

CURRICULUM VITAE

Name: Sergiu-Viorel CARAMAN
Birth date and place: September the 30th, 1955 – Galați, ROMANIA
Sex: male
Citizenship and civil status: Romanian, married, 2 children

Education

Ph.D.: “Contributions to the batch bioreactor control using expert systems”, “Dunarea de Jos” University of Galati, Romania, 1997.
Speciality: Control Systems
MSc.: Control Systems and Computer Science, Politehnica University of Bucharest, 1980
College: “Vasile Alecsandri” Theoretic College of Galați, 1974

Professional activity

September 1980 – December 1987: Arcelor Mittal Steel Company – Galati (Control engineer)
December 1987 – present: “Dunărea de Jos” University of Galați, Department of Control Systems and Applied Informatics and Department of Electrical Energy Conversion Systems
December 1987 – October 1997: Lecturer
October 1997 – February 2002: Associate professor
February 2002 – present: Professor (2005 – PhD advisor)

Disciplines taught: Microprocessor systems, Modelling and control of the biotechnological systems, Artificial intelligence in process control, Data acquisition systems

Fellowships and grants

1996 – Tempus Grant – University of Wageningen, Netherlands
1998 – Tempus Grant – LAG – INPG, Grenoble, France
1999 – Tempus Grant – Sheffield, United Kingdom
2003 – St John’s College, Oxford University, United Kingdom (Documentation stage granted by Soros Foundation for an Open Society and British Council)
May 2001 – October 2003: *Modelling, simulation and intelligent control of batch biotechnological processes* – research project funded by the Romanian National Council for Academic Scientific Research (C.N.C.S.I.S.) (*project director*)
May 2005 – October 2007: *Modelling and robust control of the wastewater treatment processes* – research project funded by the Romanian National Council for Academic Scientific Research (C.N.C.S.I.S.) (*project director*).
May 2006 – September 2008: Improvement of the qualitative indicators in the case of wastewater treatment from food industry based on advanced control systems – research project funded by the Romanian Ministry of Education, Research and Youth (M.E.C.T.) (*project director*).

Scientific activity

- 7 books (in Romanian), 90 papers in journals and at international and national scientific meetings; see the relevant list appended)
- member of IFAC subcommittee – Biosystems and Bioprocesses
- member of the *Romanian Society of Automatic Control and Applied Informatics* (SRAIT)
- member of the *Romanian Society of Biotechnology*

Software skills

- integrated environments for simulation: Matlab & Simulink
- high level languages: C/C++, Turbo Pascal

Foreign languages

English – written, spoken – good; French – satisfactory for conversation;

Hobbies: travelling, sport, music

25.07.2007

Prof. Sergiu Caraman, PhD

A handwritten signature in black ink, appearing to be 'S. Caraman', written in a cursive style.

Some relevant publications

Sergiu-Viorel CARAMAN

Papers in journals

- 1) Belea R., **Caraman S.**, Palade V., *Diagnosing the Population State in a Genetic Algorithm Using Hamming Distance*, Volume 3215/2004 - Knowledge-Based Intelligent Information and Engineering Systems, **Lecture Notes in Computer Science**, Publisher: Springer-Verlag GmbH, ISSN: 0302-9743, pp.246-255.
- 2) Belea R., **Caraman S.**, Palade V., *Convergence Analysis of Genetic Algorithm Using a Unified Representation of Genes*, International Journal of Knowledge-Based Intelligent Engineering Systems, Vol. 10, No. 1, 2006, pp. 29-40, ISSN 1327-2314.
- 3) **Caraman, S.**, Sbarciog, M., Barbu, M., *Predictive control of a wastewater treatment process*, 1st IFAC Workshop on Applications of Large Scale Industrial Systems - ALSIS'06, August 30-31, Proceedings on the CD-ROM, 2006, ISBN 952-5183-28-9, published in **International Journal of Computers, Communications and Control** (<http://journal.univagora.ro/>).
- 4) **Caraman, S.**, Frangu, L., Ceangă, E., *Modeling and Optimal Control Techniques of Biosynthesis Processes in Batch Bioreactors*, **Control Engineering and Applied Informatics**, Revista Societatii Romane de Automatica si Informatica Tehnica (SRAIT), București, **3**, nr. 1/2001, pp. 15-28, ISSN 1454-8658.
- 5) Frangu, L., **Caraman, S.**, Ceangă E., *Model Based Predictive Control using Neural Network for Bioreactor Process Control*, **Control Engineering and Applied Informatics**, **Revista Societatii Romane de Automatica si Informatica Tehnica (SRAIT)**, București, **3**, nr. 1/2001, pp. 29-38, ISSN 1454-8658.
- 6) **Caraman, S.**, Barbu, M., *Mean Age Control Strategies Techniques of the Continuous and Discontinuous Biosynthesis Processes. Comparative Study*, **Control Engineering and Applied Informatics**, Revista Societatii Romane de Automatica si Informatica Tehnica (SRAIT), **5**, No. 2, pp. 31-40, June 2003, ISSN 1454-8658.
- 7) **S. Caraman**, L. Frangu, *Software generator of the biotechnological processes models*, **Control Engineering and Applied Informatics**, Revista Societatii Romane de Automatica si Informatica Tehnica (SRAIT), București, **4**, nr. 3/2002, pp. 33-38, ISSN 1454-8658.
- 8) M. Barbu, **S. Caraman**, E. Ceanga, *Stochastic Estimation Techniques for Biotechnological Processes*, **Control Engineering and Applied Informatics**, Revista Societatii Romane de Automatica si Informatica Tehnica (SRAIT), București, **6**, nr. 4/2004, pp. 43-51, ISSN 1454-8658.
- 9) **Caraman, S.**, Barbu, M., Ceanga E., *Robust Multimodel Control Using QFT Techniques of a Wastewater Treatment Process*, **Control Engineering and Applied Informatics**, Revista Societatii Romane de Automatica si Informatica Tehnica (SRAIT), București, **7**, nr. 2/2005, pp. 10-17, ISSN 1454-8658.

Papers at international scientific meetings

- IFAC meetings

• *congresses:*

- 10) Barbu, M., **Caraman, S.**, Ceanga, E., *QFT robust control of a wastewater treatment process*, 16th IFAC World Congress, Prague, Czech Republic, July 4-8, 2005, Elsevier, ISBN 008045108X

• *symposia and conferences:*

- (11) **S. Caraman**, M. Barbu, C. Munteanu, *Expert System Based on Fuzzy Rules for Alpha-Amylase Production With Bacillus Subtilis*, Proceedings of the 9th IFAC International Symposium on Computer Applications in Biotechnology, Elsevier, Editors M.N. Pons, J.F.M. Van Impe, 2004, pp. 487-492, ISBN 0-08-044251-X.

12) Barbu, M., **Caraman, S.**, Design of a sliding-mode observer for a biotechnological process, *Preprints of the 10th IFAC International Symposium on Computer Applications in Biotechnology – CAB 2007*, Cancun, MEXICO, June 4-6 2007, pp. 215-220.

13) Barbu, M., **Caraman, S.**, QFT Multivariable control of a biotechnological wastewater treatment process using ASM1 model, *Preprints of the 10th IFAC International Symposium on Computer Applications in Biotechnology – CAB 2007*, Cancun, MEXICO, June 4-6 2007, pp. 291-296.

14) **S. Caraman**, E. Ceanga, S. Bumbaru, *Expert Control of a Biotechnological Process, Modelled as a Variable Structure System*, **IFAC Conference on System Structure and Control - Preprints**, Nantes, France, July 8-10, 1998, pp. 819-824, **Proceedings Ed. Elsevier**, pp. 787-792, ISBN 0 0804 3035-X.

• **workshops:**

15) Belea. R., **Caraman S.**, Barbu M., “The Identification of a Biosynthesis Process Using Genetic Algorithm”, *Automatic Systems for Building the Infrastructure in Developing Countries*, IFAC Workshop, Bansko, Bulgaria, 2004, pp. 207-212.

- **IEEE meetings**

16) L. Frangu, E. Ceangă, **S. Caraman**, Y. Boutalis, *A Pattern Recognition Approach to Intelligent Behaviour: Switching the Strategies*, **Proceedings of First International IEEE Intelligent Symposium - Intelligent Systems**, September 10-12th, 2002, Varna, Bulgaria, Editors T. Samad, V. Sgurev, 2002, pp. 369 – 372, ISBN 0-7803-7134-8.

17) M. Barbu, **S. Caraman**, E. Ceanga, *Bioprocess Control Using a Recurrent Neural Network Model*, *Proceedings of the IEEE International Symposium on Intelligent Control and Mediterrean Conference on Control and Automation*, Editor M. Polycarpou, 2005, pp. 479 – 484, ISBN 0-7803-8937-9.

18) **Caraman, S.**, Barbu, M., Dumitrascu, G., *Wastewater Treatment Process Identification Based on the Calculus of State Variables Sensibilities with respect to the Process Coefficinets*, *IEEE-TTTC International Conference on Automation, Quality and Testing, Robotics, AQTR 2006*, Cluj-Napoca, *Proceedings IEEE Tome 2*, 2006, pp. 199-204, ISBN 1-4244-0360-X .

20) L. Frangu, **S. Caraman**, *Measuring System of the Slab's Position in a Metalurgical Plant Using Artificial Vision Techniques*, **6-th IEEE International Conference on Electronics Circuits and Systems, ICECS'99**, Pafos, September 5 - 8, 1999, Cyprus, Vol. II, pp. 871-874, ISBN 0-7803-5682-9

21) **Caraman, C.** Cucos, L. Frangu, *A Real-Time Expert System Based on Fuzzy Rules in Enzymes Biosynthesis Control in Batch Bioreactors*, **IEEE International Conference on Intelligent Engineering Systems, INES'99**, Poprad, High Tatras, Stara Lesna, Slovakia, Nov. 1 - 3, 1999, pp. 271-278, ISSN 1562-5850, ISBN 80-88964-25-3.

22) L. Frangu, E. Ceanga, **S. Caraman**, *Learning Pattern Recognition Models for Non-Linear Plants*, **IEEE International Conference on Intelligent Engineering Systems, INES'99**, Poprad, High Tatras, Stara Lesna, Slovakia, Nov. 1 - 3, 1999, pp. 111-115, ISSN 1562-5850, ISBN 80-88964-25-3.

23) **Caraman, S.**, Belea, R., Barbu, M., “*The Identification of a Wastewater Treatment Proces Based on Genetic Algorithm*”, *IEEE International Workshop on Soft Computing Applications*, 27 – 30 August, 2005, Szeged – Ungaria, Arad – Romania, *Proceedings* pp. 79-84, ISBN 9632190017.

- **other international meetings**

24) Barbu, M., **Caraman, S.**, Ceanga, E., 2004, *Biotechnological Processes Identification Using Dynamic Neural Network*, 1st Romanian-Hungarian Joint Symposium on, ISBN 963-7154-26-4.

25) **Caraman, S.**, Barbu, M., 2003, *Fuzzy and Neural Models for the Accumulation Process of the Proteic Mass from Superior Mushroom Micelium of Polyporus Type*, 11th International Symposium on System Theory, SINTES-11, Craiova, Romania, Vol. 1, pp. 14-17, ISBN 973-8043-415-5.

- 26) **Caraman, S.**, Barbu, M., 2003, *Modelling and Control Techniques of the Continuous and Discontinuous Biosynthesis Processes. Comparative study*, 14th International Conference on Control Systems and Computer Science, CSCS-14, Bucharest, Romania, Vol. 2, pp. 34-39, (ISBN 973-8449-17-0, ISBN 973-8449-18-9).
- 27) Barbu, M., **Caraman, S.**, Ceanga, E., 2004, *QFT robust control of biotechnological processes*, 2004 IEEE-TTTC International Conference on Automation, Quality and Testing, Robotics, AQTR 2004 – THETA 14, Cluj-Napoca, Romania, Proceedings Tome 1, pp. 129-134, ISBN 973-713-046-4.
- 28) **Caraman, S.**, Barbu, M., Ceanga, E., 2005, *Robust Multimodel Control Using QFT Techniques of a Wastewater Treatment Process*, 15th International Conference on Control Systems and Computer Science, CSCS-15, Bucharest, Romania, pp. 394-399, 2005, (ISBN 973-8449-89-8, ISBN 97-8449-90-1).
- 29) Barbu, M., **Caraman, S.**, Ceanga, E., 2005, „*Multivariable Control of a MIMO Wastewater Treatment Process*”, Innovation in the Field of Water Supply, Sanitation and Water Quality Management Conference, Bucuresti, Romania, 15 – 17 iunie, 2005, pp. 421-429, ISBN 973-0-03972-0.
- 30) Barbu, M., **Caraman, S.**, *Sliding-Mode Observer for a Wastewater Treatment Process*, Proceedings of the 7th International Conference On Technical Informatics, CONTI 2006, ISBN 973-625-319-8, Vol. 1, Pp. 67-70, Timisoara, 8-9 Iunie, 2006.

25.07.2007

Prof. Sergiu Caraman, PhD



Activity report

The scientific activity developed between 1987 and 2007 consisted in 7 books, 90 papers published in journals and conferences and 23 research projects. 7 from these projects have been coordinated by prof. Caraman as the leader of an interdisciplinary research team composed of 12 members: one associate professor, two lecturers, two assistant professors, two PhD students, two master students, three students.

Areas of scientific expertise:

1. Biotechnological processes modelling:
 - using classic techniques: (mass balance equations, models based on reactions schemes, mean age models and variable structure models)
 - using artificial intelligence techniques (fuzzy, neural and neuro-fuzzy techniques);
 - using qualitative and semi-qualitative reasoning;
2. Biotechnological and wastewater treatment processes identification:
 - using genetic algorithms
 - using the calculus of parameter sensibilities with respect to the process variables
 - using recurrent neural networks
3. The parameter and state estimation of the biotechnological and wastewater treatment processes (Luenberger, Kalman, sliding-mode and H_∞ estimator);
4. Biotechnological and wastewater treatment processes control:
 - Optimal and robust control
 - Linearizing control
 - Mean-age-information-based-control
 - Multivariable control
 - Predictive control
 - Intelligent control (pattern recognition methods, expert systems)
5. Simulation software development
 - Software generator of biotechnological process models
 - Software generator for linear system simulation using fuzzy blocks

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