
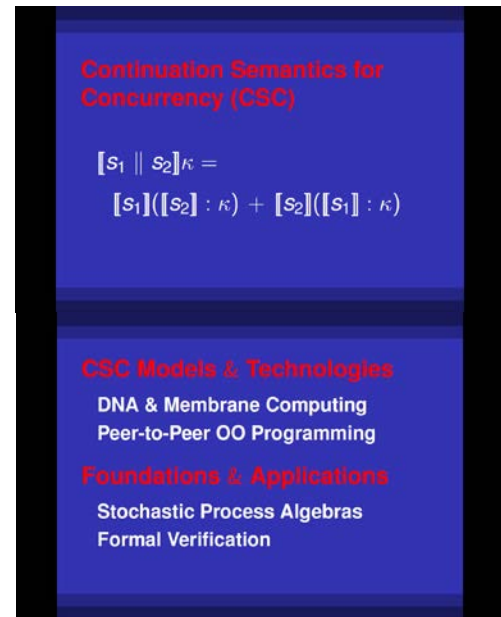


# FOUNDATIONS AND APPLICATIONS OF ADVANCED SOFTWARE TECHNOLOGY- RESEARCH GROUP

## Contact details

Name	Foundations and Applications of Advanced Software Technology – Research Group
Acronym	FAAST
Logo	
Site	<a href="http://users.utcluj.ro/~eneia/faast.htm">http://users.utcluj.ro/~eneia/faast.htm</a>
Address	26-28 G. Baritiu Str., room M05, 400027, Cluj-Napoca, Romania
Faculty Department	<b>Faculty of Automation and Computer Science Computer Science Department</b>
Telephone	+40 264 401481
Fax	+40 264 594491
Director	Prof. Dr. Eng. Eneia Nicolae Todoran
e-mail	<a href="mailto:Eneia.Todoran@cs.utcluj.ro">Eneia.Todoran@cs.utcluj.ro</a>



## Areas of expertise

### Software Engineering:

- Formal Methods, Object-Oriented Methods

### Software Solutions for Smart City:

- eBusiness, eAdministration, eHealth, Medical Databases
- Smart Traffic, Urban Traffic Image Processing

### Semantic Models and Technologies

- DNA Computing, Membrane Computing
- Global Computing (GC), Image Processing in GC Context

## Team

Prof. Dr. Eng. Eneia Nicolae Todoran, Assoc.Prof.Dr. Paulina Mitrea, Eng. Dorin Simina

## Representative projects

**Next Generation Brained City**, “Innovative development through informatization of the Cluj-Napoca urban ecosystem” - POSCCE/Op.1.3.3, no. 13.C01.010, cod SMIS 49752 (2014-2015); sub-projects:

- **ProcessPlayer**, “Platform for the optimization of process flows for and between the public authorities”, collaboration with ARXIA SRL & UBB (Contract POSCCE No.1CLT/800.003/8/29.04.2014 / Subproject SP1)
- “Software services design for intelligent routing in urban road traffic in Smart City context” (Contract POSCCE No.1CLT/800.003/8/29.04.2014 / Subproject SF1)

**SemNat**, “Semantic models and technologies for natural computing” - CAPABILITIES, Module III, Greece-Romania bilateral collaboration project, no. 582/16.07.2012 (2012-2014)

**BETTY**, “Behavioral Types for Reliable Large-Scale Software Systems”, ICT COST Action IC1201, [http://www.cost.eu/domains\\_actions/ict/Actions/IC1201](http://www.cost.eu/domains_actions/ict/Actions/IC1201) Management Committee members for Romania: Prof.Dr. Gabriel Ciobanu, Prof.Dr. Eneia Nicolae Todoran (2012-2016)

**DFA@eInclusion**, “Design for All for e-inclusion”, FP7 project no. 033838, (2008-2010)

“Distributed System for Early Prevention, Monitoring and Treatment of the Cardio toxicity Induced by Chemotherapy and Radiotherapy in Oncologic Patients”, PNII/IDEAS Project no. 1340/2009; (2008-2010)

**GlobalComp**, “Models, semantics, logics and technologies for global computing”, ANCS, CNMP-PC, no. 11052/18.09.2007; (2007-2010).

## Significant results

### The most representative publications of the past 5 years:

1. G. Ciobanu, E.N. Todoran, "Continuation Semantics for Concurrency with Multiple Channels Communication", Proc. ICFEM 2015, *Lecture Notes in Computer Science*, vol. 9407, pp. 400-416, 2015.
2. E.N. Todoran, P. Mitrea, "Semantic investigation of a control-flow subset of BPMN 2.0", *Proc. IEEE ICCP 2015*, pp. 483-490, 2015.
3. G. Ciobanu, E.N. Todoran, "Continuation Semantics for Asynchronous Concurrency", *Fundamenta Informaticae*, vol. 131(3-4), pp. 373-388, 2014.
4. I. Chifor, P. Mitrea, et al, "Mathematical methods for assessing the prognostic of fixed partial dentures resulting from evaluating a group of dental patients", *Computational and Mathematical Methods in Medicine*, vol. 2014, article ID 984901, <http://dx.doi.org/10.1155/2014/984901>, 2014.
5. S. Brad, P. Mitrea, "Functional and strategic aligned clusters towards more united economies and sustainable development", *Proc. European Cluster Days-Strasbourg 2014*, pp. 125-146, 2014.
6. A.I. Mitrea, S. Nedevschi, D. Mitrea, P. Mitrea, "Diseased tissue are detection and delimitation by fusion between finite difference methods and textural analysis", *Proc. AQTR 2014*, pp. 1-5, 2014.
7. G. Ciobanu, E.N. Todoran, "Correct metric semantics for a biologically-inspired formalism", *Proc. IEEE SYNASC 2014*, pp. 317-324, 2014.
8. E.N. Todoran, N. Papaspyrou, "Experiments with continuation semantics for DNA computing", *Proc. IEEE ICCP 2013*, pp. 251-259, 2013.
9. Y. Rouselakis, N. Papaspyrou, Y. Tsiouris, E.N. Todoran, "Compilation to quantum circuits for a language with quantum data and control", *Proc. IEEE FedCSIS*, pp. , 1549-1556, 2013.
10. P. Mitrea, D. Homorodean, S. Brad, "The role of IT technology in ambient assisted living and the assiduous involvement of EDeAN network in AAL", *Proc. AAATE 2013*, pp. 200-206, 2013.
11. P. Mitrea, A.I. Mitrea, R. Badea, D. Mitrea , S.Nedevschi, D. M. Ivan, O. M.Gurzau, "Iterative Methods for obtaining Energy-Minimizing Parametric Snakes, with Application to Medical Imaging", *Computational and Mathematical Methods in Medicine*, vol. 2012 (2012), Article ID 918510, pp. 48-59.
12. D. Mitrea, P. Mitrea, S. Nedevschi, R. Badea, M. Lupşor, M. Socaciu, A. Golea, C. Hagi, L. Ciobanu, "Abdominal Tumor Characterization and Recognition using Superior Order Cooccurrence Matrices, based on Ultrasound Images", in *Computational and Mathematical Methods in Medicine. Jurnal Hindawi*, Volume 2012 (2012), Article ID 348135, pp. 60-77
13. G. Ciobanu, E.N. Todoran, "Relating two Metric Semantics for Parallel Rewriting of Multisets", *Proc IEEE SYNASC 2012*, pp. 273-281.
14. A.I.Mitrea, P.Mitrea, O.M.Gurzau, "Finite Difference Based Algorithms for Optimal Snakes used in Medical Diagnosis", *Proc. IEEE AQTR'2012*, pp. 491-496
15. E.N. Todoran, D. Simina, et al, "Mobile Objects and Modern Communication Abstractions: Design Issues and Denotational Semantics", *Proc IEEE ISPD 2011*, pp. 191-199.
16. D. Simina, E.N. Todoran, "Mobile Objects Security Protocols", *Proc IEEE ISPD 2011*, pp. 186-193.
17. G. Ciobanu, E.N. Todoran, "Metric Denotational Semantics for Parallel Rewriting of Multisets", *Proc IEEE SYNASC 2011*, pp. 276-284.
18. P.Mitrea, A.I.Mitrea, A.Prodan, O.M.Gurzau, F.Gavrilas, V. Oprea, R.Cimpean, M.Mesaros, "Computer Assisted Prosthetic Surgery, based on Deformable Surfaces and Statistical Modeling", *Proc. IEEE AQTR'2010*, pp.271-278.

### Significant solutions:

Continuation semantics for concurrency, Denotational semantics for models of natural (membrane, DNA) computing, Denotational semantics for multiparty interaction, Denotational semantics for models of global computing

### Products and technologies:

1. Prototype interpreter for mobile objects with multiparty interaction in peer to peer systems
2. Prototype interpreter for a control flow subset of BPMN 2.0
3. Prototypes for medical image processing in global computing context
4. Communication prototypes for smart sensor networks

## The offer addressed to the economic environment

Research & development	Formal design of reliable distributed software systems and programming languages
Consulting	Formal design of reliable distributed software systems and programming languages
Training	<p><b>Software Engineering:</b> software development paradigms. requirements engineering, UML class diagrams and OO analysis, modeling interaction and behavior, architecting and designing software, software testing techniques and strategies, PRISM probabilistic model checking</p> <p><b>Advanced Topics in Software Engineering and Programming Languages:</b> formal methods, denotational and operational semantics, stochastic process algebras, type systems</p>