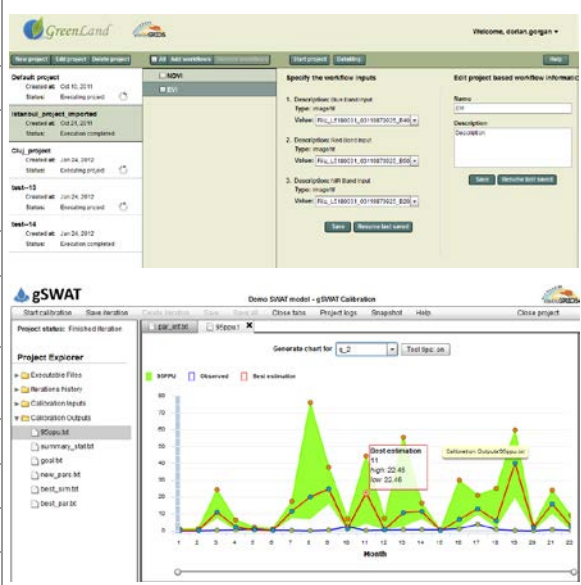



# COMPUTER GRAPHICS AND INTERACTIVE SYSTEMS LABORATORY

## Contact details

Name	<b>Computer Graphics and Interactive Systems Laboratory</b>	
Acronym	<b>CGIS</b>	
Logo		
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## Areas of expertise

High performance graphical processing and visualization, parallel and distributed processing over HPC infrastructures such as Grid, Cloud, GPU clusters, interoperability of HPC platforms, interactive application development, development of platforms and applications for spatial data processing and visualization, interdisciplinary research in the domains of Earth Sciences and Earth Observations.

## Team

**Prof.dr.eng. Dorian Gorgan**, Assoc.prof.dr.eng. Victor Băcu, Assoc.prof.dr.eng. Teodor Ștefănuț, Assoc.prof.dr.eng. Cornelia Melenti, Assoc.prof.dr.eng. Mihaela Ordean, Assist.prof.dr.eng. Adrian Sabou, Dr.eng. Danut Mihon, Dr.eng. Cristian Mocan, Eng. Denisa Rodila, Eng. Vlad Colceriu, Eng. Constantin Nandra, Eng. Mihai Bica, Eng. Marius Gorgan, Eng. Denisa Copandean

## Representative projects

**BIGEARTH - Flexible processing of big earth data over high performance computing architectures**, ROSA STAR project (2013-2016), <http://cgis.utcluj.ro/projects/bigearth>.  
**PECSA - Experimental Computer Services Platform for Scientific and Entrepreneurial Development**, PN-II-PT-PCCA project (2014-2017), <http://cgis.utcluj.ro/pecsa>.  
**IASON - Fostering sustainability and uptake of research results through Networking activities in Black Sea & Mediterranean areas**, FP7 project, funded by the European Commission (2013 - 2015), <http://www.iason-fp7.eu/>.  
**EnviroGRIDS - Building Capacity for a Black Sea Basin Observation and Assessment System supporting Sustainable Development**. FP7 project, funded by the European Commission (2009 - 2013), <http://www.envirogrids.net/>.  
**SEE-GRID-SCI - SEE-GRID infrastructure for regional eScience**. FP7 project, funded by the European Commission (2008 - 2010), <http://www.see-grid-sci.eu/>.  
**KEYSTONE - Semantic keyword-based search on structured data sources**, COST Action IC1302 (2013-2017), <http://www.keystone-cost.eu/keystone/>.  
**ComplexHPC - Open European Network for High-Performance Computing in Complex Environments**, COST Action IC0805 (2009-2013), <http://complexhpc.org/>.  
**mEducator - Multi-type Content Repurposing and Sharing in Medical Education**. eContentplus - Digital Content and Cognitive Systems Programme funded by European Commission (2009-2012), <http://www.meducator.net/>.  
**GISHEO - On demand Grid services for high education and training in Earth observation**. Funded by European Space Agency through PECS Programme (2008-2010), <http://gisheo.info.uvt.ro/>.  
**MedioGrid - Parallel and distributed graphical processing on GRID structure of geographical and environment data**, Excellence project 19CEEX-I03 (2005-2008).  
**I-TRACE - Interactive Tracing and Graphical Annotation in Pen-based e-learning**, 223434-CP-I-2005-IT-Minerva-M (2005-2007).

## Significant results

The most representative publications of the past 5 years:

1. Gorgan D., *Flexible and Adaptive Processing of Earth Observation Data over HPC Architectures*. International Conference on Satellite, 17-19 Aug, Houston, pp.35, (2015).
2. Rodila D.D., Ray N., Gorgan D., Conceptual Model for Environmental Science Applications on Parallel and Distributed Infrastructures, *Journal of Environmental Systems Research*, 4:23, (2015).
3. Bacu V., Stefanut T., Gorgan D., *Adaptive Processing of Earth Observation Data on Cloud Infrastructures Based on Workflow Description*. Proceedings of the Intelligent Computer Communication and Processing (ICCP), IEEE-Press, pp.449-454, (2015).
4. Gorgan D., Giuliani G., Ray N., Cau P., Abbaspour K., Charvat K., Jonoski A., Lehmann A., Black Sea Catchment Observation System as a Portal for GEOSS Community, in *International Journal of Advanced Computer Science and Applications (IJACSA)*, pp.9-18, (2013).
5. Mihon D., Colceriu V., Bacu V., Allenbachand K., Rodila D., Giuliani G., Gorgan D., OGC Compliant Services for Remote Sensing Processing over the Grid Infrastructure, in *International Journal of Advanced Computer Science and Applications (IJACSA)*, pp.32-40, (2013).
6. D. Gorgan, V. Bacu, T. Stefanut, D. Rodila, D. Mihon, Earth Observation application development based on the Grid oriented ESIP satellite image processing platform, *Journal on Computer Standards & Interfaces*, 34, 2012, pp. 541–548 (2012).
7. D. Gorgan, V. Bacu, D. Mihon, D. Rodila, K. Abbaspour, and E. Rouholahnejad, Grid based calibration of SWAT hydrological models, *Journal of Nat. Hazards Earth Syst. Sci.*, 12, pp. 2411-2423 (2012).
8. D. Rodila, V. Bacu, D. Gorgan, Comparative Parallel Execution of SWAT Hydrological Model on Multicore and Grid Architecture, *International Journal of Web and Grid Services*, Vol. 8, No. 3, 2012, pp. 304-320 (2012).
9. V. Bacu, D. Gorgan, Grid application oriented computational resource allocation strategy. *International Conference on High Performance Computing and Simulation (HPCS)*, pp. 581-587 (2012).
10. D. Gorgan, V. Bacu, D. Mihon, T. Stefanut, D. Rodila, P. Cau, K. Abbaspour, G. Giuliani, N. Ray, A. Lehmann, Software platform interoperability throughout enviroGRIDS portal, in *International Journal of Selected Topics in Applied Earth Observations and Remote Sensing – JSTARS*, Vol. PP/99, pp. 1-11 (2012).
11. D. Rodila, D. Gorgan, Geospatial and Grid Interoperability through OGC Services Gridification. *IEEE Journal of Selected Topics In Applied Earth Observations and Remote Sensing (J-STARS)*, *Interoperability Architectures and Arrangements for Multi-Disciplinary Earth Observation Systems and Applications Special Issue*, Vol. 5/6, pp. 1650-1658 (2012).
12. D. Mihon, V. Bacu, D. Rodila, T. Stefanut, K. Abbaspour, E. Rouholahnejad, D. Gorgan, Grid Based Hydrologic Model Calibration and Execution. Chapter in the book: *Advanced in Intelligent Control Systems and Computer Science*, Dumitrache I. (Ed.), Springer-Verlag, Volume 187, 2012, pp 279-293 (2012).

#### Software tools and platforms developed by CGIS Laboratory:

**BIGEARTH** - platform to support the flexible description and adaptive processing of massive data over distributed HPC infrastructures.

**WorDeL** – workflow oriented language for flexible description of parallel and distributed processes.

**gSWAT - gSWAT** - platform and application allows the user to calibrate and execute the SWAT hydrological models in a flexible and interactive manner by taking advantage of the Grid infrastructure.

**gSWATSim** – is a collection of Web services supporting the Grid based calibration and execution of the SWAT hydrological models. It provides the SWAT related basic functionality required to develop a remote Web application.

**GreenLand** – is a platform and application for Grid based satellite image processing and visualization. The processing is described by an interactive graphical editor. The application is connected by standard geospatial services to spatial data repositories.

**ESIP** – Grid based satellite image processing platform. GreenLand is layered on ESIP and gProcess.

**gProcess** – Grid oriented task management and execution platform. gProcess is the basic platform for ESIP, GreenLand, and gSWAT.

**eGLE** – eLearning Platform for Earth Science domain. It supports the development and execution of teaching materials including Grid based processing of satellite images, and connectivity by geospatial Web services.

**GreenView** – supports the refinement of surface and vegetation parameters in South East Europe region based on satellite images.

**eTrace** – eLearning platform for developing learning materials by graphical annotations on 3D objects.

MedioGrid – first national Grid infrastructure for research and education (2006).

#### The offer addressed to the economic environment

Research & development in core areas	- GPU cluster and Cloud computing - High performance processing and visualization - Geospatial service oriented architectures
Research & development in applied fields	- Development of Earth Science oriented applications - Earth Observation big data processing and classification
Consulting	- Graphics modelling and simulation - User interactive application development methodology - High performance computation
Training	- User interactive application development methodology - Usability evaluation of graphical user interfaces