

Dr. Mohammad A. Aliedeh: Telling the Whole Story from Seeds to Fruits



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Education



13 Ys

1. PhD in Chemical Engineering (Aug 1999- May 2004) New Mexico State University, Las Cruces, NM, USA
2. MSc. in Chemical Engineering (Aug 1994 - May 1997) Jordan University of Science & Technology, Irbid, Jordan
3. BSc. in Chemical Engineering (Aug. 1987- May 1992) Jordan University of Science & Technology, Irbid, Jordan



Honors & Awards



1. Royal Award
2. JUST Teaching Assistantship
3. Award For Applied Sciences For The Year 2000/The Scientific Foundation Of Hashem Adeeb Hijjawi, Amman, Jordan
4. NMSU Teaching Assistantship

1987-1992
1994-1997
Dec. 17, 2000



Professional Memberships



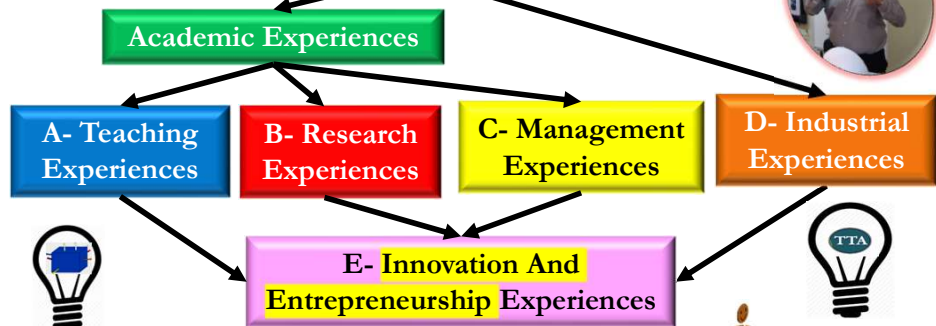
- Jordan Engineers Association (1992-till now)
- American Society of Engineering Educators (ASEE) (2010-till now)



Five Integrated Experiences



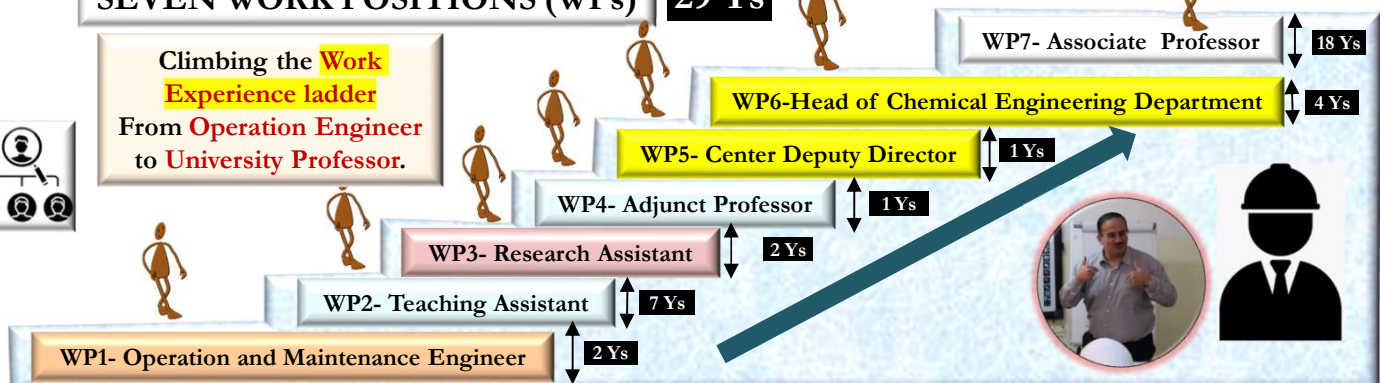
Combining
A- Teaching,
B- Research,
C- Management
D- Industrial and
E- Innovation and
Entrepreneurship
Experiences



SEVEN WORK POSITIONS (WPs) 29 Ys



Climbing the **Work Experience ladder**
From **Operation Engineer**
to **University Professor**.



7 WORK POSITIONS (WPs)

29 Ys

WP1- Operation and Maintenance Engineer from 1992 to Aug. 1994

D- Industrial Experiences

Company: Jordan Sulpho-Chemical Company, Zerqa, Jordan.

Job Description: Supervision of the work on the following plants:

1. Film Sulphonation Plant
2. Multipurpose Batch Reactor for Amid and STS Dryer.
3. Water Treatment, Steam Generation and Utilities Unit.
4. Sodium Silicate Rotary Kiln Plant and Dissolution Unit.
5. Saponification and Scraped Film Dryer Plant.



WP1

2 Ys

WP2 Teaching Assistant

A- Teaching Experiences

Institutions

- | | | |
|---|---------------------|--|
| (1) Chemical Engineering Department, JUST, Irbid, Jordan. | Sept. 94-Feb. 97 | |
| (2) Chemical Engineering Department, NMSU, NM, USA | Aug. 99- Dec. 2003 | |
| (3) Physics Department, NMSU, NM, USA | Jan. 2004- May 2004 | |

Courses Assisted:

Applied Mathematics
Separation Processes
Reaction Engineering

Introductory Physics Labs
Heat Transfer
Material Science

Labs Assisted:

Unit Operation Lab.
Chem. Processing Lab.
Petroleum Eng. Lab.
Physics Lab I and II



WP2

7 Ys

**WP3- Research Assistant**

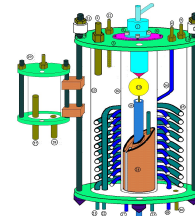
B- Research Experiences

Period: Feb. 1997- June 1998

Institution: Chemical Engineering Department, JUST, Irbid, Jordan.

Research Works: It was an extension of my M.Sc. research work. The following research works was accomplished:

1. Design of low-pressure and high-pressure solubility apparatus
2. Carry out certain modifications for wetted sphere apparatus



WP3

2 Ys

WP4- Adjunct Professor - Aug, 2004 – May, 2005

A- Teaching Experiences

Institutions

1. El Paso Community College
2. College/Dona Ana Community College

Courses taught:

- General Chemistry I
- Elementary Algebra
- General Chemistry II
- Pre-Algebra

Labs taught

- General Chem. Lab I&II
- Organic Chem. Lab



WP4

1 Ys

WP5

1 Ys

WP5 – Deputy Director:

2014- 2015

Prince Faisal Center for Dead Sea, Environment and Energy Research, Mutah University, Karak, Jordan

C- Management Experiences



Prince Faisal Center For Dead Sea, Environmental and Energy Research

WP6

4 Ys

WP6 - Head of Chemical Engineering Department, Mutah University, Karak, Jordan. 2021- 2023
2010-2013



C- Management Experiences

WP7- Associate Professor, Mutah University, Karak, Jordan, Aug, 2005 till now (18 years and 7 months)

A- Teaching Experiences

Research Interests

- Turbulent Multiphase flow
- Engineering Education.
- Computational Fluid Dynamics
- Structuring knowledge

B- Research Experiences



WP7

18 Ys

A- Teaching Experience

26 Ys



Dr. Mohammad Aliedeh **Whole Teaching Story** (Fall 2004 to Fall 2023)



As Shown in the following Figure and Summary Table, a full account of the courses taught by Dr. M. Aliedeh during the last 18 years of academic experience to reveal that wide spectrum of 26 different chemical engineering and chemistry and math based courses are taught that are repeated for a total 202 times. These courses cover topics that widely span from purely scientific to chemical engineering applied and advanced courses. This diverse and intensive teaching experience form the base for developing innovative educational reform projects.

Communication Skills (1 Course)	Math and Statistics Based Chem Eng Courses (8 courses)	Chemistry Based Chem Eng Courses and Labs (8 Courses and Labs)	Chem Eng Core Courses (8 Courses)	Chem Eng Master Courses (2 Courses)	Chem Eng Laboratories (5 Labs)	Total
Communication Skills Course	1. CCDM 105N Elementary Algebra (DACC) 2. CCDM 103N Pre-Algebra (DACC) 3. Multi-Dimensional Math 4. Numerical Analysis 5. Data Analysis (Statistics) 6. Design of Experiments (Applied Statistics) 7. Applied Mathematics 8. Optimization for Chem Eng Processes	1. General Chemistry I 2. General Chemistry II 3. Engineering Chemistry 4. Physical Chemistry 5. Organic Chemistry 6. Analytical Chemistry 7. General Chem. Lab I&II 8. Organic Chem. Lab	1. Principles of Chem Eng 2. Heat Transfer 3. Mass Transfer 4. Fluid Mechanics 5. Chemical Process and Equipment Design 6. Chem Eng Thermodynamics 7. Modeling and Simulation in Chemical Engineering 8. Reaction Engineering	1. Research Methods 2. Computational Fluid Dynamics (CFD)	1. Heat Transfer Lab 2. Thermodynamics Lab 3. Unit Operation Lab 4. Env Unit Operation Lab 5. Reaction Eng Lab	32 Different Courses and Labs
12 times	74 times	28 times	58 times	4 times	26 times	202 Times

EDUCATIONAL RESEARCH PROJECTS AND TEACHING ACTIVITIES



- Renovating and restructuring Unit operation Laboratories, which included
- Renovating the existing experiments and adding a new ones.
- Preparing a Laboratory manual and audiovisual instructional materials.
- Syllabus Preparation and delivering the course (Fall 2000)
- The outcomes is documented in a paper presented in the 2001 Science, Engineering, & Technology Education Conference Friday, January 5th, 2001
- Building a structured Curriculum for chemical engineering Department, Mutah University, August, 2009
- Building a coherent knowledge structure for chemical engineering undergraduate education
- Establishing a Transparent Learning Center as an incubator for the newly developed transparent learning theory

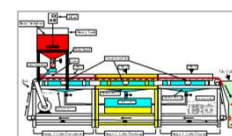
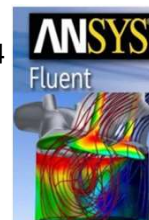


B- Research Experience

19 Ys

CURRENT & PREVIOUS GRANT SUPPORT

1. Fluent research grant: (Fluent Company) (\$100,000) 2003-2004
2. Phosphogypsum Treatment Process- Ministry of higher education research Fund (52,400 JDs)
3. Utilizing biochar for sustainable agriculture and water resources management in Jordan: Jordan valley as a pilot site SRTD II fund(25,000 Euro)

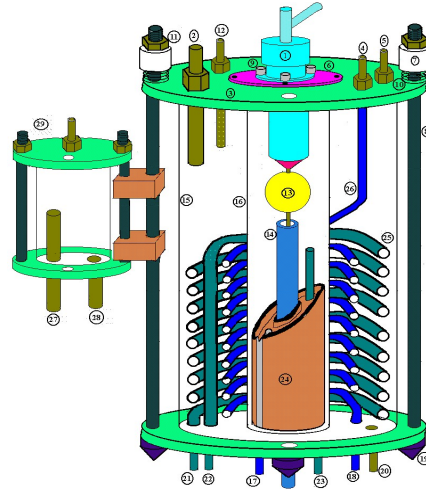
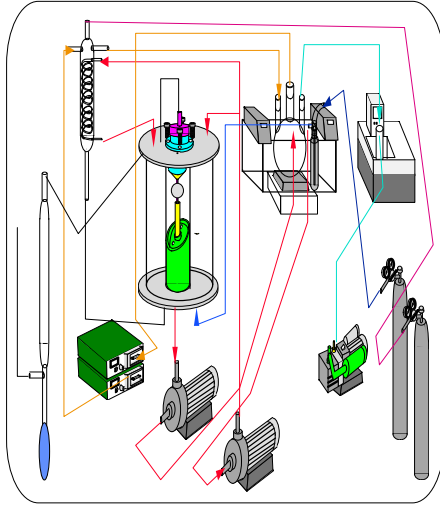


B- Research Experience



Diffusion Coefficient Measurement Research

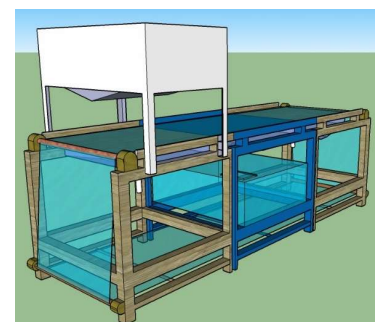
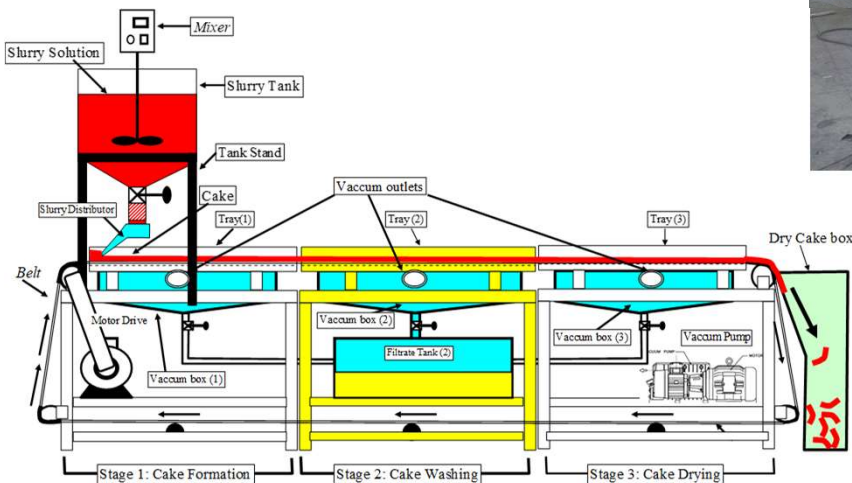
The main objective of this research was to measure diffusion coefficients of CO_2 , in protonated DEA and MEA aqueous solutions using wetted sphere absorber. The method used for diffusivity measurement was protonation method where MEA and DEA solutions were protonated by hydrochloric acid to eliminate their reactivity before gotten in contact with CO_2 gas. This required the design, assembly, and erection of a wetted sphere apparatus. The apparatus and the experimental technique were tested by carrying out some initial experiments with the well-known system CQ-H20. An average value of the diffusion coefficient of CO_2 in water at 25°C was calculated to be $1.88 \times 10^{-5} \text{ cm}^2/\text{s}$. This value is in good agreement with values published in the literature.



Phosphogypsum Beneficiation Process by using Horizontal Vacuum Belt Filter Design

Beneficiation and Utilization of Jordanian Phosphogypsum for the use in local market. In this research project has four research tasks:

1. Mitigation of P_2O_5 in Jordanian Phosphogypsum
2. Mitigation of F in Jordanian Phosphogypsum
3. Improved process for the purification of Phosphogypsum
4. Utilization of Phosphogypsum in the cement Industry



E- Innovation And Entrepreneurship Experiences

18 Ys



Aliedeh, M. A., developed over a long educational and academic experience a new innovative approach that is called **Transparent Thinking Approach (TTA)** (Aliedeh, M. A., 2015a, b, c, 2016, 2017 and 2018). **TTA** is a new innovative educational reform approach that aims to affect a change in thinking styles of learners and teachers while seeking to enhance their learning and teaching skills. **TTA** conceptual framework is built out of a core that can be extended and expanded to accommodate wide spectrum of content knowledge and skills in almost all field and domains. In addition, **TTA** can be easily diffused locally, nationally and internationally.

Most Recent Professional Development Activities



1. WISE 2021 “Discuss it” Session that is entitled “Transparent Thinking Approach (TTA) Solution Factory as an Incubator for Educational Reform”, Qatar Foundation, WISE Platform, Dec. 2021
2. Transparent Learning Workshop, Creativity Club, Karak, Jordan (March 2016)
3. Transparent Thinking Approach (TTA) Seminar, Tafelah University, Jordan (March 2015)
4. Transparent Thinking Approach (TTA) Seminar, Tafelah University, Jordan (March 2015)
5. Transparent Thinking Approach (TTA) Seminar, Tafelah University, Jordan (November 2015)
6. Transparent Thinking Approach (TTA) Seminar, Mutah University, Jordan (April 2016)

Skills

Languages

Arabic (mother tongue) English (excellent)

Software

Fluent CFD Package, Mathcad, Minitab, MS Office (Word, Excel, PowerPoint, Access), PhotoShop, SigmaPlot,



Special Aptitudes And Skills Acquired

- Adopting Transparent Thinking Approach approach
- Deep thinking and thorough analysis result in problem solving ability.
- Special Teaching Style represented by an excellent Ability to bridge the gap between abstract and living notions.
- Ability of ideas generation and formulation.
- Desire to continuously improve myself by learning new skills.
- Patience, hard working, and keeping track on distant goal.



Publications

1. **Aliedeh, M. A.** , Salah H. Aljbour , Adnan M. Al-Harashsheh , Kamel Al-Zboon , Sura Al-Harashsheh, (2021) Implementing 2^{4+1} Fractional Factorial Design For Filling The Gaps In Ovat Sorption Studies Of Nitrate Ions Onto Jordanian Zeolitic Tuff , Journal of Chemical Technology and Metallurgy, 56, 2, 2021.
2. **Aliedeh, M. A.** and Nabeel A. Jarrah (2012) “Application of Full Factorial Design to Optimize Phosphogypsum Beneficiation Process (P₂O₅ Reduction) By Using Sulfuric and Nitric Acid Solutions” Sixth Jordanian International Chemical Engineering Conference, Amman, Jordan, March 2012.
3. **Aliedeh, M. A.** (2018) “Factorial Design Study Of P₂O₅ Reduction For Jordanian Phosphogypsum Using Sulfuric And Nitric Acids Solutions” Journal of Chemical Technology and Metallurgy, 53, 3, 2018, 437-450.
4. **Aliedeh, M. A.** (2018) “Avoiding Being Trapped in False Analogical Modeling of Composite Wall Thermal Resistance” Jordanian Journal of Engineering and Chemical Industries (JJECI), Vol. 1, Issue 2, August 2018.
5. **Aliedeh, M. A.** (2019) “Optimizing the Performance of Pilot Vacuum Belt Filter (VBF) for P₂O₅ Reduction of Jordanian Phosphogypsum (PG)” ” Jordanian Journal of Engineering and Chemical Industries (JJECI), Accepted February 24th, 2019.
6. Aljbour, S. H., Al-Harashsheh, A. **M., Aliedeh, M. A.**, Al-Zboon, K., & Al-Harashsheh, S. (2016). Phosphate removal from aqueous solutions by using natural Jordanian zeolitic tuff. Adsorption Science & Technology, 35(3-4), 284-299
7. Mohawesh, O., Timothy Coolong, **Mohammad Aliedeh**, Samer Qaraleh “Greenhouse Evaluation of Biochar to Enhance Soil Properties and Plant Growth Performance Under Arid Environment” Bulgarian Journal of Agricultural Science, 24 (No 6) 2018, 1012–1019.
8. Richard L. Long, Asem Al Jarrah, **M. A., Aliedeh**, "Interfacial Area Concentration Transport Computed from a Length Scale Limited Interfacial Area Transport Balance Equation" North American Mixing Forum (06) November 2005.
9. Mousa K. Abu-Arabi, Asem M. Al-Jarrah, **M. A., Aliedeh**, and A. Tamimi “Physical Solubility and Diffusivity of CO₂ in Aqueous Diethanolamine Solutions” Journal of Chemical and Engineering Data. Accepted Dec. 15, 2000.
10. **Aliedeh, M. A.** Steve Yarbrow, and Richard Long, “Application of new interfacial area equation to multidimensional flow problems” Poster presentation on Mixing XVIII, 18th Biennial Conference on mixing, Pocano Manor, Pennsylvania, June 24-29, 2001.
11. **Aliedeh, M. A.** (2015a) “Call from the south for Transparent Higher Education (THE) Part 1: Transparent Thinking Approach (TTA) Core Conceptual Framework” Journal of Higher Education Theory and Practice (JHETP), 15(5), (2015a).
12. **Aliedeh, M. A.** (2015b) “Call from the south for transparent higher education (THE) Part 2: Extended Transparent Thinking Approach (TTA) Conceptual Framework” Journal of Higher Education Theory and Practice (JHETP), 15(6) (2015b).
13. **Aliedeh, M. A.** (2015c) “Call from the south for transparent higher education (THE) Part 3: Expanded Transparent Thinking Approach (TTA) Conceptual Framework and its Applications in Math, Science, and Engineering Education” Journal of Higher Education Theory and Practice (JHETP), 15(7) (2015c).



Publications

14. **Aliedeh, M. A.** (2016) “Customizing Transparent Thinking Approach (TTA) by Building and Implementing TTA Toolboxes: Paving the Road for TTA Operationalization Phase” *Journal of Higher Education Theory and Practice (JHETP)*, 16(5), 80-108 (2016)
15. **Aliedeh, M. A.** (2017) “Tasting the Fruits” of Transparent Thinking Approach (TTA) by Developing and Validating a TTA-Based Solution Concentration Teaching-Learning Sequence (TLS): The “Kick-Off” of TTA Operationalization Phase” *Journal of Higher Education Theory and Practice (JHETP)*, 17(3), 11-44 (2017).
16. **Aliedeh, M. A.** (2018) “Building an Integrative Framework for Transparent Thinking Approach (TTA) Solution: Calling for Collaboration in Putting TTA Factory into Educational Production” *Journal of Higher Education Theory and Practice (JHETP)*, 18(1), 103-140 (2018).
17. **Aliedeh, M. A.** and H. Aliedeh, (2018) “**Curricular Exemplars:** Implementation of the Generic Solution of Transparent Thinking Approach (TTA) in Medical Education”, *Innovations in Medical Education Conference -IME 2018*, 22-23 February 2018.
18. **Aliedeh, M. A.** and S Aliedeh, (2018) “**Interactive Workshop:** Putting the Generic Solution of Transparent Thinking Approach (TTA) in Instructional Material Production” *International Conference on Thinking (ICOT 18)*, May 16-20, 2018.
19. **Aliedeh, M. A.** and A. Aliedeh, (2018) “**Interactive Workshop:** Implementation of the Generic Solution of **Transparent Thinking Approach (TTA)** in Mathematics Education” *SIAM Conference on Applied Mathematics Education (ED18)*, Portland, Oregon, USA, July 9-13, 2018.
20. **Aliedeh, M. A.** and A. Aliedeh, (2018) “**Interactive Workshop:** Implementation of the Generic Solution of Transparent Thinking Approach (TTA) in Mathematics Education” *Canadian Undergraduate Mathematics Conference, University of Saskatchewan*, JULY 11-15, 2018.
21. **Aliedeh, M. A.** and H. Aliedeh, (2019) “**Conference Workshop:** Developing Transparent Thinking Approach (TTA) - Based Medical Enhanced Ebooks (MEEB’s)” *Innovations in Medical Education Conference- IME 2019*, 23-24 February 2019.
22. **Mohammad A. Aliedeh**, “Building Knowledge Map for Chemical Engineering Curriculum,” paper presented in the 24th Arabic Engineering Conference, Amman, Jordan. May 14th, 2007.
23. **Mohammad Aliedeh**, “ChE 422L Laboratory Manual,” Chemical Engineering Department, NMSU, NM, Aug. 2001.
24. **Mohammad A. Aliedeh**, “Knowledge-Structured Instructional Material Establishes and Enhances Students’ Learning and Problem Solving Abilities,” paper presented in 2001 Science, Engineering, & Technology Education Conference Friday, January 5th, 2001. This paper can be downloaded in pdf format at http://spacegrant.nmsu.edu/conference/2001/Papers/M_Aliedeh.pdf
25. **Mohammad A. Aliedeh**, Charles L. Johnson, and Richard Long, “Structuring Unit Operation Laboratory Curriculum Based on EC2000 Criteria,” paper presented in 2001 Science, Engineering, & Technology Education Conference Friday, January 5th, 2001. This paper can be downloaded in pdf format at <http://spacegrant.nmsu.edu/conference/2001/Papers/Aliedeh.pdf>.
26. **Mohammad A. Aliedeh**, and Naif A. Darwish, “Open Learning in the Digital Age and the Role of Communication Skills in Bridging the Gap Between the Educator and the Learner” paper presented in Distance Education and the Role of Information and Telecommunication Technology Conference, Amman, Jordan. 10-12th of April. 1999.
27. **Mohammad A. Aliedeh**, “Structured Chemical Engineering Curriculum for New Global Chemical Engineering Order,” paper presented in AIChE Rio Grande Local Section. Jan 13, 2000