

Sanaa Saad Abdulaziz AlAbbad

Assistant Professor

Personal Data

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https://scholar.google.com.tw/citations?user=jF6kR_gAAAAJ&hl=en
 ResearcherID :A-3749-2019
 ScopusID: 57209296456

Language Proficiency

| Language | Read | Write | Speak |
|----------|-----------|-----------|-----------|
| Arabic | Excellent | Excellent | Excellent |
| English | Excellent | Excellent | Excellent |
| Others | | | |

Academic Qualifications (Beginning with the most recent)

| Date | Academic Degree | Place of Issue | Address |
|------|------------------|------------------------|----------------------|
| 2018 | PhD in Chemistry | University of Montana | Missoula, MT, USA |
| 2007 | MS in Chemistry | King Faisal University | Dammam, Saudi Arabia |
| 2001 | BS in Chemistry | College of Science | Dammam, Saudi Arabia |

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

| | |
|--------|--|
| PhD | Quantum Mechanics Investigation of the Photophysical Properties of Ruthenium(II)-Based Complexes Combined with the Development of their Force Field Parameters Using Molecular Mechanics and Molecular Dynamics Simulation |
| Master | Computational Study of Structural Stability, Rotational Barriers and Vibrational Analyses of Some Carboxylic Acids |

Professional Record: (Beginning with the most recent)

| Job Rank | Place and Address of Work | | | Date |
|---------------------|--|--|------------------------|-----------------------------|
| Assistant Professor | Department of Chemistry | Imam Abdulrahman bin Faisal University | Dammam, Saudi Arabia | December 2018– present |
| Lecturer | Department of Chemistry | Imam Abdulrahman bin Faisal University | Dammam, Saudi Arabia | March 2010 – 2018 |
| Research Assistant | Department of Chemistry and Biochemistry | University of Montana | Missoula, MT, USA | August 2012- August 2018 |
| Chemistry Teacher | High School | King Fahad University Petroleum and Minerals High School | Dhahran, Saudi Arabia | August 2005 – February 2010 |
| Chemistry Teacher | High School | Education Eligibility Schools | Alkhobar, Saudi Arabia | August 2001 – June 2004 |

Administrative Positions Held: (Beginning with the most recent)

| Administrative Position | Office | Date |
|---|--|--------------------------|
| Head of the chemistry department | Department of Chemistry – College of Science - IAU | August 2021– present |
| Member in the Standing Committee for Study Plans and Programs | IAU | May 2022- present |
| Member in the committee for reviewing and approving annual reports of programs in the IAU | IAU | August 2023- present |
| Vice Chairman | Department of Chemistry – College of Science - IAU | August 2020- August 2021 |

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 | Syeda Tasnim Quayum, Nusrat Jahan Ikbal Esha, Siam Siraji, Sanaa S Al Abbad, Zainab HA Alsunaidi, Mansour H Almatarneh, Shofiur Rahman, Abdullah N Alodhayb, Khuloud A Alibrahim, Sarkar MA Kawsar, Kabir M Uddin | Exploring the effectiveness of flavone derivatives for treating liver diseases: Utilizing DFT, molecular docking, and molecular dynamics techniques | MethodsX, 2024 |
| 2 | Mehnaz Hossain Meem, Sumaiya Binte Yusuf, Sanaa S Al Abbad, Shofiur Rahman, Mahmoud Al-Gawati, Hamad Albrithen, | Exploring the anticancer and antibacterial potential of naphthoquinone derivatives: a comprehensive | Frontiers in Chemistry, 2024 |

| # | Name of Investigator(s) | Research Title | Publisher and Date of Publication |
|---|---|--|--|
| | Abdullah N Alodhayb, Kabir M Uddin | computational investigation | |
| 3 | Md Shamim Hossain, Sanaa S Al Abbad, Zainab HA Alsunaidi, Shofiur Rahman, Abdullah N Alodhayb, Md Mainul Hossain, Raymond A Poirier, Kabir M Uddin | Evaluation of novel pyridoxal isonicotinoyl hydrazone (PIH) derivatives as potential anti-tuberculosis agents: An in silico investigation | International Journal of Quantum Chemistry, 2024 |
| 4 | Atiqa Labiba, Sanaa S Al Abbad, Shofiur Rahman, Abdullah N Alodhayb, Raymond A. Poirier, Kabir M Uddin | Investigating Baxdrostat and Its Derivatives as Aldosterone Synthase Inhibitors for Resistant Hypertension: An In Silico Approach | ChemistrySelect, 2024 |
| 5 | M Alsubaie, S Alabbad, A Ezzharani, F Jomni, H Kochkar, G Berhault | Ferroelectric-assisted Enhancement of the Photocatalytic Activity of g-C ₃ N ₄ /TiO ₂ Nanotubes Heterojunctions through the Addition of Strontium | Materials Research Society Spring Meeting 2023 |
| 6 | Muhammad Usman Khan, Faiza Shafiq, Sanaa S. Al Abbad, Junaid Yaqoob, Riaz Hussain, Zainab H. A. Alsunaidi, Ghulam Mustafa and Shabbir Hussain | Designing electron-deficient diketone unit based non-fused ring acceptors with amplified optoelectronic features for highly efficient organic solar cells: A DFT study | Molecules, 28, 3625 (2023) |
| 7 | Nuhad Abdullah Alomair, Nouf Saleh Al-Aqeel, Sanaa Saad Alabbad, Hafedh Kochkar, Gilles Berhault, Muhammad Younas, Fathi Jomni, Ridha Hamdi, and Ismail Ercan | The Role of the Ferroelectric Polarization in the Enhancement of the Photocatalytic Response of Copper-Doped Graphene Oxide–TiO ₂ Nanotubes through the Addition of Strontium | ACS Omega 2023, 8, 9, 8303–8319 |
| 8 | Almatarneh, Mansour; Kayed, Ghada; Al Abbad, Sanaa; Alsunaidi, Zainab; AlSheraideh, Mohammed; Zhao, Yuming | Mechanistic study on DNA mutation of the cytosine methylation reaction at C5 position | Arabian Journal of Chemistry, 15, 103956 (2022) |
| 9 | Al Omari, Rima; Almatarneh, Mansour; Alnajajrah, Asmaa; AlSheraideh, Mohammed; Al Abbad, Sanaa; Alsunaidi, Zainab | Thermal Degradation and Bimolecular Decomposition of 2-Ethoxyethanol in Binary Ethanol and Isobutanol Solvent Mixtures: Computational Mechanistic Study | ACS Omega, 6, 20, 13365–13374 (2021) |

| # | Name of Investigator(s) | Research Title | Publisher and Date of Publication |
|----|--|--|--|
| 10 | Sanaa AlAbbad, Tova Sardot, Oliko Lekashvili, Daniel Decato, Francesco Lelj, J.B. Alexander Ross, Edward Rosenberg | Trans Influence and Substituent Effects on the HOMO-LUMO Energy Gap and Stokes Shift in Ru Mono-Diimine Derivatives | Journal of Molecular structure, (1195), 620-631 (2019) |
| 11 | Badawi H.M., Al-Saadi A.A., Al-Khaldi M.A.A., Al-Abbad S.A., Al-Sunaidi Z.H.A. | Potential energy scans and vibrational assignments of cyclopropanecarboxylic acid and cyclopropanecarboxamide | Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, (71A), 1540–1546 (2008) |
| 12 | Badawi H.M., Al-Khaldi M.A., Al-Abbad S.S., Al-Sunaidi Z.H. | Rotational barriers in monomeric CH ₂ =CX–COOH and CH ₂ =CX–CONH ₂ (X is H or CH ₃) and vibrational analysis of methacrylic acid and methacrylamide. | Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, (68A) 432–442 (2007) |
| 13 | Badawi H.M., Al-Khaldi M.A., Al-Sunaidi Z.H.A., Al-Abbad S.S.A. | Conformational properties and vibrational analyses of monomeric pentafluoropropionic acid CF ₃ CF ₂ COOH and pentafluoropropionamide CF ₃ CF ₂ CONH ₂ | Canadian Journal of Analytical Sciences and Spectroscopy, (52), 252-269 (2007) |

Completed Research Projects

| # | Name of Investigator(s) (Supported by) | Research Title | Report Date |
|---|---|--|-------------|
| 1 | Modi Alsubaie, Sanaa AlAbbad, Hafedh Kochkar | Graphitic carbon nitride for assisted photocatalysis approach of strontium doped TiO ₂ nanotubes for degradation of organic pollutants in water | 2023 |
| 2 | Noof Saleh Alaqeel, Sanaa AlAbbad, Hafedh Kochkar | The Role of Strontium on the Enhancement of Photocatalytic Response of Cu-GO-TiO ₂ Nanotubes – Application in Formic acid Photodegradation under UV-A | 2022 |

Contribution to Scientific Conferences and Symposia

| # | Conference Title | Place and Date of the Conference | Extent of Contribution |
|----|---|--|---|
| 1 | the 2nd Laboratory Technical Exchange Forum - Aramco | Saudi Arabia, Aldhahran, 2023 | Attended |
| 2 | Molecular Simulation to Drive Materials Innovation | Launch Tech – Online, 2023 | Attended |
| 3 | The Sustainable Green Future in the Kingdom of Saudi Arabia (GIKS) | King Fahad of Petroleum and Minerals, 2023 | Attended |
| 4 | ACS Spring 2022 | SAN DIEGO, CA, USA (Virtual) – March, 20-24 2022 | Attended |
| 5 | The Second International Webinar on Science, Sustainable Development and Ecosystems in Saudi Arabia | IAU February 14-17, 2022 | Attended |
| 6 | Atomic Force Microscopy, Principle & Application”, presented by scientist Long Chen | the Surface Science Lab, which is part of the Imaging and Characterization Core lab at KAUST (April 8th, 2021) | Attended |
| 7 | Combustion Research towards Net- Zero Emissions Mobility and Power | the 10th Saudi Arabian Section of the Combustion Institute Annual event. SASCI, 2020 | Attended |
| 8 | Nanomaterials for Energy & Environmental Applications | Saudi Arabian International Chemical Sciences Webinar - Prof. Omar Yaghi Aug.2020 | |
| 9 | The 6 th annual CoBRE research Retreat | University of Montana, Missoula, MT (September 2017) | Theoretical analysis of the triplet excited states of ruthenium mono-diimine and bioconjugated complexes: Effects of trans ligands and ionization Sanaa AlAbbad: poster presentation |
| 10 | Department Seminar | University of Montana, Missoula, MT (January 2017) | Theoretical Investigation of the Charge Transport Mechanisms in Porphyrinic Zirconium Metal-Organic Frameworks Sanaa AlAbbad: oral presentation |
| 11 | American chemical society, Northwest | Oregon State University, Corvallis, OR (June 2016) | Theoretical analysis of the triplet excited states of ruthenium mono- |

| # | Conference Title | Place and Date of the Conference | Extent of Contribution |
|----|---|---|--|
| | Regional Meeting (NORM 2016) | | diimine and bioconjugated complexes: Effects of trans ligands and ionization Sanaa AlAbbad: poster presentation |
| 12 | The 5 th annual CoBRE research Retreat | University of Montana, Missoula, MT (September 2016) | Theoretical analysis of the triplet excited states of ruthenium mono-diimine and bioconjugated complexes: Effects of trans ligands and ionization Sanaa AlAbbad: poster presentation |
| 13 | American physical society, March Meeting 2016 | Baltimore, Maryland (March 2016) | Recent Advances in Density Functional Theory (DFT) and Applications to Chemical Physics Attendance and open discussion |
| 14 | The 4 th annual CoBRE research Retreat | University of Montana, Missoula, MT (September 2015) | Theoretical analysis of the triplet excited states of ruthenium mono-diimine and bioconjugated complexes: Effects of trans ligands and ionization Sanaa AlAbbad: poster presentation |
| 15 | Foundations of Molecular Modeling and Simulation (FOMMS 2015) | The Resort at the Mountain (Mt. Hood), Oregon (July 2015) | The Computational Molecular Science and Engineering Forum (CoMSEF) of the American Institute of Chemical Engineers (AIChE) and the AIChE Nanoscale Science & Engineering Forum Attendance and open discussion |
| 16 | American chemical society, Northwest Regional Meeting (NORM 2014) | The University of Montana, Missoula, MT (June 2014) | Theoretical Study of the Catalytic Mechanism of Mammalian Adenylyl Cyclase Sanaa AlAbbad: poster presentation |
| 17 | The 3rd annual CoBRE research Retreat | The University of Montana, Missoula, MT (September 2013) | Theoretical Study of the Catalytic Mechanism of Mammalian Adenylyl Cyclase Sanaa AlAbbad: poster presentation |

Membership of Scientific and Professional Societies and Organizations

- Saudi Chemical Society 2010-present
- Golden Key International Honor Society 2012-present
- American Chemical Society 2015-present
- American Physical Society 2015-present
- The Extreme Science and Engineering Discovery Environment (XSEDE) 2015-present

Teaching Activities

Undergraduate

| # | Course/Rotation Title | No./Code | Extent of Contribution (no. of lectures/Tutorials. Or labs, Clinics) |
|----|---|----------|--|
| 1 | General chemistry I | 203 | Lecture |
| 2 | General Chemistry II | 305 | Lecture |
| 3 | Thermodynamic chemistry | 306 | Lecture |
| 4 | Chemical kinetics and reaction mechanisms | 402 | Lecture |
| 5 | Research project | 508 | Lecture |
| 6 | Organic chemistry | | Lab |
| 7 | Introduction into analytical chemistry | | Lab |
| 8 | Instrumentals chemical analysis | - | Lab |
| 9 | General chemistry | - | Lab |
| 10 | Electrochemical chemistry | - | Lab |
| 11 | Physical chemistry 1 | 201 | Lecture |

Brief Description of Undergraduate Courses Taught: (Course Title – Code: Description)

General chemistry I- CHEM203: Chemical foundations, atoms, Molecules, and Ions, stoichiometry, types of chemical reactions and solution stoichiometry, atomic structure and periodicity, bonding: general concepts and covalent bonding: orbitals

General Chemistry II – CHEM305: General Chemistry II deals mainly with an introduction to the states of matter: solid, liquid and gaseous state, gas laws, and kinetic theory of gases. This course includes types of solutions, ideal and non-ideal solutions, and colligative properties, chemical and ionic equilibrium. Thermochemistry, energy changes in chemical reactions, acid-base equilibrium, buffer solutions as well.

Chemical kinetics and reaction mechanisms-CHEM402: Introduction to kinetics, the definition of reaction rates, factors that affect reaction rate, the reaction rate constant, law and order, activation energy, the temperature dependence of rate constants - Arrhenius equation, collision theory - transition state theory, zero, first, second, and third-order reactions, multiple order reactions- it's applications and methods of testing, analysis of kinetic results, parallel reactions, reversible reactions and equilibrium, consecutive reactions, chain reactions and complex reaction mechanisms.

Thermodynamic chemistry- CHEM306: Introduction, the system and its environment, the first law of thermodynamics, internal energy, heat, work, enthalpy, heat capacities, thermochemistry, Thomson-Joule effect, entropy and second law of thermodynamics, Ideal gas relationship, Carnot cycle of ideal gases, the third law of thermodynamics, the study of the free energies, Maxwell relations, Clapeyron equation, Clausius and Clapeyron equation, thermodynamic derivation of the equilibrium constant, the effect of temperature on the equilibrium constant.

Course Coordination

| # | Course Title and Code | Coordination | Co-coordination | Undergrad. | Postgrad. | From | To |
|---|---|--------------|-----------------|------------|-----------|------|------|
| 1 | General chemistry I | √ | - | √ | - | 2018 | 2019 |
| 2 | General Chemistry II | √ | - | √ | - | 2018 | 2019 |
| 3 | Chemical kinetics and reaction mechanisms | √ | - | √ | - | 2019 | 2021 |
| 4 | Thermodynamic chemistry | √ | - | √ | - | 2021 | 2023 |
| 5 | Physical chemistry 1 | √ | - | √ | - | 2024 | 2024 |

Student Academic Supervision and Mentoring

| # | Level | Number of Students | From | To |
|---|------------------|----------------------|------|------|
| | Different levels | 8 (Research project) | 2019 | 2021 |

Supervision of Master and/or PhD Thesis

| # | Degree Type | Title | Institution | Date |
|---|-------------|--|-------------|------------|
| 1 | Master | Graphitic carbon nitride for assisted photocatalysis approach of strontium doped TiO ₂ nanotubes for degradation of organic pollutants in water | IAU | 2020 -2023 |

Administrative Responsibilities, Committee and Community Service

Committee Membership

| # | From | To | Position | Organization |
|---|------|---------|----------|--|
| 1 | 2023 | Present | Member | Committee for reviewing and approving annual reports of programs in the IAU |
| 2 | 2022 | Present | Member | Standing Committee for Study Plans and Programs - IAU |
| 3 | 2022 | Present | Member | Strategic plan of the college of science - IAU |
| 4 | 2021 | 2022 | Head | External advisory committee of the chemistry department |
| 5 | 2020 | 2022 | Member | Committee of graduate studies - IAU |
| 6 | 2018 | 2022 | Head | Committee of the Standard4: learning and teaching - IAU |
| 7 | 2018 | 2019 | Member | Committee of Timetable - IAU |
| 8 | 2010 | 2011 | Member | The organizing committee of conducting final exams in the college of science, University of Dammam |

Volunteer Work

| # | From | To | Type of Volunteer | Organization |
|---|------|------|---|-----------------------|
| 1 | 2023 | 2024 | Judging scientific posters for graduation research projects | IAU |
| 2 | 2021 | 2022 | Safety in the laboratories 2022 – Highschool educational tour | IAU |
| 3 | 2019 | 2020 | Happiness chemistry – Highschool and university educational seminar | IAU |
| 4 | 2018 | 2019 | Computational chemistry and its most important modern applications – Highschool educational seminar | IAU |
| 5 | 2018 | 2019 | Little chemist – Intermediate school lab activity | IAU – AlBassam school |

Personal Key Competencies and Skills: (Computer, Information technology, technical, etc.)

| | |
|---|--|
| 1 | Extensive experience with software code Gaussian, AMBER, and cpptraj |
| 2 | Extensive experience using UNIX/Linus based systems |
| 3 | Experience in using Gaussian view, VMD, Avogadro, Jmol, GaussSum, Xmgrace, and AIM |
| 4 | Experience in using spectro analytical instrument: spectromax |
| 5 | Professional in academic use of Microsoft office |
| 6 | Extensive experience using all library and online academic resources |

Last Update

02/12/2024