

# MUBARAK MUJAWAR, Ph.D.

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## Brief Biography

Mubarak Mujawar is currently working as an Instructor at the Department of Electrical and Computer Engineering, Florida International University. His research is focused on investigating **low temperature plasmas** for their applications in nanofabrication and biotechnology. He is also involved in **undergraduate engineering education research** and has interest in creating active and collaborative learning environments for large enrollment courses. He received his PhD from Dublin City University, Ireland. Prior to joining FIU, he worked as a postdoctoral research fellow at Laser and Plasma applications group, Trinity College Dublin, Ireland.

## Education

<b>Ph.D.</b>	Plasma Technology	2013	Dublin City University, Ireland
<b>M.Sc.</b>	Physics with Materials Science	2005	University of Pune, Pune, India
<b>B.Sc.</b>	Physics with Electronics	2001	Willingdon College, Sangli, India

## Teaching / Research Experience

2018- Present	Instructor, Florida International University
2016- 2017	Postdoctoral Researcher & Adjunct Lecturer, Florida International University <u>Research Area</u> : Plasma Assisted Nanomaterial Synthesis, Nanofabrication
2012-2014	Postdoctoral Research Fellow, Trinity College Dublin, Ireland <u>Research Area</u> : Pulsed Laser Deposition
2008-2012	Ph.D. Student and Teaching Associate, Dublin City University, Ireland <u>Research Area</u> : Low Temperature Plasma Physics
2005-2008	Junior Research Associate, Department of Physics, University of Pune, India <u>Research Area</u> : Thin Film and Nano-structures
2007-2008	Lecturer (BioPhysics), Symbiosis International University, Pune, India
2007-2007	Visiting Lecturer (Physics), Government College of Engineering, Pune, India

## Relevant Educational/Outreach Activities

**Collaborative learning for ‘Fundamentals of Cybersecurity’ course** - Designing a group based active and collaborative learning activities for CTS 1120 (Fundamentals of Cybersecurity) course at the Department of Electrical and Computer Engineering, FIU.

**Collaborative Inquiry facilitator** - Serving as group facilitator for undergraduate students’ ‘Collaborative Inquiry’ activities at FIU (research funded by NSF INCLUDES grant)[Since Feb 2017].

**NERC ASSIST Education Coordinator** - Acting as a Education Coordinator for NSF funded NERC - ASSIST center at the Department of Electrical and Computer Engineering, FIU [Since August 2017].

**Secretary, Physics Education Journal** - Served as secretary for Physics Education journal, a quarterly published by Indian Association of Physics Teachers in association with the University of Pune, Indian Space Research Organization and Department of Science and Technology, India. (weblink: <http://www.physedu.in/>) [Dec 2004 Sept 2005]

## Research

### Current Research Interests

- Bio-MEMS, biosensors and bioelectronics
- Low temperature Plasma - surface interaction
- Engineering Education

## Grants

**Co-PI:** Florida Center for CyberSecurity, pending; ‘Active and Collaborative learning for introductory cybersecurity courses’

**Co-PI:** National Science Foundation, DGE, pending; ‘IGE: Integrated Quantum Engineering, Science and Technology (iQuEST) graduate program’

**Co-PI:** National Science Foundation, ECCS, pending; ‘Understanding the role of cold atmospheric plasma for cellular injection’

## Prior Research work

**Postdoctoral research Fellow** @ School of Physics, Trinity College Dublin, Ireland (May 2012- August 2014)

Project title: Atmospheric plasma assisted Pulsed Laser Deposition (APLD) of metal nanoparticle

- Design and development of atmospheric plasma assisted pulsed laser deposition system
- Studied interaction of plasma jet with laser ablated material at atmospheric pressure
- Synthesizing and characterizing metal nanoparticles by nanosecond and femtosecond PLD in vacuum and atmospheric pressure

- **Postgraduate research student** @ School of Physics, Dublin City University, Ireland (May 2008-April 2012)

Thesis title: Studies on Constricted Plasma Source for Negative Ion Production

- Designed and developed a uniform, large area Hollow cathode -constricted anode plasma source
- Studied properties of anodic glow and its impact on the DC discharge properties
- Studied production and transport of oxygen negative ions in the anode region of constricted anode plasma source

- **Junior Research Fellow** @at Department of Physics, University of Pune, India (July 2005 - April 2008)

Project title: ECR Plasma Assisted Synthesis of Nanostructures

- Developed a permanent magnet based ECR Plasma source for MOCVD of metal-oxide nanoparticles
- Studied the nucleation and growth of diamond like carbon coatings using XRD, SEM, UV, IR and Raman Spectroscopy

## Courses Taught at FIU

EEL 5009	Concepts in Electrical & Computer Engineering	Spring 2018
CTS 1120	Fundamentals of Cybersecurity	Spring 2018
PHY 2048	Physics with Calculus I	Summer 2017
PHY 2053	Physics without Calculus I	Summer 2017, Fall 2017
PHY 2166	Physics problem solving	Fall 2016
AST 1002	Descriptive Astronomy	Fall 2016, Spring 2017, Fall 2017

## Membership of Professional Bodies

- IEEE
- American Association of Physics Teachers(AAPT)
- Institute of Physics (associate member)
- Plasma Science Society of India (life member)

## List of Publications

1. Mubarak A. Mujawar, Shekhar Bhansali *Anchor activities for Collaborative learning in fundamentals of cybersecurity* **IEEE Transactions on Education** (in preparation)
2. M. A. Mujawar, D. N. Chari, S. Amutha, S. Bhansali; *Metacognitive awareness of research writing amongst engineering graduates*; **International Journal of Engineering Education** (in preparation)
3. M. A. Mujawar, S. K. Karkari, M. M. Turner; *Negative oxygen ion production in the anodic glow region of a constricted hollow anode plasma source*; **Journal of Physics D: Appl Physics** (under review)
4. M Karbaschi, M.A. Mujawar, Y.Ji , M. Mendoza, J.S. Marquez, A. Sonawane, P.Shah, S. Bhansali, M. Cooke; *Novel, Automated High-Throughput Comet Assay Device for Genotoxicity Testing*; **Nature Scientific Reports**(under review)
5. Pranjal Nautiyal, Mubarak Mujawar, Benjamin Boesl, Arvind Agarwal; *In-situ Mechanics of 3D Graphene Foam Based Metallic Metamaterial*; **Advanced Functional Materials** (Under preperation)
6. T.M. Khan, M.A. Mujawar, K.E. Siewerska, A. Pokle, T. Donnelly, N. McEvoy, G.S. Duesberg, J. G. Lunney; *Atmospheric pulsed laser deposition and thermal annealing of plasmonic silver nanoparticle films*; **Nanotechnology** 28 (2017) 445601

7. S.C. Singh, C. Fallon, P. Hayden, M. Mujawar, P. Yeates, J.T. Costello; *Ion Flux Enhancements and Oscillations in Spatially Confined Laser Produced Aluminum Plasmas*; **Phys. Plasmas** 21 (2014) 093113
8. M. A. Mujawar, S. K. Karkari, M. M. Turner; *Properties of a differentially pumped constricted hollow anode plasma source*; **Plasma Sources Sci. Technol.** 20 (2011) 015024
9. N. Sirse, S. K. Karkari, M. A. Mujawar, J. Conway, M. M. Turner; *The temporal evolution in plasma potential during laser photo-detachment used to diagnose electronegative plasma* ; **Plasma Sources Sci. Technol.** 20(2011)055003
10. M. A. Mujawar , S. K. Karkari and M. M. Turner; *Properties of a constricted anode plasma source*; ECA, 34A(2010) P4.302, ISBN 2-914771-62-2
11. M. A. Mujawar, S. K. Karkari and M. M. Turner; *A differentially pumped hollow cathode constricted anode plasma source for the production of negative ions*; ECA, 34A(2010) P4.301, ISBN 2-914771-62-2
12. M. A. Mujawar, S. K. Karkari, M. M. Turner; *On the anodic current oscillations in the constricted hollow anode plasma source*; Proceedings of 30th International conference on Phenomenon in ionized gases, Belfast, UK, 28 Aug- 02 Sept 2011
13. M. A. Mujawar, S. K. Karkari, M. M. Turner; *Investigation of Ar/O<sub>2</sub> discharge in constricted hollow anode plasma source*; Proceedings of 30th International conference on Phenomenon in ionized gases, Belfast, UK, 28 Aug- 02 Sept 2011
14. M. A. Mujawar, S. K. Karkari, M. M. Turner; *Negative ion temperature from the temporal evolution of plasma potential during laser photodetachment*; Proceedings of 30th International conference on Phenomenon in ionized gases, Belfast, UK, 28 Aug- 02 Sept 2011
15. S K Karkari, M. A. Mujawar, M. M. Turner; *The non-linear behavior of the constricted anode glow and its influence on the discharge properties*; National Conference on Nonlinear Systems and Dynamics, Trichy, India 27-30 Jan 2011
16. M. A. Mujawar, S. K. Karkari and M. M. Turner; *A constricted plasma source for negative ions*; 7<sup>th</sup> International conference on reactive plasmas, Paris, France, October 4-8, 2010

### Oral presentations (selected)

1. M. A. Mujawar, S. K. Karkari, M. M. Turner; *Transient properties of anodic glow in constricted anode plasma source*; 39th IEEE International conference on plasma science, Edinburgh, UK, 8-12 July 2012
2. M. A. Mujawar, S. K. Karkari and M. M. Turner; *Studies of electronegative Ar/O<sub>2</sub> discharge in a constricted hollow anode plasma source using dual probe technique*; 38th International conference on plasma science, Chicago, Illinois, USA, 26-30 June 2011
3. M. A. Mujawar, S. K. Karkari and M. M. Turner; *A constricted plasma source for negative ions*; 63rd Annual Gaseous Electronics Conference, Paris, France, October 4-8, 2010
4. M. A. Mujawar, V. P. Godbole, S. V. Bhoraskar; *Study of photo-catalytic degradation of organic solution using micro and nano sized titania*; Raman memorial Conference, Pune, India, 24-26 Nov 2008

## Poster presentations (selected)

1. *Pulsed laser deposition of nanoparticle films*; Tony Donnelly, Mubarak Mujawar, Inam Mirza, Gearoid OConnell, Pascal Kuhn and James G. Lunney; Amber presentations, Dublin, 24 Oct 2013
2. *Time resolved electron density measurements in a pulsed discharge using combination of constricted and parallel plate electrodes*; M. A. Mujawar, S. K. Karkari, S. Daniels, M. M. Turner; Workshop on RF Discharges, La Badine France 17-20 May 2009
3. *Novel method for Synthesis of Tungsten Coatings*; G. B. Deokar, M. A. Mujawar, V. P. Godbole; International Conference on Advanced Materials and Composites, NIST, CSIR, Trivandrum, India, 24-26 Nov 2007
4. *Development of Permanent magnet electron cyclotron resonance MOCVD system for deposition of thin films*; V. S. Purohit, Mubarak Mujawar, V. P. Godbole, S. V. Bhoraskar, MRS India meeting, National Physical Laboratory, New Delhi, India; Feb 12-14 2007