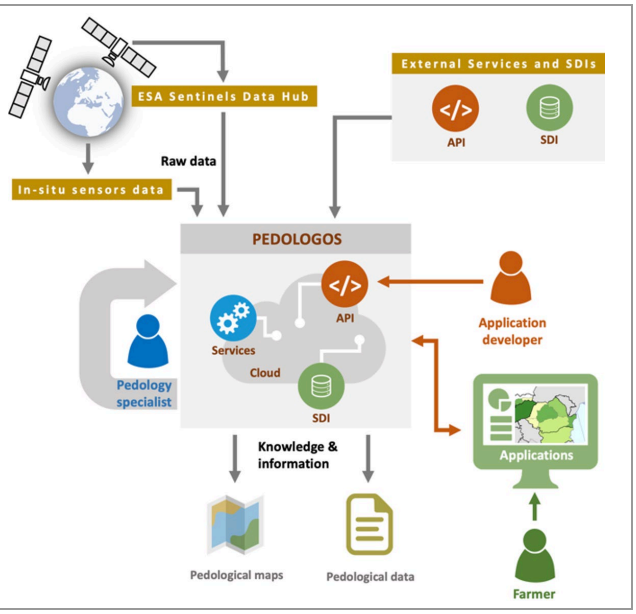
COMPUTER GRAPHICS AND INTERACTIVE SYSTEMS LABORATORY

Contact details

Name	**Computer Graphics and Interactive Systems Laboratory**
Acronym	**CGIS**
Logo	CGIS Computer Graphics and Interactive Systems
Site	http://cgis.utcluj.ro
Address	28 G. Baritiu Str., 400027, Cluj-Napoca, Romania
Faculty Department	**Faculty of Automation and Computer Science, Computer Science Department**
Telephone	+40 264 401478
Fax	+40 264 594491
Director	Prof.dr.eng. Dorian Gorgan
e-mail	dorian.gorgan@cs.utcluj.ro



Areas of expertise

High performance graphical processing and visualization, parallel and distributed processing on cloud infrastructures, interoperability of HPC platforms, interactive application development, software platforms and applications for spatial data processing and visualization, visual analytics, Virtual and Augmented Reality application development, machine learning based satellite data classification, interdisciplinary research in the domains of Earth Sciences and Earth Observations.

Team

Prof.dr.eng. Dorian Gorgan**,** Assoc.prof.dr.eng. Victor Bâcu, Assoc.Prof.dr.eng. Teodor Ştefănuţ, Senior Lect. dr.eng. Adrian Sabou, Lect.dr.eng. Constantin Nandra, Senior Lect.dr.eng. Cornelia Melenti, Senior Lect.dr.eng. Mihaela Ordean, Drd.eng. Mihai Bica, Drd.eng. Pavel Valerica, Mrd.eng. Raul Gorgan

Representative projects

EMPOWER - Design and evaluation of technological support tools to empower stakeholders in digital education, HORIZON-RIA (2022-2025), https://project-empower.eu
AITECH - Cercetare de excelență în domeniul inteligență artificială și date masive (Research of excellence in the field of artificial intelligence and massive data), Tip proiect: PNCDI III, Proiecte de finanţare a excelenţei în CDI, Contract 38 PFE/2021 (2021-2024), https://aitech.utcluj.ro
CLOUDUT – "Cloud Cercetare UTCN-CLOUDUT", Project type: Cloud and Massive Data Infrastructures, Competitiveness Operational Program 2014-2020, Contract 235/2020 (2020 - 2022), https://cloudut.utcluj.ro
CERES - "Modul software de clasificare a asteroizilor din imagini satelitare utilizand invatare automata" (Software method for classifying asteroids from satellite images by machine learning). Proiect PN III (2020-2022), https://cgis.utcluj.ro/ceres/
NEARBY – "Visual Analysis of Multidimensional Astrophysics Data for Moving Objects Detection", ROSA STAR 2017 (2017-2019), http://cgis.utcluj.ro/nearby
HORUS – "Software Toolbox for Pedological Monitoring of Transylvanian Area based on Sentinel-2 Data", ROSA STAR 2017 (2017-2019), http://cgis.utcluj.ro/horus/
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 eInfrastructure 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/
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/

Significant results

The most representative 10 publications of the past 5 years:

1. Bacu, V., Nandra, C., Sabou, A., Stefanut, T., Gorgan, D. "Assessment of Asteroid Classification Using Deep Convolutional Neural Networks". *Aerospace 2023, 10(9), 752.* https://doi.org/10.3390/aerospace10090752, (2023)
2. Dumitru R. G., Antonio Toma S. and Gorgan D., "3D Object Recognition Method Using CNNs and Slicing", *Proceedings of the 2022 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR)*, pp. 1-6, (2022).
3. Nandra C., Grigor S., Gorgan D., Integrating Voice Based Interaction with Massive Data Process Description and Execution. In: Russo D., Ahram T., Karwowski W., Di Bucchianico G., Taiar R. (eds) Intelligent Human Systems Integration 2021. IHSI 2021. *Advances in Intelligent Systems and Computing, vol 1322*. Springer, Cham, pp.133-139, (2021).
4. Margin R., Gorgan D., Qualitative Classification of Local Satellite Data. Proceedings of the *2020 IEEE ICCP - 16th International Conference on the Intelligent Computer Communication and Processing*, ISBN:978-1-7281-9081-5, pp.589-596, (2020).
5. Gorgan D., Vaduvescu O., Stefanut T., Bacu V., Sabou A., Copandean D., Nandra C., Boldea C., Boldea A., Predatu M., Pinter V., Stanica A., "Nearby Platform for Automatic Asteroids Detection and Euronear Surveys". Proc. *1st NEO and Debris Detection Conference*, Darmstadt, Germany, 22-24 January 2019, published by the ESA Space Safety Programme Office Ed. T. Flohrer, R. Jehn, F. Schmitz, (2019).
6. Bacu V., Stefanut T., Gorgan D., "Building soil classification maps using HorusApp and Sentinel-2 Products". Proceedings of the 2019 IEEE *15th International Conference on the Intelligent Computer Communication and Processing (ICCP)*, pp.79-85, (2019).
7. Nandra C., Gorgan D., "Usability evaluation of a domain-specific language for defining aggregated processing tasks". Proceedings of the 2019 IEEE *15th International Conference on the Intelligent Computer Communication and Processing (ICCP)*, pp.87-94, (2019).
8. Gorgan D., Rusu T., Bacu V., Stefanut T., Nandra N., "Soil Classification Techniques in Transylvania Area Based on Satellite Data". *World Soils 2019 Conference*, 2 - 3 July 2019, ESA-ESRIN, Frascati, Italy (2019).
9. Bica M., Gorgan D., "Data Locality Aware Algorithm for Task Execution on Distributed, Cloud Based Environments". *Advances in Intelligent Systems and Computing book series, vol. 611*, pp.557-566. Springer, Cham, ISBN 978-3-319-61565-3, (2018).
10. Stefanut T., Bacu V., Nandra C., Balazs D., Gorgan D. and Vaduvescu O., "NEARBY Platform: Algorithm for Automated Asteroids Detection in Astronomical Images". Proceedings of the 2018 IEEE *14th International Conference on the Intelligent Computer Communication and Processing (ICCP)*, pp.365-369, (2018).

Software tools and platforms developed by CGIS Laboratory:

HORUS, HorusApp – platform and application for machine learning based soil classification by using satellite and spatial data processing.
NEARBY – cloud platform for astronomical moving objects detection and tracking.
CERES – machine learning based asteroid detection classification model.
BIGEARTH - platform for flexible description and adaptive processing of massive data over HPC infrastructures.
WorDeL – workflow oriented language for flexible description of parallel and distributed processes.
gSWAT – platform and application allow the user to calibrate and execute the SWAT hydrological models in a flexible and interactive manner by taking advantage of the Grid infrastructure.
gSWATSim – 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 – 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
Research & development in applied fields	Development of Earth Science oriented applications; Earth Observation big data processing and classification, Virtual and Augmented Reality application development
Consulting	Graphics modelling and simulation; User interactive application development methodology
Training	User interactive application development methodology; Cloud computing

Last update on February 2024