

## Dr. Saad Ali Algarni

Assistant Professor

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### Professional Experience

Assistant Professor, Department of Physics and Astronomy, King Saud University, Riyadh, Saudi Arabia (2014 – Present)

Lecturer, Department of Physics and Astronomy, King Saud University, Riyadh, Saudi Arabia (2000 – 2005)

Senior Physics Teacher, Secondary Schools, Ministry of Education, Saudi Arabia (1990 – 2005)

### Education

Ph.D. in Laser Physics and Laser Applications, Worcester Polytechnic Institute (WPI), Worcester, MA, USA (2008 – 2015)

Dissertation: Development and Application of Regionally Recorded Light Scattering Technique.

M.Sc. in Physics, Worcester Polytechnic Institute (WPI), Worcester, MA, USA (2005 – 2008)

M.Sc. in Physics, King Saud University, Riyadh, Saudi Arabia (1992 – 1997)

Project: Enhancement of Interference Fringes Formed in Mixed Sugar–Macaroni Solutions.

B.Sc. in Physics, King Saud University, Riyadh, Saudi Arabia (1984 – 1989)

Project: Characteristics of the Helium–Neon Laser.

### Objective

To leverage my skills in designing, implementing, and evaluating computer-based systems, processes, and components to achieve and exceed desired outcomes. Committed to applying innovative solutions to enhance institutional success.

### Research Activities

Advanced Spectral System (ARGOS): Developing a novel multi-sample scanning system integrating 3D-printed components, multiple laser sources, and modern electronics.

Printed Electronic Sensors: Developing printed sensors and bio-inspired materials.

Quantum Mechanics Demonstration Models: Creating hands-on models for students to explore quantum systems.

## Skills

Fortran 77, C, and C++ • AutoCAD • Fusion 360 • LabVIEW • Machining (Milling & Lathing) • 3D Printing

## Languages

Arabic (Native) • English (Proficient)

## Conferences and Workshops

**Assessment of Learning Outcomes, 26-27 Oct. 2016**

**APS March Meeting 2015**

**Volume 60, Number 1**

**March 2–6, 2015; San Antonio, Texas**

**Abstract I, Q47.00004:** Observations of Bacterial Behavior during Infection Using the ARGOS Method

**Abstract II, Q47.00009:** Population Dynamics of the Stationary Phase Utilizing the ARGOS Method

**APS March Meeting 2013**

**Volume 58, Number 1**

**March 18–22, 2013; Baltimore, Maryland**

**Abstract: W21.00015:** Development of an image-analysis light-scattering technique

**APS March Meeting 2011**

**Volume 56, Number 1**

**Monday–Friday, March 21–25, 2011; Dallas, Texas**

**Abstract: W21.00001 :** Particle distribution and dynamics in a complex fluid suspension studied by an image-analysis light-scattering technique

**Computational Biophysics Workshop - Champaign, Aug. 10-14, 2009**

**Introduction to Protein Structure and Dynamics**

## Research Publications

1. Langeswaran, K., Saad AlGarni, Muthuramamoorthy, M., Saravanan, P., Premkumar, R., & Sangeetha, R. (2025). 4-Fluorochalcone as a novel therapeutic agent for cervical cancer: An in-depth spectroscopic and computational study. **Journal of Molecular Structure**, 1326, 141130. [10.1016/j.molstruc.2024.141130](https://doi.org/10.1016/j.molstruc.2024.141130)
2. Mohammed S. Alqahtani, S. H. Mohamed, Saad AlGarni, M. Abo EL-Kassem, N. M. A. Hadia, Mohamed Rabia, and M. A. Awad, Photocatalytic and photoluminescence activities of Se and Se/ZnO nanostructured thin films, **Journal of Materials Science: Materials in Electronics** 36, 1098 (2025), Impact Factor: 2.8, <https://doi.org/10.1007/s10854-025-15145-8>
3. Ravitchandiran, A., Saad Ali AlGarni, et al. ZnFe(PBA)@Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> nanohybrid-based highly sensitive non-enzymatic electrochemical sensor for the detection of glucose in human sweat. **Scientific Report** 14, 23835 (2024). Impact Factor: 3.8, <https://doi.org/10.1038/s41598-024-75623-7>
4. AlQahtani H, Alswieleh A, Al-Khurayyif I, Saad Ali AlGarni, Grell M. Parallel Potentiometric and Capacitive Response in a Water-Gate Thin Film Transistor Biosensor at High Ionic Strength. *Sensors*. 2021; 21(16):5618. Impact Factor : 3.5, <https://doi.org/10.3390/s21165618>
5. G. S. Iannacchione and Saad Ali AlGarni, "Digital image capture and analysis for simultaneous static and dynamic light scattering for biological systems," 2016 *International Conference Laser Optics (LO)*, St. Petersburg, Russia, 2016, pp. S2-34-S2-34, doi: 10.1109/LO.2016.7550001.
6. Atanu Chatterjee, Nicholas Mears, Abigail Charest, Saad Ali AlGarni, Germano Iannacchione, High-resolution Experimental Study and Numerical Modeling of Population Dynamics in a Bacteria Culture, On Responsory, Populations and Evolution (q-bio.PE), <https://doi.org/10.48550/arXiv.1912.08389>
7. Ravitchandiran, A., Saad Ali AlGarni, et al., Hydrothermally synthesized high fluorescent carbon dots from Citrus medica peels for bioimaging application, Under Review in **Journal of Molecular Liquids**

## Research Papers in Progress

1. **Influence of different electrolytes on the formation of electrochemically exfoliated graphene and their supercapacitor performance, Accepted in ionic**
2. **NiFe(PBA) nanocubes decorated MoS<sub>2</sub> nanosheets as selective and sensitive non-enzymatic electrochemical sensor for the detection of glucose in human sweat, submitted to a journal**
3. **A Strong Fluorescent Carbon Dot Probe Derived from Citrus Medica Peels for Anti-Microbial and Bioimaging Applications, submitted to Journal**
4. **"Advanced MXene-Based Hybrid Nanocomposites for Real-Time Non-Invasive Glucose Monitoring in Human Sweat" (March 2026)**

This builds on his work in non-enzymatic glucose sensors, extending it to novel hybrid materials for enhanced sensitivity and robustness.

5. **"Integration of Thin-Film Transistor Biosensors with Wearable Electronics for High Ionic Strength Environments" (April 2026)**

This explores biosensor technology in wearable applications, focusing on overcoming challenges in physiological ionic conditions.

6. **"Coupling Digital Image Analysis with Plasmonic Nanostructures for Simultaneous Multi-Mode Sensing of Biomolecules" (May 2026)**

Combines his expertise in light scattering and image analysis for high-throughput biomolecular detection.

7. **"Numerical Modeling and Experimental Validation of Population Dynamics in Multi-Species Microbial Communities" (March 2026)**

Expands on his previous work in bacterial population dynamics by addressing multi-species interactions and their ecological implications.

8. **"Electrochemical and Optical Dual-Mode Sensing Using ZnFe(PBA)@MXene Nanohybrids for Early Disease Diagnosis" (June 2026)**

Integrates electrochemical and optical detection modes for a versatile diagnostic platform, leveraging his expertise in hybrid materials and biosensors.

## References

Available upon request.