Bassem Dahroug

PhD, Mechatronics research 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 ●●●●●
Robotics ●●●●○
Automatic control ●●●●○
Scientific programming ●●●●○
Mechanics ●●●◐○
Electronics ●●●○○

Robotic experimentation ●●●●●
Analysis, synthesis and solving problems ●●●●○
Oral and writing communication ●●●●○
Organization, rigor and autonomy ●●●●○
Project Collaboration ●●●◐○

Education

11/2014 – 02/2018 **Philosophy degree in Engineering Sciences**, ***UBFC*** [1], Besançon, France.
Dissertation titre: Minimally Invasive Surgery in the Middle Ear: a guided micro-robotic system to efficiently remove cholesteatoma.

09/2012 – 09/2014 **Master degree in Mechatronics and Micro-Mechatronics Systems**, master double degree from **ENSMM** [2], Besançon, France and **EPI** [3], Gíjon, Spain..
Master thesis titre: Design, modelling and control of a contactless modular conveyor.

09/2006 – 09/2011 **Bachelor degree in Mechanical Engineering**, ***AAST*** [4], *College of Engineering Studies and Technology, Department of Mechatronics*, Alexandrie, Egypt..
Graduation project titre: Mobile robot control for parking manoeuvre.

Professional and Academic Experiences

09/2018 – 09/2020 **Researcher, Post-doctoral**, *Institute* ***FEMTO-ST*** [5]*, 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 project's teams,
- supervision of two undergraduate trainees.

[1] UBFC: https://www.ubfc.fr/
[3] ENSMM: https://www.ens2m.fr/
[3] EPI: http://www.epigijon.uniovi.es/
[4] AAST: http://www.aast.edu/en/index.php
[5] FEMTO-ST: http://www.femto-st.fr/en/

09/2019 – 01/2020 **Temporary teaching**, ***UFC*** [6], Besançon, France.
- 28 hours of practical work of robotics for the **ISIFC** [7] students in the 3^{rd} year of bachelor,
- 12 hours of practical work of 3D computer vision for the students in the 2^{nd} year of master,
- 9 hours of practical work of automatic control of continuous system for the students in the 3^{rd} year of bachelor.

11/2014 – 02/2018 **Research assistant,PhD student**, *Institute* ***FEMTO-ST***, *Department AS2M*, Besançon, France.
- 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** Center [8], Bern, Switzerland, by conducting experimental tests to evaluate the proposed controller in a clinical environment,
- supervision of six undergraduate trainees.

09/2015 – 01/2016 **Temporary teaching**, ***ENSMM***, Besançon, France.
- 64 hours of practical work of automatic control and programming for students in the 1^{st} year of bachelor.

02/2014 – 08/2014 **Master graduation project**, *Institute* ***FEMTO-ST***, *Department AS2M*, Besançon, France.
- 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 – 07/2012 **Temporary teaching**, ***AAST***, *Department of Mechanics*, Alexandria, Egypt.
- practical work of robotics and CAD (Computer Aided Design),
- tutor of a university team participating in the 11^{th} MATE (Marine Advanced Technology Education Centre) International ROV Competition.

02/2012 – 07/2012 **Bachelor graduation project**, ***AAST***, *Department of Mechanics*, Alexandria, Egypt.
- 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 Award, **ICRA**'2015 (IEEE Internaltional Conference on Robotics and Automation [9])

2012 European Scholarship, Master **EU4M** (Mechatronics and Micro-Mechatronics Systems [10]) funded by the Erasmus Mundus programme

[7] UFC: http://www.univ-fcomte.fr/
[7] ISIFC: http://isifc.univ-fcomte.fr/pages/en/index.html
[8] ARTOG: http://www.artorg.unibe.ch/research/igt/index_eng.html
[9] ICRA'2015: http://icra2015.org/conference/awards#!A99Q1394
[10] EU4M: http://www.eu4m.eu/

Computer skills

Mechanics: Solidworks, CATIA V5, Creo
Programming: C/C++, ViSP, OpenCV, PCL, VTK, micro-controller, Ladder, Java, JS, HTML, CSS
Mathematics: Matlab/Simulink, Octave
Numerical Modeling / Simulation: COMSOL Multiphysics, Solidworks, CATIA, Blender
Office tools: LaTeX, MS-office, Sozi
Operating systems: Ubuntu, Windows

Linguistics

 mother tongue
 fluent, level C1
 usual, level B2
 usual, level B2

Referees

Name	Position	Contact
○ Nicolas Andreff	○ University professor	○ ✉ nicolas.andreff@femto-st.fr ☎ +33 - 381 40 29 61
○ Brahim Tamadazte	○ Research scientist	○ ✉ brahim.tamadazte@femto-st.fr ☎ +33 - 381 40 29 25
○ Guillaume Laurent	○ Associate professor	○ ✉ guillaume.laurent@ens2m.fr ☎ +33 - 381 40 28 08