CURRICULUM VITAE

**Dr. ZAKI M. SALEH**

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***PERSONAL:*** Married, two children.

***EDUCATION:* Ph.D. Solid State Physics** 11/90

*University of Utah (SLC, Utah, USA)*

**M.S. Solid State Physics** 06/82

*State University of New York at Albany (Albany, N.Y. USA)*

**B.Sc. Physics** 06/80

*Yarmouk University (Irbid, Jordan)*

***EXPERIENCE:* Vice President for Academic Affairs** *08/17 - present*

**Professor of Physics** *06/16 – present*

* Developed and taught two graduate courses on Materials Science and Classical Electrodynamics.
* Member of: curriculum committee, hiring and promotion committee, and the university research council.

**Associate Professor of Physics** *09/02 – 05/16*

* Published 12 papers in internationally-recognized journals on nanostructured materials for solar energy.
* Presented four oral talks and one visual poster in international conferences.
* Supervised undergraduate students conducting research on IV and photoconductivity measurements on nc-Si thin films.
* Served as the external examiner on one Ph.D. and 7 MS theses thesis defenses
* Refereed many papers for international journals.
* Developed and taught several physics courses including: quantum mechanics I&II, electromagnetic theory I&II, classical mechanics, semiconductor physics, general physics I&II, physics for medical students.

**Vice President for Planning and Development** *04/07 – 09/11*

* Led effort on SWOT analysis to prepare the first strategic plan for the university.
* Obtained funding (USD90,000) and implemented a project on institutional self-assessment.
* Obtained funding for one developmental project (USD380,000) and submitted four others.
* Coordinated scholarships to develop faculty at AAUJ and promote scientific research.

**Dean of Scientific Research:** *9/07 – 09/11*

* + - Facilitated several externally funded research projects and managed existing ones.
    - Conducted two rounds of internal funding (startup funds) for AAUJ faculty
    - Managed the Eng. Zuhair Hijjawi Award for undergraduate research.
    - Conducted research visits US, Turkey, and Norway to establish collaboration projects.
    - Lead the university research rules and regulations to promote research.

**Acting Dean, Faculty of Arts and Sciences**  *9/02 – 9/05*

*Arab American University, (Jenin, Palestine)*

* Transformed the faculty from one offering service courses to one offering B.Sc. degrees in five disciplines, increasing student enrollment from 40 to over 500.
* Developed faculty and recruited highly-qualified and research-oriented faculty members.
* Obtained ministry approvals for three new programs in English, physics and chemistry.

**Assistant Professor** *9/00 – 9/2002*

*Arab American University, (Jenin, Palestine)*

* Developed and taught freshman physics courses including: general physics I&II, physics for IT, and physics for medical students.
* Prepared the laboratory manuals for several physics labs including physics lab 105 and physics 106 and physics 175.

Senior Research Scientist *12/98 – 8/00*

*Solus Micro Technologies, Inc., (Los Angeles, CA, USA)*

Led process development for two major projects involving Micro-Electro-Mechanical-Systems (MEMS) for optical switches and displays:

* Developed materials for flexures, reflectors, membranes and processes.
* Resolved a major stiction problem commonly observed in MEMS improving mirror yield.
* Reduced and stabilized residual stress in free standing Al and Si structures.

**Senior Research Scientist** *2/94 – 10/98*

*Tokyo Electron Massachusetts (Boston, USA)*

Worked with a team of scientists and engineers leading thin-film process development for metalization and liquid crystal displays:

* Optimized CVD a-Si:H and SiN film thickness and refractive index uniformity by reconfiguring tool design for optimum glow discharge and gas flow dynamics. Supervised PECVD tool installation at NEC facility in Japan.
* Developed algorithms to optimize liquid delivery of TiI4 precursor for Ti/TiN deposition.
* Developed an in-situ cleaning process for metal deposition reactor leading to a US patent.
* Help-developed a TiN plug-fill process in high-density memories, leading to a US patent.

**Postdoctoral Researcher** *4/91 – 4/93*

*Sanyo Electric Co. Ltd. (Osaka, Japan)*

Constructed the experimental set-ups for Light‑induced Electron Spin Resonance (LESR) and light‑soaking equipment to research light‑induced metastabilities in a‑Si:H:

1. First to observe light‑induced changes in the steady‑state‑LESR line shape indicating an increase in the population of holes relative to electrons trapped in tail states.
2. Correlated these changes to the density of metastable defects, and used them as a new characterization technique to differentiate light-induced defects from native ones.

***LEAVES* OF ABSENCE**

* Conducted a one-year sabbatical starting 1/9/2012 – 8/31/13, at the Center for Solar Energy Research and Applications (GUNAM), Middle East Technical University, Ankara, Turkey.
* One Month Research Leave at Sabanci University, Istanbul, Turkey, 2008
* One month Research Leave at the Nordic Center for Biomaterials, Oslo, Norway (2003)
* Three week Research Visit to the University of California at Irvine, Irvine California (2003)

***INTERESTS:***

1. Nano-structured and electronic materials for photovoltaic applications including: a-Si:H, nc-Si, nanostructured SiOx, and SiNx.
2. Metals for display and memory devices including: Ti/TiN, Ta/TaN, Al.
3. Biomaterials including: polymers, ceramics, metal ceramic structures.
4. Material Properties including: defects and transport, light-induced effect, stress and strength.
5. Devices: Solar Cells, MEMS, optical filters, lasers, thin-film transistors, and memory.
6. Information exchange through discussions, writing and reviewing of publications.
7. Teaching: enjoys introducing students to the vast applications of physics in technology.

***SKILS****:* Extensive experience in a variety of research techniques including:

* Characterization methods including: Four point probe, CV/IV, SEM, EDS, FTIR, ellipsometry, LESR, NMR, and NQR.
* Processing techniques including: chemical vapor deposition (CVD) and plasma-enhanced CVD, evaporation, sputtering, reactive ion etching, ashing.
* Communications: experience in dealing with all types of people and refereeing disputes. Fluent in Arabic and English, some Japanese.

***REFERENCES:*** *available upon request.*

PUBLICATIONS:

1. Refereed Journals:
2. **Z. M. Saleh**, G. Nogay, E. Ozkol, G. Yilmaz, M. Sagban M. Gunes, R. Turan, Atmospheric Aging and Light-induced Degradation of Amorphous and Nanostructured Silicon Using Photoconductivity and Electron Spin Resonance, Canadian Journal of Physics **92**, (2014) 713. **(IF = 0.86)**

<http://www.nrcresearchpress.com/doi/abs/10.1139/cjp-2013-0573>

1. **Z. M. Saleh**, S. M. Kmail, S. F. Assaf, A. F. Qasrawi, Recombination mechanisms in hydrogenated silicon nanocrystalline thin ﬁlms Turk. J. Phys., **37**, (2013), 283-288.

<http://mistug.tubitak.gov.tr/bdyim/toc.php?dergi=fiz&yilsayi=2013/3>

1. **Z. M. Saleh**, G. Nogay, E. Ozkol, R. Turan, Atmospheric and light-induced effects in nanostructured silicon deposited by capacitively and inductively-coupled plasma, International Journal of Intelligent Systems and Applications in Engineering 3, No. 2, (2015).

<http://ijisae.atscience.org/article/view/1065000154/pdf_17>

1. **Z. M. Saleh**, H. Nasser, E. Özkol, M. Günöven, B. Altuntas, A. Bek, R. Turan, Enhanced optical absorption and spectral photocurrent in a-Si:H by single- and double-layer silver plasmonic interfaces, Plasmonics 9 (2014), 357 – 365. **(IF = 2.99)**

<http://link.springer.com/article/10.1007%2Fs11468-013-9632-9>

1. **Z. M. Saleh**, H. Nasser, E. Ozkol, M. Gunoven, K. Abak, S. Canli, A. Bek R. Turan, Optimized Spacer Layer Thickness for Plasmonics-induced Enhancement of Photocurrent in a-Si:H, J. of Nanoparticle Research, 17 (2015), Issue 10 **(IF = 1.86), Scopus**

<http://opensample.info/optimized-spacer-layer-thickness-for-plasmonic-induced-enhancement-of-photocurrent-in-a-si-h>

1. **Z. M. Saleh**, H. Nasser, E. Ozkol, A. Bek R. Turan, Dependence of plasmonic enhancement of photocurrent in a-Si:H on the position and thickness of SiNx spacer layers, Physica Status Solidi C (PSS-C), 12, 9-11, 2015, Scopus

<http://onlinelibrary.wiley.com/doi/10.1002/pssc.201510109/abstract>

1. H. Nasser, **Z. M Saleh**, Engin Ozkol, Alpan Bek, Rasit Turan, Advanced light trapping interface for a-Si:H thin film, Physica Status Solidi C (PSS-C), 12, 9-11, 2015, **Scopus**

<http://www.readcube.com/articles/10.1002%2Fpssc.201510097>

1. H. Nasser, **Z. M. Saleh**, [E. Özkol](http://link.springer.com/search?facet-author=%22Engin+%C3%96zkol%22), [M. Günoven](http://link.springer.com/search?facet-author=%22Mete+G%C3%BCnoven%22), [A. Bek](http://link.springer.com/search?facet-author=%22Alpan+Bek%22), R. Turan, [Fabrication of Ag Nanoparticles Embedded in Al:ZnO as Potential Light-Trapping Plasmonic Interface for Thin Film Solar Cells](http://link.springer.com/article/10.1007/s11468-013-9562-6). Plasmonics, 8 (2013), 1485 – 1492 (USA). **(IF = 2.99)**

<http://connection.ebscohost.com/c/articles/89730072/fabrication-ag-nanoparticles-embedded-al-zno-as-potential-light-trapping-plasmonic-interface-thin-film-solar-cells>

1. A. F. Qasrawi, S. M. Kmail, S. F. Assaf**, Z. M. Saleh**, Design and investigation of SST/nc-Si:H/M(M=Ag, Au, Ni) and M/nc-Si:H/M multifunctional devices, Advances in OptoElectronics, 2013 (2013). <http://www.hindawi.com/journals/aoe/2013/807542/>
2. G. Nogay**, Z. M. Saleh,** E. Özkol, R. Turan, Optoelectronic properties of nanostructured Si prepared at low temperature by Inductively Coupled Plasma Chemical Vapor Deposition (ICP-CVD), Materials Science and Engineering B, **196** (2015), 28 – 34. **(IF = 2.12)**

<http://www.sciencedirect.com/science?_ob=ArticleListURL&_method=list&_ArticleListID=-854092355&_sort=r&_st=13&view=c&md5=c2206b536d288ae7c2dc7868ece9ae24&searchtype=a>

1. Registered Patents:
2. **Z. M. Saleh** and R. Comunale, Systems and methods for dry cleaning process chambers, United States Patent, **No. US 6,290,779 B1**, September 18, 2001 (USA).

<file:///C:/Users/zakis_000/Downloads/US6290779%20(1).pdf>

1. Conference Proceedings:
2. **Z. M. Saleh**, Hisham Nasser, Mete Gunoven, Engin Ozkol, Burju Altuntas, Alpan Bek, Rasit Turan1, Enhancement of optical absorption in a-Si:H films by silver nanoparticle plasmonic interface, in Proc. of the 28th Photovoltaic Science and Engineering Conference (PVSEC-28), September 29 – October 5, 2013, Paris, France.

<https://www.eupvsec-proceedings.com/proceedings?fulltext=Zaki+Saleh&search.x=12&search.y=14&offset=0>

1. Old Publications:
2. J. Hautala, **Z. M. Saleh**, J.F.M. Westendorp, H. Meiling, S. Sherman and S. Wagner), High deposition rate a-Si:H for the flat panel display industry, in Proc. of the Materials Research Society, San Francisco, USA (1997).
3. H. Meiling, J.F.M. Westendorp, J. Hautala, **Z. M. Saleh**, and C.T. Malone “Influence of the deposition rate of the a-Si:H channel of the field-effect mobility of TFTs deposited in VHF glow discharge”, Proc. of the Materials Research Society, San Francisco, USA (1994).
4. **Z. M. Saleh**, H. Tarui, S. Tsuda, S. Nakano and Y. Kuwano, A comparative study of defect states in light-soaked and high-temperature-annealed a-Si:H, Proc. of the Materials Research Society, San Francisco, USA (1993).
5. **Z. M. Saleh**, H. Tarui, S. Tsuda, S. Nakano and Y. Kuwano, Trapping and recombination of photo-generated carriers in as‑grown, high‑temperature annealed and light‑soaked a‑Si:H, Jpn. J. Appl. Phys. **32** (1993), 3376 (Japan).
6. **Z. M. Saleh**, H. Tarui, S. Tsuda, S. Nakano and Y. Kuwano, Potential role of charged dangling bonds in transient‑LESR of light‑soaked a‑Si:H, Proc. of the Materials Research Society, San Francisco, USA (1992).
7. **Z. M. Saleh**, H. Tarui, S. Tsuda, S. Nakano and Y. Kuwano, Stable, metastable and charged defects in a‑Si:H; a transient‑LESR study,”, Jpn. J. Appl. Phys. **12** (1992), 3801 (Japan).
8. **Z. M. Saleh**, H. Tarue, K. Ninomya, S. Tsuda, S. Nakano and Y. Kuwano, Light‑induced ESR investigations of the role of hydrogen in the stability of a‑Si:H, , Jpn. J. Appl. Phys. **31** (1992) 995 (Japan).
9. **Z. M. Saleh**, G.A. Williams and P.C. Taylor, Nuclear-magnetic resonance relaxation in glassy Cu‑As‑S and Cu‑As‑Se,”, Phys. Rev. B **47** (1993-I) 4990 (USA).
10. **Z. M. Saleh**, G.A. Williams and P.C. Taylor, Possible atomic diffusion of Cu in glassy Cu‑As‑Se,”, J. Non‑Cryst. Solids **137&138**, (1991) 1047 (USA).
11. P.C. Taylor, **Z. M. Saleh**, and J.Z. Liu, A general structural model for amorphous and glassy semiconductors,”, in Advances in Disordered Semiconductors, Vol. **3**, H. Fritzsche, ed. (World Scientific, Singapore, 1990), p. 3 (USA).
12. **Z. M. Saleh**, G.A. Williams and P.C. Taylor, “Nuclear quadrupole resonance in Cu‑As‑S and Cu‑As‑Se systems, Phys. Rev. B **40**, 10557 (1989‑II) (USA)
13. **Z. M. Saleh**, G.A. Williams and P.C. Taylor, 63Cu NMR studies of local structural order in the Cu‑As‑S and Cu‑As‑Se systems,”, J. Non‑Cryst. Solids **114**, 58 (1989), USA.
14. George W. Williams, **Z. M. Saleh**, and P. Hari, Nuclear Quadrupole Resonance as a Non-Destructive Testing Tool, Proceedings of the Conference on Quantitative Non-destructive Evaluation, La Jolla, CA, July 1992 (USA).
15. **Z. M. Saleh**, P. C. Taylor and G.A. Williams, Local structural order and atomic diffusion of metal in metal‑arsenic‑chalcogenide glasses, Proc. of Amorphous Seminar, Gifu, Japan (1992).
16. **Z. M. Saleh**, G.A. Williams and P.C. Taylor, Local structural order and relaxation effects in metal chalcogenides, Proc. of the 20th International Conference on the Physics of Semiconductors, Thessaloniki, Greece. World Scientific, Singapore, 1990), p. 2159 (Greece).

***PRESENTATIONS:***

1. Z.M. Saleh, H. Nasser, M. Gunoven, E. Özkol, A. Bek, R. Turan, Dependence of Plasmonics Enhancement of Photocurrent on the Position and Thickness of Spacer Layers, *Solar Electricity Conference and Exhibition* (SOLAR-TR3), Ankara, Turkey, April 27 – 29, 2015.

<http://www.solartr.org/>

1. Z.M. Saleh, H. Nasser, M. Gunoven, E. Özkol, A. Bek, R. Turan, Enhancement of Optical Absorption in a-Si:H Films By Silver Nanoparticle Plasmonic Interfaces. The 28th Photovoltaic Science and Engineering Conference (PVSEC-28), September 29 – October 5, 2013, Paris, France.

https://www.eupvsec proceedings.com/proceedings?fulltext=Zaki+Saleh&search.x=12&search.y=14&offset=0

1. Z.M. Saleh, Salam Kmail, Samah Assaf, Recombination Mechanisms in Hydrogenated Silicon Nano-crystals, *Solar Electricity Conference and Exhibition* (SOLAR-TR2), Antalya, Turkey, November 7 – 9 2012. <http://www.solar-academy.com/menuis/SolarTR-2_booklet.104826.pdf>
2. Photovoltaic effects in Silicon Nano-crystals, Z.M. Saleh, S. Kmail, S. Assaf, A. Qasrawi, The first International Palestinian Conference on Nanotechnology for Advanced Material and Devices, Al-Najah National University (Palestine, 2012).

<http://scholar.najah.edu/conference/first-international-palestinian-conference-nanotechnology-advanced-material-and-devices?page=1>

1. FOUR talks at the 1987 - 1990 March Meetings of the American Physical Society (APS), USA.
2. A poster at the 13th International Conference on Amorphous and Liquid Semiconductors (ICALS‑13), Asheville, NC (USA), 1989.
3. A poster at the 20th International Conference on the Physics of Semiconductors (ICPS‑20), Thessaloniki, Greece (1990).
4. A poster at the 14th International Conference on amorphous Semiconductors (ICAS‑14), Garmisch‑Partenkirchen, Germany (1991).
5. THREE talks at the Fall and Spring Meetings of the Japanese Society of Applied Physics, Japan (1991‑92).
6. A talk at the Spring Meeting of the Materials Research Society, San Francisco, USA (1992).
7. An invited talk at the 19th Annual Meeting of Amorphous Seminar, Gifu, Japan (1992).
8. A poster at the Spring Meeting of the Materials Research Society, San Francisco, USA (1993).
9. Numerous presentations and reports at company seminars to educate company employees on research results and report findings.
10. Invited seminars at national and international institutions including: Japanese Technical Laboratory (Tokyo, Japan, 1992), University of Utah (SLC, USA, 1993), Gifu University (Japan, 1993), Kanazawa University (Japan, 1993), Al-Albait University (Jordan, 1998), Abu-Dees University (Palestine, 1998) and UC at Irvine (USA, 1999).