

Prof. Nasreldin Elhadi

POSITION: Professor

Personal Data

Nationality | Sudan

Department | Clinical Laboratory Science/College of Applied Medical Sciences

Official IAU Email | nmohammed@iau.edu.sa

Office Phone No. | +966 1333 31250

Language Proficiency

| Language | Read | Write | Speak |
|----------|-----------|-----------|-----------|
| Arabic | Excellent | Excellent | Excellent |
| English | Very good | Very good | Very good |

Academic Qualifications (Beginning with the most recent)

| Date | Academic Degree | Place of Issue | Address |
|------------------------------|---|-------------------|--|
| 13 June 2002 | Ph.D. in Molecular Microbiology | Malaysia | University Putra Malaysia, Serdang, Malaysia |
| 2 nd August, 1999 | MSc. in Molecular Microbiology | Malaysia | University Putra Malaysia, Serdang, Malaysia |
| July, 1996 | PGD-MLT in Medical Laboratory Technology | India | Institute of Medical Laboratory Technology, Gujarat State, Ahmedabad, India |
| May 1995 | BSc. (Hons) in Microbiology | India | Gujarat University, Ahmedabad, India |

PhD, Master or Fellowship Research Title: (Academic Honors or Distinctions)

| PhD | Prevalence of pathogenic <i>Vibrio</i> spp., growth survival and molecular characterization of <i>Vibrio cholerae</i> serotype O1, O139 and non-O1/O139 isolated in Malaysia |
|--------|--|
| Master | Isolation & molecular characterization of <i>Vibrio vulnificus</i> & <i>Vibrio parahaemolyticus</i> |



Professional Record: (Beginning with the most recent)

| Job Rank | Place and Address of Work | Date |
|---------------------|--|-------------------------------------|
| Professor | Department of Clinical Laboratory Science, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University (IAU) , Dammam, (formerly University of Dammam), Dammam, Saudi Arabia. | 6 th Feb 2019 to present |
| Associate Professor | Department of Clinical Laboratory Science, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University (IAU) , Dammam, (formerly University of Dammam- uod), Dammam, Saudi Arabia. | 2007 to 2018 |
| Associate Professor | Department of Basic Medical Sciences, University of Medical Sciences & Technology (UMST) , Khartoum, Sudan | 2005 – 2006 |
| Assistant Professor | Department of Basic Medical Sciences, Faculty of Medicine and Pharmacy, International Islamic University Malaysia (IIUM) , Kuantan, Malaysia. | 2003 – 2005 |
| Assistant Professor | Faculty of Medicine & Health Sciences, University College Sedaya International (UCSI) , Kuala Lumpur Malaysia | 2001 – 2003 |



Administrative Positions and Committees Membership Held: (Beginning with the most recent)

| Administrative Position | Office | Date |
|---|---|--------------|
| Chairman | Curriculum Committee for Graduate Studies Programs, Deanship of Graduate Studies, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia | 2016 to 2022 |
| Graduate Studies Coordinator | Department of Clinical Laboratory Science, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. | 2009 to 2022 |
| Head of Bridging Program | Clinical Laboratory Science, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University, Saudi Arabia. | 2014 to 2017 |
| Committee Membership | s & Service to the University | |
| | Fellowships Committee, Deanship of n Abdulrahman Bin Faisal University | 2018 to 2022 |
| Member of the Curricul Programs, Deanship of Faisal University | 2016 to 2022 | |
| Member of the Graduat Studies Committee, Un | 2009 to 2022 | |
| Member of the Graduat Clinical Laboratory Scie | 2007 to 2022 | |
| Member of the University Scientific Council, University of Dammam, KSA | | 2009 to 2014 |
| Member of the permane Publication, University | ent committee for Scientific Research & of Dammam, KSA | 2009 to 2014 |
| Member of the Develop Academic Affairs Office | 2010 to 2014 | |
| Member of the committee established the Bridging Program for bachelor's degree in clinical laboratory sciences, University of Dammam, KSA | | 2010 to 2011 |
| Member of the Research and Graduate Studies Committee, Faculty 2 of Medicine, International Islamic University Malaysia (IIUM), Malaysia. | | 2003-2005 |
| | | 2003-2005 |



Scientific Achievements

Published Refereed Scientific Researches

(In Chronological Order Beginning with the Most Recent)

| # | Name of Investigator(s) | Research Title | Publisher and Date of |
|---|-------------------------|----------------|-----------------------|
| | | | Publication |

- 1. Virulence characteristics, antibiotic resistance patterns and molecular typing of enteropathogenic producing *Escherichia coli* (EPEC) isolates in Eastern Province of Saudi Arabia: 2013-2014. *Manuscript submitted to Journal of medicine and life*. **July 2022**
- 2. Evaluating ERIC-PCR for determining genetic diversity among *Escherichia coli* isolated from human and retail imported frozen shrimp and beef. *Manuscript submitted to Journal of* International journal of food contamination. **July 2022**
- 3. Serological and Antibiotic Resistance Patterns as well as Molecular Characterization of *Vibrio parahaemolyticus* Isolated from Coastal Waters in the Eastern Province of Saudi Arabia. *Manuscript submitted to Journal of Epidemiology and Public Health.* **June 2022**
- 4. Mariam Almejhim, Mohammed Aljeldah, **Nasreldin Elhadi**. Improved isolation and detection of toxigenic Vibrio parahaemolyticus from coastal water in Saudi Arabia using immunomagnetic enrichment. PeerJ. **2021**, 9:e12402 DOI 10.7717/peerj.12402.
- 5. **Nasreldin Elhadi**, Reem Aljindan, Khaldoon Alsamman, Amer Alomar, Mohammed Aljeldah. Antibiotic resistance and molecular characterization of enteroaggregative *Escherichia coli* strains isolated from patients with diarrhea in the Eastern Province of Saudi Arabia. *Heliyon*.**2020**,6: e03662.
- 6. Mohammed M. Aljeldah, Hosam El-Sayyad, **Nasreldin Elhadi** and Ali A. Rabaan, Effect of Gamma-Rays on the Growth and Penicillin Production of *Penicillium chrysogenum*. *J Pure Appl Microbiol.*, **2019**; 13(2): 779-788.
- 7. Doha Hudhaiah and **Nasreldin Elhadi**. Prevalence and genotypes of nosocomial *Clostridium difficile* infections in the Eastern Province of the Kingdom of Saudi Arabia: A multi-centre prospective study. *Journal of Clinical and Diagnostic Research.* **2019**; *13*(3): *DC16-DC20*.



- FM Alzahrani, SS Shaikh, AI Alomar, S Acharya, N Elhadi. Prevalence of Hepatitis B Virus (HBV) Among Blood Donors in Eastern Saudi Arabia: Results from a Five-Year Retrospective Study of HBV Seromarkers. *Annals of Laboratory Medicine*. 2019; 39(1), 81-85.
- 9. Elhadi N. Clonal relationship among the *Vibrio parahaemolyticus* isolates from coastal water in Saudi Arabia. *Egyptian Journal of Aquatic Research*. **2018**; <u>44</u> (2):131-137.
- 10. Ghenem L, **Elhadi N**. Isolation, molecular characterization, and antibiotic resistance patterns of *Vibrio parahaemolyticus* isolated from coastal water in the Eastern Province of Saudi Arabia. *Journal of Water and Health*. **2018**;(1):57-69.
- 11. Elhadi N, Nishibuchi M. Characterization of *Vibrio parahaemolyticus* isolated from coastal water in Eastern Province of Saudi Arabia. *Malaysian Journal of Microbiology*. **2018**; 14 (1), 1-9.
- 12. Alsalem Z, **Elhadi N**, Aljeldah M, Alzahrani F, Nishibuchi M. Characterization of *Vibrio vulnificus* Isolated from the Coastal Areas in the Eastern Province of Saudi Arabia. *Journal of Pure and Applied Microbiology*. **2018**;12(3), 1355-1364.
- 13. Aljindan RY, **Hussein NE**, Khoudair HA, Shaikh AY, Hassan HA, Alabdulqader NA, Shorman MA, Abdalhamid BA. First description of plasmid mediated quinolone resistance genes in *Salmonella* isolates from Saudi hospitals. *Saudi Medical Journal.* **2018**; 39(7), 685-689.
- 14. Aljindan R, Alsamman K, **Elhadi N**. ERIC-PCR genotyping of *Acinetobacter baumannii* isolated from different clinical specimens. *Saudi Journal of Medicine and Medical Sciences*. **2018**;6(1):13.
- Aljindan R, Elhadi N. Genetic Relationship of multi-resistant Acinetobacter baumannii isolates in Kingdom of Saudi Arabia. J Pure Appl Microbiol, 2018; 12(4), 1951-1958.
- 16. Abdalhamid B, **Elhadi N**, Albunayan S, Alsamman K, Aljindan R. First description of methyltransferases in extensively drug-resistant Klebsiella pneumoniae isolates from Saudi Arabia. *Journal of Medical Microbiology*. 2017;66(7):859-63.
- 17. Abdalhamid B, Albunayan S, Shaikh A, **Elhadi N**, Aljindan R. Prevalence study of plasmid-mediated AmpC β-lactamases in *Enterobacteriaceae* lacking inducible ampC from Saudi hospitals. *Journal of Medical Microbiology*. 2017;66(9):1286-90.
- 18. Ghenem L, **Elhadi N**, Alzahrani F, Nishibuchi M. *Vibrio Parahaemolyticus*: A review on distribution, pathogenesis, virulence determinants and epidemiology. *Saudi Journal of Medicine and Medical Sciences*. 2017;5(2):93.



- 19. **Elhadi**, **N.**, Aljeldah, M. and Aljindan, R. Prevalence and antimicrobial susceptibility pattern of extended-spectrum-β-lactamase-producing Escherichia coli isolated from imported frozen freshwater fish in Saudi Arabia. *International Journal of Food Research*. 2016; 23(6): 2719-2727.
- 20.Baha Abdalhamid, **Nasreldin Elhadi**, Khaldoon Alsamman, Reem Aljindan. *Chryseobacterium gleum* pneumonia in an infant with nephrotic syndrome. *IDCases*. 2016; 5: 34–36.
- 21. Abdalhamid B, **Elhadi N**, Alabdulqader N, Alsamman K, Aljindan R, Rates of gastrointestinal tract colonization of carbapenem resistant *Enterobacteriaceae* and *Pseudomonas aeruginosa* in hospitals in Saudi Arabia, *New Microbes and New Infections* (2016), doi: 10.1016/j.nmni.2016.01.014.
- 22. **Nasreldin Elhadi**. Prevalence of extended-spectrum-β-lactamase-producing Escherichia coli in imported frozen freshwater fish in Eastern Province of Saudi. *Saudi Journal of Medicine & Medical Sciences* 4 (1), 2016.
- 23. **Nasreldin Elhadi**, Khaldoon Alsamman. Incidence and antimicrobial susceptibility pattern of extended-spectrum-β-lactamase-producing Escherichia coli isolated from retail imported mackerel fish. *African Journal of Biotechnology*. 2015; 14 (23): 1954-1960.
- 24. **Nasreldin Elhadi** (2014). Prevalence and antimicrobial resistance of Salmonella spp in raw retail frozen imported freshwater fish to Eastern Province of Saudi Arabia. *Asian Pacific Journal of Tropical Biomedicine*. 2014; 4 (3): 234-238.
- 25. Nasreldin Elhadi, Reem Aljindan, Mohammed Aljeldah. Prevalence and antimicrobial resistance of Nontyphoidal *Salmonella* serogroups in a University Hospital in Eastern Province of Saudi Arabia. *Journal of Infection and Drug Resistance*. 2013; 6: 1-7.
- 26. Nasreldin Elhadi (2013).Occurrence of Potentially Human Pathogenic Vibrio Species in the Coastal Water of the Eastern Province of Saudi Arabia. *Research Journal of Microbiology*, 8 (1): pp. 1-12.
- 27. Nasreldin Elhadi (2012). Antibiotic Resistance and Plasmid Profiling of Clinically Significant *Vibrio vulnificus* Isolated from Coastal Water in Eastern Province of Saudi Arabia., *British Journal of Pharmacology and Toxicology* 3 (2), pp. 93-97.
- 28. **Nasreldin Elhadi** and Hatem Qutub. Detection of *Legionella* from Teaching Hospital Cooling Tower Water of Air Conditioning Systems in Eastern Province of Saudi Arabia., *Asian Journal of Medical Sciences*. 2012; Vol 4 (2), pp. 99-102.



- 29. **Nasreldin Elhadi**, Layla Bashawri, Mohammed Aljeldah, Burhan Imamwerdi, Faisal Alzahrani and Mitsuaki Nishibuchi (2012). Molecular characterization of *Vibrio cholerae* non-O1/non-O139 isolated from coastal water of Arabian Gulf., *African Journal of Microbiology Research*. 2012; Vol. 6(2), pp. 447-452.
- 30. **Nasreldin Elhadi**, Son Radu, Chien-Hsien and Mistuaki Nishibuchi. Prevalence of Potentially Pathogenic *Vibrio* Species in the Seafood Marketed in Malaysia. 2004. J. Food Protection, Vol. No. 7. Pages 1469-1475.
- 31. Chien-Hsien Chen, Toshio Shimada, Nasreldin Elhadi, Son Radu, and Mitsuaki Nishibuchi. 2004. Phenotypic and Genotypic Characteristics of *ctx*⁺ Strains of *Vibrio cholerae* Isolated in Malaysia and the Significance of the strains in Epidemiology in Seafood Marketed in Malaysia. J. Applied and Environmental Microbiology. Vol.: 70: pages 1964-1972.
- 32. **Nasreldin Elhadi**. 2003. Determination of Survival and Growth of *Vibrio cholerae* O1 in Food. *The International Medical Journal*. <u>http://uia4.tripod.com/_Vol. 2.</u>
- 33. **Nasreldin Elhadi** 2003. Survival and Growth of *Vibrio cholerae* O1 in Food, *Centre for Research Excellence* (SICCRE). Vol. 4: 40–45.
- 34. **Nasreldin Elhadi**, Son Radu and Nishibuchi Mitsuaki. 2002. Application of Multiplex PCR and DNA Colony Hybridization to Detect Virulence Genes in *Vibrio cholerae* isolated from Seafood. *Centre for Research Excellence* (SICCRE). Vol. 3: 30 37.
- 35. **Nasreldin Elhadi**, Son Radu, Gulam Rusul and Nishibuchi Mistuaki. 2001. Rapid Molecular Method for Detection of Cholera Toxin in *Vibrio cholerae*. *Fulllength original research paper published in 24th Symposium of the Malaysian Society for Microbiology Proceeding* No. 24:134-137. Cherating, 9-12 September, 2001.
- 36. Nasreldin, EH. R. Gulam, R., and Nishibuchi. M. 2001. Prevalence of Pathogenic Vibrio species in Seafood. Full-length original research paper published in 23rd Symposium Malaysian Society for Microbiology Proceeding No. 24:23-27. Cherating, 9–12 September, 2001.
- 37. **Nasreldin Elhadi**. 2001. Elevated temperature enrichment method for isolation of Vibrio cholerae. Full-length original research paper published in 24th Malaysian Society for Microbiology Proceeding No. 24:138-142. Cherating, 9 12 September, 2001.



- 38.Son Radu, Sahilah, G. Rusul and Nasreldin Elhadi. 2000. Characterization of Salmonella enteritidis Isolated from fish (*Telapia Mossambica*) by plasmid profile, Antibiotic Resistance and Random Amplification Polymorphic DNA (RAPD) Fingerprinting. Asian Fisheries Science 13:13 – 20.
- 39. Tg Abbrizal, Son Radu, Abdul Reezal, Abdul Rahim Mutalib, Gulam Rusul, **Nasreldin Elhadi**, and Yuherman. 2000. Random Amplified Polymorphic DNA Analysis to Differentiate strains of *Vibrio vulnificus* Isolated from Cockles and Shrimp. *Malaysian Journal of Medical Science* 7:37-42.
- 40.**Nasreldin Elhadi**, Son Radu and Mistuaki Nishibuchi. 2000. Application of Polymerase Chain Reaction (PCR) and DNA Colony Hybridization in Detection of *Vibrio cholerae* Virulence Genes. *Full-length original research paper published in* 23rd Symposium Malaysian Society for Microbiology *Proceeding* No. 23: 29-32, Langkawi, 19 – 21 November, 2000.
- 41. **Nasreldin Elhadi**, Son Radu, Gulam Rusul, Jamal Khair, ZaitonHassan, R. Abdul Latif. 2000. Prevalence of *Vibrio spp* in shrimps (*Penaeus indicus*) marketed in Malaysia. *Full-length original research paper published in Symposium of Medical Health Science for the New Millennium Proceeding*: 144 – 147. Kuala Lumpur, 29 – 30 April, 2000.
- 42. Son Radu and **Nasreldin Elhadi**, Samuel Lihan. 2000. Epidemiologic typing and delineation of genetic relatedness of *Vibrio parahaemolyticus* by random amplified polymorphic DNA method. *Full-length original research paper published in Symposium of Medical Health Science for the New Millennium Proceeding*: 166-169. Kuala Lumpur, 29 30 April, 2000.
- 43. R. Son, F. Nimita, G. Rusul, **E. H. Nasreldin**, L. Samuel and M. Nishibuchi. 1999. Isolation and Molecular Characterization of Vancomycin Resistant *Enterococcus faecium* (VRE) in Malaysia. *Letters in Applied Microbiology* 29:118-122.
- 44. Son Radu, Yuherman, Ho Yun Kit and **Nasreldin Elhadi**.1999. Molecular Characterization of *Vibrio cholerae* O1 and non- O1 DNA from human and environmental sources in Malaysia. *J. Epidemiology Infection 123:225-232*.
- 45. **Nasreldin Elhadi**, Zaiton Hassan and Jamal Khair. 1998. Characterization of *Vibrio Parahaemolyticus* isolated from cockles (*Anadara granosa*) by plasmid Profiling and Random Amplification Polymorphic DNA analysis. *Full-length original research paper published in 21st Malaysian Society for Microbiology*. Vol. 21:63-67, Mines Beach Resort, Kuala Lumpur, 15–16 December, 1998.
- 46. **Nasreldin Elhadi**, Son Radu, and Jamal Khair. 1998. Isolation and Molecular Characterization of *Vibrio cholerae* O139 isolated from seawater. *Full-length*



original research paper published in 21st Malaysian Society for Microbiology. Vol. 21:89-93, Mines Beach Resort, Kuala Lumpur, December, 1998.

- 47. Son Radu, **Nasreldin Elhadi**, Zaiton Hassan, and Gulam Rusul. 1998. Characterization of *Vibrio vulnificus* isolated from cockles (*Anadara granosa*) by Plasmid Profiling and Random Amplification Polymorphic DNA Analysis. *FEMS Microbiology Letters* 165:139.
- 48.Son Radu, **Nasreldin Elhadi** and Zaiton Hassan 1998. Use of Randomly Amplified Polymorphic DNA Analysis to differentiate isolates of *Vibrio parahaemolyticus* from cockles (*Anadara granosa*). *World J. of Microbiology and Biotechnology* 14:895-901.
- 49. **Nasreldin Elhadi**, Zaiton Hassan, Gulam Rusul and Nimita Fifadara. 1998. Prevalence studies of *Vibrio vulnificus* isolated from cockles (*Anadara granosa*) in Malaysia. *J. Malaysian Applied Biology*. Vol 25:44-49.
- 50. R. Son, Yuherman, G. Rusul, Jamal Khair and **E. H. Nasreldin**. 1998. Application of Randomly Amplified Polymorphic DNA (RAPD) Analysis of *Vibrio parahaemolyticus* Isolated from coastal water. *J. of Bioscience* Vol. 9.
- 51. R. Son, G. Rusul, L. Samuel, **E. H. Nasreldin**, M. Nishibuchi. 1998. Characterization of *Vibrio cholerae* O139 Bengal isolated from Water in Malaysia. *J. Applied Microbiology* 85:1073-1077.

Scientific Research Papers Presented to Refereed Specialized Scientific Conferences

| # | Name of | Research Title | Conference and Publication |
|---|-----------------|----------------|-----------------------------------|
| | Investigator(s) | | Date |

- 1. **Nasreldin Elhadi**., Mariam Almejhim and Mitsuaki Nishibuchi. Detection of the tdh gene in *Vibrio parahaemolyticus* isolated from coastal environment by using immuno-magnetic beads (IMB) and PCR in Saudi Arabia. 53rd US-Japan Annual Joint Panel Conference on Cholera and Other Bacterial Enteric Infections, (28 February to 1 March 2019, Hanoi, Vietnam.
- 2. **Nasreldin Elhadi** and Mitsuaki Nishibuchi. Screening of diarrheal stool specimens for *Escherichia coli* O157 and other diarrhoeagenic *Escherichia coli* pathotypes in a university teaching hospital in Eastern Province of Saudi Arabia. 53rd US-Japan Annual Joint Panel Conference on Cholera and Other Bacterial Enteric Infections, (28 February to 1 March 2019, Hanoi, Vietnam.



- 3. **Nasreldin Elhadi.** The unseen risk and current trend in the antimicrobial resistance of foodborne bacterial pathogens isolated from imported frozen freshwater fish, shrimp and beef meat in Eastern Province of Saudi Arabia. 3rd Sharjah Food Safety Forum "Human Safety is our Wealth", 26 February, 2019. Sharjah Municipality, United Arab Emirates.
- 4. Nasreldin Elhadi., and Mitsuaki Nishibuchi. Prevalence and characterization of Vibrio parahaemolyticus in the coastal environment in Eastern Province of Saudi Arabia. 52nd US-Japan Annual Joint Panel Conference on Cholera and Other Bacterial Enteric Infections, Department of Microbiology (22-24 February, 2018, Faculty of Science, Prince of Songkla University, Hat Yai, Songkhla, Thailand.
- 5. Son Radu, **Nasreldin Elhadi** and Mitsuaki Nishibuchi. 2002. Detection of *Vibrio cholerae* and other *Vibrio* spp. from environmental sources in Malaysia. The Thirty-Seven Joint Conference of USA Japan Cooperative Medical Science Program: Cholera and Other Bacterial Enteric Infections Panel. Ginowan City, Okinawa, Japan, December 19, 2002.
- 6. Nishibuchi, M., **Nasreldin, E.H**., Chen, E., Son, R. and Shimada, T. 2001. Molecular Characterization of toxigenic *Vibrio cholerae* isolated from seafood marketed in Malaysia. Tropical Medicine in the 21st Century.
- 7. **Nasreldin Elhadi**, Son Radu, Gulam Rusul, Zaiton Hassan, Endang Purwati and Tg. Ahbrizal. 2000. Multiplex PCR to detect virulence gene *ctx* and *tcpA* genes to biotype *Vibrio cholerae* isolated from seafood in Malaysia. 6th National Conference on Medical Science. 6: 91., Kota Bharu, Kelantan, May, 2000.
- 8. Sara A. **Nasreldin E H**., Son R., Ooi W., and Osman M. 2000. Isolation of *Escherichia coli* O157 from Imported beef in Malaysia. 6th National Conference on Medical Science. 6: 80., Kota Bharu, Kelantan, May, 2000.
- 9. Endang Purwati, Raha Abdul Rahim and **Nasreldin Elhadi**. 2000. Studies of the multiple antibiotic resistance of *Listeria monocytogenes*. 6th National Conference on Medical Science. 6: 96., Kota Bharu, Kelantan, May, 2000.
- 10. Mickey Vincent, Son Radu, **Nasreldin Elhadi**, Hon Shiu Fong. 2000. *Vibrio cholerae* in Meri Sarawak: Antibiotic resistance and their genotypic characterization. 4th UNESCO National Workshop on Promotion of Microbiology, Kuala Lumpur 26 August, 2000.
- 11. Tg Abbrizal and **Nasreldin Elhadi**. 2000. Strain typing of *Vibrio vulnificus* biotype 1 in cockles and shrimp by Random Amplified Polymorphic DNA Assay. 4th UNESCO National Workshop on Promotion of Microbiology. Kuala Lumpur 26 August, 2000.



- 12. Nimita Fifadara, G. Rusul, Son Radu and **Nasreldin Elhadi**. 1999. Characterization of vancomycin resistant *Enterococcus faecium* using antibiotic susceptibility, plasmid profile and random amplification of polymorphic DNA (RAPD). Malaysian Society of Parasitology and Tropical Medicine Proceeding: 13. Kuala Lumpur, 1999.
- 13. **Nasreldin Elhadi**. 1999. Distribution of Potentially Pathogenic *Vibrios* in shrimp (*Penaeus indicus*) in Malaysia wet market and supermarkets. Malaysian Society for Microbiology Proceeding No.22, Penang Parkroyal Resort, November, 1999.
- Nasreldin Elhadi. 1999. Occurrence and Characterization of *Vibrio* parahaemolyticus, *Vibrio vulnificus* biotype 1 and biotype 2 isolated from cockles (*Anadara granosa*). Malaysian Society for Microbiology Proceeding No. 22, Penang Parkroyal Resort, November, 1999.
- 15. **Nasreldin Elhadi**, Son Radu, Jamal Khair, Gulam Rusul, Rohani Md. Yassin, Harrison Abd Aziz, Zaiton Hassan. 1999. Prevalence and Distribution of pathogenic *Vibrio* species in seafood available in Malaysia. Malaysian Society for Microbiology Proceeding No. 22. 1999
- 16. Sara Abd Alla, **Nasreldin Elhadi**, Son Radu, Mariana N.S, Gulam Rusul, Rohani Ooi Wi Ling, Samuel Lihan. 1999. Detection of *Escherichia coli* Harboring Shiga Like Toxins (*SLT I & II*) from Imported beef. Malaysian Society for Microbiology Proceeding No. 22. Penang Parkroyal Resort, November, 1999.
- Noorlis Ahmad and Nasreldin Elhadi. 1999. Isolation and Characterization of Aeromonas spp from Fish. Malaysian Society for Microbiology Proceeding No. 22. Penang Parkroyal Resort, November, 1999.
- 18. TG Ahbrizal, **Nasreldin Elhadi**, Son Radu, Gulam Rusul, Jamal Khair. 1999. Prevalence Studies, Antibiotic Resistant and Plasmid Profiles of *Vibrio vulnificus* Isolated from Shrimp. Malaysian Society for Microbiology *Proceeding* No. 22. Penang Parkroyal Resort, November, 1999.
- 19. Samuel Lihan, Son Radu, Gulam R., **Narseldin Elhadi**. 1999. Use of Randomly Amplified Polymorphic DNA Analysis to differentiate isolates of *Salmonella spp*. Malaysian Society for Microbiology *Proceeding* No. 22, Penang Parkroyal Resort, November, 1999.
- 20.Zaiton Hassan and **Nasreldin Elhadi**. 1998. *Vibrio vulnificus* and other *Vibrios* isolated from cockles (*Anadara granosa*). Malaysian Science and Technology Congress, Terengganu, November, 1998.



Current and Completed Research Projects

| # | Name of | Research Title | Report Date |
|---|-----------------|----------------|-------------|
| | Investigator(s) | | |
| | (Supported by) | | |

- 1. **Principle investigator for research** entitled: Serological and molecular characterization of *Vibrio cholerae* serovars associated with diarrhea or cholera-like illness in the Eastern Province, Saudi Arabia, 2022-2023.
- 2. **Principle investigator for research** entitled: Evaluation of ERIC-PCR based fingerprint as molecular typing method for determination of genetic diversity among *Escherichia coli* strains isolated from human and retail frozen shrimp and beef, 2022-2023.
- 3. **Principle investigator for research** entitled: Virulence Characteristics, Antibiotic Resistance Patterns and Molecular Typing of Enteropathogenic producing *Escherichia coli* (EPEC) Isolates in Eastern Province of Saudi Arabia: 2013-2014, 2022-2023.
- 4. *Principle investigator* for *Strategic Research Grant* entitled: Environmental and Molecular Investigations of Toxigenic Vibrio species in the Coastal Areas of Arabian Gulf in Eastern Province of Saudi Arabia. The project is funded by National Science, Technology and Innovation Program (NSTIP)-King Abdul-Aziz City for Science and Technology (KACST), Kingdom of Saudi Arabia, 2016-2021.
- 5. **Principle investigator** for research grant entitled: Prevalence and Antimicrobial Resistance of Extended-Spectrum β-Lactamase (ESBL)-Producing *Escherichia coli* in imported frozen shrimp and beef in Eastern Province of Saudi Arabia. The project was funded by Deanship of Scientific Research, University of Dammam, Saudi Arabia, 2014-2016.
- 6. **Principle investigator** for research grant entitled: Prevalence and molecular screening of virulence gene markers of diarrhoeagenic *Escherichia coli* pathotypes from hospitalized patients in Eastern Province of Saudi Arabia. The project was funded by Deanship of Scientific Research, University of Dammam, Saudi Arabia, 2013-2015.
- 7. **Principle investigator** for research grant entitled: Prevalence, Quantification and Antimicrobial Resistance Patterns of Human Potentially Pathogenic bacteria in imported frozen fish marketed in Eastern Province of Saudi Arabia. The project was funded by Deanship of Scientific Research, University of Dammam, Saudi Arabia, 2012-2014.



- 8. **Principle investigator** for research grant entitled: Prevalence of Significant Vibrios Virulence genes in the Coastal Areas of Arabian Gulf, Saudi Arabia. The project was funded by Deanship of Scientific Research, University of Dammam, Saudi Arabia, 2009-2010. (*Funding Amount: 100, 000 Saudi Riyals*)
- 9. **Principle investigator** for research grant entitled: Prevalence of Potentially Pathogenic *Vibrio* species in the Arabian Gulf Coastal water. The project was funded by Deanship of Scientific Research, University of Dammam, Saudi Arabia, 2007-2009. (*Funding Amount: 200, 000 Saudi Riyals*)
- 10. **Principle investigator** for research grant entitled: Prevalence of Clinically important Vibrios in East Coast Malaysia. IIUM Research Center grants mechanism, Malaysia, 2004-2005.
- 11. **CO- investigator** for research grant entitled: Distribution of Pathogenic *Vibrio* spp. in Seafood and its association with human Diarrhea in Malaysia. Malaysian Ministry of Health through the (IRPA) grants mechanism, 1999-2002.
- 12. **CO- investigator** for research grant entitled: Incidence of *Vibrio vulnificus* in Malaysia from environmental sources. Malaysian Ministry of Health through the (IRPA) grants mechanism, 1997-1998.

Contribution to Scientific Conferences and Symposia

| # | Conference Title | Place and Date of the Conference | Extent of Contribution |
|---|-------------------------|-------------------------------------|------------------------|
|---|-------------------------|-------------------------------------|------------------------|

- 1. 53rd US-Japan Annual Joint Panel Conference on Cholera and Other Bacterial Enteric Infections, (28 February to 1 March 2019, Hanoi, Vietnam.
- 2. 3rd Sharjah Food Safety Forum "Human Safety is our Wealth", 26 February, 2019. Sharjah Municipality, United Arab Emirates.
- 3. 52nd US-Japan Annual Joint Panel Conference on Cholera and Other Bacterial Enteric Infections, Department of Microbiology (22-24 February, 2018, Faculty of Science, Prince of Songkla University, Hat Yai, Songkhla, Thailand.
- 4. Current Trends and New Challenges in Clinical Laboratory Sciences. King Fahd Hospital of the University, Directorate of Academic Affairs and Training and Department of Medical Laboratory Technology, College of Applied Medical Sciences, King Faisal University, Al-Khobar, Saudi Arabia. April, 22, 2009.
- 5. Challenge in Laboratory Medicine King Fahd Hospital of the University, Al Khobar, Saudi Arabia. April, 9-10, 2008.



- 6. Biotechnology for Wealth Creation and Social Well-Being. BioMalaysia 2005. Putrajaya International Convention Centre. Putrajaya, 28-29 April, 2005.
- 7. International Biotechnology Symposium, Exhibition and Bio-Partnering. BioMalaysia 2002. PWTC, Kuala Lumpur, 1-4 October, 2002.
- 8. 24th Symposium of the Malaysian Society for Microbiology. Cherating Island, Malaysia, 9-12 September, 2001.
- 9. Symposium of Medical Health Sciences for the New Millennium: Kuala Lumpur, 29-30 April, 2000.
- 10. 6th National Conference on Medical Science. Kota Bharu, Kelantan, May, 2000.
- 11. 4th *UNESCO National Workshop on Promotion of Microbiology*, Kuala Lumpur 26 August, 2000.
- 12. 23rd Symposium of the Malaysian Society for Microbiology, Langkawi, Malaysia, November, 2000.
- 13. Malaysian Society of Parasitology and Tropical Medicine Symposium, Kuala Lumpur, Malaysia. 1999.
- 14. 22nd Microbiology Symposium of the Malaysian Society for Microbiology and Japan Society for Promotion of Science (JSPS), Penang Parkroyal Resort, Malaysia, 21-24 November 1999.
- 15. 21st Symposium of the Malaysian Society for Microbiology. "The Role of Microbiologists in Health, Food Production and the Environment. Mines Beach Resort, Kuala Lumpur, Malaysia, 15-16 December, 1998.
- Malaysian Science and Technology Congress'98. Theme: Update of R & D Findings and Commercialization. Park Royal Hotel, Kuala Terengganu, Malaysia, 7-9 November 1998.
- 17. Fifth Symposium of Applied Biology: Natural Resources and Food Security, Challenges to Applied Biologist. University Putra Malaysia, Serdang, 5-6 May, 1998.





Training and Workshops Certificates

Training

| 1999-2002 | (Ph.D. research) Conducted research on prevalence of pathogenic Vibrio spp. & molecular characterization of Vibrio cholerae Serovars, under the supervision and guidance of: Professor Son Radu, University Putra Malaysia and Professor Mitsuaki Nishibuchi, Kyoto University, Japan PhD thesis examiner: Prof. G. Balakrish Nair |
|-----------|---|
| 1996-1999 | (MSc. research) Conducted research on isolation & molecular characterization of <i>Vibrio vulnificus</i> & <i>Vibrio parahaemolyticus</i> , under the guidance of Professor Zaiton Hassan and Professor Son Radu, University Putra Malaysia |

Workshops Certificates

| 2017 | Training workshop on EndNote Web,Information Learning and Research commons, Deanship of Library Affairs, University of Dammam, Saudi Arabia, held on 01-03-2017. |
|------|---|
| 2016 | Intensive Training Program on "Mentor Training Program" Deanship of Education Development, University of Dammam, Saudi Arabia, 31 May- 2 June, 2016 |
| 2013 | The Canadian Medical Education Directions for Specialists (Can-Meds) Workshop. Saudi Commission for Health Specialties, King Fahd Hospital of the University, Al-Khobar, Saudi Arabia, May, 8-9, 2013 |
| 2008 | Strategic Planning Workshop. Medical Education Centre, King Faisal University and Kaludis Consulting, Washington DC, USA, Site 1, King Faisal University, AlKhobar, KSA, May, 31-June, 5-July, 2008 |
| | Workshop Training course on Fluorescence in Situ DNA Hybridization (FISH). Department of Diagnostic Laboratories, King Fahd Hospital of the University, Al-Khobar, Saudi Arabia, April, 7-10, 2008 |
| | Safety and Exposure Biohazards Workshop. College of Applied Medical Science, King Faisal University, Dammam, Saudi Arabia. February, 2-5, 2008 |



| 2005 | Workshop Training on the Laboratory Diagnosis of Dengue Virus. Department of Medical Microbiology, Faculty of Medicine, University of Malaya and WHO Collaborating Centre for Arbovirus (DF/DHF), Kuala Lumpur, Malaysia. May, 9-13, 2005 |
|------|--|
| 2004 | Workshop Training course on Pharmacogenetics. Pharmacogenetics Research Group University, Faculty of Medicine, Health Campus, Science Malaysia, Kelantan, Malaysia. April, 1-4, 2004 |
| | Workshop Training course in Competency Level Assessment (CLA) Program (EDUCATION). Centre for Education Technology (CET) and Management Services Division, International Islamic University Malaysia (IIUM), Kuala Lumpur, Malaysia, July, 7-18, 2004 |
| | Intellectual Discourse Workshop Program. Office of the Deputy Rector (Academic Affairs), International Islamic University Malaysia (IIUM), Kuala Lumpur, Malaysia, March, 23-28, 2004. |
| 2001 | Workshop Training course on Genetically Modified Organisms (GMO): Current Status and Technologies. Ministry of Health Malaysia, Malaysian Society for Microbiology and University Putra Malaysia, Kuala Lumpur, Malaysia. November, 5-9, 2001 |
| 2000 | Workshop Training course on Polymerase Chain Reaction (PCR). Department of Biotechnology, Faculty of Food Science and Biotechnology, University Putra Malaysia. Ministry of Health, Kuala Lumpur, Malaysia and Kyoto University, Japan. July, 24-26, 2000 |
| 1999 | Workshop Training course on Isolation and Screening of Microbes for Useful Materials. University Putra Malaysia and Hokkaido University, Japan, March, 10-12, 1999 |
| 1999 | Training course on Microbiological Risk Assessment. Faculty of Food Science and Biotechnology, University Putra Malaysia, Ministry of Health Malaysia and Center for Southeast Asian Studies and Graduate School of Medicine, Kyoto University, Japan, October, 4-8, 1999 |
| 1998 | Workshop Training course in Multiplex Polymerase Chain Reaction (PCR) and Molecular Tools for Biotechnology. Department of Biotechnology, University Putra Malaysia, Kuala Lumpur, Malaysia, December, 10-12, 1998 |



- 1997 Workshop Training course in Pulsed Field Gel Electrophoresis (PFGE) and Polymerase Chain Reaction (PCR). Department of Biotechnology, University Putra Malaysia and Centre for Southeast Asian Studies, Kyoto University, Japan, September, 17-20, 1997
- 1996 Computer Certificate in Microsoft offices, Boston Computer Institute, Gujarat State, Ahmedabad, India, May, to September, 1996

Membership of Scientific and Professional Societies and Organizations

- American Society for Microbiology
- Malaysian Society for Microbiology

Teaching and Courses Coordination Activities

Undergraduate courses taught, Imam Abdulrahman Bin Faisal University

- 211 Introduction to Microbiology
- RC 212 Medical Microbiology
- 322 Medical Parasitology
- 323 Medical Virology
- 421 Diagnostic Microbiology
- 424 Research project
- NUT 212 Microbiology & Parasitology
- 314 Clinical Microbiology & Mycology
- CT 222 Microbiology and Infection Control

Graduate studies courses taught, Imam Abdulrahman Bin Faisal University

- CLS704 Student seminar I
- CLS705 Student seminar II
- CLS 706 Principles of Microbiology
- CLS707 Medical Parasitology
- CLS 708 Medical Mycology
- CLS709 Medical Virology
- CLS 710 Advanced Clinical Microbiology
- ML 833 Microbiology and Parasitology,
- MLT841 Master Degree thesis research in Microbiology
- ML 822 Communication skills



Courses taught at other Universities for undergraduate and graduate students

2005-2006

The Ribat National University, Khartoum, Sudan

- Clinical Microbiology
- Medical Microbiology
- Molecular Biology

2005-2006

University of Medical Sciences and Technology, Khartoum, Sudan

- Medical Microbiology
- Microbiology for Dentistry
- Biotechnology
- Molecular Biology

2003-2005

International Islamic University, Malaysia http://www.iium.edu.my/

- Microbiology
- Biotechnology
- Medical Microbiology
- Pharmaceutical Microbiology
- Pharmaceutical Biotechnology
- Research Methodology
- Research Project

2001-2003

University College Sedaya International (UCSI), Kuala Lumpur, Malaysia

https://www.ucsiuniversity.edu.my

- Microbiology
- Medical Microbiology
- Food Microbiology
- Microbial Biotechnology
- Biotechnology
- Pharmaceutical Microbiology
- Pharmaceutical Biotechnology





Supervision of Master and/or PhD Thesis and Ongoing Research Supervision

- Student name: Rana Alghamdi, Department of Clinical Laboratory Science, College of Applied Medical Sciences, *Imam Abdulrahman Bin Faisal University*. *MSc thesis title* "Virulence associated genes and whole genome sequencing (WGS) analysis of clinically significant Vibrio parahaemolyticus isolated from coastal environment in Eastern Province of Saudi Arabia"; 2022-present.
- 2. **Student name: Reema Allham:** Department of Clinical Laboratory Science, College of Applied Medical Sciences, **Imam Abdulrahman Bin Faisal University**. **MSc thesis title** "Molecular characterization and antibiotics resistance of gram-negative bacteria that isolated from Eastern region in Saudi Arabia, **2022-present.**
- **3.** Student name: Hessah Marzouq Alwaalan, Department of Clinical Laboratory Science, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University. MSc thesis title "Antibiotic resistance and molecular characterization of diarrheagenic Escherichia coli in patients with gastroenteritis infections in Eastern Province of Saudi Arabia"; 2020-present.
- **4.** Student name: Fatmah Mohammed AL-Hussain, Department of Clinical Laboratory Science, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University. MSc thesis title "Assessment of new β-lactam/β-lactamase inhibitor combinations against Multiple drug resistant Pseudomonas aeruginosa strains isolated in King Fahad Hospital of the University"; 2020-2022.
- **5.** Student name: Somayah Mohammad Alfifi, Department of Clinical Laboratory Science, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University. MSc thesis title "Assessment of new β-lactam/β-lactamase inhibitor combinations against Multiple drug resistant Pseudomonas aeruginosa strains isolated in King Fahad Hospital of the University"; 2019-present.
- Student name: Ahlam Fahad Almulhim, Department of Clinical Laboratory Science, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University. MSc thesis title "Detection of Shiga Toxin-Producing Escherichia coli O157:H7 by Using Immunomagnetic Separation and PCR in Imported Frozen Beef Marketed in Eastern Province of Saudi Arabia"; 2018-2020.



- 7. **Student name:** Maryam Ibrahim Almejhim, Department of Clinical Laboratory Science, College of Applied Medical Sciences, **Imam Abdulrahman Bin Faisal University**. **MSc thesis title** "Application of Immunomagnatic separation technique to detect pathogenic Vibrio parahaemolyticus in coastal water in Eastern province Saudi Arabia"; **2018-2020.**
- Student name: Bashayer Ali Al-Shehri, Department of Clinical Laboratory Science, College of Applied Medical Sciences, *Imam Abdulrahman Bin Faisal University*. *MSc thesis title* "The prevalence and characterization of dermatophytes isolation from clinical specimens in Eastern Province of Saudi Arabia"; 2018-2020.
- MSc thesis title "Prevalence of Metallo β-lactamase producing *Pseudomonas* aeruginosa in Eastern Province of Saudi Arabia" Student name: Ahmed Albuloshi; 2017–2018
- MSc thesis title "Characterization of uropathogenic *Escherichia coli* in Eastern Province of Saudi Arabia" Student name: Mohammad Abusuliman; 2017 – present
- **11.** *MSc thesis title* "Prevalence of CTX-M β-lactamase producing *Escherichia coli* in Eastern Province of Saudi Arabia" *Student name:* Faris Al atmah; 2017 2018
- 12. *MSc thesis title* "Characterization of non-typhoidal *Salmonella* associated with gastroenteritis in Eastern Province of Saudi Arabia" *Student name:* Adham Al harbi; **2017 2018**
- 13. *MSc thesis title* "Putative virulence factors and characterization of *Vibrio vulnificus* isolated from the coastal areas in Eastern Province of Saudi Arabia" *Student name:* Zainab Alsalem; **2015** –**2017**
- 14. *MSc thesis title* "Phenotypic and Genotypic Characterization of *Aeromonas hydrophila* isolated from the coastal areas in Eastern Province of Saudi Arabia" *Student name:* Jalilah Alhmad; **2015**–**2017**
- 15. MSc thesis title "Characterization of Acinetobacter spp strains isolated from hospitals in the Eastern region of Saudi Arabia" Student name: Yasmeen Ashoor; 2015 –2017
- 16. MSc thesis title "Prevalence and molecular characterization of Vibrio parahaemolyticus from Arabian Gulf coastal water" Student name: Lubna Ghanem; 2014 –2017



- MSc thesis title "Prevalence and genotype of nosocomial infection of *Clostridium difficile* in multi-center in Eastern province of Saudi Arabia" Student name: Dhoha Hudhaiah; 2015 –2017
- MSc thesis title "Molecular characterization of extended spectrum betalactamase producing Enterobacteriaceae isolated from clinical specimen in eastern province of Saudi Arabia" Student name: Hanan Bogemey; 2015 – 2017
- 19. *MSc thesis title* "Assessment of NT-proBNP level and other cardic biomarkers in Saudi Arabian women taking combined oral contraceptive pills" *Student name:* Muneera Al-Duailej; **2014-2016**
- 20. *MSc thesis title* "The frequency of IRS1 Gly972Arg polymorphism and its relationship and its relationship with the incidence of type 2 Diabetes mellitus in the Eastern Province of KSA" *Student name:* Hawra Alsalman; **2014-2016**
- 21. *MSc thesis title* "Hepatitis B genotypes among Saudi patients with chronic Hepatitis B in King Fahd Hospital" *Student name*: Mrs. Fatima Al-Tauroti; 2012-2014
- 22. *MSc thesis title* "Relationship between vitamin D, calcium and parathyroid hormone among young healthy adults in the Eastern Province of Saudi Arabia" *Student name*: Lama Turki Al-Subiae; 2010 – 2012
- 23. *MSc thesis title* "Application of anti-cyclic citrullinated peptide antibody (anti-CCP) in diagnosis and differentiation of Rheumatid Artheritis" "*Student name*: Amani Al-Dakhil; 2008 to 2010
- 24. *MSc thesis title* "Isolation and characterization of *Vibrio cholerae* from Kuantan River, Pahang, Malaysia" *Student name*: Imranul Mawa; 2003-2005

Graduate thesis examination:

MSc thesis title "Establishment of In-House Quantitative Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) Multiplex Assay and RNA Isolation Kit for The Diagnosis of COVID-19 Infection" *Student name*: Osama Ezzeldin Abdelazim Abdelhadi, Alfaisal University, 26 June, 2022.



MSc thesis title "Effects of TGF- β Induced Epithelial-Mesenchymal Transition Cells on Induction of Colorectal Cancer Stem Cells" *Student name*: Saleh alghafis, King Faisal University, 13 June, 2022.

PhD thesis title "Green Synthesis of Nanoparticles by Marine Macroalgae with Assessment of Their Anticancer and Antimicrobial Potential" *Student name*: Sabiha Mahmood Ansari, King Saud University, 26 April 2020.

PhD thesis title "The Effect of Virulence Factors of *Staphylococcus epidermidis* on mechanism of adhesion to intravascular cannulae" *Student name*: Ghadah Salim Abusalim, King Saud University, 21 April 2020.

PhD thesis title "Biosynthesis of Silver Nanoparticles (AgNPs) using some plants extract and their phytochemical activity against some human pathogenic bacteria" *Student name*: Jawaher Iibrahim Alahadeb, King Saud University, 26 December 2019.

PhD thesis title "Studies on alkaline protease enzyme produced by a halophilic Bacillus isolated form the Kingdom of Saudi Arabia" *Student name*: Eidah Al-Khalidy, University of Dammam, 2014.

MSc thesis title "Infection of Renal Transplant Patients with Kaposi's Sarcoma and Hepatitis C Viruses as measured by Real Time PCR Technique" *Student name*: Amirah Habib Haikal, University of Dammam, 2011.

MSc thesis title "Effect *of Nigella sativa* supplementation on the eradication of *Helicobacter pylori* infection in patients with non-ulcer dyspepsia" *Student name*: Eyad M. Salem, University of Dammam, 2009.

PhD thesis title "Genetic bases of methicillin susceptible and Methicillin resistant Staphylococci" *Student name*: Omer Mohamed Khalil, Sudan University of Science and Technology, 2006.

MSc thesis title "Isolation and antimicrobial susceptibility of Enteropathogenic Escherichia coli and *E. coli* O157:H7" *Student name*: Hind Haider, Juba University, 2006.



UNIVERSITY

Scientific Consultations

| # From | То | Institute | Full-time or Part-time | |
|---------------|--------|---|------------------------|--|
| November 2016 | | | | |
| to present | Deans | Evaluation and reviewing new proposed graduate studies programs Deanship of Graduate Studies, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. | | |
| 2012-2019 | funde | Reviewed several numbers of Research grant proposal and final funded project reports for King Abd Aziz City for Science and Technology (KACST), Riyadh, KSA | | |
| April 2012 | | Evaluation of Medical Laboratory Technology program curriculum, College of Applied Medical Sciences, Dar Al-Uloom University, KSA | | |
| March 2011 | | Research grant reviewer for Essential & Health Science Research Center, Majma'ah University, KSA | | |
| May 2010 | Prince | Evaluation of Medical Laboratory Technology program curriculum, Prince Sultan military College of Health Sciences, Dhahran, Saudi Arabia | | |

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