

Curriculum Vitae
NAZIR MUSTAPHA

5 Dunholme Avenue, Loughborough, Leics., LE11 4SG, UK.

1. Profile:

- Highly qualified lecturer in Applied physics and Materials with teaching experience in :
Thin Film Techniques and surfaces (3rd year).
Solid State Physics (1st and 2nd year).
CAD and Modeling (1st year).
Technology of microelectronic devices (2nd year).
Microelectronics (3rd year), Semiconductors Devices (1st year) and
Fundamentals of Electromagnetism (2nd year).
Mass Media Technology.
Mechanics, Electricity and Magnetism.
Fluid Mechanics
Nuclear Physics
Atomic Physics
Thermodynamics
- I was an Academic visitor to University of Oxford (UK) since October 2001-October 2003.
- Expertise in **Organic Light Emitting Diodes (OLED)** fabrication, processing and electrical and optical characterization.
- Extensive hands on experience in clean room practice and in **micro-scale device processing** (e.g deposition, photolithography, **etching, general vacuum equipment including plasma tools as well as management experience in operating such facilities**).
- Ion Implantation, Ion beam analysis and patterning of materials for communication, information technology and semiconductor applications.
- Specialist in the Depositing of **Thin Films** by: reactive filtered arc **evaporation, ion** plating, sputtering, metal **organic** evaporation, and Plasma Enhanced **Chemical Vapour Deposition**, and the publication of several papers on the subject.
- Experience in production and characterization of functional plasma polymers.
- **International Reviewer** of the text book: University Physics with Modern Physics by Bauer & Westfall, McGraw-Hill , 2010

2. Personal Details

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Nationality: **British**

3. Higher Education Qualifications

1989-1993 PhD in Thin Film Technology and microelectronic devices,
Applied Physics, Faculty of Science, Physics Department,
Loughborough University, Loughborough , United Kingdom.

“Deposition of Thin Films by reactive filtered arc evaporation and comparison with magnetron sputtering”. My work involved the design of a vacuum coating system, testing and characterization of deposited films for optical, electronics and decorative applications.

Furthermore I have gained considerable experience in many aspects of modern practical research; such as Vacuum Coatings techniques, surface and analysis techniques, computing, time management, constructive reading and group working.

1979-1983 BSc (First class honours) Physics.
King Abdulaziz University, Jeddah, Saudi Arabia .

4. Work Experience

Sep 2003 – present **Associate Professor in Applied Physics at Imam University, Riyadh, Saudi Arabia.** Teaching Mechanics, Electricity and Magnetism, Fluid Mechanics, Thermodynamics, Nuclear Physics, nanotechnology and thin films; and Atomic Physics. In addition to several administrative duties, I was involved in writing the BSc program in **Applied Physics** for the newly established Department of Physics.

Jan 2003 –Sep 2003 **Lecturer in “Mass Media Technology” at De-Montfort University.** Involved in preparing and delivering the course (1st year students) I set the examination papers, develop the practical sessions where appropriate, and offered guidance to the students undertaking assignments in relevant engineering and communication subject areas.

Oct 2001 – Dec2002 **Senior Research Engineer for Opsys Limited.**

Concerned with the fabrication, processing and optimization of Organic Light Emitting Diodes (OLED's). A characteristic feature of the research is the strong links with Inorganic Chemistry Laboratory as well as with development group at Opsys Limited.

OLED,s can contain light emitters known as “small molecules”, “light emitting polymers”, or light emitting dendrimers. Light emitting dendrimers represent a bridge between small molecules and light emitting polymers, and combine the advantages of both systems. In addition to take a project responsibility such as optimizing electronic and processing properties, this **work recently results in** producing the **world's most efficient LED's made from dendrimer solution** , This research lead to liaison in a professional and competent manner with technical and scientific staff from external collaborating companies such as CDT Ltd in Cambridge and other International collaborators. A key remaining challenge for the OLED's is to increase the efficiency of light extraction from its low current level which is in the region of 20% and the device lifetime. Optimization of the device structure would be able to achieve higher efficiencies; such high efficiency paves a way to cheaper big area displays.

Further I was also an **academic visitor** to the Materials Department at the **University of Oxford**.

**Oct 2000 - Sep 2001 Research Liaison Fellow for the Surrey Ion Beam Centre.
University of Surrey.**

Concerned in carrying out an expanding ion implantation activity to support over forty university user groups and industrial laboratories. The work is varied, state-of-the-art, highly interactive and supports key research activities across the UK. Most of the work is associated with the implantation and processing of **semiconductor** materials, supported by the EPSRC .

I was also involved in the deposition of **amorphous carbon (a-C)** and investigating the electronic properties of (a-C) to understand the fundamental conduction mechanisms in these thin films, and to examine the modifications to the electronic properties of carbon films by the inclusion of dopants via gaseous sources and ex-situ ion implantation for displays applications.

Jan 1997- Oct 2000 Research Fellow at the University of Birmingham.

Since completing my PhD the nature of my research interests has become more diverse, although still largely connected with Thin Film Deposition Techniques. Examples of projects with which I was involved are:

- Develop new experimental techniques for advanced thin film superconducting microwave circuits and the optimization of the packaging of superconducting microwave devices.
- Design and packaging of microwave circuits. This work was in **Co-operation with our industrial collaborators both in the UK (e.g. GEC Marconi) and Europe (e.g. Thomson France).**
- Production of printed circuit boards.
- Deposition and patterning (dry and wet etching of silver, gold, palladium and superconductor (e.g. YBCO) thin films).
- Electroplating of silver, nickel and gold materials.
- Maintain the deposition and fabrication equipment for conducting, semi-conducting and insulating films.
- Set up and maintain a clean room facility (class 1000).
- I also took: an active role in the day to day **supervision of several postgraduate practical projects** in the Electronic Materials and Devices Research Group.

Jan. 1989-1995. Research Student/Assistant at Loughborough University.

- **Reactive sputtering and evaporation of oxide and nitride films.**

During the research, metal oxides, nitrides and carbides were produced onto low temperature substrates such as glass and polymer by reactive sputtering and evaporation in atmospheres of argon and reactive gas. Silicon oxide, aluminum oxide and nitride, zirconium oxide, titanium and tantalum oxides have been produced onto low temperature substrates, including ones of polymeric material for optical applications.

Compound such as the nitrides of titanium, hafnium and zirconium were made to form hard and durable surfaces on temperature-sensitive substrates.

1994 - 1995. Part time Lecturer at Loughborough Technical College.

At Loughborough Technical College, I taught the BTEC national Diploma courses in **Materials Science** and **Technology I & II** to two groups of students (Technicians). In addition to preparing and delivering these courses I set the college examination papers, developed the practical sessions where appropriate, and offered guidance to the students undertaking assignments in relevant subject areas

1992- 1993. Research Assistant at Loughborough University

The preparation of diamond-like carbon films on temperature-sensitive substrates. Diamond-Like Coatings (DLC's) were produced by the deposition of fast-atoms or carbon ion fluxes onto cooled substrates. The possessed mechanical properties of the deposited films resembling those of diamond and can evidently be used as a wear-resistant material to strengthen different sliding units and machine parts. It was shown that both mechanical and chemical properties of the substrate surface and the microstructure of the substrate material have a decisive influence on film growth conditions. The electronic properties of (a-C) to understand the fundamental conduction mechanisms in these thin films, and to examine the modifications to the electronic properties of carbon films by the inclusion of dopants via gaseous sources for displays applications.

5. Teaching Experience

As a postgraduate student I gave several courses of tutorial seminars in the Thin Films and Coatings subject areas and in clean room technology. I have also taught in a wide variety of practical sessions and to short courses both in the Physics and Electrical Engineering Departments at De Montfort, Loughborough, Birmingham and Surrey Universities.

- Thin Film Techniques and Surfaces (3rd year).
- Solid State Physics (1st and 2nd year).
- CAD and modeling (1st year).
- Technology of microelectronic devices (2nd year).
- Microelectronics (3rd year), Semiconductors Devices (1st year) and Fundamentals of Electromagnetism (2nd year).
- Mass Media Technology (1st year)

6. Supervised Projects:

- Electrostatic Micro-motor/Actuator, final year project (BEng) Birmingham University.
- Preparation and characterization of Diamond-like Carbon Films on temperature sensitive substrates, PhD, Loughborough University.
- Optical Coatings by Physical Vapour Deposition techniques.
- Processing of electronic devices for Communication applications.
- **External examiner for a Master degree student at King Saud University:** Spectral properties and Laser emission from conjugated "PDEHF" polymer. April 2009.

- **Currently I am involved in supervising several BSc projects for physics's students at Imam University:**
 1. **Optical Properties of thin films deposited by Physical Vapor Deposition onto glass substrates.**
 2. **Gamma irradiation effects on ITO thin films.**
 3. **A lift off process for the fabrication of silver metallization contacts.**

7. Seminars:

- Validating a clean room. June 1999. Birmingham University.
- Clean room technology. October 1998. Birmingham University.
- Technological needs for vacuum arc evaporation. July 1995. Loughborough University.
- Clean Room Disciplines. March 2001. University of Surrey.

8. Teaching Skills:

- **City and Guild 7306 Further and Adult Education Certificate, Loughborough College. 1995-1996.**
- **Teaching Skills & Assessment procedures:** The course was organized by the Staff Development Unit at the University of Birmingham. September 1997.
- **Lecturing Skills for Research Staff:**
This course was organized by the Staff Development Unit at the University of Birmingham, November 1999.
 - **Presenting your research at conferences:**
This course was organized by the Staff Development Unit at the University of Surrey, March 2001.

9. Other Training Courses

- **Workshop at University of Surrey Ion Beam Centre.** April 2001.
- **Making the move contract Researcher to Lecturer.** It was organized by the Staff development Unit at the University of Surrey. January 2001
- **Clean Room Technology:** a course on clean room technology organized by the Scottish Society for Contamination Control in Scotland. October 1998.
- **Compressed Gas safety:** It was organized by the Health and safety Unit at the University of Birmingham. October 1998.
- **Laboratory Chemical Safety Course:** It was organized by the Health and safety Unit at the University of Birmingham. October 1998.
- **Clean Room Validation:** A course on clean room validation organized by the Scottish Society for Contamination Control. NEC Birmingham, June 1999.

10. Skills and talents

- Strong background in Thin Film Coatings, processing and characterisation.
- Extensive Hands on experience on photolithography and patterning of materials.
- Good knowledge of semiconductor physics and fabrication of semiconductor devices.
- Familiar with thin film optical fibre devices and signal travelling through the fibre for communication applications.
- Good communication skills both oral and written.
- Reliable and dependable person.
- Good command of English and French.
- Extensive use of computer graphics and word processor: PowerPoint, Excel, Word, FrontPage, Internet research, Unix, Sigma Plot and CAD package e. g. Corel Draw.
- Excellent interpersonal skills, able to work as part of team or alone as the task demand.

11. Interests

I take part in various sporting activities, including swimming football and volleyball. I enjoy reading scientific journals and books. I also enjoy travelling as it enables me to meet people of different culture and background.

12. Current Research projects

Modeling and Simulation of high efficiency Organic Light Emitting Diode. Principal Investigator (SR 76,800 sponsored by Al-Imam University).

Optimization of Physics interfaces between substrates and deposited thin films in microelectronic device fabrication. Principal Investigator (SR 88,800 sponsored by Al-Imam University).

Optimizing solar electricity output from silicon p-n junction solar cells. Co Investigator (SR 101,800 sponsored by Al-Imam University).

Fabrication of new Multilayer's Nano-diode from organic materials for full color displays. Joint project with King Saud University and KACST

Silicon Nano-particles-Top-Dye-Sensitized Solar Cell(Si-DSSC): New Designs and Mechanistic Studies of Photosensitization. . (SR1, 350, 000), Joint project with King Saud University and KACST .

Fabrication of electronic devices for communication and display applications. .(Photolithography, Etching: dry/wet, lift off, patterning and clean room management).

Joint project with KSU.

**Thin films by physical / chemical vapour deposition techniques for optical ,
electronic and decorative applications.**

13. List of publications:

- **N. Mustapha, A. Hennache, and Z. Fekkai.** Conducting Oxide thin films as anode for solar cell device. Accepted for publication in British Journal of Applied Science & Technology (BJAST) 2013.
- **K H Ibnaouf, S. Prasad, v. Masilamani, M. S. AlSalhi, N. Mustapha, A.Alyamani.** Triple amplified spontaneous emissions from a conjugated copolymer BEHP-co-MEH-PPV in solution. Physica E 53(2013) 66-71
- **N. Mustapha, K H Ibnaouf, Z. Fekkai, A. Hennache, S. Prasad, A.Alyamani.** Improved efficiency of solar cells based on BEHP-co- MEH-PPV doped with ZnO nanoparticles. Optik-International Journal for Light and Electron Optics. Volume 124, Issue 22, November 2013, Pages 5524-5527.
- **Nazir Mustapha and Zakia Fekkai**
Optical Properties of Solution - Processed MEH-PPV Thin Films. Journal of Materials Science and Engineering, Volume 5, No. 8 USA, August 2011.
- **Nazir Mustapha and Zakia Fekkai**
Improved Structure and Efficiency of Nano-Structured Organic Light Emitting Diode. Journal of Materials Science and Engineering, Volume 5, No. 1 (serial No.38), USA, Jan 2011.
- **Nazir Mustapha**
Fabrication of Efficient Solution-Processed Nano-diode for full color displays. Journal of Materials Science and Engineering, , Volume 3, No. 8 (serial No.21), USA, Aug2009.
- **Nazir Mustapha**
Investigation and Development of a model to characterize SWCNT and MWCNT Carbon Nanotubes.
Presented at the KAIN and King Saud University Conference held 5 - 7April-2009, Riyadh, Saudi Arabia.
- **N Mustapha**
Scanning Tunneling Microscope and its uses in measuring atomic structure. **The chemistry**, Published by Saudi Chemical Society, Issue 23, October 2004.p.30-31.
- **N. Mustapha**
Artificial Intelligence and its uses in the production of chemical compounds.
The chemistry, Published by Saudi Chemical Society, Issue 24, March 2005. Pp.30-31.

- O V Salata, Z Liu, A Safonov, **N Mustapha**, V Christou, S C Lo, P L Burn, Ifor Samuael and Jonathan Markham. Highly Efficient OLED's with Solution-Processed Dendrimer Emitter. The 9th International Display Workshops, 4-6 December 2002, IDW 02, Hiroshima, Japan.
- O V Salata, Z Liu, A Safonov, **N Mustapha**, S C Lo and P L Burn. Efficient Solution-Processed Dendrimer OLED's. Photonics Asia 2002, Proceedings of SPIE Vol 4918, 15-16 October 2002, pp.117-121, Shanghai, China.
- **N Mustapha** and R P Howson. Reactive filtered arc evaporation. **Vacuum**, Volume/issue: 60/3, Feb.2001 pp.361-368.
- **N Mustapha**
Deposition of silver contacts onto microwave devices by DC magnetron sputtering. School of Electronic and Electrical Engineering, University of Birmingham. Presented in the 2000 **MESM** conference, Philadelphia University, Amman, Jordan, August 28-30, 2000.
- **N Mustapha** and R P Howson. Comparison of reactive magnetron sputtering and filtered arc evaporation for the preparation of films onto insulating substrates. **Vacuum**, Volume 49, Number 2, 1998 pp. 75-79.
- **N Mustapha** and R P Howson.
Optical TiN films by reactive filtered arc evaporation. **Surface Coatings and Technology** 92 (1997). Pp.29-33.
- **N Mustapha**.
Preparation of carbon films by filtered arc evaporation. Internal review report, Physics Department, Loughborough University, March 1993. Presented to Leicester, Sheffield and Loughborough Universities.
- R P Howson, **N Mustapha**, H A J' afer and M Stenlake.
A comparison between the performance of an arc evaporation source with ion selection and an unbalanced magnetron sputtering source. Proceedings of **IPAT** 1991, (CEP Consultants Ltd) Brussels, **Belgium**. Pp. 328-334