DASSAULT SYSTÈMES SOLUTIONS CENTER

Contact details

Name	**Dassault Systèmes Solutions Center**
Acronym	**DSSC**
Logo	CENTRUL DE COMPETENTE SI SOLUTII DASSAULT SYSTEMES
Site	https://dssc.utcluj.ro/
Address	**Technical University of Cluj-Napoca** Adress: 103-105 Muncii Av. Cluj-Napoca, Romania, Rooms: B09, M401, M402, M403, M404, M405, M406, M409, M410 **Research Institute for Innovative Technologies**, Adress: 12 Muncii Av. Cluj-Napoca, Romania, Rooms 6 and 15
Faculty	**Faculty of Industrial Engineering, Robotics and Production Management**
Department	**Design Engineering and Robotics Department**
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Director	Prof. Dr. Eng. Daniela Popescu
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3D measurements and scanning Laboratory

VR/AR/MR Laboratory

Areas of expertise

The centre primarily focuses on **Digital Production, Design, Development and Simulation**, covering the following key areas:

- **CAD/CAM/CAE –** The research center is the first Dassault Systèmes academic partner in Romania, providing cutting-edge solutions in computer-aided design (CAD), product modeling, computer-aided engineering (CAE) and manufacturing system simulation. It serves as a hub for innovation, education, and industry collaboration, offering expertise in virtual prototyping, digital twin technology, and process optimization. The centre provides product lifecycle management (PLM), finite element analysis (FEA), and manufacturing process simulation.
- **Reverse engineering and digitization –** drive innovation across multiple fields, transforming physical objects into precise digital models, using 3D scanners that employ a wide range of technologies (laser, structured light and terrestrial 3D scanners) for workpieces ranging from small to medium and big. Applications include product development for prototyping and manufacturing, digital archaeology for artifact preservation and reconstruction, and medical prosthetics for custom implants. They also support automotive and aerospace part replication, biomechanics for ergonomic design, and entertainment for realistic digital assets. These technologies enhance precision, efficiency, and creativity across diverse industries.
- **3D high-precision measurements –** the research center is well equipped with multiple fixed and mobile CMM machines, that can be deployed for a wide range of services, depending on the requirements of the measured workpieces (dimensions, precision requirements and data collection speed).
- **Extended reality –** complex computer-generated 3D environments in VR, AR, and MR enable users to access and interact with an alternative reality. These environments allow for immersive interaction with 3D models at a 1:1 scale providing an in-depth overview of complex assemblies. Users can conduct virtual inspections, disassemble parts into individual components for measurement and analysis, and evaluate ergonomics, all within an interactive and spatially aware digital workspace.

Team

Prof. Dr. Eng. Daniela Popescu, Prof. Dr. Eng. Călin Neamţu, Prof. Dr. Eng. Crișan Liviu, Associated Prof. Dr. Eng. Grigore Pop, Associated Prof. Dr. Eng. Ștefan Bodi, Associated Prof. Dr. Eng. Radu Comes, Associated Prof. Dr. Eng. Răzvan Curta, Lect. Dr. Eng. Zsolt Buna, Lect. Dr. Eng. Vasile Tompa, Research Assistant Eng. Raul Roszos, Research Assistant Eng. Milan Jac, Research Assistant Eng. Dragoș Adreșan, Research Assistant Eng. Cătălin Grec

Representative projects

RESTORY - HORIZON-CL2-2023-HERITAGE-01-04 (2024-2026) - **Recovering Past Stories for the Future: A Synergistic Approach to Textual and Oral Heritage of Small Communities**
AtOP - PN-III-P1-1.1-TE-2021 (2021-2023) **- Mass digitization of cultural heritage: between myth and reality. Evaluating the accuracy of 3D models generated using the photogrammetry method in the case of cultural Heritage**
HOPE - PN-III-P2-2.1 PED-2019-5430 (2021-2023) - **"Intelligent Hospital Bed"**
VART - PN-III-P1-1.1-PD-2019-1246 (2021-2023) - "**Scientific investigation and promotion of the ornamental Dacian parade shields using virtual / augmented reality techniques"**
RO-CULTURA CALL01-16 (2021-2023) "**Horea's Church – a heritage for the future. Valorization of an 18th century architectural monument through virtual reality"**
RO-CULTURA CALL01-15 (2021-2023) "**Innovative techniques in the valorization of cultural heritage. Icons from the Sebeș Valley from the collection of the Ethnographic Museum of Transylvania"**
IDArt - PNIII-P1-1.2 PCCDI 2018 (2018-2020) **– "Elaborating Complex Methodologies Regarding the Attribution and Authentication of Medieval and Early Modern Paintings Belonging to the National Cultural Heritage"**
DACIT - EEA Grants - PA16/RO12, (2015-2016) **- "The conservation and revitalization of cultural and natural heritage, When ancient everyday life becomes UNESCO heritage. The scanning, digital restoration and contextualization of Dacian artefacts from Orăștie Mountains"**
"Digitizing and reconstructing the historic artifacts from the "Grădiștea de Munte" archaeological site (Sarmisegetuza Regia)" (2012), The National Museum of History of Transylvania
"Blended learning course on Measurement Uncertainty for advanced vocational training" (2011-2013), Leonardo da Vinci - Transfer of Innovation
"Creating a virtual museum for promoting the patrimony of The National Museum of History of Transylvania" (2010) The National Museum of History of Transylvania
"Project concerning research on new product design, development and simulation" (2007-2009), HAMK Univ. Finland
"Scanning and generating surfaces for a orthopedic prosthesis" (2008), SC Gibas CNC East Europe SRL

CAD/CAM/CAE and Reverse Engineering/3D measurement contracts with industrial partners such as BELCO AVIA SRL, Emerson SRL, Comelf SA, Turdeana SA, RAAL SA, Robert Bosch SRL, Continental Automotive Romania, Elcom Cablaje, Leoni Wirings System Romania, Eckerle Automotive.

Significant results

The most representative 10 publications of the past 5 years:

1. Neamțu, C., Comes, R., Popovici, D. M., Băutu, E., Liliana, M. S., Syrotnik, A., & Popovici, M. I. (2024). Evaluating User Experience in the Context of Cultural Heritage Dissemination Using Extended Reality: A Case Study of the Dacian Bronze Matrix with Hollow Design. *ACM Journal on Computing and Cultural Heritage*, *17*(2), 1-21.
2. Popescu, D., Dragomir, M., Popescu, S., & Dragomir, D. (2022). Building better digital twins for production systems by incorporating environmental related functions—literature analysis and determining alternatives. Applied Sciences, 12(17), 8657.
3. Comes, R., Neamțu, C. G. D., Grec, C., Buna, Z. L., Găzdac, C., & Mateescu-Suciu, L. (2022). Digital Reconstruction of Fragmented Cultural Heritage Assets: The Case Study of the Dacian Embossed Disk from Piatra Roșie. Applied Sciences, 12(16), 8131.
4. Kęsik, J., Żyła, K., Montusiewicz, J., Miłosz, M., Neamtu, C., & Juszczyk, M. (2022). A methodical approach to 3d scanning of heritage objects being under continuous display. *Applied Sciences*, *13*(1), 441.
5. Popovici, D. M., Iordache, D., Comes, R., Neamțu, C. G. D., & Băutu, E. (2022). Interactive exploration of virtual heritage by means of natural gestures. *Applied Sciences*, *12*(9), 4452.
6. Bere, P., Dudescu, M., Neamțu, C., & Cocian, C. (2021). Design, manufacturing and test of CFRP front hood concepts for a light-weight vehicle. *Polymers*, *13*(9), 1374.
7. Neamțu, C., Bratu, I., Măruțoiu, C., Măruțoiu, V. C., Nemeș, O. F., Comes, R., ... & Popescu, D. (2021). Component materials, 3D digital restoration, and documentation of the imperial gates from the Wooden Church of Voivodeni, Sălaj county, Romania. *Applied Sciences*, *11*(8), 3422.
8. Bere, P., Neamtu, C., & Udroiu, R. (2020). Novel method for the manufacture of complex CFRP parts using FDM-based molds. *Polymers*, *12*(10), 2220.
9. Comes, R., Neamțu, C., Buna, Z. L., Bodi, Ș., Popescu, D., Tompa, V., ... & Mateescu-Suciu, L. (2020). Enhancing accessibility to cultural heritage through digital content and virtual reality: A case study of the Sarmizegetusa Regia UNESCO site. Journal of Ancient History and Archaeology, 7(3).
10. Neamțu, C., Bârcă, V., & Buna, Z. (2020). Promoting and Capitalizing on the Vestiges from Sarmizegetusa Regia by Modern Multimedia Methods. *Plural. History, Culture, Society*, (1), 150-173.

Significant solutions:
Measurement uncertainty evaluation in case of classical measurements hand tools for length
Mold Design for injected plastic part
Reverse engineering of mechanical parts
Terrestrial laser scanning
Products and technologies:
Extended reality applications for industrial application
Extended reality applications for museum and digital exhibitions

Books:
Comes Radu, Buna Zsolt Levente, Raul Silviu Rozsos, SolidWorks Indrumator de proiect, ISBN 978-606-737-450-6, UT PRESS, 2020
Neamțu Călin, Popescu Daniela, Bodi Stefan, Comes Radu, Curta Razvan, SolidWorks 2016: Îndrumător de laborator, ISBN 978-606-543-906-1, Editura Mega, Cluj-Napoca, 2017;
Neamțu Călin, Popescu Daniela, Curta Razvan, Comes Radu, Bodi Stefan, SolidWorks 2016: Student`s Guide, ISBN 978-606-543-907-8, Editura Mega, Cluj-Napoca, 2017;
Neamțu Călin, Constantin Marutoiu et.all (Ed.), Catalog proiect PN-II-PT-PCCA-2013-4-1882 - Biserici de lemn din Transilvania-Wooden churches of Transylvania, Editura Mega, ISBN 978-606-543-857-6, 207 pagini, 2017
Neamtu Calin, et. all (Ed.) Catalog proiect PA-16/RO 12 – LP10 - Incursiuni Dacice in Spațiul Virtual, ISBN 978-606-94125-4-1, Editura Only One, 249 pagini, 2016
Neamțu Călin, Popescu Daniela, Popișter Florin, *Module CAD/CAM în Catia V5*, Editura Mega, Cluj-Napoca, 2013
Neamțu Călin, Dragomir Mihai, Popescu Daniela, Popescu Sorin, Răcăsan Radu *Uncertainty of conventional measurements / Incertitudinea de măsurare în metrologia clasică*, Editura UT PRESS, Cluj-Napoca, 2012
Wojciech Plowucha (ed.) et al. – *Didactics of Coordinate Metrology*, Editura Wydawnictwo naukowe Akademii Techniczo-Humanistycznej W Bielsku-Bialej, - Bielsko Biala 2012, - capitolul Virtual Laboratory, autori: Călin Neamțu, Mihai Dragomir, Daniela Popescu, Rareș Ghinea

The offer addressed to the economic environment

Research & development	VR/AR/MR training and education; Designing and optimization of products and industrial manufacturing systems; Reverse engineering; Digital Archaeology; Research in the field of Digital Factory simulations; Research on adapting the reverse engineering techniques in various interdisciplinary fields (art, medicine, etc.) Reverse engineering and reconstruction of complex surfaces Designing, modelling and 3D simulation of manufacturing systems 3D modelling of components and complex assemblies
Consulting	Consultancy regarding the optimization of CAD/CAM processes; Consultancy regarding production planning; Consultancy regarding advance 3D modelling; Consultancy regarding 3D scanning
Training	CAD/CAM/CAE: using the Dassault Systèmes software packages Training on various topics related to extend reality (VR, AR, MR) Advanced reverse engineering technique, 3D Sheet metal design, Measurement Uncertainty

Last updated: January 2025