NATIONAL CENTRE OF INNOVATIVE MANUFACTURING

Contact details

Name	**National Centre of Innovative Manufacturing**
Acronym	**FABRIN**
Logo	
Site	http://www.tcm.utcluj.ro
Address	103-105 Muncii Av., Room: G14; B07; G19; C04; M201, M203; B05; B06; G15; C 03, 400641Cluj-Napoca, Romania
Faculty Department	**Faculty of Machine Building** **Manufacturing Engineering Department**
Telephone	+40264 401614, +40264 415653
Fax	+40 264 415653
Director	Prof. Dr. Eng. Petru Berce
e-mail	Petru.Berce@tcm.utcluj.ro

Areas of expertise

Industrial Engineering (Laser Beam Machining, Water Jet Cutting, Electrical Discharge Machining, Rapid Prototyping of complex parts and master models for Rapid Tooling, etc.); **Flexible Manufacturing Systems** (CNC Manufacturing Systems); **CAD/CAM Systems** (Applied Industrial design for products and technologies); **Production Engineering** (Innovative Manufacturing for product development and Rapid Tooling technologies); **Automotive Engineering** (Competitive Manufacturing of car components); **Composite Materials** (Manufacturing technologies of complex parts made out of composite materials enforced with carbon fiber); **Engineering and Technologies** (Concurrent engineering, Methodologies and Software tools in Design for Manufacture and Assembly); **Biomedical engineering**, (Prototypes, customized implants, new biocompatible materials); **Operational Research**. Development of algorithms for solving TSP, Flowshop Scheduling, Optimal Nesting etc. **Technology Processes Optimization Development of algorithms** for linear and nonlinear optimization, without/with constraints.

Team

Prof. Dr. Eng. Petru Berce, Prof. Dr. Eng. Nicolae Bâlc, Prof. Dr. Eng. Mircea Ancău, Prof. Dr. Eng. Domniţa Frăţilă Assoc.Prof. Dr. Eng. Mihai Damian, Assoc.Prof. Dr. Eng. Alexandru Cărean,, Assoc.. Prof. Dr. Eng. Răzvan Păcurar Assist. Prof. Dr. Eng. Cristian Caizar, Assist. Prof. Eng. Horea Chezan, Assist., Assist. Prof. Dr. Eng. Radu Sever Adrian, Assist. Prof. Dr. Eng. Ancuţa Păcurar, Assoc.. Prof. Dr. Eng Dan Leordean, Assoc.. Prof. Dr. Eng Paul Bere, Assoc.. Prof. Dr. Eng. Nicolae Panc, Assoc.. Prof. Dr. Eng. Emilia Sabă. Assoc.. Prof. Dr. Eng Alexandru Popan, Assoc.. Prof. Dr. Eng Alina Luca

Representative projects

DigiTech – "Implementation of additive technologies in complex and overbuilt components manufacturing", PNIII-P1-1.2 PCCDI 2018, (2018-2021)
"**AMaTUC – Boosting the scientific excellence and innovation capacity in additive manufacturing of the Technical University of Cluj-Napoca**", HORIZON 2020 – twinning, 2016-2018
"Research concerning the development of new stochastic heuristic algorithms for solving flowshop scheduling problems",PNII-Idei,http://www.ci579.utcluj.ro (2008-2011)
"**Expert Systems for Technology Processes Optimization. The research contracts deals with rapid prototyping and tooling optimization"**, PNII, http://www.esop.utcluj.ro (2007-2010)
Adm-ERA, **"Reinforcing Additive Manufacturing research cooperation between the Central Metallurgical Research and Development Institute and the European Research Area"**, European FP7 Project, (2011-2013)

BIOMAPIM, **"New Biocompatible Materials for personalized implants made by SLS and SLM"**, PCCE, (2010-2013)
OP3MET, **"Optical 3D Metrology - Automated in-line metrology for quality assurance in the manufacturing industry"**, European FP6 Project, (2006-2008)
"Innovative Manufacturing Network", (2005-2008)

Significant results

The most representative publications of the past 5 years:

1. Berce, P. Advances in Additive Manufacturing and Their Applications. Metals, 14(2), 165, 2024
2. Cosma, C., Teusan, C., Gogola, P., Berce, P.Balc,N. Investigation of the Interface between Laser-Melted CoCr and a Stainless Steel Substrate. In:Metals, 2022, 12(6), 965
3. Pacurar, R.; Berce, P.; Petrilak, A.; Neme¸s, O.; Borzan, C. ¸S.M.; Harnicárová, M.; Pacurar, A. Selective Laser Melting of PA 2200 for Hip Implant Applications: Finite Element Analysis, Process Optimization, and Morphological and Mechanical Characterization. Materials 2021, 14, 4240. https://doi.org/10.3390/ma14154240 (ISI-Q1, IF: 3,623)
4. Cosma, C; Drstvensek, I; Berce, P; Prunean, S.; Legutko, S; Popa, C.; Balc, N; „Physical-Mechanical Characteristics and Microstructure of Ti6Al7Nb Lattice Structures Manufactured by Selective Laser Melting", MATERIALS, Volume: 13 Issue: 18, 2020. Article Number: 4123, DOI:10.3390/ma13184123,
5. Perini, M; Bosetti, P; Balc, N," Additive manufacturing for repairing: from damage identification and modeling to DLD", Rapid Prototyping Journal, Publisher: Emerald Group Publishing LTD, UK, Volume: 26, Issue 5, ISSN: 1355-2546 / eISSN: 1758-7670, DOI: 10.1108/RPJ-03-2019-0090, Published 2020, Q1-FI: 3.937;
6. Todea, M.; Vulpoi, A.; Popa, C.; Berce, P., et al., Effect of different surface treatments on bioactivity of porous titanium implants, JOURNAL OF MATERIALS SCIENCE & TECHNOLOGY Volume: 35 Issue: 3 Pages: 418-426 Published: MAR 2019
7. Petru Berce, et. al., „Medical applications of Additive Manufacturing technologies", *Romanian Academy Publishing House*, Bucharest, 2015
8. Leordean, Dan; Dudescu, Cristian; Marcu, Teodora; P. Berce et al "Customized implants with specific properties, made by selective laser melting" *RAPID PROTOTYPING JOURNAL* Volume: 21 Issue: 1 Pages: 98-104, Published: 2015
9. Leordean, Dan; Radu, S. A.; Fratila, D.; P. Berce, "Studies on design of customized orthopedic endoprostheses of titanium alloy manufactured by SLM", *INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY* Volume: 79 Issue: 5-8 Pages: 905-920 Published: JUL 2015
10. Petru Berce, et.al., „Additive Manufacturing Technologies and their applications", *Academy Publishing House*, Bucharest, 2014.

International Patent: "Acting Device", registered in USA and Germany;
Others:
Competitive Manufacturing techniques transferred to industrial partners and used in commercial contracts with companies from Germany and England

The offer addressed to the economic environment

Research & development	Develop new materials, suitable for Rapid Prototyping using the SLS and SLM equipment. Development of optimization algorithms. Design for Competitive Manufacturing of Industrial Products. Rapid Tooling and Additive Manufacturing Rapid Prototyping using the well known CNC machines, available within DME-TUCN. Researches concerning the technological processes optimization.
Consulting	External evaluation of products/projects; Select the optimal RP technological route; Consulting in the area of operational research (industrial application of combinatorial optimization: calculation of minimum path length, optimal nesting, flowshop scheduling etc.).
Training	We offer training in the field of Numerical Optimization Techniques in Computer Aided Design. Training for people from industry, in the following fields: Use modern CAD systems for integrated applied design; Rapid Tooling; Modern Manufacturing Technologies; Using the modern RP equipment

Last updated: 01/20/2025