



TO MAGNIFICO RETTORE OF UNIVERSITA' DEGLI STUDI DI MILANO

ID CODE 5987

I the undersigned asks to participate in the public selection, for qualifications and examinations, for the awarding of a type B fellowship at **Dipartimento di Fisica**.

Scientist- in - charge: **Prof. Alessandro Podestà**

Hatice Zohra Michèle Holuigue

CURRICULUM VITAE

PERSONAL INFORMATION

Surname	Holuigue
Name	Hatice Zohra Michèle

PRESENT OCCUPATION

Appointment	Assegnista di ricerca, tipo B
Assegnista di ricerca	Dipartimento di Fisica, Università degli studi di Milano

EDUCATION AND TRAINING

Degree	Course of studies	University	year of achievement of the degree
Bsc. Degree	Physics and Chemistry	Université de Lille	2017
Master	Advanced Spectroscopy in Chemistry	Université de Lille / Jagiellonian University in Krakow	2019 (defense 24/06/2019)
PhD	Physics, Astrophysics and Applied Physics	Università degli Studi di Milano	2023 (defense 13/03/2023)

FOREIGN LANGUAGES

Languages	Level of knowledge
French	Native
English	C1



Italian	B2
Spanish	B1

AWARDS, ACKNOWLEDGEMENTS, SCHOLARSHIPS

Year	Description of award
2014	Cambridge First Certificate of English (B2)
2016	Label international - University of Lille, BSc. Physics and Chemistry. Label obtained thanks to a semester abroad (University of Moncton, Canada) and for pursuing a course of international culture.
2017	Label initiative - University of Lille, Master Advanced Spectroscopy in Chemistry. Label obtain for the co-creation of the student association BDE angstrom , the first of his kind for the student in physics and chemistry of the University of Lille. Student association that became "BDE Polysciences" from the merging with the student association of the chemistry students.

TRAINING OR RESEARCH ACTIVITY

<p><u>Description of activity:</u> Post-doctoral researcher at Dipartimento di Fisica "Aldo Pontremoli" at the University of Milan, working with Prof. A. Podestà.</p> <p>My research is focused on the study of the cell-microenvironment interaction and mechanobiology by atomic force microscopy (AFM).</p> <p>I perform cell-microenvironment adhesion force spectroscopy and cell nanomechanics experiment via AFM. My research is in collaboration with national and international institutes such as :</p> <ul style="list-style-type: none">- Ospedale San Raffaele (OSR, Dr. Massimo Alfano),- Istituto Europeo di Oncologia (IEO, Dr. Giuseppe Diaferia)- University of Cambridge (UC, Dr. Ioanna Mela). <p>My main goal is the description and characterization of the mechanotransductive events between the cells and their microenvironment such as its extracellular matrix or microbiome in both context of health and disease, combining diverse scanning probe techniques.</p> <p>In the meantime, I also focus on the characterization and calibration of probes for the reliable measurements of small interaction forces via Adhesion Force Spectroscopy measurements.</p> <p><u>Lectures followed during the PhD Fisica, Astrofisica, Fisica Applicata:</u></p> <ul style="list-style-type: none">• Experimental Methods for the investigation of Systems at the nanoscale (a.a. 2019/2020)• Meccanismi biologici alla base dello sviluppo tumorale (a.a. 2019/2020)• Molecular and cellular biology: methods and communication of results (a.a 2019/2020) <p><u>Workshops:</u></p> <ul style="list-style-type: none">• Communication, presentation, and public engagement skills, Bremen, Germany, 6th-9th



September 2021

- Gender issues in science and Gender in Science Careers, Gargnano, Italy, 10th-11th May 2022
- Proposal writing and grant scouting, Gargnano, Italy, 12th-13th May 2022
- Entrepreneurship in research, Amsterdam, The Netherlands, 29th-30th June 2022

Attended schools:

- AFM BioMed School, Grenoble, France, 21st-26th October 2019
- AFM BioMed School online edition, Marseille, France, 20th-22nd July 2020
- School organized by the Phys2BioMed project: Nano-mechanics: theory, models, experimental techniques, and practice, Bremen, Germany, 11th-12th September 2021
- School organized by the Phys2BioMed project: Biomechanics and its relation to disease, Lille, France, 17th-18th January 2022
- FEBS School : Mechanics in Biology: from molecules to cells and tissues, Glasgow, 4th-7th June 2023

PROJECT ACTIVITY

Year	Research Project
2018-2019	<p><u>Master Advanced Spectroscopy in Chemistry (M2)</u>. Research within the Laboratory for Forensic Chemistry, Faculty of Chemistry, Jagiellonian University in Kraków, under the supervision of Dr. Michał Woźniakiewicz.</p> <p>Investigation of possible degradation of D- lysergic acid amid (LSA) in Ipomoea, one of the many ergots alkaloids present in widely gardened ornamental plants. LSA has been proven to have similar psychoactive effect to LSD. Experiments were carried out using Liquid Chromatography-Mass Spectrometry obtained by microwave-assisted extraction.</p> <p>Work presented at the conference of the Young Forensic Chemists in Białystok, 2019.</p>
2019-2023	<p>PhD in Applied Physics within the <u>project H2020-MSCA-ITN project Phys2BioMed</u> (Grant agreement n. 812772) under the supervision of Prof. Alessandro Podestà. "Influence of the microenvironment of healthy and tumoral cells".</p> <p>The project included collaboration with national and international groups and secondment periods.</p> <p>National research collaboration:</p> <ul style="list-style-type: none">• IEO Istituto Europeo di Oncologia, Milan: Non-conventional use of Laser Microdissection of Extracellular Matrix for AFM studies and production of ECM probes with Dr. Giuseppe Diaferia• Ospedale San Raffaele, Milan: Study of bladder cancer cells of increasing grade of invasiveness. Contact Person: Dr. Massimo Alfano <p>International research collaboration:</p>



	<ul style="list-style-type: none">• University of Bremen, Bremen, Germany: Cell-cell adhesion force spectroscopy on bladder cancer cells. Contact Person: Prof. Manfred Radmacher. Secondment period from the 13th January 2021 until 5th of March 2021• VMicro SAS, Lille, France: Calibration of AFM tiplless and homemade colloidal probes with Laser Doppler Vibrometer with Dr. Benjamin Walter. Secondment period from the 28th of November 2021 until the 30th of January 2022• Kanazawa University, Kanazawa, Japan: Study of cadherins interaction through cell-cell force spectroscopy with Prof. Clemens Franz. Secondment period from the 28th of August 2022 until the 2nd of October 2022.
2023	<p><u>Post-doctoral researcher</u> under the supervision of Prof. Alessandro Podestà. “Study of the Influence of the microenvironment of healthy and tumoral cells via Adhesion Force Spectroscopy”.</p> <p>During the year of post-doctoral research, I pursued my studies of the cell and microenvironment interaction by mean of Adhesion Force Microscopy (AFM) and custom made colloidal probes. The research focused on the bladder cancer in collaboration with Ospedale San Raffaele (OSR, Dr. Massimo Alfano) and Istituto Europeo di Oncologia (IEO, Dr. Giuseppe Diaferia). That successful collaborations led to the publication of an article in Nanoscale (IF. 8.3) untitled “Native extracellular matrix probes to target patient-and tissue-specific cell-microenvironment interactions by force spectroscopy”. In order to do more patient-specific research with our newly developed method, we opted to focus on another disease, pancreatic ductal carcinoma (PDAC) using directly patient tissues and PDAC primary and commercial cell lines.</p> <p>In another aspect of my research, I am studying the relation between cells and their microbiome, notably in the breast cancer with a collaboration with the University of Cambridge (UC, Dr. Ioanna Mela) by combination of AFM nanomechanics and adhesion force spectroscopy as well as Light Sheet Microscopy.</p> <p>Lastly, I devoted a part of my research on the application and implementation of calibration procedures for custom made AFM probes with Laser Doppler Vibrometer following up the collaboration with VMicro (Lille, France).</p>

CONGRESSES AND SEMINARS

Date	Title	Place
31/05/2019 - 01/06/2019	<u>Oral presentation</u> at Konferencji Młodych Chemików Sądowych / Conference of the Young Forensic Chemists. Oral presentation	Bialystok, Poland
02/09/2019 - 06/09/2019	<u>Attendance</u> at the AFM BioMed 2019	Munster, Germany
27/03/2022 - 31/03/2022	<u>Poster presentation</u> at Nanoengineering	Cenobio dei Dogi, Camogli,



	for Mechanobiology 2022	Italia
29/08/2022 - 2/09/2022	<u>Oral presentation</u> at the AFM BioMed 2022	Nagoya, Japan
19/11/2022	<u>Oral presentation</u> at the Phys2BioMed symposium	Barcelona, Spain

PUBLICATIONS

E. Lorenc, <u>H. Holuigue</u> , F. Rico, A. Podestà, “Cantilevers and tips”, Contribution in the book: Mechanics of cells and tissues in diseases Volume 1, De Gruyter (2022), ISBN: 9783111009049
<u>H. Holuigue</u> , E. Lorenc, M. Chighizola, C. Schulte, L. Varinelli, M. Deraco, M. Guaglio, M. Gariboldi, and A. Podestà, “Force Sensing on Cells and Tissues by Atomic Force Microscopy” Sensors 22, no. 6: 2197. DOI: 10.3390/s22062197
<u>H. Holuigue</u> , L. Nacci, P. Di Chiaro, M. Chighizola, I. Locatelli, C. Schulte, M. Alfano, G.R. Diaferia, A. Podestà, “Native extracellular matrix probes to target patient-and tissue-specific cell-microenvironment interactions by force spectroscopy”, Nanoscale, 2023, 15, 15382-15395. DOI: 10.1039/D3NR01568H
M. Lekka, S.G. Kulkarni, S. Perez-Dominguez, K. Gnanachandran, E. Lorenc, <u>H. Holuigue</u> , M. Berardi, N. Antonovaite, M. Eroles Navarro, M. L. Marini, J. Lopez Alonso, S. Janel, S. Acharya, J. Otero, D. Navajas, K. Bielawski, H. Schillers, F. Lafont, F. Rico, A. Podestà, M. Radmacher, “Reliable, standardized measurements for cell mechanical properties”. Nanoscale, 2023, 15, 16371-16380. DOI: 10.1039/D3NR02034G
Phys2BioMed network paper. “Standardisation of AFM-based elasticity measurements on tissues”. In preparation.
L. Dal Fabbro, <u>H. Holuigue</u> , M. Chighizola and A. Podestà, “Contact mechanics models for Atomic Force Microscopy Techniques: a comprehensive study via experiments and simulations”, <i>In preparation</i> .

OTHER INFORMATION

Didactic activities: 2021-2022: 26 hours for <u>tutoring, assistance in preparation and evaluation of oral and written tests</u> . Physics course (F66 M-Z) at the Faculty of Natural Science, University of Milan - held by Prof. A. Vailati and C. Barbieri. 2022-2023: 26 hours for <u>tutoring, assistance in preparation and evaluation of oral and written tests</u> . Physics course at the Faculty of Chemistry, University of Milan - held by Prof. M. Paris 2022-2023: 35 hours for <u>tutoring, assistance in preparation and evaluation of oral and written tests</u> . Physics course (F66 M-Z) at the Faculty of Natural Science, University of Milan - held by Prof. A. Vailati and C. Barbieri.
Digital Skills:



Programming language: Matlab

Software applications: Matlab, Labview, Nanoscope, Prism, Origin, Microsoft Office.

Activities of communication and dissemination:

- Presentation at the Researcher's Night 2019 "Meet Me Tonight - Faccia a Faccia con la ricerca".
- Participation at the Milano Biophysical Society chapter "Biophysical week - Q&A session about the biophysics work and study path" as invited speaker in a round table.

Declarations given in the present curriculum must be considered released according to art. 46 and 47 of DPR n. 445/2000.

The present curriculum does not contain confidential and legal information according to art. 4, paragraph 1, points d) and e) of D.Lgs. 30.06.2003 n. 196.

Please note that CV WILL BE PUBLISHED on the University website and It is recommended that personal and sensitive data should not be included. This template is realized to satisfy the need of publication without personal and sensitive data.

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Place and date: Milano, 10/11/2023