

Curriculum vitae



Personal information

First name(s) Surname(s)
House number, street name, city,
country
Mobile number
E-mail
Nationality
Date and place of birth
Sex

COLNIȚĂ ALIA

Donat 67-103, Cluj-Napoca, Cluj
0264 584 037
alia.colnita@itim-cj.ro
Romanian
08.04.1987, Câmpulung Moldovenesc, Suceava
F

Work experience

Period
Occupation or position held
Main activities and responsibilities

01.02.2015 – present
Scientific Researcher
- Investigation of biological and biomolecular systems of Raman and SERS vibrational spectroscopies. Real time detection of pathogenic and nonpathogenic microorganisms in complex biological samples. Principal Component Analysis for discrimination and differentiation of bacteria.
- Bacteria detection in microfluidic devices using SERS ultrasensitive technique. Result interpretation and spectra analysis.
- Deposition of thin films (metallic, semiconductor or molecular) with controlled thicknesses on various substrates using ultra-high vacuum (UHV) molecular beam epitaxy (MBE) technique for biosensors and nano/microelectronics.
- Fabrication of controlled nanostructured architectures using nanoimprint lithography.
- Fabrication of interdigitized microelectrons using MBE and photolithography and their characterization using scanning tunneling microscopy and X-ray diffraction techniques.

Employer's name and locality

National Institute for Research and Development of Isotopic and Molecular Technologies Donat 97-103, Cluj-Napoca, Romania

Business or sector

Research activities

Period
Occupation or position held
Main activities and responsibilities

03.09.2012 – 31.01.2015
Scientific Research Assistant
- Investigation of biomolecular systems using Raman and SERS spectroscopies.
- Deposition of gold, silver and silicon thin films with controlled thicknesses on various substrates using ultra-high vacuum (UHV) molecular beam epitaxy (MBE) technique for biosensors and nano/microelectronics.
- Fabrication of controlled nanostructured architectures using nanoimprint lithography.
- Fabrication of interdigitized microelectrons using MBE and photolithography and their characterization using scanning tunneling microscopy and X-ray diffraction techniques.

Employer's name and locality

National Institute for Research and Development of Isotopic and Molecular Technologies Donat 97-103, Cluj-Napoca, Romania

Business or sector

Research activities

Period
Occupation or position held
Main activities and responsibilities

01.09.2009 – 01.09.2010
Physics Teacher
- Teaching physics to 7th and 8th grade pupils;
- Class management;
- Extracurricular activities, such as: short visit to the Astronomical Observatory in Cluj-Napoca, visiting the event "Fizica Experimentelor" organized by the Faculty of Physocs, Babes-Bolyai University, Cluj-Napoca.

Employer's name and locality

School „Mihai - Viteazul” Campia Turzii

Business or sector

Education

Education and training

Period	01.10.2011 – 30.09.2014
Qualification awarded	PhD in Physics The thesis entitled Optimization of physico-chemical parameters of gold epitaxial films and biomolecular systems for improving life quality was defended 31.10.2014.
List of principal subjects covered or skills acquired	- Characterization, discrimination and the assessment of physical and chemical properties of Gram-positive, Gram-negative bacteria and relevant molecular systems (antibiotics e.g. sulfamethoxazole) using Raman, SERS and PCA techniques. - Deposition of gold thin films with high quality and flatness on silicon substrates using ultra-high vacuum (UHV) molecular beam epitaxy (MBE) technique and assesment of the topographic properties using STM and AFM.
Education or training organisation's name	Babes-Bolyai University, Faculty of Physics.
Level of study	Doctoral studies
Period	01.10.2009 – 01.07.2011
Qualification awarded	Medical Physicist / Dissertation grade obtained: 10 Title of the dissertation „A spectroscopic and theoretic study of the pharmacological relevant molecule of trimethoprim“.
List of principal subjects covered or skills acquired	Scientific Leaders: Assoc. Prof. Nicolae Leopold and Prof. Sebastian Schlücker. - The scope of the thesis was a complete physico-chemical characterization of the antibiotic trimethoprim using IR, Raman and SERS spectroscopies. Furthermore, the thesis included also a theoretical characterization of the molecule, using the DFT approach and an attempt to simulate the molecule-silver substrate interaction.
Education or training organisation's name	Babes-Bolyai University, Faculty of Physics.
Level of study	Master studies
Period	01.10.2006 – 01.07.2009
Qualification awarded	Bachelor degree in Physics; the bachelor thesis was evaluated with 9.79.
List of principal subjects covered or skills acquired	Theoretic and experimental characterization of biological relevant molecules. Theoretic aspects of medical imaging, radiotherapy and radioprotection.
Education or training organisation's name	Babes-Bolyai University, Faculty of Physics. Domain: Physics, specialization: Medical Physics.
Level of study	Bachelor studies
Other relevant studies	<ul style="list-style-type: none">• Didactic training courses level I and II;• Alpha English language certificate• Grundkurs I.1. German language course• Erasmus Fellowship during a period of 6 months (October 2010 - March 2011) at the University of Osnabrück, Germany. During this period, I developed practical abilities that allowed me the work in a chemistry laboratory (sample weighting, sample manipulation, chemical synthesis of silver colloids and the proper use of research equipments). Furthermore, I gained practical abilities to perform IR, Raman and UV-Vis experiments and also participated to the alignment procedure of the Raman working lasers, the Raman sample preparation protocols that involved the use of antibiotics and their manipulation. The obtained experimental results have been published in 2 ISI papers and in one dissertation thesis.

- Participant to the international course entitled "**Electroporation for Medicine: Basic Knowledge, Applications and Technologies**", organized by the **University of Medicine and Pharmacy Carol Davila**, Bucharest and the **Romanian Society of Pure and Applied Biophysics** and the support from the COST Action COST TD 1104 (25 – 27 October 2012, Bucharest, Romania).
- Participation with the **Oral presentation "Nanoimprint lithography: A versatile tool for high resolution nanofabrication"** to the Satellite Workshop "**Current reports on synthetic peptides, metals and molecular adaptors interaction with protein pores and reconstituted lipid membrane systems**", organized during the International Conference **IC-ANMBES 2014** (11-12 June 2014, Brasov, Romania).
- **Specialization research stage in learning the experimental techniques used to fabricate self assembled supramolecular structures on metallic surfaces**. The internship took place at Paul Scherrer Institute, Villigen, Switzerland and the Basel University, Switzerland, within the two groups specialized in UHV molecular depositions of supramolecular entities of Prof. Dr. Thomas Jung (24-29 November 2014).
- Participant to the workshop entitled: **Taylor & Francis "Publishing in Academic Journals – tips to help you succeed!"** 24 March 2015 Cluj-Napoca.
- Specialization research internship entitled "**Scanning probe techniques applied to molecular and supramolecular structures on metallic surfaces**", during a 13 days' period (25 October -7 November 2015) in the Molecular Nanoscience research group of Prof. Dr. Thomas Jung, Paul Scherrer Institute, Villigen.
- Specialization research internship entitled "**STM and STS Studies on 1D Coordination Polymers on Metallic Substrates**" during a 11 days' period (1-12 November 2016) in the Molecular Nanoscience research group of Prof. Dr. Thomas Jung, Paul Scherrer Institute, Villigen.
- Participant to the Satellite Workshop „**Current reports on synthetic peptides, metals and molecular adaptors interaction with protein pores and reconstituted lipid membrane systems**", organized in the frame of the International Conference **IC-ANMBES 2016** (25-28 June 2016, Peștera, Romania).
- Participant to the Satellite Workshop „**Emerging molecular technologies based on micro and nano-structured systems with biomedical applications**", organized in the frame of the International Conference **IC-ANMBES 2018** (21-23 May 2018, Peștera, Romania).

Personal skills

Mother tongue(s)
Other language(s)

[Common European Framework of Reference for Languages](#)

English
French
German

Romanian

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
French	A2	A2	A2	A2	A2
German	A1	A1	A1	A1	A1

Communication skills

- Efficient collaboration in a working group;
 - Organized, positive and logic thinking, oriented towards results;
 - Good communication and negotiation skills;
 - Psycho-pedagogical skills;
 - Serious attitude;
 - Increased concentration to stress
 - Willing and able to learn new information and minimum amount of time;
 - Always oriented towards learning new and improved research methods.
- Other competences:

- Competences in oncological equipment operation;
- Very good knowledge of IR, Raman and UV-Vis equipment use;
- Very good knowledge in working in chemistry laboratory;
- Proficient in English-Romanian / Romanian-English translations from research journals in the areas of physics, chemistry, biophysics;
- Proficient in specialized database usage (Web of Science, Scopus etc)

Digital and computer-related skills

Internet, Office package, beginner user of Linux, C si C++ programming – beginner/average level.

Good knowledge in theoretical modelling softwares: Gaussian, GaussView, Turbomole, Maestro, Avogadro.

Proficient in using OriginPro software; beginner level in using Matlab software.

Proficient in SPIP for AFM and STM image processor software.

Other relevant information

- Member of the Romanian Society of Pure and Applied Biophysics (RSPAB).
- Starting with November 2014, I was elected as the Secretary-Treasurer of RSPAB Cluj.
- The article *The effect of substrate temperature on structural and morphological properties of Au/Si(111) thin films* (D. Marconi, A. Ungurean) have been chosen as a "**Key Scientific Article contributing to excellence in engineering scientific and industrial research**" and highlighted on the website of **Advances in Engineering Series** (March, 2014).
- Several articles were awarded through the UEFISCDI program HUMAN RESOURCES 2013-2017: **Vibrational spectroscopic and DFT study of trimethoprim** (A. Ungurean, N. Leopold, L. David, V. Chis); **The effect of substrate temperature on structural and morphological properties of Au/Si(1 1 1) thin films** (D. Marconi, A. Ungurean - Colniță); **Rapid single-cell detection and identification of pathogens by using surface-enhanced Raman spectroscopy** (N. Dina, H. Zhou, A. Colniță et al.), **Single-step fabrication of homoepitaxial silicon nanocones by molecular beam epitaxy** (A. Colniță et al.).
- "The best poster award" granted by RSPAB for the poster presentation **The effect of substrate temperature on structural and morphological properties of Au/Si(111) thin films** (D. Marconi, A. Colniță, I. Turcu) during *The 3rd International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences* "IC-ANMBES 2014", Braşov, 13-15 June 2014.
- "The best poster award" granted by RSPAB for the poster presentation **Fabrication of Nanostructured, Homoepitaxial Silicon Films for Biosensing Applications** (A. Colniță, D. Marconi, R.T. Bratfalean, I. Turcu) during *The 4th National Conference on Biophysics* "CNB 2016", Cluj-Napoca, 2-4 June 2016.
- "The best poster award" granted by the organizers for the poster presentation **The Use of *In situ* Surface Enhanced Raman Spectroscopy Technique for Antibiotic Resistance Determination of Pathogenic Microorganisms** (A. Colniță, A.M.R Gherman, T. Szoke-Nagy, B. I. Cozar, N. E. Dina) during *The 5th International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences* "IC-ANMBES 2018", Braşov, 23-25 May 2018.

Research project involvement

Proposed projects as Project Director:

- **The Swiss-Romania Cooperation programm SCIEX-NMS^{ch} (2013)**
 - Partners: *Main Applicant*: Prof. Dr. Thomas Jung, Paul Scherrer Institute, Villigen, Switzerland; *PhD Student*: Alia Colniță, INCDTIM Cluj-Napoca/ Babeş-Bolyai University, Cluj-Napoca, Romania.
- **Human Resources Program – Postdoctoral Projects, UEFISCDI, 2016 competition**

- Project title: Nanostructured small molecule-based solar cells fabricated by Nanoimprint Lithography (NANOSOLCEL); mentor Prof. Dr. Ion Grosu (**84 points granted in the evaluation panel**).

As Project Director:

- **Human Resources – Mobility Projects for Research Scientists, UEFISCDI, 2018 competition**
 - Project code PN-III-P1-1.1-MC-2017-0782, **Domain of interest:** Molecular and biomolecular nanotechnologies. The research internship took place in the 28 November – 2 December 2017, in the research group NANOLAB led by Dr. Thomas Jung (<https://www.nanolab.unibas.ch>), Basel, Switzerland and aimed the learning and understanding of the technique Low temperature scanning tunneling microscopy (LT-STM).

As Phase Responsible:

- **Core Program 2014** (PN09-44 02 14) “Modern techniques for the fabrication and nondestructive characterization of molecular and biomolecular systems for improved life quality and environment”
 - Phase 3/2014: *The development of fabrication techniques for obtaining high quality gold micro-/nanoelectrodes for applications in biosensors and molecular electronics.*
- **Core Program 2018** (PN18 03 02 01) “Innovative platforms for emergent domains: calculation methods based on neuronal networks, the development of new pharmaceutical formulations, molecular diagnosis, biomedicine”
 - Phase 3a: *The development of new platforms of molecular diagnosis based on ultrasensitive Raman detection and high accuracy, new multivariate statistical and computational analysis – from biomolecules to living organisms. The fabrication of high quality, nanostructured surfaces using nanoimprint lithography (NIL) with applications in electronic, photonic, optic and microfluidic devices.*

As Postdoctoral Fellow / Research Scientist:

- Project code PN-II-PT-PCCA-2011-3 (123/2012) “**Rational design and generation of synthetic, short antimicrobial peptides. Linking structure to function**” (BIOPEP) (Project responsible: Dr. Claudiu Filip).
- Research project “**High Contrast Gallium Mirrors**” (HCGaMs), financed by the Romanian-American Foundation (Project Director: Dr. Radu Bratfalean).
- Project code PN-II-RU-TE-2014-4-0862 „**Pathogenic microorganisms’ rapid detection and identification using high sensitive Raman spectroscopy**” (PATHOSENS) (Project Director: Dr. Nicoleta Elena Dina).
- Core Program 2016 (PN16-30 02 01) „**Tehnici de micro-si nano-fabricatie dedicate dezvoltarii de dispozitive moleculare respectiv termoelectrice si a senzorilor pe baza de grafene**” – Project phase „**Dioda hibridă organic-anorganic pe bază de compusi moleculari cu centri metalici**” (Phase responsible: Dr. Daniel Marconi, Project responsible: Dr Ioan Turcu).
- Project code PN-III-P2-2.1-PED-2016-0983 ”**The development of a portable microfluidic device for the rapid SERS detection of pathogens**”(mifSERS) (Project Director: Dr. Nicoleta Elena Dina/Dr. Daniel Marconi).
- Project code PN-III-P1-1.2-PCCDI-2017-0010 ” **Emerging molecular technologies based on micro and nano-structured systems with biomedical applications**” (TehnoBioMed) (Project Director: Dr. Ioan Turcu).
- Project code PN-III-P1-1.2-PCCDI-2017-0387 ”**Emerging technologies for industrial capitalization of 2D structures (graphene and nongraphenic)**” (EMERG2Ind) (Project responsible: Dr. Ioan Turcu)

**Oral presentations to
International/National
conferences**

- **Theoretic and vibrational spectroscopy investigations of trimethoprim**, A. Unquirean, N. Leopold, V. Chiş, L. David, *International Conference on Sciences*, 11-12 November 2011, Oradea, Romania
- **Fabrication of interdigitated electrodes using molecular beam epitaxy and optical lithography techniques and its applications in molecular detection**, A. Colniţă, D. Marconi, I. Turcu, *The 3rd International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences "IC-ANMBES 2014"*, 13-15 June 2014, Brasov, Romania.
- **Detection and Identification of Pathogenic Microorganisms Using Ultrasensitive Raman Spectroscopy**, A. Colniţă, T. Szöke-Nagy, A.-M. R. Gherman, I. B. Cozar, N.E. Dina, *National Conference on Biophysics (CNB 2018)*, 7-10 September 2018, Bucharest, Romania.
- **IMAGCELL – Assessing living cells natural features by employing optical microscopy and statistical analysis**, L. Buimaga-Iarinca, C. Morari, **A. Colniţă**, S. Neamtu, E. Fischer-Fodor, T. Szoke-Nagy, A. Farcas, I. Turcu, *The 5th International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences "IC-ANMBES 2018"*, 23-25 May 2018, Brasov, Romania.

28.05.2019

Alia Colniţă