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Professor of Radiation Biophysics

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Short Biography

I am a professor of radiation biophysics at Galala University and National Research Centre in Egypt with 17 years experience. I have earned my D.Phil. in Radiobiology from University of Oxford, UK. During my D.Phil., I investigated the role of radiation quality in modulating the intercellular communication between normal and precancerous cells. I have extensive research and training experience at University of Oxford, New Jersey Medical School Cancer Center, Rutgers University, NASA Space Radiation Laboratory and National Research Centre. My research interest is studying the effects of low-dose ionizing radiation and the associated phenomena of Bystander Effect, Adaptive Response and modulation intercellular communication with their implications on human health. I have Published 20 papers in peer-reviewed journals. Teaching and courses development experience for both undergraduate and postgraduate levels at Mansoura, Port Said and Galala Universities.

Education

2007 –2011	D.Phil. in Radiobiology, University of Oxford, UK
2003 – 2006	M.Sc. in Biophysics, Mansoura University, Egypt
1995 – 1999	B.Sc. in Biophysics, Mansoura University, Egypt

Professional Career

Oct. 2024 – Present	Full-time Professor at Physics Department, Faculty of Science, Galala University, Egypt Development and teaching of Biophysics, General Physics & Introductory Physics courses (Courses include Classical Mechanics, Fluid Mechanics, Thermodynamics, Radiation Physics, Radiobiology, Electricity and Magnetism)
Aug. 2024 – Present	Biophysics Professor at National Research Centre, Egypt (On a leave)
2019 – 2024	Associate Professor at the National Research Centre, Egypt My research at the National Research Centre focused on investigating the <i>in vivo</i> radiation-induced Bystander effects and adaptive response in partially and whole-body irradiated rats to estimate the risk associate diagnostic and therapeutic radiology for both patients and radiation workers

- 2012 –2019 **Researcher at the National Research Centre, Egypt**
- 2020 – 2024 **Part-time Associate Professor at Faculty of Science, Galala University, Egypt**
- 2020 – 2021
2013 – 2014 **Part-time Associate Professor at the physics department, Faculty of science, Mansoura University, Mansoura, Egypt**
Development and teaching of Radiobiology course to postgraduate students.
- 2018 – 2020 **Part-time Associate Professor at the Physics Department, Faculty of science, Port Said University, Port Said, Egypt**
Development and teaching of Biophysics and Radiobiology courses to undergraduate students.
- July –Aug. 2018 **Visiting Research Fellow at Oncology Department and Jesus College, University of Oxford, UK.**
In the fellowship, we investigated the kinetic behaviour of both autocrine destruction (AD) and IIA as a function of cell density of both precancerous and normal cells using an insert co-culture system and how exposure of normal cells to ionizing radiation influence the kinetics of apoptosis induction in precancerous cells.
- April 2011 - Oct. 2012 **Postdoctoral fellow at the New Jersey Medical School Cancer Center, Rutgers university, USA**
Investigation of the molecular mechanisms underlying the non-targeted effects of ionizing radiation, with particular emphasis on the role of intercellular communication, oxidative metabolism and DNA repair.
- Oct. 2006 – Jan 2011 **D. Phil. student at University of Oxford, UK.**
- Dec 2001 – Jan 2006 **Associate researcher at National Research Centre, Egypt**
Investigation of the radiation-induced structural changes in the haemoglobin of whole-body irradiated rats.
- Sep 2001 – Dec 2001 **Laboratory instructor at Physics Department, Faculty of Science, Mansoura University, Egypt**
Teaching experimental physics to undergraduate students at physics laboratories.

Teaching Experience

- 2020 – Present **Undergraduate students Instructor, Galala University**
Courses: Biophysics, General Physics & Introductory Physics
Responsibilities: Preparation of course specifications, delivering lectures and associated labs to Physical Therapy, Dentistry, Engineering, Computer Sciences and Applied Health Sciences students with all associated examination and student evaluation processes

- 2020 – 2021
2013 – 2014
- Graduate students Instructor, Faculty of Science, Mansoura University**
Course: Radiobiology and General Biophysics
Responsibilities: Course development, and delivering lectures to medical Physics and Biophysics graduate students with all associated examination and student evaluation processes
- 2018 – 2020
- Graduate and undergraduate students Instructor, Faculty of Science, Port Said University**
Courses: Radiobiology, Radiation Protection, Bioelectricity and General Biophysics
Responsibilities: Course preparation and delivering lectures to undergraduate and Radiology Physics graduate students and with all associated examination and student evaluation processes

Leadership Experience

- ISO9001:2015 quality management system manager at the National Research Centre. Egypt.
- Internal Auditor of ISO9001:2015 quality management system at the National Research Centre. Egypt.
- Principal Investigator of two research projects at National Research Centre.
- Board member of conferences and seminars committee at Faculty of Science Galala University.
- Board member of Biophysics exam committee at Faculty of Science Galala University.

Academic Supervision

- Co-supervised four M. Sc. students at Mansoura University, Egypt. (three awarded and one running)

Current Collaboration

- Current collaboration with the Radiation Biophysics group at Oncology Department, University of Oxford, UK.
- Current collaboration with Oxford Big Data Institute, University of Oxford, UK.

Selected Conference Talks

Talks in international scientific meetings

- The Imaging Cellular and Chromosome Dynamics, FASEB Conference, Accra, Ghana, 2023
- Biophysics and related sciences conference, Cairo University, Egypt, 2023.
- The 61th annual meeting of Radiation Research Society, Weston, Florida, USA, 2015
- The 14th International Workshop on Radiation Damage to DNA, Malborne, Australia, 2015
- The 60th annual meeting of Radiation Research Society, Las Vegas, USA, 2014
- The 6th Hope meeting with Nobel Laureates, Tokyo, Japan, 2014
- The 13th International Workshop on Radiation Damage to DNA, MIT, Cambridge, USA, 2014
- Association for Radiation Research Annual meeting, Edinburgh, Scotland, 2010.
- The 15th International Symposium on Microdosimetry, Verona, Italy, 2009.
- The 54th annual meeting of Radiation Research Society, Boston, USA, 2008.

Honours and Awards

- Africa Oxford Initiative catalyst grant award, University of Oxford, UK. 2024
- Professor Kamal Nasr Abdelnoor Award in physical sciences from the National Research Centre, Egypt. 2017
- Early Career Investigator Award from the 14th international workshop on radiation damage to DNA, Melbourne, Australia, March 2016.
- SIT award at the 61st Radiation Research Society meeting in Weston, Florida, USA. September 2015
- SIT award at the 60th Radiation Research Society meeting in Las Vegas, USA. September 2014
- Young Investigator award for the 13th international workshop on radiation damage to DNA. MIT, Cambridge, USA. June 2014
- Junior investigator travel award from USRA, NASA Johnson Space Centre, in the MICROS 2009 – 15th International Symposium on Microdosimetry, Verona, Italy. October 2009.

Laboratory Expertise

- The use of different types of irradiation machines (X-rays & gamma-rays).
- Cell culture.
- Radiobiology *in vivo* experiments using animal models.
- Co-Immunoprecipitation.
- Western-blotting.
- Confocal microscopy.
- Flow cytometry.
- Comet Assay.
- FTIR spectroscopy.
- UV/Visible spectroscopy.

Training & Courses

- Training course on Modelling radiation effects from initial physical events. University of Pavia, Pavia, Italy May-June 2014.
- Training on the beam line of the NASA space radiation laboratory while attending the NASA Space Radiation Summer School, NASA space radiation laboratory, Brookhaven National Lab., NY, USA, May-June 2012.
- Training on the RARAF microbeam facility at Columbia University, NY, USA March. 2012.
- Training course “Development/Implementing & Reviewing ISO9001:2015 Quality Management System
- Training course “Internal Audit of quality management system ISO9001:2015
- During both of my Ph.D. and Postdoctoral fellowship, I have had training on the use of irradiation facilities at the Medical Research Council, Harwell and University of Oxford. After successful training, I got unescorted access to both facilities.
- Training course on Cryogenic Gas Safety, University of Oxford, UK.
- Training course on Teaching Skills, University of Oxford, UK.
- Training course on Laser Safety at the Medical Research Council, Harwell, UK.
- Training course on Basic Radiation Protection at the Medical Research Council, Harwell, UK.

Funding

- Africa Oxford Initiative catalyst grant, University of Oxford, UK. 2024
- A research grant from the National Research Centre (NRC 13020305), 2023-2025. (A running grant). **Role:** PI
- A research grant from the National Research Centre (NRC 12020305), 2019-2022. **Role:** PI
- A research grant from the National Research Centre (NRC 1050601), Sep. 2014 – June 2016. **Role:** Member
- Chemical Security Improvement Grant from the U.S. Department of State's Chemical Security Engagement Program (CSP), July 2013. **Role:** PI

Fellowships

April. 2024 – June 2024	Africa Oxford Initiative catalyst grant, University of Oxford, UK
July 2018 – Aug. 2018	Africa Oxford Initiative fellowship, University of Oxford, UK
April 2011 – Oct. 2012	Postdoctoral fellowship at the New Jersey Medical School Cancer Center, Rutgers university, New Jersey, USA
Oct. 2006 – Jan. 2011	D.Phil. scholarship from the Ministry of Higher Education and Scientific Research

Quality Management System experience

- ISO9001:2015 quality management system manager at the National Research Centre. Egypt.
- Internal Auditor for ISO9001:2008 and ISO9001:2015 quality management system at National Research Centre, Egypt.

List of Publications

- 1- Lamiaa M. Ramadan, Abdelrazek B. Abdelrazzak. (2024) " The non-targeted effect increases the risk of the radiation-induced myocardial injury" Int J Radiat Res. 22(2).
- 2- Abdelrazzak, A. B. and L. M. Ramadan (2024). "Markers of oxidative stress and inflammation increase in the lung and liver of partially irradiated rats." Egyptian Journal of Basic and Applied Sciences 11(1): 412-423.
- 3- Abouelsayed, A., El-Bahy, G. S., & Abdelrazzak, A. B. (2024). FTIR spectroscopic investigations of protein conformation provide clues of radioadaptation in the kidney of low-dose irradiated rats. Journal of Molecular Structure, 1295, 136643.
- 4- Abozied, A. M., A. Abouelsayed, B. Anis, M. F. Zayed, W. H. Eisa and A. B. Abdelrazzak (2024). "Thymus vulgaris-assisted growth of nickel nanoparticles onto Luffa fibers: A robust and recyclable catalyst for the reduction of organic pollutants." Materials Today Sustainability 27: 100814.
- 5- Abouelsayed, A., El-Bahy, G. S., & Abdelrazzak, A. B. (2024). "Terahertz Time-Domain Spectroscopic (THz-TDS) Insights into Protein Deformation". Brazilian Journal of Physics, 54(2), 1-9.
- 6- AM Hezma, WA Shaltout, HA Kabary, GS El-Bahy, AB Abdelrazzak (2023). Fabrication, characterization and adsorption investigation of Nano zinc oxide–sodium alginate beads for effective removal of chromium (VI) from aqueous solution Journal of Inorganic and Organometallic Polymers and Materials 33 (5), 1400-1408

- 7- Abouelsayed, A., Hezma, A. M., El-Bahy, G. S., & Abdelrazzak, A. B. (2023). Modification of protein secondary structure as an indicator of radiation-induced abscopal effect: a spectroscopic investigation. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 287, 122093.
- 8- A. B. Abdelrazzak, M. Hill and P. O'Neill (2022) "Influence of ionizing radiation and cell density on the kinetics of autocrine destruction and intercellular induction of apoptosis in precancerous cells". *Scientific reports* 12 (1), 1-12.
- 9- Abdelrazek B. Abdelrazzak, A. M. Hezma and Gamal S. El-Bahy (2021) "ATR-FTIR spectroscopy probing of structural alterations in the cellular membrane of abscopal liver cells" *Biochimica et Biophysica Acta (BBA) – Biomembranes*, 1863 (11), 183726.
- 10- Mohamed E. Abdraboh, Zaidoon Shaker Essa, Abdelrazek B. Abdelrazzak, Yousra M. El-Far, Yasser Elsherbini, Mustafa M. El-Zayat, Doaa A. Ali. (2020) "Radio-sensitizing effect of a cocktail of phytochemicals on HepG2 cell proliferation, motility and survival" *Biomedicine & Pharmacotherapy*, 131, 110620.
- 11- A. M. Hezma, Abdelrazek B. Abdelrazzak, Gamal S. El-Bahy (2019) "Preparation and Spectroscopic Investigations of Hydroxyapatite-Curcumin Nanoparticles-loaded Polylactic acid for biomedical application" *Egyptian Journal of Basic and Applied Sciences*, 6(1), 1-9
- 12- Abdelrazek B. Abdelrazzak, Mohamed A. El-missiry, Moustafa T. Ahmed, Basma F, Elnady (2018) "Effect of low-dose X-rays on the liver of whole-body irradiated rats" *International Journal of Radiation Biology*, 95 (3): 264-273.
- 13- Abdelrazek B. Abdelrazzak, Ahmad M. Labeeb, Gamal S. El-Bahy (2018). "Changes in the dielectric properties of rat lung tissue following x-irradiation." *Egyptian Journal of Basic and Applied Sciences* 5(4): 298-302.
- 14- Abdelrazek B. Abdelrazzak, Gamal S. El-Bahy (2018) "FT-IR spectroscopic investigation of ionizing radiation-induced damage in the small intestine of whole-body irradiated rats". *Vibrational Spectroscopy* 99 146–150.
- 15- Amal A. Mohye El-Din, Abdelrazek B. Abdelrazzak, Moustafa T. Ahmed, Mohamed A. El-missiry (2017) "Radiation induced bystander effects in the spleen of cranially-irradiated rats". *Br. J Radiol.* 90 (1080): 20170278.
- 16- Hezma, A. M., El-Rafei, A. M., El-Bahy, G. S., Abdelrazzak, A. B. (2017) "Electrospun Hydroxyapatite Containing Polyvinyle Alcohol Nanofibers Doped with Nanogold for Bone Tissue Engineering". *Interceram* 66 [3] 96-100
- 17- Abdelrazek B. Abdelrazzak, Stefanie Pottgießer, Mark Hill, Peter O'Neill and Georg Bauer (2016) "Enhancement of peroxidase release from non-malignant and malignant cells through low-dose irradiation with different radiation quality". *Radiation Research*, 185:199-213.
- 18- L. G. Marriotti, A. B. Abdelrazzak, A. Ottolenghi, P. O'Neill and M. A. Hill. (2015) "Stimulation of intercellular induction of apoptosis in transformed cells at very low doses of ionizing radiation: spatial and temporal features". *Radiation Protection Dosimetry*, Vol. 166, No. 1–4, pp. 161–164.
- 19- Abdelrazzak Abdelrazek B, Stevens David L, Bauer Georg, O'Neill Peter, and Hill Mark A (2011) "The role of radiation quality in the stimulation of intercellular induction of apoptosis in transformed cells at very low doses". *Radiation Research*, 176(3):346-55.
- 20- Abdelrazek B. Abdelrazzak, Peter O'Neill and Mark A. Hill. (2011) "Intercellular induction of apoptosis signalling pathways". *Radiation Protection Dosimetry*, Vol. 143, No. 2–4, pp. 289–293.

21-L. G. Mariotti, A. B. Abdelrazzak, D. Liddle, A. McGuire, B. Vojnovic, M. Hill, P. O'Neill "Modulation of intercellular induction of apoptosis in transformed cells by ionising radiation: the variation with space and time". *Submitted to Radiation Research*