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Laila H. Abuhassan

Former Senator
University of Jordan / Prof. of Physics & Nanotechnology
Council for Higher Education / Former Member
Higher Council for Science & Technology / Former Advisor on Nanotechnology
Scientific Research Fund-Jordan, Basic Sciences & Nanotechnology/Former Chair

Education

1987: Ph.D. in Physics (Condensed Matter Physics: Optical effects of ion beam irradiation), Sussex University, Brighton, U.K.

1978: M.Sc. in Physics (Condensed Matter Physics: Magnetic spectroscopy), American University of Beirut, Lebanon.

1970: B.Sc. in Physics, The University of Jordan, Amman, Jordan.

Professional Experience

October 2011- Oct. 2013: Senator- The House of Senate, Jordan.

Jan. 2014- : Professor of Physics, The University of Jordan, Amman, Jordan.

April 2010- Oct. 2011 : Professor of Physics, The University of Jordan, Amman, Jordan.

1998–2010: Associate Professor of Physics, The University of Jordan, Amman, Jordan.

1987-1998: Assistant Professor of Physics, The University of Jordan, Amman, Jordan.

1978-1982: Lecturer, Department of Physics, The University of Jordan, Amman, Jordan.

1971-1977: Laboratory Supervisor, Department of Physics, The University of Jordan, Amman, Jordan.

Awards & Distinction

Women in Science Award (Middle East & North Africa) – 2014

(Organized by the Department of State-USA, through US Embassy in Amman, Jordan.

The University of Jordan Distinguished Researcher Award 2009/2010.

Administrative Academic Experience

2009/2011 Basic Sciences & Nanotechnology Sector, Chair, Scientific Research Support Fund, Ministry of Higher Eduacation.

2009/2011 Technical Committee Member, Scientific Research Support Fund, Ministry of Higher Eduacation.

Feb.2009 - June 2009 Nanotechnology Sector, Advisor and Chair, Higher Council for Science & Technology.

2008/2009 - Materials Science & Technology, Program Coordinator, Faculty of Science, University of Jordan.

2006/2007 & 2007/2008: Chairperson of the Physics Department, The University of Jordan.

1989/1990 - First Semester: Assistant-Dean of Students, Deanship of Students, The University of Jordan.

Additional Professional Activities

- Invited speaker/participant to NSF-funded meetings about 'Nanotechnology and its Applications in: Development, Education, and Energy'; Gazi University-Turkey (Sep. 2014); Masdar Institute-Abu Dhabi-UAE (Feb. 2015).
- Member of the International Organizing Committee of the International Conference "Advanced Nanostructured Materials", the University of Jordan, 10-13 Nov. 2008. This Conference has been organized in collaboration with the NSF-USA, Ministry of Higher Education-Jordan, Higher Council for Science & Technology-Jordan, King Saud University-Saudi Arabia, University of Illinois at Urbana-Champaign-USA, and the University of Jordan.
- Organized, through collaboration with the 'Jordanian Association for Scientific Research', "Nanotechnology & its Applications" Conference that was held in the University of Jordan, Nov. 2017.

- Invited speaker to Nanotechnology and Nanotechnology - Related Conferences / Workshops / Activities organized and/or sponsored by ISESCO / COMSATS / UNESCO.

- Organized several specialized 'one/two-days' workshops in 'Nanotechnology' at The University of Jordan and other professional organizations in Jordan (Philadelphia University; Mutah University; Zarqa Private University; Engineering Association).

- Participated in several International, Regional and National Conferences.

- Involved in the organization of several specialized International, and Regional conferences that were held in The University of Jordan.

- Involved in the coordination and organization of the ASTA (Arab Scientists and Technologists Abroad) Conferences held in Jordan.

- Collaborator of an International joint research project with Prof. Munir Nayfeh from the University of Illinois at Urbana-Champaign in the United States. The joint research project was jointly funded by The University of Jordan, University of Illinois, the National Science Foundation (NSF, U.S.A.) and the Higher Council for Science and Technology of Jordan. Through is project, the technology for fabrication and characterization of porous silicon; as well as the fabrication of the silicon, germanium and silicon-germanium nanomaterial, has been successfully transferred to the research laboratory at The University of Jordan.

- Member of several M.Sc. and Ph.D. theses examination committees.

- Established cooperation with colleagues in my Department, other Departments in The University of Jordan, and other Universities and Institutions in Jordan and U.S.A., as well as other countries. Most of the publications co-authored with colleagues from Jordan, England, Italy and U.S.A.

- Participated in the development of training manuals, coordination and supervision of laboratory exercises and experiments.

- Participated in the development and revision of Curricula for specialized courses at the different levels.

- Cooperated with the Ministry of Education in Revising and developing Curricula and Curricula Textbooks of Physics and General Sciences for different Educational Stages including different school levels (elementary, primary and secondary levels).

- Through voluntary work with Non Governmental Organizations, helped in planning for and undertaking social studies that are focused on children, women, and youth status especially in the Less Fortunate areas. These studies were aiming at identification of the problems facing development of these areas, on one hand and how to enhance the standard of living in these areas on the other hand.

Research

1. Synthesis and characterization of silicon, germanium, and silicon-germanium nanomaterials. *(Research in Progress)*

2. Synthesis and characterization of copper, platinum and gold nanomaterials. *(Research in Progress)*

3. Optical, electrical and structural characterization of silicon, germanium, and silicon-germanium porous material. *(Research in Progress)*

4. Bio-medical and nutrition related applications of nanotechnology. *(Research in Progress)*

5. Energy related applications of nanotechnology. *(Research in Progress)*

6. Water related applications of nanotechnology. *(Research in Progress)*

7. Ethics and Bio-safety related issues of nanomaterials and Nanotechnology. *(Research in Progress)*

8. Optical, mechanical, electrical and structural characterization of thin films, especially anti-reflecting optical coatings.

9. Optical effects of ion beam bombardment on some materials (alkali halides, oxides and thin films) both in-situ and under equilibrium conditions.

10. The use of Thermoluminescence and ion beam techniques in applications.

11. The effects of Radiation on Agriculture and Food and their applications.

Board and Committee Memberships

- Member of The Council for Higher Education; April 2015 – July 2018.
- Member of The Board of Trustees, Philadelphia University, Amman, Jordan; 2001-2015.
- Member of the Technical Committee, Scientific Research Support Fund, Ministry of Higher Education, 2009/2010.
- Chairperson of the 'Basic Sciences' Committee, Scientific Research Support Fund, Ministry of Higher Education, 2009/2010.
- Consultant on Nanotechnology for the Higher Council for Science & Technology of Jordan, Feb-June 2009.
- Member of the Council for the "Renewable Energy Center" in the Faculty of Engineering - The University of Jordan, Sep. 2008-2011.
- Member of the Higher Committee for Elections of The University of Jordan Students Union, 2008/2009.
- Member of the Committee for Energy & Nanotechnology, The Higher Council for Science & Technology, Jordan, First Semester 2008/2009.
- Member of the "Nanotechnology Experts Committee for the ISESCO Region", Jan. 2005-2011.
- Coordinator on Nanotechnology, Scientific Thematic Groups for Enhancing Cooperation among Islamic Countries, COMSATS/ISESCO, March 2009-2011.
- Member of the establishing Committee of the 'Nanotechnology Network for the Arab Countries' / Union of Scientific Research Councils for the Arab Countries / The Arab League, Feb. 2009.
- Member of the Experts Committee on Ethics in Nanotechnology for the Arab Countries, organized by: UNESCO / ISESCO / COMEST, May 2009-
- Member of the 'Third World Organization for Women in Science', Aug. 1990-
- Member of the Judges Committee for the International Intel Prize in Science & Technology in Jordan, Sep. 2005-
- Member of the Judges Committee for the Intel Prize in Science & Technology for the Arab World, Egypt,

Dec. 2010.

- Elected Member to The University of Jordan Council; 1996/97.

- Elected Member to the Faculty of Sciences Council; 1992/93 & 1995/96 & 2014/2015.

Publications

1. Electrical model to simulate the quantal bump spread along the photoreceptor cell, A.A.Alawai and L.H.Abu Hassan, Proceedings of the Third Arab Conference on Physiological Sciences, 222-230, 1979.
2. F and F_2 centres in LiF induced by ion implantation, L.H.Abu Hassan and P.D.Townsend, Radiation Effects, **98**, 313-317, 1986.
3. Ion implantation in LiF to form F and F_2 centres, L.H.Abu Hassan and P.D.Townsend, J. Phs. C: Solid State Phys. **19**,99-110,1986.
4. Luminescence excited in SiO_2 during ion implantation, L.H.Abu Hassan and P.D.Towsend, Nuclear Instruments and Methods, **B19/20**, 927-930,1987.
5. Luminescence efficiency of silica during ion beam excitation, L.H.Abu Hassan and P.D. Townsend, Nuclear Instruments and Methods, **B32**,293-298, 1988.
6. Silver colloid formation in Ag+ implanted $LiNbO_3$, M.Rahmani, L.H.Abu Hassan, P.D.Townsend, I.H.Wilson and G.L.Destefanis, Nuclear Instruments and Methods, **B32**,56-60, 1988.
7. In situ optical absorption during ion-beam irradiations of LiF, L.H.Abu Hassan, P.D.Townsend and R.A.Wood, Nuclear Instruments and Methods, **B32**,225-230, 1988.
8. Quenching of porous silicon photoluminescence by deposition of metal adsorbates, D.Andsager, J.Hillard, J.M.Hetrick, L.H.AbuHassan, M.Plisch and M.H.Nayfeh, J.Appl. Phys., **74 (7)**; 4783-4785; 1993.
9. Infrared Spectroscopy and secondary ion mass spectrometry of luminescent, nonluminescent, and metal quenched porous silicon; J.Hillard, D.Andsager, L.H.AbuHassan, Hasan M.Nayfeh and M.H.Nayfeh, J. Appl. Phys., **76 (4)**; 2423-2428,1994.
10. Time-resolved measuements of the photoluminescence of Cu-quenched porous silicon; N.Rigajis, Z.Yamani, L.H.AbuHassan, J.Hilliard, and M.H.Nayfeh, Appl. Phys. Lett. **69(15)**, 2216-2218,1996.
11. Room temperature oxidation enhancment of porous Si(001) using ultraviolet- ozone exposure, W.Howard Thompson , Zain Yamani, Laila H. AbuHassan, J.E. Greene, and Munir Nayfeh, and M.A.Hasan, J. Appl. Phys. **80(9)**, 5415-5421,1996.
12. Design and construction of a microcomputer based interface/controller to drive and process spectrophotometer data; Y.A.Yousef, M.M.Shaderma, L.H.Abu Hassan, A.J.Abu El-Haija and A.A.Rousan, Optica Applicata, **XXVI (1)**, Lett. to the Ed., 61-65, 1996.
13. Effect of oxidation treatments on photoluminescence excitation of porous silicon, N.Rigakis, J.Hilliard, L.AbuHassan, J.M.Hetrick, D.Andsager, and M.H.Nayfeh, J.Appl. Phys. **81(1)**, 440-444, 1997.
14. Ideal anodization of silicon, Zain Yamani, Howard Thompson, Laila AbuHassan, and Munir H.Nayfeh, Appl. Phys. Lett. **70(25)**,

3404-3406, 1997.
15. New design of a reflectance unit for the measurement of near-normal incidence reflectivity, A.J.Abu El-Haija and L.H.AbuHassan, Dirasat, **25 (2)**, 1998.
16. Depth profiling of molecular Infrared activity in porous silicon, Laila H.AbuHassan, A.J.Abu El-Haija and Munir H.Nayefeh, Dirasat **25 (3)**, 419-426, 1998.
17. Structural characterization of porous silicon as a function of depth , L.H.Abu Hassan, A.J.Abu El-Haija, S. Mahmood, Z. Yamani, M.H.Nayfeh, Dirasat **25 (3)**, 427-433, 1998.
18. The Basic Optical Properties, Optical Constants and Optical Conductivity of Bismuth single thin films and Bismuth-Copper Bilayer Systems; A.J.Abu El- haija, A.A.Rousan and L.H.AbuHassan; Phys.Stat.Sol. **168**, No2, 1998.
19. The effect of ultrathin oxides on luminescent silicon nanocrystallites; W. Howard Thompson, Zain Yamani, Laila AbuHassan, Osman Gurdal, and Munir Nayfeh; Appl. Phys. Lett. **73(6)**, 841-843, 1998.
20. Si-N linkage in ultrabright, ultrasmall Si nanoparticles; E. Rogozhina, G. Belomoin, A. Smith, L. AbuHassan, N. Barry, O. Akcakir, P. V. Braun and M. H. Nayfeh; Appl. Phys. Lett.; **78 (23)**, 3711-3713, 2001.
21. Effects of surface termination on the bandgap of ultrabright Si_{29} nanoparticles: Experiments and computational Models; G. Belomoin, E. Rogozhina, J. Therrien, P. Braun, L. AbuHassan and M. H. Nayfeh; Phys. Rev. **B65**, 2002.
22. Cathodoluminescence of Ultrasmall silicon nanoparticles under electron beam excitation; L. H. Abuhassan, M. R. Khanlary, P. D. Townsend, and M. H. Nayfeh; J. Appl. Phys.; **97 (10)**; 104314/1-104314/5; 2005.
23. Electrodeposition of fluorescent Si nanomaterial from acidic sodium silicate solutions; Laila H. Abuhassan and Munir H. Nayfeh; Mat. Res. Soc. Symp. Proc. Vol. **862**; A8.10.1-A8.10.5; 2005
24. Material analysis of fluorescent Si nanomaterial prepared from silicate water glass solutions; L. H. Abuhassan, and M. H. Nayfeh; Dirasat, **34**;183-191;2007.
25. Current-less anodization of intrinsic silicon powder grains: Formation of fluorescent Si nanoparticles; D. Nielsen, L. Abuhassan, M. Alchihabi, A. Al-Muhanna, Jon Host, and M. H. Nayfeh; J. Appl. Phys, **101**; 114302; 2007.
26. Optimization of Flourescent Silicon Nanomaterial using Peroxide/Acid/Salt Technique; L. H. Abuhassan; Sains Malaysiana, **38**; 77-83; 2009.
27. Synthesis and characterization of copper nanomaterial; Laila H. Abuhassan; International Journal of Nano and Biomaterials; **2**; 375-385; 2009.
28. Enhancement of the Production Yield of fluorescent silicon nanostructures using silicon-based salts; Laila H. Abuhassan; Sains Malaysiana, **39**, 837-844; 2010.
29. Synthesis of Red Luminescent Copper Nanoparticles, Laila H. Abuhassan and Noah George; International Journal of Nanomanufacturing; In press.
30. Strong 1.54 μm cathodoluminescence from core-shell structures of silicon nanoparticles and erbium; Tuan Hoang,

Noha Elhalawany, Brian Enders, Ersin Bahceci, Laila Abuhassan, and Munir H. Nayfeh; Applied Physics Letters, **109**, 261103 (2016).
31. Wideband luminescence from bandgap-matched Mg-based Si core-shell geometry nanocomposite; Adam Kocyigit, Noha Elhalawany, Ersin Bahceci, Brian Enders, Krithik Puthalath, Laila Abuhassan, Zain Yamani, and Munir Nayfeh; AIP Advances, **8**, 055324 (2018).
32. Proximal probe-like nano structuring in metal-assisted etching of silicon; Ersin Bahceci, Brian Enders, Zain Yamani, Serekbol Tokmoldin, Aman Taukenov, Laila Abuhassan, and Munir Nayfeh; AIP Advances, **9**, 055228 (2019).

Other Publications

The Status of Women in Higher Education in Jordan; W. Petro, M. Hadeedi, H. Milkawi, L. H. Abuhassan, and R. Shrim; The National Strategy for Higher Education in Jordan 2005-2015: The Ministry of Higher Education in Jordan;2005.

Patents

1. Geramium and germanium alloy nanoparticle and method for producing the same;M. Nayfeh, L. Abuhassan, A. Nayfeh, and Y-C. Chang; **Patent: U.S. patent office, Serial No. 10/849,536; UIUC-OTM Ref. TF03092**.

World Intellectual Property Organization (WIPO):
Publication No.: WO/2005/123985, **International Application No.:** PCT/US2005/017063, **Publication Date:** 29.12.2005, **International Filing Date:** 16.05.2005, **IPC:** ***C25C 1/00*** (2006.01), ***C25C 1/22*** (2006.01), ***C25D 1/00*** (2006.01).

2. Silicon nanoparticle formation by electrodeposition from silicate; M. Nayfeh, and L. Abuhassan; **Patent: U.S. patent office, Serial No. 11/088,269; UIUC-OTM Ref. TF03092**.

World Intellectual Property Organization (WIPO): Publication No.: WO/2007/100314, International Application No.: PCT/US2006/005068, Publication Date: 07.09.2007, International Filing Date: 14.02.2006; IPC: *C25D 15/00* (2006.01).

3. Hexachloroplatinic acid assisted silicon nanoparticle formation method; Munir H. Nayfeh, Laila Abuhassan, David Nielsen, and Abdulrahman Almuhanna; **U.S. patent office, Serial No. 60/702,674;**

World Intellectual Property Organization (WIPO): Publication Number: WO/2007/018959, International Application Number: PCT/US2006/027243, Publication Date: 15.02.2007, International Filing Date: 14.07.2006; IPC: H01L 29/24 (2006.01).

In addition:

-The Chair of the Jordanian-Korean Friendship Committee, The House of Senate, 2013.

- Dr. Abuhassan has led the Department of Physics initiative to start "Materials Science & Technology Program" at the University of Jordan which is multi-disciplinary based and

takes into consideration the partnership between the Different Departments at the Faculty of Science, the research institutes, and the industrial public and private sectors.

- Dr. Abuhassan, has led the Department of Physics initiative to start the use of modern technology: digital media, and computer-assisted learning via virtual labs, in teaching Physics courses. This style of teaching/learning process has been adopted by the Department of Physics as part of the B.Sc study plan.

- Dr. Abuhassan is cooperating with institutes of higher learning and advanced research institutes in North America, Europe and the Region to start capacity development training programs on materials science, especially nanotechnology, in Jordan and the region.

- Dr. Abuhassan has been working, in Jordan and the region, for the popularization of the new technology 'Nanotechnology' and its possible impact on Developing Countries, in general and Jordan in specific. She has been bringing scientists from different disciplines (Physics, Chemistry, Biology, Medicine, Pharmacy, Agriculture, Food Technology and Nutrition, etc.) to work together, as multi-disciplinary teams and not as individuals, in this fast-growing area of research and its applications.