolymerization*, **Desalination and Water Treatment**, 66 (2017) 203 209, doi:10.5004/dwt.2017.20212
- [31] F. Ahmad, W. Rehman, **M. Younas**, A. Muhammad, W. Ali, I. K. Swati, *Optimal clarification of apple juice using crossflow microfiltration without enzymatic pre-treatment under different operation modes* **NUST J. Engg. Sci.** 9(1) 2017.
- [30] A. Muhammad, W. Ali, I. Ahmad, **M. Younas**, *Performance Evaluation of Hollow Fiber Membrane Contactors for Dispersion-Free Extraction of Cu2+ through Modelling and Simulation*, **Periodica Polytechnica Chemical Engineering**, 61, 2 (2017), 133 143, DOI: 10.3311/PPch.9207, 2016: 1-11.
- [29] Q. Suhaib, A. Muhammad, M. Younas, Fast pyrolysis of sugar cane baggase: Effect of pyrolysis conditions on final product distribution and properties, Energy sources, Part A: Recovery, Utilization and Environmental Effects, DOI: 10.1080/15567036.2016.1212292, 2017
- [28] S. Gul, A. Hai, M. Younas, K. Islam, A. A. Shah, M. Rafiq, A. Zeb, *Optimizing the performance of Hybrid: Induced-Forced Draft Cooling Tower*, JPIChE 43 (2) 2015: 57-66
- [27] W. Ur Rehman, W. Zeb, M. Younas, A. Muhammad, W. Ali, Osmotic distillation and quality evaluation of sucrose, apple and orange juices in hollow fiber membrane contactor. Chem. Ind. Chem. Eng. Q. 23 (2) 2017 217-227, DOI:10.2298/CICEQ150720035R.
- [26] I. Ahmad, H Ernst-Ulrich, J. Werther, **M. Younas**, Characterization of bauxite ore for the selection of a beneficiation technique. **JPIChE** 44(1) 2016: 19-24
- [25] I. Ahmad, M. Younas, S. Gul, A simple empirical model for processing (washing) of bauxite ore. **JPIChE** 44(1) 2016: 14-18
- [24] W. Ali, W-Ur Rehman, M. Younas, M.I. Ahmad, S. Gul, *Reverse osmosis as one-step wastewater treatment: a case study on groundwater pollution.* **Polish J of Chem: Tech:** 17 (4) 2015 42-48.
- [23] M. Younas, S.Druon-Bocquet, J. Romero and J. Sanchez, Experimental and theoretical investigation of kinetics and extraction capacity of acid extractants for copper (II) extraction. Separation Science & Tech: 50: 2015 1523-1531.
- [22] I. Ullah, M.I. Ahmad, M. Younas, Optimization of saponification reaction in a continuous stirred tank reactor (CSTR) using design of experiments. Pak. J. Engg. & Appl. Sci. 16 (1), 2015 84–92
- [21] **M. Younas**, W. Ali, M. Zaheer, A Prototype Design and Experimentation of Reverse Osmosis (RO) Based Wastewater Treatment. **NUST J. Engg. Sci.** 6(1) 2014 5-9.
- [20] M. Shoaib, M.I. Ahmad, A. Khan, M. **Younas**, S. Gul, *Investigation of Urea-formaldehyde resin synthesis using design of experiments*. **JPIChE**. 42(2) (2014) 115-120.
- [19] A. Ahmad, M.I. Ahmad, H. Khan, **M. Younas**, M.H Shah, *A comparative study of alkaline hydrolysis of ethyl acetate using design of experiments*. **Iran. J. Chem. Chem. Eng.** 32(4) (2013) 33-47.
- [18] M. Irfan, S. Gul, M. Younas, Fermentation of sugarcane molasses by Saccharamycescerevesia: Effects of operating parameters on ethanol production. J. Engg. And Appl. Sci. 33 (1) 2014.
- [17] M. Irfan, S. Gul, M. Younas, Statistical and experimental study of sea water purification using solar still. J. Engg. And Appl. Sci. 32 (2) 2013.
- [16] M. I. Ahmad, N. Zhang, M. Jobson, M. Younas, K. Ghani, Delumping procedure for prediction of distribution of products in distillation using a short-cut model. J. Engs. And Appl. Sci. 32 (2) 2013.
- [15]H. Khan, M. Younas, Five-zone simulating moving bed for ternary separation. Iran. J. Chem. Chem. Eng. 30(2) (2011) 101-117
- [14] M. Younas, I. K. Swati, I. Ali, N. Ullah, M.I. Ahmad, Performance study of a lab scale packed bed Chemical Looping Combustion reactor: Part b) Oxidation cycle. JPIChE. 40 (1) 2012: 109-114.
- [13] M. Younas, I. K. Swati, I. Ali, N. Ullah, M.I. Ahmad, Performance study of a lab scale packed bed Chemical

- Looping Combustion reactor: Part a) Reduction cycle. JPIChE. 40 (1) 2012: 114-119.
- [12] H. NASIM, M. YOUNAS, N. Feroz, I. K. Swati, Continuous processing of Aloe Vera juice in Reverse Osmosis integrated plant. JPIChE 40 (1) 2012: 55-59.
- [11] M. Younas, S. Gul, S. DruonBocquet, J. Sanchez. *Modeling, Simulation and Optimization of Hollow Fiber Membrane Contactors for Dispersion-Free Liquid-Liquid Extraction*. **Procedia Engineering**, 44 (2012) 1268-1270.
- [10] M. Younas, B. Bibi, H. Nasim, Hollow fiber membrane contactors: A novel separation technology for value added product industry. J. of Faculty of Engineering and Technology, Punjab University, Lahore 19(10), 2012, 17-25.
- [9] H. Khan, M. Younas, Theoretical analysis and simulation of five-zones simulating moving bed for ternary mixture separation. The Canad. J. chem. Eng. 89 (2011) 1480-1491.
- [8] M. Younas, S.Druon-Bocquet and J. Sanchez, Experimental and theoretical mass transfer transient analysis of copper extraction using hollow fiber membrane contactors. J. Membr. Sci., 382, 1-2 (2011) 70-81.
- [7] M. Younas, H. Khan, A. Ahmad, Implementation and experimental analysis of conventional PID controllers for efficient heat treatment of fruit juices in plate heat exchanger. J. Engg. And Appl. Sci. 30 (2) 2011, 47-56.
- [6] **M. Younas**, S.Druon-Bocquet and J. Sanchez, *Kinetic and dynamic study of liquid-liquid extraction of copper in a HFMC: Experimentation, modelling and simulation.* **AIChE J.** 56, 6 (2010) 1469-1480.
- [5] **M. Younas**, S.Druon-Bocquet and J. Sanchez, *Extraction of aroma compounds in a HFMC: Dynamic modelling and simulation.***J. Membr. Sci.,** 323 (2008) 386-394
- [4] Gul S, Naveed S and Younas M, Effect of Operating Parameters on the Performance of Reverse Osmosis Membranes, J. Engg. and App. Sci., 25(2) 2006, 59-64
- [3] Naveed S, **Younas M** and Gul S, Comparative Study of Process Performance for Regulatory Control under Zeigler-Nichols and Cohen-Coon Truing of Controllers, **JPIChE**. 34, 2006, 37-40.
- [2] **Younas M,**Naveed S and Gul S, *Waste minimization of a process fluid through effective control under various controllers tuning*, **J. Engg. And App. Sci.**, 24 (2), 2005, 79-82.
- [1] Naveed S, Younas M and Gul S, Effect of Ziegler-Nichols and Cohen-Coon tuning for bumpless shift in a process, UET Lahore Research Journal, 16 (1-2), 2005-2006, 56-60.

## **Selected Conference participation**

- [17] **M. YOUNAS**, A. Muhammad, G. Lipsomb, *CFD simulation of crimped hollow fiber membranes for liquid separation processes*, in Proc. NAMS 2019, Pittsburgh PA, USA, May 11-15, 2019. (**ORAL**)
- [16] M. Younas, W. U. Rehman, Fouling analysis and membrane wetting of hydrophobic membranes in osmotic distillation during fruit juice concentration. International Conference on Engineering with Membranes (EWM2019), 8-10 April 2019, Basted Sweden (ORAL)
- [15] **M. Younas**, A. Muhammad, G. Lipscomb, *Modelling and simulation of hollow fiber membrane contactor for post combustion CO2 capture through sweep gas*. Euromembrane 2018, July 9-13, 2018, Valencia Spain (ORAL)
- [14] **M. Younas**, A. Muhammad, G. Lipscomb, *Hollow fiber membrane contactor design for post-combustion capture of CO2/N2 through sweep gas*. **The 11<sup>th</sup> International congress on Membranes and Membrane Processes** (ICOM2014), 29<sup>th</sup> Jul 4<sup>th</sup> Aug 2017, USA (ORAL)
- [13] M. Younas, W. U. Rehman, Q. A. Khan, W. Zeb, Osmotic Distillation of Fruit Juice Concentration Using Hollow Fiber Membrane Contactor: Experimentation, Modeling and Simulation. International Conference on Engineering with Membranes (EWM2017), 26-28 April 2017, Singapore (ORAL)
- [12] M. Younas, S.Druon-Bocquet, J. Romero and J. Sanchez, *CFD Modeling and Simulation of Dispersion Free Liquid Extraction through Hollow Fiber Membrane Contactor*. The 10<sup>th</sup> International congruence on Membranes and Membrane Processes (ICOM2014). 20-25 July 2014, China (ORAL)
- [11] M. Younas, M.I. Ahmad, N. Ullah, A. Ul-Asar, One step waste water treatment of flood 2010 affected areas of north west region of Pakistan with reverse osmosis (RO). 1st International conference on Desalination using Membrane Technology. 7-10 April 2013, Spain (ORAL)
- [10] M. Younas, S. Gul, S. Druon Bocquet, J. Sanchez. Modeling, Simulation and Optimization of Hollow Fiber Membrane Contactors for Dispersion-Free Liquid-Liquid Extraction. Procedia Engineering, 44 (2012) 1268-1270. [9] M. Younas, S. Gul, S. Druon-Bocquet, J. Sanchez, Modelling, simulation and optimization of hollow fiber membrane contactors for dispersion-free liquid-liquid extraction. Euromembrane 2012, London UK, 23-27 Sep 2012. (POSTER)
- [8] M. YOUNAS, F. Gallucco and M. V. S. Annaland, *Transient 1-d model simulation of a packed-beds chemical-looping combustion reactor of syngas with ilmenite*. 1nternal symposium on Chemical Reaction Engineering (ISCRE 22), Maastricht, The Netherlands, 2-5 September 2012. (ORAL)
- [7] <u>M. Younas</u>, B. Bibi, H. Nasim, *Hollow fiber membrane contactors: A novel separation technology for value added product industry*. **Int. Conference on Engineering Sciences (ICES), Inst. Chem. Eng. Punjab Univ, Lahore** Pakistan, Feb 28-29 2011(ORAL).
- [6] M. YOUNAS, S.Druon-Bocquet and J. Sanchez, *Single fiber model of Membrane Contactor for liquid-liquid extraction*, in Proc. NAMS/ICIM 2010, Washington D.C, USA, July. 17-22, 2010. (ORAL)

- [5] M. YOUNAS, S.Druon-Bocquet and J. Sanchez, *Modelling and simulation of HFMC for dispersion free liquid-liquid extraction of copper*, in Proc. Euromembrane 2009, Montpellier, France, Sep. 6-10, 2009. (POSTER)
- [4] M. YOUNAS, S.Druon-Bocquet and J. Sanchez, *Hollow Fiber Membrane Contactor based non-dispersive liquid-liquid extraction System: Dynamic Modelling and simulation*, in Proc. Annual Meeting of North American Membrane Society (NAMS)2009, Charleston, North Carolina, USA, Jun. 20-24, 2009. (ORAL)
- [3] M. YOUNAS, S.Druon-Bocquet and J. Sanchez, Dynamic modelling and simulation of integrated membrane contactor separation system for the recovery of aroma compounds from aqueous streams, in Proc. Engineering with Membranes 2008, Algarve, Portugal, May 25-28, 2008, Book of Abstracts, pp 75-76.(ORAL)
- [2] M. YOUNAS, S.Druon-Bocquet, Delphine Paolucci Jeanjean and J. Sanchez, *Transient mass transfer model of membrane based solvent extraction in hollow fiber contactor: extraction of aroma compounds*, in roc. International Congress on Membrane s and Membrane Processes (ICOM 2008), Honolulu, Hawaii, USA, July 12-18, 2008, Book of poster session proceedings, pp session 1, 145. (POSTER)
- [1] M. YOUNAS, S.Druon-Bocquet and J. Sanchez, *Efficient recovery of aroma compounds in HFMC: Dynamic Modelling and simulation*, in training course on Nanostructured materials and membrane modelling and simulation, Patras, Greece, June 18-27, 2008. (POSTER)

## **Countries Visited**

Country	Purpose	Date
China	Key note Speaker/Research Collaboration	April 12 – 20, 218 (Short Stay, 8 days)
United States of America	Conference/Research Collaboration	March 27-April 10, 2018 (2 weeks)
		July-August 2017 (Short stay, 6 weeks)
Srilanka	Visit	April 2017 (Short stay, 2 days)
Singapore	Conference	April 2017 (Short stay, 5 days)
France	Training/Research collaboration	January 2016 (Short stay, 2 weeks)
Spain	Conference	April 2013 (Short stay, 5 days)
The Netherlands	Conference	September 2012 (Short stay, 5 days)
The Netherlands	Work (Post doctorate)	2011-2012 (Long stay)
United States of America	Conference/Research Collaboration	July 2010 (Short stay, 7 days)
UK	Visit Family friends	October 2009 (Short stay, 7 days)
Portugal	Conference	April 2008 (Short stay, 5 days)
France	Student	2006 – 2011 (Long stay, ~ 5 years)

## **Synergistic Activities**

Member "European Membrane Society" EMS

Member "North American Membrane Society" NAMS

Member Organizing committee "Network Young MemBrains NYM2009"

Member, Pakistan Institute of Chemical Engineers

Reviewer, Desalination, Chem. Eng. J., J. of Korean Inst. of Chem. Eng., J. of Membr.Sci., Sep. Sci. and Tech.; Editor of J. of Pakistan Institute of Chemical Engineers, Pakistan

## **Collaborators/references**

Prof. Jose Sanchez Marcano, European Membrane Institute, University of Montpellier2, France Prof. Glenn Lipscomb, Department of Chemical and Environmental Engineering, University of Toledo, USA Prof. Fausto Gallucci, Faculty of Chemistry & Chemical Engineering, Technical University of Eindhoven, The Netherlands

Computer Skills: Matlab, Comsol Multiphysics, ANSYS Fluent, Borland Delphi

Languages: English, French, Urdu