



*“Gheorghe Asachi” Technical University of Iasi, Romania*



---

## ROLE OF ENVIRONMENTAL RISK FACTORS IN PARKINSON'S DISEASE: BUCOVINA REGION CASE STUDY

Oana Geman<sup>1,2\*</sup>, Hariton Costin<sup>3,4</sup>

<sup>1</sup>*Stefan cel Mare University of Suceava, Department of Health and Human Development*

<sup>2</sup>*Integrated Center for Research, Development and Innovation in Advanced Materials, Nanotechnologies, and Distributed Systems for Fabrication and Control (MANSiD), 13, University Street, 720229 Suceava, Romania*

<sup>3</sup>*Grigore T. Popa University of Medicine and Pharmacy, Faculty of Medical Bioengineering, Iasi, Romania*

<sup>4</sup>*Institute of Computer Science of Romanian Academy Iasi Branch, Romania*

---

### Abstract

Parkinson's disease (PD) is a neurodegenerative disorder that occurs due to a progressive degeneration of dopaminergic (DA) neurons. Brain area affected by progressive destruction of neurons controls movements, and patients with PD reveal rigid and uncontrollable gestures, postural instability, small handwriting and tremor. There are some risk factors that have been proven to trigger PD with a certain probability (for example insecticides exposure, and genetic and environmental factors), but still can not say for sure which are all risk factors for this terrible disease. Also, many other leads were analyzed, such as exposure to certain metals, toxins, head trauma, constipation, low intake of antioxidants, infection (chicken pox, measles, rubella, mumps), but no studies have shown clear links with them. The aim of this study is to examine the association between Parkinson's disease and exposure to environmental factors such as living in the Bucovina Region (Suceava District, North of Eastern Carpathians). Exposure to metals such as lead, manganese, iron, copper and uranium have been of interest since some occupational studies focused on mining identified them as potential risk factors for PD. Moreover, we have done a statistical study based on Markov chains regarding this disease prediction and we have developed a specific screening test for early diagnosis of Parkinson's disease.

*Key words:* Bucovina region, environmental risk factors, non-linear signal analysis, Parkinson's disease

*Received: July, 2013; Revised final: June, 2014; Accepted: June, 2014*

---