

# Marwa ElDiwiny

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## Professional Experience

1 Nov 2018- Present	<b>Research Scholar</b> , University of Tartu, Institute of Technology, working on atomistic modelling and simulating of ionic-EAP artificial muscle for robotic application.
Sep 2017-Nov 2018	<b>Graduate Student Researcher</b> at Inria, Lille, Working on physics-based modelling of artificial muscle actuator for surgical applications.
May 2017-Sep 2017	<b>Research Engineer</b> at Inria, Lille, Working on Modeling and Simulation of Soft Robots.
Sept-Oct 2016	<b>Research Intern at Google [x]</b> , Reliability Team, Self-Driving cars project ( <b>Waymo</b> ), Mountain View, CA, USA.
Oct 2012- April 2017	<b>Assistant Lecturer (Sabbatical Leave)</b> <b>University:</b> Mechatronics and Industrial Robotics, Faculty of Engineering, Minia University, El Minia, Egypt.

## Professional Activities and Services

1 Dec 2018- Present	<b>Co-organizing</b> , Women in Robotics Workshop IV, Robotics: Science and Systems A Robotics Conference, Germany, 2019.
Jan 2018 - July 2018	Volunteer at Robohub, Pod-casting team. I did two pod-casting: <ul style="list-style-type: none"><li>• <i>Towards using Micro and Nano Robots in the Human Body, with Peer Fischer.</i></li><li>• <i>Bio-inspired Soft Robots for Healthcare, with Yong-Lae Park.</i></li></ul>
2015- April 2017	Women Activities Co-chair at IEEE Robotics and Automation Society Egypt Chapter (IEEE RAS). I was a co-organizer of <b>Prof. Oussama ElKhatib's</b> Talk of Ocean One: A Robotic Avatar for Oceanic Discovery at Zewil city.

## Editorial Experience

Dec 2018	IEEE Transactions on Mechatronics ( <b>Reviewer</b> ).
Dec 2018	IEEE Transactions on Vehicular Technology ( <b>Reviewer</b> ).

## University Education

2013–2015	Master of Science in Electrical Engineering, <b>Major:</b> Mechatronics and Industrial Robotics. <b>University:</b> Mechatronics and Industrial Robotics Program, Faculty of Engineering, Minia University, 61519, Minia, Egypt. <b>Dissertation titled</b> "Anti-Stealth Technology for safe piloting of Unmanned Aerial Vehicles", <b>Awarded.</b>
2012–2013	Pre-Master's for Mechatronics and Industrial Robotics Engineering. <b>University:</b> Mechatronics and Industrial Robotics Program, Faculty of Engineering, Minia University, 61519, Minia, Egypt. <b>Pre-master's Syllabus:</b> Mechatronics, Special Electric Machines, Variable Speed Drives, Automatic control (2) and Design of Digital Circuits, <b>Distinguished.</b>
2007–2012	Bachelor of Science in Mechatronics and Industrial Robotics Engineering. <b>University:</b> Mechatronics and Industrial Robotics Program, Faculty of Engineering, Minia University, 61519, Minia, Egypt. <b>Grade: Excellent with honor</b> , GPA 3.77 from 4.0 (94.11%), Top Student of Faculty of Engineering, Minia University In addition to being one of the top three graduates over Faculties of Engineering at Egyptian Universities. <b>Graduation Project:</b> Inertial guidance Algorithm for Unmanned Aerial Vehicle's, <b>Distinguished.</b>

## Summer School

2017	8th Summer School Surgical Robotics, <b>LIRMM</b> , September 6-13th 2017, Montpellier, France
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## Academic Honors and Awards

- **Third Place** at Tech starts Lille- Belgo, startup -weekend, designing an interactive online platform for teaching children the reading and writing.
- **Selected for the participation at Women in Robotics III, Robotics, Science and Systems Conference.** I have been granted a travel award \$1000.
- **Selected for the participation at IEEE ICRA PhD student Forum**, I have been awarded \$1000 for covering travel expenses. The PhD Forum will provide an opportunity for discussing and exploring the research interests and career objectives with a panel of established researchers in robotics.
- **One of ninety women** who have been selected at **Techwomen 2016** out of +2300 **applicants**. TechWomen is an initiative of the **U.S. Department of States Bureau of Educational and Cultural Affairs (ECA)**. Launched by former Secretary of State Hillary Clinton in 2011. TechWomen brings emerging women leaders in science, technology, engineering, and mathematics (STEM) from Africa and the Middle East together with their professional counterparts in the The United States for a mentorship and exchange program.
- Distinguished Egyptian Engineer Day under the patronage of the Egyptian Presidency and Egyptian Engineering Syndicate, Honoring the top twenty of Egyptian Universities in 2013. One of the top three engineering graduates over Egyptian universities with percentage 94.11% GPA 3.77 scale(4.0).
- The Ideal student of faculty of Engineering for two years, the second place an ideal student at Minia University.

# Publications

## Conference Papers

- C1 Marwa A. El Diwiny, Abou Hashema M. El Sayed, El Sayed and G.Abouelmagd, Implementation of Anti-Stealth Technology for secure and safe operations of Unmanned Aerial Vehicle, IEEE/AIAA 33rd DASC, Digital Avionics System Conference, Designing an Air Transportation System with Multi-Level- Resilience, Colorado Springs, CO, United States, ISBN:978-1-4799-5002-7, DOI:10.1109/DASC.2014.6979527.
- C2 Marwa A. El Diwiny and Abou Hashema M. El Sayed, PTSD Monitoring by using brain computer Interface for Unmanned Aerial Vehicle Operator safety, IEEE/AIAA 33rd DASC, Digital Avionics System Conference, Designing an Air Transportation System with Multi Level- Resilience, Colorado Springs, CO, United States, ISBN: 978-1-4799-5002-7, DOI: 10.1109/DASC.2014.6979507.
- C3 Marwa A. El Diwiny, Abou Hashema M. El Sayed, El-Sayed Hassanen and G. Abouelmagd, New Anti Stealth Technology for Safe Piloting of Unmanned Aerial Vehicle, 11th IEEE ICMA 2014, the International Conference on Mechatronics and Automation, ISBN: 978-1-4799-3978-7, DOI:10.1109/ICMA.2014.6885679.
- C4 Marwa A. El Diwiny, Abou Hashema M. El Sayed, El-Sayed Hassanen and G.Abouelmagd, Proposed surface to Air Anti stealth Technology for Homeland Security, in proc of 2nd in- international Conference on Engineering and Technology IEEE ICET 2014, German University in Cairo, DOI:10.1109/ICEngTechnol.2014.7016785.
- C5 Marwa A. El Diwiny and Abou Hashema M. El Sayed, New Intelligent control of Auto self defensive unmanned Aerial Vehicle, in Proc. of the 12th WSEAS International Conference on Signal Processing, Robotics and Automation (ISPRA13), Cambridge, UK, ISSN: 1790-5117.

## Journal Paper

- J1 Marwa A. El Diwiny and Abou Hashema M. El Sayed, Intelligent Control of Unmanned Aerial Vehicle Using Inertial Guidance Algorithm, Online Journal on Electronics and Electrical Engineering, OJEEE, Reference Number: JO-E-0042, Vol. (5) - No. (3), 2013.

## Conference Presentations

- W1 Poster Presentation, Selected for the participation in Shape Changing Robotic Structures and Interfaces workshop, International Conference on Intelligent Robots and Systems, Spain, oct, 2018.
- W2 Poster Presentation, Selected for the participation in Women in Robotics III workshop, Robotics, Science and Systems Conference, PA, USA.
- W3 Poster Presentation, IEEE PhD student forum, IEEE International conference on Robotics and Automation, Brisbane, Australia.

W4	Lightning speaker at the Robots and Art Forum, the IEEE International Conference on Robotics and Automation in Brisbane, Australia, 2018.
W5	Assistant in the soft robotics workshop at RoboSoft 2018- IEEE RAS International Conference on Soft Robotics, Livorno, Italy.
W6	Marwa A. El Diwiny, Abou Hashema M. El Sayed, Future Unmanned Space Shuttle Anti-Stealth System for Safe Operation in War Space, Unmanned Systems 2015 Conference, AUVSI, Georgia World Congress Center, Innovation Hub Super Tracks: Defense& Research Atlanta, GA, USA.
W7	Marwa A. El Diwiny, Abou Hashema M. El Sayed, El-Sayed Hassanen and G.Abouelmagd, Airborne Anti stealth Technology, in proc of IAC 2014 1st international conference on Industry-Academia Collaboration, Cairo.

## Projects

May 2017-June 2017	<p><b>Simulating, Fabricating and Controlling a PneuNets-Gripper:</b> This tutorial is about designing, simulating and fabricating a soft gripper made with PneuNets actuators in Sofa-SR. Sofa-SR is a modelling, simulation and control environment for soft robotics using the simulation framework Sofa for rigid and deformable mechanics, and the plugin SoftRobots. PneuNets (pneumatic networks) are a class of soft actuator originally developed by the Whitesides Research Group at Harvard. They are made up of a series of channels and chambers inside an elastomer. These channels inflate when pressurized, creating motion. With three of such actuators, it is possible to make a soft gripper.</p> <p>For fabrication, we wanted to try the new Laser-cutting device available in the FabLab to see if it was easier than our classical 3D-printing workflow. The simulation aspects are done using Sofa-SR which is available from <a href="https://project.inria.fr/softrobot/">https://project.inria.fr/softrobot/</a>.</p> <p>This tutorial is strongly inspired by <a href="https://softroboticstoolkit.com/book/pneunets-bending-actuator">https://softroboticstoolkit.com/book/pneunets-bending-actuator</a>, the biggest difference is on how to use Sofa-SR for modelling and simulation and control.</p> <p>Link: <a href="https://github.com/SofaDefrost/Tutorials/blob/master/PneuNets-Gripper/README.md">https://github.com/SofaDefrost/Tutorials/blob/master/PneuNets-Gripper/README.md</a></p>
2012-2015	<p><b>Master Project</b> This project presents a new deep brain emotional learning for controlling proposed Unmanned Aerial Vehicle(UAV) anti-stealth technology. Anti-stealths environment is dynamic and unstructured, for tackling this case, intelligently pulsed ND YAG 532nm is empirically implemented for increasing lab specimen EM3500 wave absorbers electric permittivity consequently enhancing reflectivity. The coverage area of UAV is achieved by proposing cooperative laser beams for making intelligent shapes that mimic the expected dimensions of potential stealthy objects. These intelligent shapes of laser beams could detect the stealthy objects in a short time delay and from different angles of azimuth and elevation planes. Inspiring from the limbic system of the human brain, the deep brain emotional learning (DBEL) is implemented for UAV Anti-Stealth environment. A nested DBEL is simulated for controlling cooperative laser beams and tracking the detected stealthy object.</p>
2012-2015	<p>EEG signals as a secure communication for stealthy UAVs: The other part of the research handles the potential application for a brain-computer interface for Anti-Stealth technology. The proposed application, using normalized EEG signal as secure communication between stealth UAV and ground-station. The recorded electroencephalography signals from Emotive EEG headset, the data is sampled at 128Hz and analyzed by EEGLAB MATLAB. The energy of the recorded signals is calculated and normalized to form the encryption key required for the proposed application. This potential application is a benchmark for ongoing research to use brain signals as secure communication.</p>

2015-2015	Controlling mobile robot with EMG signals: In this project olimex EKG/EMG shield with three electrodes are used for measuring the neural activity of the muscles for specific motions for forearm. Digital Signal processing, Integration and pattern recognition are deployed for achieving the required output patterns for mobile robot movements.
2011-2012	Intelligent control of Unmanned aerial vehicle using inertial guidance algorithm.
2011-2012	Robot Competition, Asia-Pacific Broadcast Union(ABU).
2010-2011	Artis Zeego Machine for Cancer Diagnosis.
2009-2010	Computer Numerical Control PCB Drill.
2008-2009	Elevator project.

## Skills

### Programming Languages

Python, Assembly, VHDL.

### Software Skills

SOFA-framework, Matlab/Simulink, Excellent skills in distributed version control systems (Git) - Experience with cross-platform programming (Windows/Linux) .

## Training and Courses

2014	Mechatronics and Robotics workshop at Egypt Japan University of Science Technology (EJUST)
2012	Egypt air maintenance holding company, Cairo airport.
2011	MATLAB Course Jeilecom Company.
2011	Water station, Minia station.
2010	FPGAs design at Jeilecom Company.
2009	Microcontrollers at Jeilecom Company.

## References

### Prof.Oussama Khatib

Professor, Department of Computer Science, Director of Stanford Robotics Lab.  
e-mail:okhatib@gmail.com.

### Prof.Abdelfatah Mohamed

Chairman of Mechatronics and Robotics Engineering Dept, School of Innovative Design Engineering, Egypt-Japan, University of Science and Technology (EJUST).  
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### John Henrie

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