

Bassem DAHROUG

PhD, Mechatronics Engineer

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Field of Interest

Mechatronics - Mechatronics Design - Robotics - Automatic control - Visual servoing - Programming - Mechanics - Fluid mechanics - (micro)Manufacturing - Materials - Electronics

Skills and Know-how

Mechatronic design	● ● ● ● ●	Robotic experimentation	● ● ● ● ●
Robotics	● ● ● ● ○	Analysis, synthesis and solving problems	● ● ● ● ○
Automatic control	● ● ● ● ○	Oral and writing communication	● ● ● ● ○
Scientific programming	● ● ● ● ○	Organization, rigor and autonomy	● ● ● ● ○
Mechanics	● ● ● ● ○	Project Collaboration	● ● ● ● ○
Electronics	● ● ● ● ○		

Education

- 11/2014 – **Doctor of philosophy in Engineering Sciences**, **UBFC**¹, Besançon, France.
02/2018 **Dissertation**: Minimally Invasive Surgery in the Middle Ear: a guided micro-robotic system to efficiently remove cholesteatoma.
- 09/2012 – **Masters degree in Mechatronics and Micro-Mechatronics Systems**, joint masters degree
09/2014 from **ENSMM**², Besançon, France and **EPI**³, Gijón, Spain.
Master thesis: Design, modelling and control of a contactless modular conveyor.
- 09/2006 – **Bachelor degree in Mechanical Engineering**, **AAST**⁴, *College of Engineering Studies and Technology, Department of Mechatronics*, Alexandrie, Egypt.
09/2011 **Graduation project titre**: Mobile robot control for parking manoeuvre.

Professional and Academic Experiences

- 06/2021 – **PhD, Mechatronics engineer**, **AMAROB Technologies**⁵, Besançon, France.
11/2022
 - participate in the research and development of the main product of the company which is a micro-robotic systems dedicated to intracorporeal laser surgery;
 - design of a mechatronics device to actuate a blendable micro-robot;
 - manufacturing some parts of the micro-robot;
 - take part in the company activities with its collaborators and client;
 - design and fabricate a medical prototype for detecting the breast cancer;
 - manufacturing using milling and electrical discharge machines.
- 09/2021 – **Temporary teaching**, **ENSMM**, Besançon, France.
01/2022
 - 20 hours of practical work of JAVA programming for students in the 1st year of bachelor.

¹UBFC: <https://www.ubfc.fr/>

²ENSMM: <https://www.ens2m.fr/>

³EPI: <http://www.epigijon.uniovi.es/>

⁴AAST: <http://www.aast.edu/en/index.php>

⁵AMAROB: <https://amarob.com/>

- 09/2018 – **Researcher, Post-doctoral**, *Institute FEMTO-ST*⁶, *Department AS2M (Automatique et Systèmes Micro-Mécatroniques)*, Besançon, France.
- participate to the INSERM project "ROBOT" (Robotics and Optical coherence tomography for optical BiOpsy in the digestive Tract) [2017 – 2021] which proposes an innovative approach to detect the cancer cells at the digestive tract;
 - implement a visual servoing scheme based on the 3D imaging (C-scan) obtained from the OCT (Optical Coherence Tomography) for guiding a robot during the intra-operative phase in order to perform a repeatable optical biopsy;
 - design and development of a prototype in order to validate and integrate the distinct technological and methodological approaches proposed by the different projects teams;
 - supervision of two undergraduate trainees;
 - valorization of the dissertation work.
- 09/2019 – **Temporary teaching**, *UFC*⁷, Besançon, France.
- 01/2020
- 28 hours of practical work of robotics for the **ISIFC**⁸ students in the 3rd year of bachelor;
 - 12 hours of practical work of 3D computer vision for the students in the 2nd year of master;
 - 9 hours of practical work of automatic control of continuous system for the students in the 3rd year of bachelor.
- 11/2014 – **Research assistant, PhD student**, *Institute FEMTO-ST*, *Department AS2M*, Besançon, France.
- 02/2018
- early research stage of the project " μ RMEs" (Micro-Robot for Middle Ear Surgery)
 - analysis of the clinical need for middle ear surgery to treat the disease known as cholesteatoma;
 - development of an image-guided micro-robotic system to perform this procedure.
 - collaboration with **ARTOG** Center⁹, Bern, Switzerland, by conducting experimental tests to evaluate the proposed controller in a clinical environment;
 - supervision of six undergraduate trainees.
- 09/2015 – **Temporary teaching**, *ENSMM*, Besançon, France.
- 01/2016
- 64 hours of practical work of automatic control and programming for students in the 1st year of bachelor.
- 02/2014 – **Master graduation project**, *Institute FEMTO-ST*, *Department AS2M*, Besançon, France.
- 08/2014
- participate to the project "Smart Block" [2011 – 2015] which innovates the transportation of fragile objects by designing a modular and reconfigurable conveyor;
 - propose new designs for a modular block which builds an aerodynamic conveyor for transporting photovoltaic cells;
 - model the air jets below an object;
 - propose control law to control the opening of the ports of each block independently so that the object can maintain a fixed position or follow a desired trajectory;
 - numerical and experimental validation of the proposed controller.
- 02/2012 – **Temporary teaching**, *AAST*, *Department of Mechanics*, Alexandria, Egypt.
- 07/2012
- practical work of robotics and CAD (Computer Aided Design);
 - tutor of a university team participating in the 11th MATE (Marine Advanced Technology Education Centre) International ROV Competition.
- 02/2012 – **Bachelor graduation project**, *AAST*, *Department of Mechanics*, Alexandria, Egypt.
- 07/2012
- model and control of a mobile robot (car-like vehicle) for performing an automated parking maneuver.

Scholarship and Awards

2016 International mobility grant for doctoral students, funded by **UBFC**

2015 Best Automation Paper Award¹⁰, **ICRA'2015** (IEEE International Conference on Robotics and Automation)

⁶FEMTO-ST: <http://www.femto-st.fr/en/>

⁷UFC: <http://www.univ-fcomte.fr/>

⁸ISIFC: <http://isifc.univ-fcomte.fr/pages/en/index.html>

⁹ARTOG: http://www.artorg.unibe.ch/research/igt/index_eng.html

¹⁰ICRA'2015: <https://www.ieee-ras.org/about-ras/latest-news/635-icra-2015-award-recipients-announced>

- 2012 **European Scholarship**, Master **EU4M** (Mechatronics and Micro-Mechatronics Systems ¹¹) funded by the Erasmus Mundus programme
- 2008 **Participation in competition Robocon** (Egypt) with AAST team, 4th place in Egypt

Computer skills

Computer Aided Design (CAD): FreeCAD, Solidworks, CATIA, Creo

Computer Aided Manufacturing (CAM): G-Code, FreeCAD-Path, Vericut, GO2Cam

Electronic Design Automation (EAD): KiCAD, Eagle, Proteus, Quartus

Mathematics: Matlab/Simulink, Octave

Numerical Modeling: COMSOL Multiphysics

Programming: C/C++, ViSP, OpenCV, PCL, VTK, CMake,
Python, Java, JS, HTML, CSS,
micro-controller, Ladder,
TCP/IP, I2C,
Android

Simulation: Blender

Version Control: SVN, GIT

Operating Systems: Linux, Windows

Planning: Gantt

Office Tools: L^AT_EX, MS-office, Sozi

Linguistics



English



French



Arabic



Spanish

¹¹EU4M: <http://www.eu4m.eu/>