

# Eugen GHEORGHIU

International Centre of Biodynamics [www.biodyn.ro](http://www.biodyn.ro)  
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**Nationality:** Romanian ; **Civil Status:** Married

**Education:** PhD in Theoretical Physics, 1994, Institute for Atomic Physics - Bucharest, Romania

## Relevant Professional experience:

University of Kyoto JSPS fellow	1996- 1997	Visiting professor	Research in methods for monitoring and nonlinear analysis of cell cycle progression
National Institute of Biotechnology	1997-2000	Scientific Director	Supervising and research
<i>IC Biodynamics</i> <a href="http://www.biodyn.ro">www.biodyn.ro</a>	since 2000	Director- <b>founder</b>	Supervising, training and research
<i>University of Bucharest</i>	2003- present	Professor; <i>since 2004</i> <i>PhD adviser</i>	<i>Supervising PhD students and research;</i> 2003- 2008 <i>Teaching &amp; Coordination of the Master Programme in Biodynamics</i>
Invited researcher and professor (short stages- up to 3 months)	Binghamton Univ., US (2001); Catholic University Leuven, Belgium (2002 & 2003); National University of Singapore (2004 & 2005)		

## Research Interests include:

- Modelling & data analysis and experimental aspects of non-invasive analysis of dynamics of living cells and bio-interfaces using (coupled) electrical impedance spectroscopy, magnetic and optical (imaging) methods, including optical waveguides (e.g. SPR) microscopy and bio-affinity assays. The goal is to assess gentle (non-lethal) bioeffects of various stimuli including environmental ones using time based electro-optical biosensing (including cellular) analytical platforms
- Fast Point-of-care: (A) sensitive identification & quantitation of microbes (bacteria, fungi & viruses) and (B) Antibacterial & Antifungal Susceptibility Testing based on immune-magnetic capture, magneto-phoresis and electro-optical fingerprinting
- Electro-Optical (QPI or BFRL) analysis of (single) cell dynamics
- Electro-Optical Tomography at micro-scale

**Professional Honors:** “Stefan Procopiu” Award for Physics of the Romanian Academy, 1995

## Teaching:

### University of Bucharest,

(2004-2009) *Coordinator of the Master Program in Biodynamics*; Courses: Introduction in (non)linear data analysis; Electrochemical Impedance Spectroscopy to investigate bio-systems;

*2004– present: PhD Adviser, University of Bucharest*

### Polytechnic University of Bucharest

*2019- present*, Course on *Biodynamics* and related biomedical applications within the Master in modern technologies for Medical Engineering

**Invited Seminars on bio-impedance, biodynamics and electro-optical biosensors at:** University of Bologna and EC JRC Ispra (Italy);  
University of Hasselt (Belgium);  
University of Montpellier, University of Nancy and University of Perpignan (France); University of Wuppertal and Max Plank Institute for Biophysics-Frankfurt (Germany);  
Kyoto University (Japan);  
Karolinska Institute- Stockholm (Sweden);  
National University of Singapore;  
Emory & SUNY-Binghamton (US).

**Recent Oral Presentations & Invited talks:**

SPIE Photonics West, San Francisco, February 2018, “Optical and electrical mapping of live cell response to AC excitation using quantitative phase and optical waveguide assays”  
Photonics Europe, Strasbourg, April 2018, “Label-free imaging of cellular optical and electrical properties using quantitative phase imaging and AC field modulation assays”  
2019, Sept: RICCE 21, “Enhanced analytic performances of biosensors by modulating optical waveguides resonance with magnetic / electric alternating fields” & SIMI 2019, “Biosensing tools to assess the quality of aquatic environment”

**Promoter of over 20 International Research Grants** most representative:

**3 FP7: “DYNANO”** (Contract People ITN 2011- 289033);  
    **“PROARGUS” (coordinator)** (Contract-PIRG08-GA-2010-277126)  
    **“NanoMagma”** (Contract - NMP3-SL-2008-214107),  
**2 FP6: ROBIOS (coordinator)** Contract- INCO-2004-ACC-RSTP,  
    **CHARPAN**, (Contract - NMP2-CT-2005-515803)  
**and 1FP5: Aframilk-** (Contract- GRD1-2000-25801)

Co-Director, **TUMORANALYZER:** Response of in vitro hypoxic tumor models to potentially therapeutic compounds as revealed by an advanced analytical platform: 7/RO-CH/RSRP/2013,2013-15;

Co-Director, **Cell Biosensors for Detection of Chemical and Biological Threats, NATO-SPS 985042 & UEFISCDI-PN3-329/42/2017** (2016 - 2019)

**Director of over 20 National and International Research Grants** (during the last 10 years) including Director of the Complex Research Project BIOSCOPE, Contract No. 11/ 2012, PN-II-ID-PCCE-2011-2-0075

**Recent and ongoing National Projects:**

*Director* PATHSECURE, Development of a Point of Need portable system for rapid assessment of high threat pathogens including bioterrorism agents - Contract: 290PED/2020; PN-III-P2-2.1-PED-2019-5155;(03/08/2020 – 31/07/2022)

*Director*, FINDPATHOGEN, Advancement of a Portable System for Fast and Sensitive Detection of Pathogenic Cells – UEFISCDI-PN3-P2-2.1-PED-2016-1041, 2017-2018

#### **Recent & Ongoing International Projects:**

- Coordinator: SmartMatter- Core integration of novel functional, adaptive materials into a smart, highly sensitive analytical system for point of need environmental applications, M-EraNet (2020-22);
- Co-Pi: MarkerSense (attract-eu.com): SPR for early detection of biomarker proteins in whole blood (2019-20)

#### **Synergistic Activities**

- Since 2019- Member of the International Consortium of the Tim Hunt Research Institute of Life Science and Biotechnology, Jiangyin, China
- Co-founder Euroscience and member of Euroscience Governing Board (elected for three mandates)
- Expert of European Commission- Evaluator of Proposals on (nano)biosensing (1995-present), 2016-2020: H2020-FET OPEN
- 2016-2019 Member of ESF College of Expert Reviewers
- Review Panel member- European Science Foundation – EuroBioSAS (2010-2015)
- Member of Selection Committee for European Young Researchers' Award (2010-2016)
- Member of Editorial Board of: *Physics in Medicine* (Elsevier), *Journal of Electrical BioImpedance*, *Romanian Journal of Biophysics*
- Guest Editor Materials IF=3.375; Special issue **2020-2022**, Advanced Designs of Materials, Devices and Techniques for Biosensing ([https://www.mdpi.com/journal/materials/special\\_issues/materials\\_devices\\_techniques\\_biosensing](https://www.mdpi.com/journal/materials/special_issues/materials_devices_techniques_biosensing))
- Member of Evaluation Commissions of PhD thesis of: University of New South Wales, Sydney & Swinburne University of Technology, Melbourne Australia, National University of Singapore, Université Catholique de Louvain, Belgium Babes-Bolyai University, Cluj-Napoca and Polytechnic University of Bucharest.

## Patents

### Patents and Patent Applications:

1. Ro Patent Application A/00577/2020 Method to collect, identify and quantitatively assess the concentration and the infectivity of pathogenic microorganisms with aerogenous spreading, Authors: E. Gheorghiu, M. Gheorghiu
2. **European Patent: EP2710359/2020**, Systems and Methods for Detection and Quantitation of Analytes Using Periodic Actuation, Authors: E.Gheorghiu, M.David, C.Polonschii, D.Bratu
3. US Patent Application BDN1901/2019, Systems and Methods for measuring cellular response to target analytes by controlled application of an oscillating stimulus, Authors: E. Gheorghiu, M. S. David, M. Gheorghiu
4. US Patent Application BDN1902/2019, Systems and methods for detecting bioactive compounds using sensors with pre-stimulated cells, Authors: M. Gheorghiu, E. Gheorghiu
5. Ro Patent Application Ro A/00224/2019, Method to measure the phase difference and the intensity introduced by the sample on beams with controlled polarization in a common-path geometry, Authors: E. Gheorghiu, M. S. David, M. Gheorghiu, C. Polonschii
6. Ro Patent Application A/00420/2018, Method and system for detection of bioactive compounds e.g. cytotoxic, using sensors with stimulated cells, Authors: M. Gheorghiu, E. Gheorghiu
7. Ro Patent Application A/00421/2018, Method for detection and quantitation of target analytes as well as for monitoring and increasing the yield of analyte capturing using a periodic stimulus, Authors: E. Gheorghiu, M. S. David, M. Gheorghiu
8. Ro Patent Application A/00422/2018, Method for assessing the viability of biological cells and for testing their susceptibility when exposed to a compound (e.g. antibiotic), Authors: E. Gheorghiu, M. S. David, M. Gheorghiu
9. Ro Patent Application A/00423/2018, Method and system for high precision measurement of the periodic variations of the electrical impedance of a sample, Authors: E. Gheorghiu, M. S. David, D. Bratu, M. Gheorghiu, C. Polonschii
10. Ro Patent Application A0031/2018: Portable device to measure optical waveguides including their resonances, Authors: E. Gheorghiu, M. S. David, M. Gheorghiu, C. Polonschii
11. Ro Patent Application A00651/2017: Method for measuring the distributions of electric fields and of refractive indices with high spatial and temporal resolution, Authors: E. Gheorghiu, M. S. David, C. Polonschii, M. Gheorghiu
12. **U.S. Patent 9,315,855/2016**: Systems and Methods for Detection and Quantitation of Analytes Using an Oscillating Stimulus, Authors: E. Gheorghiu, M. S. David, C. Polonschii, D. Bratu
13. Ro Patent Application A00502/2016: Method and system for illumination and reception for total internal reflection microscopy applications, Authors: E. Gheorghiu, R. Dabu, D. Ursu, M. Gheorghiu, M. S. David, C. Polonschii, D. Bratu
14. **Patent Ro 128065/2015**: Platform and method to monitor the quality of an aquatic environment based on analysis of the behavior of a fish population, Authors: E. Gheorghiu, C. Polonschii, D. Bratu
15. **Patent RO 127854/2014**- Method to assess the amount of target analytes by controlled periodic actuation, Author: E. Gheorghiu
16. **Patent RO127853/2014**- Device to assess the amount of target micro-organisms by controlled periodic actuation, Authors: E Gheorghiu, M. S David, C Polonschii and D Bratu
17. **Patent RO120867/14.03.2008**: Quantitative assessment of (bio)sensors by analysis of nonlinear frequency response, Authors: E. Gheorghiu, M. Gheorghiu, C. Balut, D. Bratu
18. **Patent RO120790/01.04.2003**: Method to detect analytes by analyzing the polarization impedance of the transducer/ sample interface, Authors: E. Gheorghiu, M. Gheorghiu, D. Bratu, A. Ursu
19. **Patent RO117877/30.08.2002**: Method for detecting target analytes in liquid media, Authors: E. Gheorghiu, M. Gheorghiu, C. Balut, D. Bratu
20. **Patent RO117986/29.11.2002**: Fast, high accurate method to measure AC impedances, Authors: E. Gheorghiu, D. Bratu, M. Gheorghiu, C. Balut

November 9, 2021

