

Ziad Abu El-Rub, Ph.D.

Dean, School of Applied Medical Sciences | Associate Professor of Pharmaceutical and Chemical Engineering
German Jordanian University, Amman, Jordan

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[Google Scholar](#) | [ResearchGate](#) | [LinkedIn](#)

ACADEMIC PROFILE

Associate Professor of Pharmaceutical and Chemical Engineering and Dean of the School of Applied Medical Sciences at the German Jordanian University. His academic profile combines research in sustainable chemical and energy systems, applied engineering education, externally funded international projects, and institutional academic leadership. His work spans biomass gasification, catalytic tar removal, natural mineral catalysts, renewable energy systems, oil shale characterization, digital learning, micro-credentials, and university-industry collaboration.

SELECTED ACADEMIC METRICS

- Peer-reviewed journal articles: 18 | Book manuscript: 1 under submission | Selected conference papers and presentations: 25+
- Google Scholar citations: approximately 2,000 | h-index: 12
- Externally funded and institutional projects: active and completed projects exceeding USD/EUR 1.5M in total value, including GIZ, DAAD, Erasmus+, and institutional grants
- Teaching portfolio: 15+ undergraduate and postgraduate courses in chemical, pharmaceutical, and applied engineering
- Graduate and student research development: MSc supervision and examination, BSc research supervision, award-winning graduation projects, and contribution to building a recently established MSc program

ACADEMIC APPOINTMENTS

2025-Present	Dean, School of Applied Medical Sciences, German Jordanian University, Jordan
2024-Present	Associate Professor, Pharmaceutical and Chemical Engineering Department, German Jordanian University, Jordan
2024-2026	Director, Center for E-Learning and Academic Performance Improvement (CeLAPI), German Jordanian University, Jordan
2024-2025	Vice Dean, School of Applied Medical Sciences, German Jordanian University, Jordan
2025-2026	Coordinator, DAAD Online GATE Program for the Pre-Year, German Jordanian University, Jordan
2022-2024	Associate Professor, Chemical Engineering Department, American University of the Middle East (AUM), Kuwait
2021-2023	Associate Professor, Pharmaceutical and Chemical Engineering Department, German Jordanian University, Jordan
2020-2022	Acting Department Head, Pharmaceutical and Chemical Engineering Department, German Jordanian University, Jordan
2016-2020	Dean Assistant for Industrial Relations, School of Applied Medical Sciences, German Jordanian University, Jordan
2012-2021	Assistant Professor, Pharmaceutical and Chemical Engineering Department, German Jordanian University, Jordan
2020	Train the Trainer, Beuth Hochschule fuer Technik Berlin, Germany

EDUCATION

2002-2007	Ph.D. in Chemical Engineering, University of Twente, the Netherlands Dissertation: Biomass char as an in-situ catalyst for tar removal in gasification systems Supervisor: Prof. Gerrit Brem
2000-2002	Master of Technological Design, University of Twente, the Netherlands Thesis: High-temperature catalytic tar removal from producer gas of biomass-fueled gasifiers
1993-1998	B.Sc. in Chemical Engineering, University of Jordan, Jordan Thesis: Plant design for biogas production from Amman municipal solid waste GPA: 3.48/4.00 Rank: 3rd

RESEARCH PROFILE

Research positioning: Dr. Abu El-Rub's research focuses on sustainable chemical and energy systems, particularly catalytic conversion processes for biomass gasification, tar removal, and low-cost natural mineral catalysts. His earlier work established a recognized research line on biomass char and catalytic tar elimination, while his recent work extends this line into natural zeolites, kaolinite, oil shale-derived materials, renewable-energy systems, membrane-related applications, and applied sustainability technologies. A parallel academic development track addresses AI-enabled learning, micro-credentials, and digital transformation in applied higher education.

Current Research Agenda

- Advance catalytic tar removal using biomass char, natural zeolite, kaolinite, and low-cost Jordanian minerals.

- Strengthen applied research on sustainable energy systems, oil shale characterization, renewable technologies, and circular materials.
- Develop externally funded applied research and capacity-building projects that connect engineering education, employability, and international labour-market readiness.
- Translate digital learning, AI, and micro-credential frameworks into institutional academic transformation models.

Research Interests

- Biomass gasification, catalytic tar removal, and biomass char catalysis
- Low-cost natural mineral catalysts, zeolites, kaolinite, and oil shale-derived materials
- Renewable and sustainable energy systems, including solar chimney power plants and phase change materials
- Oil shale pyrolysis, thermogravimetric analysis, kinetics, and material characterization
- Membrane-based wastewater treatment and separation technologies
- AI, digital learning, micro-credentials, and transformation of higher education

PUBLICATIONS

Peer-reviewed Journal Articles

1. Abu El-Rub, Z., Nassar, N., Shuqum, N., & Al-Juaniadi, R. (2025). Recycling technologies for lithium-ion batteries in electric vehicles: A critical review. *Jordanian Journal of Engineering and Chemical Industries*, 8(2), 176-190.
2. Abdelsalam, E., Abu El-Rub, Z., Alkasrawi, M., Ibrahim, D., Azzam, A., Salameh, T., & Abdul Ghani. (2023). A novel design of a twin-chimney solar power plant for power and distilled water production. *Thermal Science and Engineering Progress*, 46, 102231.
3. Abu El-Rub, Z., Halawa, D., Alqudah, I., Nasr, A., & Naqvi, M. (2023). Natural zeolite catalyst for tar removal in biomass gasification systems: Kinetics and effectiveness evaluation. *Fuel*, 346, 128393.
4. Abu El-Rub, Z., Abu Hassan, R., Alnajjar, R., & Alkasrawi, M. (2022). Kinetics of natural kaolinite as a catalyst for toluene dry reforming. *Jordanian Journal of Engineering and Chemical Industries*, 5(3), 71-77.
5. Al-Gharabli, S., Abu El-Rub, Z., Hamad, E. M., Kujawski, W., Flanc, Z., Pianka, K., Jankowski, W., & Kujawa, J. (2022). Toward anti-fouling properties and enhanced performance in separation process: Carbon nanotubes-PVDF hybrids. *Applied Surface Science*, 602, 154341.
6. Khanfar, M. F., Kopti, T. S., Gharaibeh, N. O., & Abu El-Rub, Z. (2021). Differential pulse voltammetry as an alternative method for tracking hydrochlorothiazide electrolytic degradation. *Jordanian Journal of Engineering and Chemical Industries*, 4(3), 70-77.
7. Al-Gharabli, S., Abu El-Rub, Z., Hamad, E. M., Kujawski, W., Flanc, Z., Pianka, K., & Kujawa, J. (2021). Surfaces with adjustable features: Effective and durable materials for water desalination. *International Journal of Molecular Sciences*, 22, 11743.
8. Hamad, E. M., Khaffaf, A., Yasin, O., Abu El-Rub, Z., Al-Gharabli, S., Al-Kouz, W., & Chamkha, A. (2021). Review of nanofluids and their biomedical applications. *Journal of Nanofluids*, 10, 463-480.
9. Tawalbeh, M., Al-Othman, A., Salameh, T., Alkasrawi, M., Martis, R., & Abu El-Rub, Z. (2021). A critical review on metal-based catalysts used in the pyrolysis of lignocellulosic biomass materials. *Journal of Environmental Management*, 299, 113597.
10. Abu El-Rub, Z., Kujawa, J., & Al-Gharabli, S. (2020). Pyrolysis kinetic parameters of Omari oil shale using thermogravimetric analysis. *Energies*, 13(16), 1-13.
11. Abu El-Rub, Z. (2019). TGA and BET characterization of spent oil shale as a catalyst in biomass tar removal applications. *International Journal of Smart Grid and Clean Energy*, 8(6), 680-687.
12. Abu El-Rub, Z., Kujawa, J., Albarahmiah, E., Rifai, N., Qaimari, F., & Al-Gharabli, S. (2019). High throughput screening and characterization methods of Jordanian oil shale as a case study. *Energies*, 12(16), 3148.
13. Abu El-Rub, Z., Bramer, E., Al-Gharabli, S., & Brem, G. (2019). Impact of char properties and reaction parameters on naphthalene conversion in a macro-TGA fixed char bed reactor. *Catalysts*, 9, 307.
14. Al-Gharabli, S., Hamad, E. M., Saket, M., Abu El-Rub, Z., Arafat, H., Kujawski, W., & Kujawa, J. (2018). Advanced material: Ordered nanotubular ceramic membrane covalently capped with single wall carbon nanotubes. *Materials*, 11(5), 739.
15. Al-Gharabli, S., Kujawski, W., Abu El-Rub, Z., Hamad, E. M., & Kujawa, J. (2018). Enhancing membrane performance in removal of hazardous VOCs from water by modified fluorinated PVDF porous material. *Journal of Membrane Science*, 556, 214-226.
16. Abu El-Rub, Z., Brem, G., & Bramer, E. A. (2015). Single char particle model for naphthalene reduction in a biomass gasification system. *Biomass and Bioenergy*, 72, 19-27.
17. Abu El-Rub, Z., Bramer, E. A., & Brem, G. (2008). Experimental comparison of biomass chars with other catalysts for tar reduction. *Fuel*, 87(10-11), 2243-2252.
18. Abu El-Rub, Z., Bramer, E. A., & Brem, G. (2004). A review of catalysts for tar elimination in biomass gasification processes. *Industrial & Engineering Chemistry Research*, 43, 6911-6919.

Book Manuscript

Abu El-Rub, Z., & Al-halhouli, A. *The Smart University: A Handbook for Higher Education in the Age of AI*. Under submission.

Invited Keynotes and Talks

- Abu El-Rub, Z., & Khalifeh, A. (2025). From Experiment to Strategy: A University-Wide Model for Ethical Generative AI Integration in Smart Learning. Keynote speech, IEEE SCME 2025, Hebron, Palestine, delivered online.

Selected Conference Papers and Presentations

- Abu El-Rub, Z. (2018). Characterization of a spent-oil shale as a catalyst for tar removal. 3rd International Conference on New Energy and Applications, Singapore.
- Abu El-Rub, Z., Kähler, B., & Al-Khatib, J. (2017). University-industry collaboration: A case study from the German Jordanian University. 3rd MENA Higher Education Leadership Forum, Dubai, UAE.
- Abu El-Rub, Z., Bramer, E. A., & Brem, G. (2016). Parameters affecting the removal of naphthalene over fixed biomass char bed. Venice 2016, Sixth International Symposium on Energy from Biomass and Waste, Venice, Italy.
- Abu El-Rub, Z., Bramer, E. A., & Brem, G. (2015). Real tar removal over fixed bed of biomass char. 23rd European Biomass Conference and Exhibition, Vienna, Austria.
- Abu El-Rub, Z., Bramer, E. A., & Brem, G. (2004). Modeling of tar reduction in biomass gasification using biomass char as a catalyst. Science in Thermal and Chemical Biomass Conversion, Victoria, Canada.
- Abu El-Rub, Z., Bramer, E. A., & Brem, G. (2002). Removal of naphthalene as the model tar compound on calcined dolomites, olivine and commercial nickel catalyst in a fixed bed tubular reactor. 21st European Conference for Energy, Industry and Climate Protection, Amsterdam, the Netherlands.

Public Scholarship and Academic Commentary

Author of opinion and analysis articles on higher education, AI, university rankings, vocational education, micro-credentials, and academic development in Talaba News. Full list available upon request.

RESEARCH GRANTS AND FUNDED PROJECTS

Funding summary: Active and completed externally funded and institutional projects exceed USD/EUR 1.5M in total value. Major funders include GIZ, DAAD, Erasmus+, and German Jordanian University institutional research funds.

PI, Lead, or Institutional Leadership Roles

2025-2026	Empowering Jordanian Candidates for the International Labour Market (EJIM), GIZ, Principal Investigator, budget: EUR 516,568
2026-2027	Syrian Innovation in Academia (Pilot) (SyrIA), DAAD, Subproject Lead for Digitization (M/A5), GJU budget: EUR 800,000
2026-2028	International Network for Future Universal Skills Education (INFUSE), DAAD, GJU Expert for Micro-Credentials/Institutional Lead, implementation support and mobility funding
2016-2019	Elimination of tar produced from biomass gasification using Jordanian low-cost mineral catalysts, German Jordanian University, Principal Investigator, USD 100,000
2015-2018	Vocational Training Center for undergraduate university students and teachers in Jordan, Erasmus+, GJU Coordinator, total budget: USD 783,000

Team Member or Academic Expert Roles

2024-2027	Bologna for Science Education in Palestine and Jordan (BASE), Erasmus+ CBHE, Senior Researcher/GJU Team Member, GJU budget: EUR 80,000
2026-2029	FRME: Fostering Resilient Academic Systems through Micro-Credentials and Recognition of Prior Learning for Employability, Erasmus+ CBHE Strand 3, Principal Investigator, GJU budget: EUR 100,000, submitted/pending
2026-2029	NOURISH: Collaborative Industry-Based Curriculum for Interdisciplinary Innovation in Nutrition, Agriculture, and Nutraceuticals, Erasmus+ CBHE, Senior Researcher/GJU Team Member, GJU budget: EUR 100,000, submitted/pending
2026-2029	PURE: Developing an Innovative Vocational Diploma in Natural Cosmetics and Green Entrepreneurship in Higher Education, Erasmus+ CBHE, Academic Expert/GJU Team Member, GJU budget: EUR 83,000, submitted/pending

Selected Student-Linked and Institutional Research Projects

2015-2016	Experimental and economic evaluation of a designed machine for converting waste cooking oil into biodiesel, KADDB and KAFD, BSc project supervisor, USD 7,000
2017-2019	Investigation of the effect of heating rates on BET surface area of Jordanian minerals, German Jordanian University, BSc project supervisor, USD 700
2021-2022	Kinetics of toluene dry reforming reaction using Jordanian zeolite as a catalyst, German Jordanian University, BSc project supervisor, USD 850

GRADUATE SUPERVISION, EXAMINATION, AND STUDENT RESEARCH DEVELOPMENT

Institutional context: The Pharmaceutical and Chemical Engineering Department at GJU does not currently offer a PhD program. The MSc program was established only recently; therefore, graduate research supervision is represented through MSc thesis supervision and examination, BSc research projects, student research outputs, and contribution to building graduate research capacity within a young MSc program.

MSc Thesis Supervision

- Esraa Alsaleh, Optimization of Low-Cost Jordanian Minerals as Catalysts for Enhanced Tar Removal in Biomass Gasification Systems, Pharmaceutical and Chemical Engineering Department, German Jordanian University, Oct. 2024-June 2026.
- Mathijs Snippert, Characterization of biomass char as a catalyst for tar reduction in a fixed bed reactor, Thermal Engineering Laboratory, University of Twente, 2004.
- Jorke Jellema, Catalytic Tar Reduction from Biomass Gasification Gas using Wood Char as a Catalyst, Thermal Engineering Laboratory, University of Twente, 2003.

MSc Thesis Examination

- Mays Ababneh, Melting Behavior of Phase Change Material During Heating and Cooling Processes, Chemical Engineering, Jordan University of Science and Technology, 2025.
- Hamzeh Al-Omari, Olive mill wastewater treatment using membrane technology, Chemical Engineering, Jordan University of Science and Technology, 2019.
- Fadi Alrawash, Treatment of olive mill wastewater using membrane distillation, Chemical Engineering, Jordan University of Science and Technology, 2019.

BSc Research Supervision and Student Outcomes

- Supervised multiple BSc graduation projects in catalysis, biomass energy, biodiesel production, oil shale, renewable energy, and applied chemical engineering.
- Supervised or supported award-winning graduation projects recognized by the Jordan Engineers Association, Amman Chamber of Industry, and AUM Innovation Fair.
- Supported student research development through project-based learning, funded BSc projects, industrially linked graduation projects, and research-oriented laboratory work.

TEACHING EXPERIENCE

Courses Taught

- Core Chemical Engineering: Chemical Reaction Engineering; Fluid Mechanics for Chemical and Medical Engineers; Principles of Chemical Engineering; Chemical Engineering Economics; Separation Processes Lab
- Design, Practice, and Industry: Pharmaceutical Plant Design; Industrial Processes Management; Graduation Project I; Graduation Project II; Design and Analysis of Processing Systems; Introduction to Oil and Gas Production; Shale Oil Production Processes
- Laboratories and Simulation: Fluid, Heat and Reaction Engineering Lab; Chemical Engineering Lab; Aspen HYSYS Simulation; General Chemistry and Lab
- Professional Skills and Innovation: Technical Writing; Transforming Ideas to Innovation I; Chemical Engineering Sophomore Seminar; Introduction to Pharmaceutical and Chemical Engineering

Teaching Innovation and Digital Learning

- Led institutional initiatives related to e-learning, academic performance improvement, digital course development, and professional video-based learning through CeLAPI.
- Contributed to university-wide initiatives on AI integration, micro-credentials, recognition of prior learning, and blended learning models.
- Developed and improved course materials, question banks, simulation-based activities, and project-based learning approaches in chemical engineering.

ACADEMIC LEADERSHIP, PROGRAM DEVELOPMENT, AND ACCREDITATION

- Dean, School of Applied Medical Sciences, with academic leadership responsibilities across Biomedical Engineering and Pharmaceutical and Chemical Engineering programs.
- Led or contributed to development of the MSc program in Pharmaceutical and Chemical Engineering and the BSc Dual Study track.
- Led departmental work related to ASIIN accreditation and contributed to study plan development, quality assurance, and academic performance improvement.
- Led CeLAPI initiatives on e-learning, faculty support, course digitization, AI in teaching and learning, and academic performance improvement.
- Principal Investigator of the GIZ-funded EJIM project, connecting applied education, labour mobility, employability, and international labour market readiness.
- Contributed to institutional frameworks related to micro-credentials, recognition of prior learning, and digitally supported academic transformation.

UNIVERSITY SERVICE

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| 2024-Present | Member, Students Evaluation of Teaching Committee, German Jordanian University |
| 2024-Present | Head, University Regulations Committee, German Jordanian University |

2024-2025	Member, University Council, German Jordanian University
2021-2022	Member, Study Plan Committee, BSc Pharmaceutical and Chemical Engineering Program, GJU
2020-2022	Member, Committee for Establishing MSc Program in Pharmaceutical and Chemical Engineering, GJU
2018-2021	Head, General Safety Committee, School of Applied Medical Sciences, GJU
2015-2018	GJU Coordinator, VTC Erasmus+ Project
2016-2021	Head, GJU Industrial Relations Committee
2014-2022	Liaison Officer, GJU Training Center
2014-2020	Graduation Projects Coordinator
2013-2014	Member, German Jordanian University Council
2023-2024	Head, Labs Committee, Chemical Engineering Department, AUM
2023	Head, Green Energy Club, AUM

HONORS AND RECOGNITION

2024	Third Place Award for Outstanding Graduation Projects in Chemical Engineering, AUM Innovation Fair, Kuwait
2019	Distinguished Industrial Professor Award of Excellence, German Jordanian University
2018	Best Presentation Award, 3rd International Conference on New Energy and Applications, Singapore
2017	Second Prize, Industrial Graduation Projects Competition, Chemical Engineering, Jordan Engineers Association and Amman Chamber of Industry
2017	Certificate of Excellence for Distinguished Academic Performance, German Jordanian University
2016	First Prize, Graduation Projects Competition, Chemical Engineering, Jordan Engineers Association and Amman Chamber of Industry
2016	Certificate of Excellence for Distinguished Academic Performance, German Jordanian University
2013-2016	Industrial Experience Allowance Award, German Jordanian University

PROFESSIONAL ACTIVITIES AND SERVICE TO THE PROFESSION

Editorial and Reviewing Activities

- Editorial Board Member, Jordanian Journal of Engineering and Chemical Industries, 2024-Present.
- Journal reviewer for Industrial & Engineering Chemistry Research, Energy & Fuels, Fuel Processing Technology, Biofuels, Thermal Science and Engineering Progress, and Jordanian Journal of Engineering and Chemical Industries.

Conference and Professional Service

2023	Member, International Advisory Board, 3rd BAU International Oil Shale Conference, Amman, Jordan
2018, 2021	Member, Technical Program Committee, International Conference on New Energy and Applications; Member, Organizing Committee, International Oil Shale Conference
2013-2014	Vice President, Preparatory Committee, 7th Jordan International Chemical Engineering Conference, Amman, Jordan
2013	Chair, Workshop Oil Shale in Jordan: Reality, Potential, and Limitations, Jordan Engineers Association, Amman, Jordan
2012	Steering Committee Member, 2nd Annual Global Sand Management and Control Workshop, Dubai, UAE
2011	Steering Committee Member, 4th Annual Global Produced Water Management Workshop, Istanbul, Turkey
2018-2021	Board Member, Chemical Engineering Division, Jordan Engineers Association
2016-2017	Head, JEA Branches Committee for Workshops, Jordan Engineers Association
2016-2022	Advisory Board Member, Engineering Training Center, Jordan Engineers Association
2015-2018	Board Member, Chemical Engineering Division, Jordan Engineers Association
2013-2015	Head, Chemical Engineering Scientific Committee, Jordan Engineers Association
2014-Present	Advisory Board Member, Chemical Engineering Department, Jordan University of Science and Technology

INDUSTRY EXPERIENCE

2011-2012	Regional Manager for the Middle East and North Africa, ASCOM Separation Company, the Netherlands Led technical sales, process design, and qualification of separation technologies for crude oil, water, gas, and sand applications in the MENA region.
2007-2010	Business Development Manager, PetroLink Holding Company, Kuwait Managed technical and commercial studies for energy and petrochemical projects, including a proposed USD 120 million PET plant in Kuwait.
1998-1999	Quality Control Manager, National Paints Factories, Jordan Managed quality control laboratories and implemented testing procedures to support product quality and compliance.

LICENSES AND CERTIFICATIONS

2025	Certified Quality Evaluator, Higher Education Institutions Accreditation and Quality Assurance Commission, Jordan
2018	Consultant Engineer in Chemical Engineering, Jordan Engineers Association
2015	Professional Engineer in Bioenergy Engineering, Jordan Engineers Association

PROFESSIONAL MEMBERSHIPS

2006-Present	Jordan Engineers Association
2009	Society of Petroleum Engineers

LANGUAGES AND SKILLS

- Languages: Arabic, native; English, fluent; Dutch, basic; German, basic.
- Engineering software: Aspen Plus, Aspen HYSYS.
- Digital and productivity tools: Microsoft Office, Microsoft Project, Microsoft Visio, Moodle, Microsoft Teams, and digital learning platforms.

REFERENCES

Available upon request.