

Universitatea Tehnică din Cluj-Napoca
Facultatea de Inginerie Industrială, Robotica și Managementul Producției
Departamentul de Ingineria Proiectării și Robotică
Conf.dr.ing. Florin Alexandru COVACIU

**LISTA LUCRĂRILOR ȘTIINȚIFICE PUBLICATE,
CONTRACTE DE CERCETARE
ȘI BREVETE**

Teza de doctorat

Titlu: Simularea, Comanda și Acționarea Roboților Paraleli pentru Brahiterapie

Conducător științific: Prof.dr.ing. Doina Pisla

Universitatea Tehnică din Cluj-Napoca

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Bursă post-doctorat

Titlul proiectului - Competențe antreprenoriale și cercetare de excelență în programele de studii doctorale și postdoctorale - ANTREDOC

Perioada bursei post-doctorale: 2020-2021

Instituția: Universitatea Tehnică din Cluj-Napoca / Partener: ROBERT BOSCH SRL

A. Cărți/ capitole publicate în edituri naționale recunoscute CNCSIS

1. **F. Covaciu**, Introducere în mediul de dezvoltare de realitate virtuală Unity3D, PIM, Iași, 2020, ISBN 978-606-13-5620-1, 202 pagini.
2. **F. Covaciu**, Elemente Avansate de Proiectare, Control și Acționare a unor Roboți Seriali, Paraleli și Mobili, PIM, Iași, 2021, ISBN 978-606-13-6615-6, 152 pagini.
3. **F. Covaciu**, Mașini, Roboți și Echipamente pentru Sisteme Flexibile de Fabricație 1, PIM, Iași, 2022, ISBN 978-606-13-5583-9, 324 pagini.

A. Cărți/ capitole publicate în edituri naționale recunoscute CNCSIS (ISI Book)

1. **F. Covaciu**, B. Gherman, A. Pisla, G. Carbone, D. Pisla (2020) Rehabilitation System with Integrated Visual Stimulation. In: Pisla D., Corves B., Vaida C. (eds) New Trends in Mechanism and Machine Science. EuCoMeS 2020. Mechanisms and Machine Science, vol 89. Springer, Cham. https://doi.org/10.1007/978-3-030-55061-5_16
Print ISBN 978-3-030-60075-4; Online ISBN 978-3-030-60076-1; pp. 131–137.
2. A. Pisla, C. Vaida, **F. Covaciu** (2018) Test Bench for Space Remote Docking System. In: Husty, M., Hofbauer, M. (eds) New Trends in Medical and Service Robots. MESROB 2016. Mechanisms and Machine Science, vol 48. Springer, Cham. https://doi.org/10.1007/978-3-319-59972-4_18
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3. **F. Covaciu**, I. Pop, B. Gherman, A. Pislă, C. Vaida, N. Al Hajjar & D. Pislă (2023). Development of a Virtual Reality Simulator for Robotic Assisted Surgery. In: Laribi, M.A., Nelson, C.A., Ceccarelli, M., Zegloul, S. (eds) *New Advances in Mechanisms, Transmissions and Applications*. MeTrApp 2023. Mechanisms and Machine Science, vol 124. Springer, Cham. https://doi.org/10.1007/978-3-031-29815-8_6
Print ISBN 978-3-031-29814-1; Online ISBN 978-3-031-29815-8; pp. 52–61

B. Îndrumătoare de lucrări

1. A. Pislă, **F. Covaciu**, *Comanda numerică a mașinilor-unelte*, UTPRESS, Cluj-Napoca, 2016, ISBN 978-606-737-134-5, 120 pagini.
2. A. Pislă, **F. Covaciu**, *Computer numerical control*, UTPRESS, Cluj-Napoca, 2016, ISBN 978-606-737-133-8, 136 pagini.
3. **F. Covaciu**, *Masini, Roboți și Echipamente pentru Sisteme Flexibile de Fabricație II*, Îndrumător de Laborator, PIM, Iași, 2020, ISBN 978-606-13-5817-5, 202 pagini.

C1. Articole ISI în reviste cu factor de impact (Thomson Reuters)

1. N. Plitea, D. Pislă, C. Vaida, B. Gherman, A. Szilaghyi, B. Galdau, D. Cocorean, **F. Covaciu**, On the Kinematics of a New Parallel Robot for Brachytherapy, *Proceedings of the Romanian Academy Series A- Mathematics Physics Technical Sciences Information Science* Volume: 15, Issue: 4, pp: 354-361, ISSN: 1454-9069 [ISI FI: 0.3], Published: 2014. (Q4)
2. D. Pislă, B. Galdau, **F. Covaciu**, C. Vaida, D. Popescu, N. Plitea, Safety Issues in the Development of the Experimental Model for an Innovative Medical Parallel Robot used in Brachytherapy, *International Journal of Production Research*, Vol. 55 Issue: 3, pp. 684-699, ISSN / ISBN: 0020-7543 [ISI FI: 9.2], Published: 2017. (Q1)
3. **F. Covaciu**, A. Pislă, A. E. Iordan, Development of a Virtual Reality Simulator for an Intelligent Robotic System Used in Ankle Rehabilitation, *Journal Sensors*, Vol. 21, Issue: 4, pp. 1-17, ISSN / ISBN: 1424-8220 [ISI FI: 3.9], Published: 2021. (Q2)
4. **F. Covaciu**, A. E. Iordan, Control of a Drone in Virtual Reality Using MEMS Sensor Technology and Machine Learning, *Journal Micromachines*, Vol. 13, Issue: 4, pp. 1-19, ISSN / ISBN: 2072-666X [ISI FI: 3.4], Published: 2022. (Q2)
5. **F. Covaciu**, N. Crisan, C. Vaida, I. Andras, A. Pusca, B. Gherman, C. Radu, P. Tucan, N. Al Hajjar, D. Pislă, Integration of Virtual Reality in the Control System of an Innovative Medical Robot for Single-Incision Laparoscopic Surgery, *Journal Sensors*, Vol. 23, Issue: 12, pp. 1-25, ISSN / ISBN: 1424-8220 [ISI FI: 3.9], Published: 2023. (Q2)
6. **F. Covaciu**, Development of a Virtual Reality Simulator for an Autonomous Vehicle, *Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering*, Vol.65, Issue: 2, pp. 155-160, ISSN / ISBN: 1221-5872, [ISI FI: 0.3], Published: 2022. (Q4)
7. **F. Covaciu**, L.N. Covaciu, Control and Actuation of a Parallel Robot with three degrees of freedom, *Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering*, Vol.65, Issue: 1, pp. 37-42, ISSN / ISBN: 1221-5872, [ISI FI: 0.3], Published: 2022. (Q4)
8. L.N. Covaciu, **F. Covaciu**, L. Bacali, Reaching industry 4.0 goals under the influence of sustainable finance, *Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering*, Vol.65, Issue: 3, pp. 407-416, ISSN / ISBN: 1221-5872, [ISI FI: 0.3], Published: 2022. (Q4)

9. **F. Covaciu**, Development of a control program for dc motors using pid control and low-pass filter, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, Vol.66, Issue: 2, pp. 191-198, ISSN / ISBN: 1221-5872, [ISI FI: 0.3], Published: 2023. (Q4)
10. A.E. Iordan, **F. Covaciu**, A combined neuro-fuzzy system to command an autonomous automobile from virtual reality, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, Vol.66, Issue: 2, pp. 223-228, ISSN / ISBN: 1221-5872, [ISI FI: 0.3], Published: 2023. (Q4)
11. A.E. Iordan, **F. Covaciu**, Estimation of the effort required to develop a software through the k-nearest neighbors method, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, Vol.66, Issue: 3, pp. 327-332, ISSN / ISBN: 1221-5872, [ISI FI: 0.3], Published: 2023. (Q4)

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1. **F. Covaciu**, Actuation and Control of a Serial Robotic Arm with four degrees of freedom, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, pp. 347-356, ISSN / ISBN: 1221-5872, Published: 2018
2. **F. Covaciu**, Control and Actuation System of a Six Degrees of Freedom Robotic Arm, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, pp. 99-106, ISSN / ISBN: 1221-5872, Published: 2019
3. **F. Covaciu**, D. Filip, Design and Manufacturing of a 6 Degree of Freedom Robotic Arm, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, pp. 107-114, ISSN / ISBN: 1221-5872, Published: 2019
4. **F. Covaciu**, A. E. Iordan, Designing a Cooling System for an Electric Motor that is Used in the Automotive Industry, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, pp. 61-66, ISSN / ISBN: 1221-5872, Published: 2020
5. **F. Covaciu**, Designing and Manufacturing a Delta Robot for Pick and Place Applications, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, pp. 67-72, ISSN / ISBN: 1221-5872, Published: 2020
6. **F. Covaciu**, A. E. Iordan, Designing and Building a Serial Robotic Arm with four Degrees of Freedom, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, pp. 317-322, ISSN / ISBN: 1221-5872, Published: 2019
7. C. Vaida, N. Plitea, B. Gherman, A. Szilaghyi, B. Galdau, D. Cocorean, **F. Covaciu**, D. Pislă, Structural Analysis and Synthesis of Parallel Robots for Brachytherapy, New Trends in Medical and Service Robot: Theory and Integrated Applications Book Series: Mechanisms and Machine Science, pp. 191-204, ISSN / ISBN: 2211-0984, Published: 2014
8. A.E. Iordan, **F. Covaciu**, Efficient Method to Solve the Guarini Puzzle Generalization using Bipartite Graphs, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, pp. 157-162, ISSN / ISBN: 1221-5872, Published: 2019
9. D. Filip, **F. Covaciu**, A. Sarb, S. Timoftei, Building a Project Team According to the Time Allocated and the number of Relationships for the Successful Completion of a Project, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, pp. 141-148, ISSN / ISBN: 1221-5872, Published: 2019
10. A.E. Iordan, **F. Covaciu**, Improving Design of a Triangle Geometry Computer Application using a Creational Pattern, Acta Technica Napocensis Series-Applied

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11. **F. Covaciu**, D. Filip, M. Rebreanu, Design of a Speed Bump with a Complex Opening System, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, Vol.65, Issue: 1, pp. 63-70, ISSN / ISBN: 1221-5872, Published: 2021

C2. Articole ISI Proceedings & Scopus (conferinte)

1. **F. Covaciu**, A. Pislă, G. Carbone, F. Puskas, C. Vaida, D. Pislă, VR interface for cooperative robots applied in dynamic environments, IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 24-26 May, 2018, Cluj-Napoca, Romania, pp. 1-6, ISBN 978-1-5386-2206-3 (ISI Proceedings)
2. **F. Covaciu**, A. Pislă, C. Vaida, B. Gherman, D. Pislă, Development of a Virtual Reality Simulator for a Lower Limb Rehabilitation Robot, IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 21-23 May, 2020, Cluj-Napoca, Romania, pp. 178-183, ISBN 978-1-7281-7167-8 (ISI Proceedings)
3. B. Galdău, N. Plitea, C. Vaida, **F. Covaciu**, D. Pislă, Design and control system of a parallel robot for brachytherapy, IEEE International Conference on Automation, Quality and Testing, Robotics, 22-24 May 2014, Cluj-Napoca, Romania, pp. 1-6, ISBN 978-1-4799-3731-8 (ISI Proceedings)
4. **F. Covaciu**, B. Gherman, A. Pislă, G. Carbone, D. Pislă, Rehabilitation System with Integrated Visual Stimulation, Mechanisms and Machine Science, Vol. 89, pp.131-137, ISSN / ISBN: 22110984, Published: 2020 (Scopus)
5. **F. Covaciu**, D. Baldean, Contribution to Research the Applied Engineering Protocol to Implement a Fuzzy Regulator for Autonomous Driving of an Automotive Model Implemented in Virtual Reality, SIAR International Congress of Automotive and Transport Engineering: Science and Management of Automotive and Transportation Engineering, 23-25 October, 2019, Craiova, Romania, pp. 468-476, ISBN 978-3-030-32564-0 (ISI Proceedings)
6. C. Vaida, D. Pislă, **F. Covaciu**, B. Gherman, A. Pislă, N. Plitea, Development of a control system for a HEXA parallel robot, IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 19-21 May, 2016, Cluj-Napoca, Romania, pp. 1-6, ISBN 978-1-4673-8692-0 978-1-4673-8692-0 (ISI Proceedings)
7. C. Vaida, D. Pislă, A. Szilaghyi, **F. Covaciu**, D. Cocorean, N. Plitea, The Control System of a Parallel Robot for Brachytherapy, 5th European Conference on Mechanism Science (EUCOMES), 16-20 September, 2014, Guimaraes, PORTUGAL, Volume 24, pp. 563-571, ISSN: 2211-0984, (ISI Proceedings)
8. **F. Covaciu**, I. Pop, B. Gherman, A. Pislă, C. Vaida, N. Al Hajjar, D. Pislă, Development of a Virtual Reality Simulator for Robotic Assisted Surgery, MeTrApp 2023, the 6th IFToMM International Conference on Mechanisms, Transmissions, and Applications, May 24-26, 2023, University of Poitiers, France, Volume 124, pp. 52-61, ISSN: 978-3-031-29815-8 (Scopus)

D. Articole & Conferinte BDI

1. D. Baldean, **F. Covaciu**, Robotic Art in Creation and Development of Innovative Shapes and Programs for Automated Driven Cars with Artificial Intelligence, Journal for Social Media Inquiry, Vol. 2, Issue 1, pp. 22-39, ISSN / ISBN: 2559-763, Published: 2020

2. D. Pisla, P. Tucan, B. Gherman, N. Crisan, N. Plitea, **F. Covaciu**, Graphical Simulation System for Functional Analysis of a Parallel Robot for Transperineal Prostate Biopsy, International Conference of Mechanical Engineering, 8-9 October, 2015 Craiova, Romania, Applied Mechanics and Materials, pp. 101-106, ISSN / ISBN: 1662-7482, Published: 2016
3. **F. Covaciu**, P. Bec, D. Băldean, Developing and Researching a Robotic Arm for Public Service and Industry to Highlight and Mitigate Its Inherent Technical Vulnerabilities, The 14th International Conference on Interdisciplinarity in Engineering—INTER-ENG 2020, 8–9 October, 2020, Târgu Mureș, Romania, pp. 1-9, ISBN 978-3-0365-0716-3, Published: 2020
4. C. Vaida, P. Tucan, D. Pisla, **F. Covaciu**, Parametric Modeling for Analyzing Diseases of the Human Spine, International Conference of Mechanical Engineering, 8-9 October, 2015 Craiova, Romania, Applied Mechanics and Materials, pp. 131-136, ISSN / ISBN: 1662-7482, Published: 2016
5. **F. Covaciu**, P. Bec, D. Băldean, Design and Development of a Low-Cost Automated All-Terrain Intelligent Robotic Vehicle for Detection to Study Its Faults and Vulnerabilities from SWOT Perspective, The 14th International Conference on Interdisciplinarity in Engineering—INTER-ENG 2020, 8–9 October, 2020, Târgu Mureș, Romania, pp. 1-11, ISBN 978-3-0365-0716-3, Published: 2020
6. **F. Covaciu**, D. Baldean, Dezvoltarea aplicativă a unei soluții de autovehicul care se conduce autonom utilizând realitatea virtuală și regulatorul FUZZY, Simpozionul "Realizări și perspective în ingineria agrară și transport auto" Chișinău, Moldova, 4-5 octombrie 2018, Vol. 51, pp. 220-224, ISBN 978-9975-64-300-9, Published: 2018
7. D. Pisla, **F. Covaciu**, B. Gherman, C. Vaida, N. Plitea, A new Serial Communication Protocol for the Control of a Medical Parallel Robot, Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering, Vol.59, Issue: 1, pp. 7-16, ISSN / ISBN: 1221-5872, Published: 2016
8. **F. Covaciu**, B. Gherman, C. Vaida, N. Plitea, D. Pisla, F. Puskas, Control of a Medical Parallel Robot for Brachytherapy, Acta Electrotehnica, Volumul 56 Numărul 4, pp. 152-156, ISSN / ISBN: 2344-5637, 2015
9. **F. Covaciu**, D. Ani, B. Gherman, N. Plitea, D. Pisla, Design and Control System of a Modular Parallel Robot for Medical Applications, Robotica & Management, Volumul 20, Numărul 1, pp. 22-27, ISSN: 1453-2069, Published: 2015
10. **F. Covaciu**, D. Băldean, Proiectarea și Controlul unui Robot Mobil de Explorare, folosind Realitatea Virtuală ca Mediu de Simulare, Conferința Internațională multidisciplinară – “Profesorul Dorin PAVEL – fondatorul hidroenergeticii românești”, 29 mai 2018, Volumul 34, pp. 1-8, ISSN 2067-7138, Published: 2018
11. H.G. Crisan, F. Serdean, **F. Covaciu**, C. Birleanu, M. Pustan, O. Crisan, Testing the Quality of Filtered Drinking Water and Developing Technical Solutions to Improve It, International Conference "INTER-ENG 2023", 5 - 6 October 2023, U.M.F.S.T. Târgu Mureș, Romania, pp. 1-15, 2023.
12. **F. Covaciu**, P. Tucan, G. Rus, A. Pisla, I. Zima, B. Gherman, Positioning of a Surgical Parallel Robot Using Artificial Intelligence, The 33rd International Conference on Robotics in Alpe-Adria-Danube Region, RAAD 2024, June 5-7, 2024, in Cluj-Napoca, Romania, pp. 87-96, 2024.
13. **F. Covaciu**, B. Gherman, G. Rus, C. Vaida, I. Zima, D. Pisla, Development of a Virtual Reality Simulator for a Robotic-Assisted Laparoscopic Surgery, IEEE International Conference on Automation, Quality and Testing, Robotics - AQTR 2024, May 16-18, 2024, Cluj-Napoca, Romania, pp. 1-6, 2024.

E. Membru în granturi de cercetare

1. CHANCE - Brahiterapia asistata robotic, o abordare inovativă în terapia cancerelor inoperabile, Proiect național de tip PCCA TIP 2, finanțat de Unitatea Executiva pentru Finanțarea Învățământului Superior, a Cercetării, Dezvoltării și Inovării (UEFISCDI), Cod proiect: PN-II-PT-PCCA-2011-3.2-0414, 2012-1015, Contract numărul: 173/2012, Coordonator Prof. Dr. Ing. Nicolae Plitea, Universitatea Tehnica din Cluj-Napoca.
2. Simulation and control techniques for robots used in minimally invasive surgery – SIMCOSURG, International Grant, 2011-2013, Registration Nr.: 12546/31.05.2012, Coordonator Prof. Dr. Ing. Calin Vaida, Universitatea Tehnica din Cluj-Napoca.
3. ROBOCORE - Biopsia Prostataei Asistata Robotic, o metoda inovativă de mare precizie, Proiect național PCCA TIP 2, finanțat de Unitatea Executivă pentru Finanțarea Învățământului Superior, Cercetare, Dezvoltare și Inovare (UEFISCDI). Cod proiect : PN-II-PT-PCCA-2013-4-0647, Numar contract: 247/2014, Durata proiect: 2014-2016, Coordonator Prof. Dr. Ing. Doina Pisla.
4. AgeWell - Dezvoltarea inovativă a unor sisteme robotice pentru reabilitare și asistare în îmbătrânirea sănătoasă, Proiect Cofinanțat prin Fondul European de Dezvoltare Regională, Cod proiect: ID P_37_215 Cod MySMIS 2014: 103415, Proiect coordonat de Universitatea Tehnica din Cluj-Napoca, Centrul de Cercetare pentru Simulare și Testare Roboți Industriali – CESTER, Coordonator Prof. Dr. Ing. Carbone Giuseppe.
5. Challenge - Noi frontiere in chirurgia uniport asistata robotic: Un sistem robotic inovativ cu instrumente cu dexteritate marita. Finantat de: Unitatea Executiva Pentru Finantarea Invatamantului Superior a Cercetarii Dezvoltarii si Inovarii, cod proiect: PCE171/2021 - Challenge within PNCDI III. Durata proiect: 2021-2023, Coordonator Prof. Dr. Ing. Doina Pisla.
6. Proiect de cercetare-dezvoltare din planul sectorial al MAPN, nr. 1PSCD cu titlu „Sistem tip exoschelet pentru augmentare umană”, cod proiect: A2 9034/2022(1PSCD/2022). Durata proiect: 2022-2025, Coordonator Prof. Dr. Ing. Doina Pisla.
7. ATHENA - New smart and adaptive robotics solutions for personalized minimally invasive surgery in cancer treatment. PNRR-III-C9-2022 – I8. Durata proiect: 2023-2026, Director proiect: Dr. ing. Damien CHABLAT, Responsabil UTCN: Prof. Dr. Ing. Doina Pisla.
8. ASKLEPIOS - New frontiers in adaptive modular robotics for patient - centered medical rehabilitation. PNRR-III-C9-2022 – I8. Durata proiect: 2023-2026, Director proiect: Assistant Professor Ing. Jose MACHADO PhD, Responsabil UTCN: Prof. Dr. Ing. Calin Vaida.

Cereri de brevete:

1. N. Plitea, D. Pisla, C. Vaida, B. Gherman, P. Tucan, C. Gavor, **F. Covaciu**, Familie de roboți paraleli pentru biopsia transperineală a prostatei. În curs de brevetare: A/00191/13.03.2015
2. **F. Covaciu**, A. Pisla, Sistem de asistare robotică pentru reabilitarea gleznei după accident vascular cerebral, Cerere brevet de invenție: A/00062/18.02.2021

Data: 16.05.2024

Candidat abilitare,
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