Lista de lucrări în domeniul de studii universitare de licenţă
Ştiinţe exacte-Fizică-Fizică Cod 010-020-010

Numele şi prenumele: Biró Dominic

A. Teza de doctorat: "*Obţinerea şi caracterizarea acoperirilor dure pe bază de nitruri ale metalelor de tranziţie*", Universitatea din Bucureşti (2001).

B. Cărti publicate

B2. Cărţi (manuale, monografii, tratate, îndrumare etc.) publicate în ţară, la edituri recunoscute CNCSIS.
Dominic Biró: *Straturi subţiri nanostructurate*, Editura Universităţii Petru Maior Târgu Mureş, ISBN 973-7794-09-5 (2004).

B3. Cărţi (manuale, monografii, tratate, îndrumare etc.) publicate la alte edituri sau pe plan local.
Dominic Biró: *Optică tehnică. Aparate optice*, Universitatea Petru Maior Târgu Mureş (2004).
Mircea Dulău, László Dávid, Dumitru Soaită, Lucian Grama, Biró Dominic, Emil Geampană: *Electrotehnologii*, Universitatea Petru Maior Târgu Mureş (2001).

B5. Capitole de cărţi publicate în străinătate:
Dominic Biró: Processing of self-lubricated MoS_2 doped TiAlCN nanocomposite coatings by reactive UM magnetron co-sputtering and tribological performance optimisation by controlled preparation conditions, pp. 88-95 and 315-319 in Vol. Triboscience and tribotechnology superior friction and wear control in engines and transmissions, Edited by Kenneth Holmberg, Sture Hogmark, Bojan Podgornik, Amaya Igartua, Kristian Tönder, Joze Vizintin and Marian Szcerek, ISBN 978-92-898-0040-2, Printed in Luxemburg (2008).

C. Lucrări ştiinţifice publicate

C1. Lucrări ştiinţifice publicate în reviste cotate ISI

1. **D. Biro**, M.F. Hasaneen, L. Székely, M. Menyhárd, S. Gurbán, P. Pekker, I. Dódony, P.B. Barna: *Texture change of TiN films due to anisotropic incorporation of oxygen,* Vacuum, Plasma, Surface and Material Science, ISSN: 0042-207X, 103 (2014) 78-86, Published by Elsevier Ltd. (2013), (IF:1.530 in 2012), http://dx.doi.org/10.1016/j.vacuum.2013.12.013
2. L. Jakab-Farkas, **D. Biro**, G. Strnad, I. Vida-Simiti: *Preparation and characterization of (Ti, Al, Si)N coatings developed by d.c. reactive magnetron sputtering,* Journal of Optoelectronics and Advanced Materials, Vol. 15, No. 7-8, July - August 2013**,** p. 696 –

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3. Timea Simon, Sanda Boca, **Dominic Biro**, Patrice Baldeck, Simion Astilean: *Gold–Pluronic core–shell nanoparticles: synthesis, characterization and biological evaluation*, J Nanopart Res (2013) 15:1578, Print ISSN 1388-0764, Online ISSN 1572-896X, DOI 10.1007/s11051-013-1578-5, Published by Springer Science Edition, Dordrecht, Netherlands 2013, (IF:3.253), *www.springer.com*

4. M.F. Hasaneen, **D. Biro**, L. Székely, P. Nemes-Incze, P.B. Barna: *Substructure in the columnar crystals of the $Ti_{0.45}O_{0.20}N_{0.35}$ oxynitride thin film*, Vacuum, Vol. 86 (2012) 2105-2108, Rapid communication in Vacuum, Plasma, Surface and Material Science, ISSN: 0042-207X, (IF: 1.317). Pergamon-Elsevier Science Ltd., Oxford, www.elsevier.com

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6. **D. Biró**, L. Jakab-Farkas, G. Strnad, V. Bolos, I. Vida-Simiti: Effect of nitrogen concentration on microstructure and microhardness of nanostructured (Ti, Al, Si)N coatings developed by d.c. reactive magnetron sputtering, in Journal of Optoelectronics and Advanced Materials, Vol. 13, No. 7, July 2011, pp. 859-865. ISSN 1454-4164, http://inoe.inoe.ro/joam/index.php

7. A.M. Gabudean, **D. Biro** and S. Astilean: Localized surface plasmon resonance (LSPR) and surface-enhanced Raman scattering (SERS) studies of 4-aminothiophenol adsorption on gold nanorods, Journal of Molecular Structure, Vol. 993 Issue (1-3), pp. 420-424, 2011. ISSN: 0022-2860, DOI:10.1016/j.molstruc.2010.11.045, Published by Elsevier Science Direct, Indexed by The Smithsonian/NASA Astrophysics Data System (IF: 1.551). www.elsevier.com

8. **D. Biró**, P.B. Barna, L. Székely, O. Geszti, T. Hattori, A. Devenyi: *Preparation of multilayered nanocrystalline thin films with composition-modulated interfaces, in* Nuclear Instruments and Methods in Physics Research A 590 (2008) pp. 99-106. ISSN 0168-583X, www.elsevier.com

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14. R. Manaila, **D. Biró**, A. Devenyi, D. Fratiloiu, R. Popescu, J.E. Totolici: *Structure of nitride film hard coatings prepared by reactive magnetron sputtering*, in Applied Surface Science, 134 (1998), pp. 1-10. ISSN 0169-4332. (IF: 1.045). www.elsevier.com

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1. Domokos BÍRÓ, László JAKAB-FARKAS, András KELEMEN, Sándor PAPP, Mohamed Fathy HASANEEN, Miklós MENYHÁRD, Sándor GURBÁN, Péter B. BARNA: *Effect of Oxygen Doping on the Structure of TiN Surface Coatings,* MACRo 2015- 5th International Conference on Recent Achievements in Mechatronics, Automation, Computer Science and Robotics, Edition De Gruyter (2015)

2. G. Strnad, L. Jakab-Farkas, S. Papp, A-Zs. Fekete, D. Biró, I. Vida-Simiti: *Optimization of reactive sputtering technology for hard coatings deposition*: Applied Mechanics and Materials, Vol. 657 (2014) pp. 246-250 (2014) Trans Tech Publications, Switzerland, doi: 10.4028 /www.scientific.net/AMM.657.246

3. S Papp, A Kelemen, L Jakab-Farkas, I Vida-Simiti and D Biró: *Multilayered nanocrystalline CrN/TiAlN/MoS2 tribological thin film coatings: preparation and characterization*, 2nd International Conference on Competitive Materials and Technological Processes, IOP Publishing. IOP Conf. Series: Materials Science and Engineering 47 (2013) 012016, doi: 10.1088/1757-899X/47/1/012016, iopscience.iop.org

4. V. Bolos, D. Biró, G. Strnad, C. Bolos: Gearbox with worm face gear coated with nanostructured multilayer, in *Advanced Materials Research* Vols. 463-464 (2012) pp 1455-1458, Trans Tech Publications, Switzerland, ISSN 1022-6680.1, doi:10.4028/www.scientific.net/AMR.463-464.1455, Indexed by Elsevier: SCOPUS www.scopus.com and Ei Compendex (CPX) www.ei.org/ Cambridge Scientific Abstracts (CSA) www.csa.com, Chemical Abstracts (CA) www.cas.org

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6. G. Strnad, D. Biró, V. Bolos, I. Vida-Simiti: *Research on nanocomposite self-lubricated coatings*, International Conference BRAMAT 2009, published in Metalurgia International, Vol. XIV (2009) Special Issue No. 3 (2009), pp. 121-124, ISSN 1582-2214.
7. D. Biro: *Opportunities in development of compound coating thin films as tribological coatings*, „*ROTRIB'03*" Galati, National Tribology Conference 24-26 September 2003. The Annals of University „*Dunărea de Jos*" of Galaţi, Fascicle VIII, *Tribology*, Volume I (2003) p3-68. ISSN 1221-4590, B+ CNCSIS cod 56. *Indexed by Cambridge Scientific Abstracts (CSA) www.csa.com*
8. D. Biro: Contributions in PVD processing of the carbon and MoS_2 doped TiAlNC nanocomposite as self-lubricated hard coating for wear protection of the mechanical components. The Annals of University „Dunărea de Jos" of Galaţi, Fascicle VIII, Tribology, (2004), p. 52-57. ISSN 1221-4590, B+ CNCSIS cod 56. Indexed by Cambridge Scientific Abstracts (CSA) *www.csa.com*

C3. Lucrări ştiinţifice publicate în reviste din străinătate (altele decât cele menţionate anterior).

1. D. Biró, M.F. Hassanen, L. Székely, M. Menyhárd, S. Gurbán, P. Pekker, I.Dódony, and P.B. Barna: *Effect of oxygen doping on the evolution of 002 texture and the crossover between 002 and 111 textures in TiN films*, published in *MFA Yearbook 2011* Hungarian Academy of Sciences, MTA RITPMS, Budapest, http://www.mfa.kfki.hu/

2. D. Biró**:** *Development of hard coatings*, pp. 223- 227, in Volume: *Material Research* Tribology. Scientific Final Report of COST Action 516 coordinated by Directorate-General for Research ERA of the European Commission, Editors Kenneth Holmberg, Philippe Kapsa, Sture Hogmark, Bo Jacobson, Erik Höglund, Espoo 2000, VTT Finland, Printed in Belgium, Brussels ISBN 92-894-0639-9 (2001).

3. D.Biró: *Processing of self-lubricated nano-composite coatings by reactive UM magnetron co-sputtering and tribological performance optimisation by controlled preparation conditions*, pp. 88-95 and 317-321 in Volume: Tribochemistry and tribotechnology - superior friction and wear control in engines and transmissions. Scientific final report of EU COST 532 Action: Material Research, Physics and Nanosciences. Edited by Kenneth Holmberg, Sture Hogmark, Bojan Podgornik, Amaya Igartua, Kristian Tönder, Jože Vižintin and Marian Szczerek. Brussels, (2007). http://ltds.ec-lyon.fr/cost532/

C4. Lucrări ştiinţifice publicate în reviste din ţară, recunoscute CNCSIS (altele decât cele din baze de date internaţionale).

1. D. Biró, P.B. Barna, T. Hattori, A. Devenyi, L.F. Jakab, S. Papp: *Preparation and microstructure characterization of MoS_2 added TiAlN/CrN multilayered nanocrystalline thin film*s, in Volume: Progress in Nanoscience and Nanotechnology, in Series Micro and Nanoengineering, Editura Academiei Române, Vol. 11 (2007) p. 45-67, ISBN 978-973-27-1576-5, edacad@ear.ro, http://www.ear.ro
2. D.Biró, P.B. Barna: *Fulleren-like structure of nanocrystalline MoS2 tribological coatings prepared with composition-modulated interfaces*, Interdisciplinarity in

Engineering Scientific International Conference „Intering`07", Tg-Mures - Romania, 15-16 November 2007, Vol. I. (2008) p. 1-10, http://inginerie.upm.ro/InterIng2007.htm , www.upm.ro

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4. Strnad G., Biró D., Vida Simiti I.: *Aspects regarding the model of grain growth and structure evolution in TiAlN multilayer nanocomposite coatings*, 1st International Conference „Advanced Composite Materials Engineering" COMAT 2006, 19-22 October 2006, Brasov, Romania, p. 160-165. ISBN 973-635-821-8, ISBN 978-973-635-821-0.

5. K. Gyorgy, D. Biro: *Consideration about dynamical modeling reactive DC sputtering process and partial pressure estimation of reactive gas,* Proceedings of the Scientific Conference „Intering 2003" Petru Maior University of Targu-Mures, 6-7 November 2003, in Volume I. (2003) p. 97-100. ISBN 973-8084-83-0.

6. D. Biró: *Survey on the co-ordinated research activities performed in friction and wear control of engines and transmission systems by improvements of tailored tribological PVD coatings*, Proceedings of the Scientific Conference „Intering 2003", Petru Maior University of Târgu-Mures, 6-7 November 2003, in Volume I. (2003) p. 45-51. ISBN 973-8084-82-2.

7. D. Biró: *Investigarea microstructurală XTEM a stratului tribologic* $Ti_{1-x}Al_xN$, publicat în volumul Conferinţei Universităţii "Petru Maior", Targu-Mures 27-28 octombrie 2000, Editura Universităţii "Petru Maior" Vol. 2. (2001) p. 43-52. ISBN 973-8084-10-5.

8. D. Biró: *Rezultate noi obtinute in domeniul cercetarii structurilor multistrat nanocompozite Ti—Al/N realizate in gradient de compozitie* (Gradiens-összetételű nanokompozit Ti-Al-nitrid multirétegek kutatása terén elért újabb eredmények), Lucrare prezentată în l. maghiară la Simpozionul OGET – 2001 organizat de Soc. Stiinţifică şi Tehnică Maghiară din Transilvania, Cluj Napoca, publicată în volumul "*Műszaki Szemle*" (2001).

C6. Lucrări ştiinţifice publicate în volumele manifestărilor ştiinţifice

1. L. Jakab-Farkas, Z. Forgó, S. Papp, A. Kelemen, D. Biró: *Nanoskalige Multilayer-Beschichtungen aus CrN-, TiAlN-, und* MoS_2 *für tribologische Anwendungen*, Conference 3. Győrer Tribologie Tagung, 30. Juni - 1. Juli (2014), ISBN 978-615-5298-35-6, Győr (2014).

2**.** G. Radnóczi, D. Biro, M.F. Hasaneen, L. Székely, F. Misják, I. Dódony, P. Pekker, P.B. Barna: *Oxygen incorporation induced texture change in* TiO_xN_{1-x} *films*. 28th International Conference on Surface Modification Technologies, Tampere, June 2014, Finland, https://www.conftool.pro/smt28/

3. Domokos BIRÓ, Sándor PAPP, László JAKAB-FARKAS: *Microstructural Modification of ($Ti_{1-x}Al_xSi_y$)N Thin Film Coatings as a Function of Nitrogen Concentration*, Proceedings of the *MACRo 2010* 2nd International Conference on Recent Achievements in Mechatronics, Automation, Computer sciences and Robotics, May 14-15, 2010, Tirgu Mures, Romania, Sciencia Publishing House, pp. 199- 208, ISBN 978-973-1970-39-4 (2010).

4. Domokos BIRÓ, Sándor PAPP, László JAKAB-FARKAS: Morphology and microstrucrture of ($Ti_{1-X}Al_XSi_y$)N thin film coatings synthesized by reactive co-sputtering process**,** The XXth International GTE Conference MANUFACTURING 2010**,** 20-21 October, 2010, Budapest, Hungary. ISBN 978-963-9058-31-6 (2010).

5. Papp Sándor, Jakab-Farkas László, Biró Domokos: *Reaktív plazmaporlasztás optikai spektrum intenzitásának mérése*, XV. Fiatal Műszakiak Tudományos Ülésszaka, Kolozsvár, 2010. március 25-26, pp. 247-250, Műszaki Tudományos Füzetek, Erdélyi Múzeum-Egyesület kiadványa, Kolozsvár ISSN 2067-6808 (2010).

6. T. Hattori, T. Ito, N. Hayashizaki, T. Ishibashi, L. Lu, J. Tamura, R. Kobori, M. Okamura, E. Osvath, D. Biro, D. Hollanda, L. Kenez: *C^{6+} Ion hybrid single cavity LINAC with direct plasma injection scheme for cancer therapy*, Proceedings of LINAC 08, Victoria, BC, Canada, pp. 211-213 (2008).

7. D.Biró, P.B. Barna: Preparation and microstructure investigation of MoS_2 doped nano-scale multilayered CrN/TiAlN tribological coatings, paper presented on Conference Meeting „Strengthening of Regional R&D collaborations" 18-20 May 2008, Debrecen, Hungary, (2008).

8. G. Strnad, D. Biró, I. Vida_Simiti, N. Jumate: *Acoperiri nanocompozite în structură multistrat pentru aplicaţii tribologice*, prezentat la Simpozionul Progress in Nanoscience and Nanotechnology, Bucureşti (2007), spre publicare in Series Micro and Nanoengineering, Editura Academiei Române (2008).

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10. P.B. Barna, D. Biró, A. Kelemen, L. Szekely, A. Devenyi: *Structure development of nanocomposite multiphase coatings*, Paper presented on The International Conference on Surfaces, Coatings and Nanostructured Materials NanosMAT`2007, 9-11 July 2007, Algarve, Portugal (2007) www.nanosmat.org

11. D. Biró: Relevance of process control in preparation of single layer and nano-scale multilayer compound coatings synthesized by DC reactive UM magnetron sputtering, Invited talk at Osaka University, Department of Structural Characterization, Division of Nano-characterization and Design, SANKEN The Institute of Scientific and Industrial Research, 12 October, 2006, Osaka University Japan, granted by the Japan Society for Promotion of Sciences (JSPS, Tokyo), www.jsps.go.jp

12. T. Hattori, N. Hayashizaki, …. , D. Biró: *Next generation PET beam accelerator system for cancer therapy*, Proceedings of 3rd Annual Meeting of Particle Accelerator Society of Japan, and the 31th Linear Accelerator Meeting in Japan, August 2-4, 2006, Sendai, Japan 2006, Tokyo, Japan, p. 218-220.

13. T. Hattori, N. Hayashizaki, …. , D. Biró: *PET Beam accelerator system for future cancer therapy*, Proceedings of Accelerator and Related Technology for Application, June 8-9, 2006, Tokyo, Japan, ISSN 1344-4514, p. 11-14.
14. A. Kovacs, D. Biró, P.B. Barna: *Phase formation and growth in metal-composite layers*, Workshop of IUVSTA and ELFT Vacuumphysics Group, Budapest, 14 February 2006.
15. D. Biró, P.B. Barna, L. Székely, O. Geszti, T. Hattori, A. Devenyi: *Preparation of multilayered nanocrystalline thin films with composition-modulated interfaces,* prezentat la "The 23rd World Conference of INTDS KEK Tsukuba", Japonia, 16-20 octombrie, 2006, apărut în volumul special al conferinţei Proceedings of the 23rd World Conference of the International Nuclear Target Development Society „Toward the realization of target and stripper foil technologies for high-power proton and radioactive ion accelerators" Editors Isao Sugai, David Giliam, Anna Stolarz, ISSN 0168-9002 (2008), http://www.intds.org
16. Strnad G., Biró D., Vida Simiti I.: *Contributions to processing of self-lubricated, nanocomposite wear resistant coatings by reactive UM magnetron co-sputtering*, Matehn06, Fourth International Conference on Materials and Manufacturing Technologies, 21-23 Sept. 2006, Cluj-Napoca
17. D. Biró: Industrial improvements of the self-lubricated MoS2 doped TiAlCN nano-composite coatings processed by reactive UM magnetron co-sputtering and tribological performance optimization of controlled preparation conditions, Triboscience and Tribotechnology Conference, 21-22 April, 2006, Dubrovnik, Croatia, ISSN 953-96454-0-9, www.cost.esf.org
18. Strnad G., Biró D., Vida-Simiţi Ioan: *Reactive sputtering system for self-lubricated multiphase, wear resistant coatings*, la Inter-Ing 2005, 10-11 Noiembrie 2005, Universitatea „Petru Maior" Targu-Mureş, ISBN 973-7794-41-9, p. 161-167.
19. Strnad G., Biró D., Vida-Simiţi Ioan: *Study of process parameters for reactive sputtering of self-lubricated nanocomposite wear resistant coatings,* prezentat la Inter-Ing 2005, 10-11 Noiembrie 2005, Universitatea „Petru Maior" Targu-Mures, ISBN 973-7794-41-9, p. 155-160.
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23. R. Manaila, A. Devenyi, D. Biró, L. David, P. B. Barna, A. Kovacs: *Multilayer TiAlN coatings with composition gradient*, lucrare prezentata la "The European Material Conference" Strasbourg (France), 5-8 June, 2001.

24. D. Biró, A Kovacs, F. Misjak, P.B. Barna: *Layered Composite Structure in Co-deposited Al-C Thin Films*, in Abstracts of the 12th National Conference of the Romanian Physical Society „Trends in Physics" Targu-Mures 26-28 September 2002, Editors A. Calboreanu, D. Grecu, M. Oancea, Bucharest (2002), p. 60.
25. L. David, D. Biró, N. Kutasi, P. B. Barna, M. Berger: *Adaptiv fuzzy-logic control in recative magnetron sputtering process for thin film deposition*, in Proceedings of the 3rd COST 516 Tribology Symposium, Eibar, Spain, 18-19 May 2000, Edited by A. Igartua and A. Alberdi, Fundación TEKNIKER, ISBN 84-699-2557-1, (2000), p. 155-162.
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27. Biró D., Dávid L.: Aspecte economice şi ecologice ale unor technologii de plasmă aplicate în tratamentul suprafeţelor materialelor metalice, Simpozion OGET organizat de EMT în colaborare cu Universitatea "Petru Maior" Târgu-Mureş, 7-9 aprilie (2000), publicat în Műszaki Szemle, (2000) p. 83-86.
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30. D. Biró, L. David, Z. German, A. Devenyi, M. Adamik: *Coating optimisation by dynamic control of reactive sputtering process*, in COST 516 Tribology Symposium, Antwerpen, 20-21 May 1999, ISBN 90-5857-001-0 Edited by Jan Meneve and Karen Vercammen, Flemish Institute for Technological Research, Boeretang 200, B-2400 MOL, Belgium (1999).
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G. Contracte de cercetare (menţionaţi calitatea de director sau membru) (extras din cele realizate după 1990):

1. *Influenta oxigenului asupra mecanismului de formare a structurii straturilor subtiri TiN(O)* (Oxigén hatásának feltárása TiN vékonyrétegek szerkezetének kialakulására), MTA Határon Túli Magyar Tudományos Ösztöndíjprogram, Budapest, 2010-2011), Contract Grant de cercetare acordat de MTA – Academia de Stiinte din Ungaria (2010-2011). Biró Domokos: director de proiect, Papp Sándor, Jakab-Farkas László, Kelemen András, Kakucs András, membri colaboratori.
2. *Obţinerea şi investigarea microstructurală a straturilor subţiri tribologice de compoziţie TiAlSiN* (TiAlSiN összetételű tribológiai vékonyrétegbevonatok megvalósítása és mikroszerkezeti vizsgálata), Contract Grant de cercetare IPC 34/4/22.03.2011., finanţat de Institutul Programelor de Cercetare KPI-EMTE Sapientia, 2010/2011. Director de proiect D. Biro.
3. *Influenţa compoziţiei gazului reactiv asupra evoluţiei microstructurii straturilor subţiri dezvoltate în procesul pulverizării* reactive (Reaktív plazmaporlasztási folyamatban használt gázkeverék összetételének hatása a kialakuló rétegek mikroszerkezetére), Contract Grant KPI- EMTE Sapientia, 2009, Institutul Programelor de Cercetare KPI. Director de proiect D. Biro.
4. *Obţinerea şi caracterizarea microstructurală a depunerilor antiuzură autolubrefiate realizate în structura nanocompozit prin procedeul co-pulverizării reactive* (Kopásálló vékonyrétegek előállítása és mikroszerkezeti kutatása TEM és XTEM eljárás szerint),

Grant KPI- EMTE Sapientia, 2005-2007, Institutul Programelor de Cercetare KPI, director de proiect D. Biro.

5. *Obţinerea şi caracterizarea microstructurală XTEM a depunerilor nanocompozite TiAlN în structura multistrat gradient de compoziţie realizate prin pulverizarea reactivă în curent continuu tip magnetron* (Gradiens összetételű nanokristályos TiAlN multirétegek előállítása egyenáramú plazmaporlasztással és azok mikroszerkezeti vizsgálata), Grant KPI- EMTE Sapientia, Institutul Programelor de Cercetare, 2003-2004, director proiect D. Biro.

6. *Cercetări privind utilizarea straturilor tribologice nanocompozite pentru acoperirea flancurilor angrenajelor spiroide în vederea creşterii siguranţei în funcţionare*, Grant CNCSIS Bucureşti, 663/2005, 2006-2007, director de proiect profesor V. Boloş, membru executant D. Biro.

7. *Obtinerea straturilor tribologice nanocompozite TiAlCN dopat cu MoS2*, Contract de colaborare nr. 1461/25.06.2003 incheiat intre Universitatea Petru Maior si firma SC Durkopp Adler Targu-Mures, in vederea dezvoltarii tehnologiei PVD, SC Durkopp Adler Targu-Mures, (2003-2007) director de proiect D. Biro, www.upm.ro

8. *Processing of self-lubricating MoS_2 doped TiAlCN nano-composite coatings by reactive UM magnetron co-sputtering and tribological performance optimization in controlled preparation conditions*, Proiect EU de cercetare internationala realizat in cadrul Actiunii COST 532 , Bruxelles, PROJECT CODE CH13 ERA – Comunitatea EU, Bruxelles (2002-2007) cu participare UPM prin directorul de proiect Biro D, www.cost.esf.org

9. *Preparation, structure analysis and investigation of the physical properties of multilayer compound polycrystalline thin films (Ti, Al, N, C, Cr, MoS_2),* Program de colaborare internaţională încheiat intre Universitatea "Petru Maior" (UPM) si Research Institute for Technical Physics and Material Science (RITPMS-MFA) Budapest, director de program D. Biro.

10. *Straturi tribologice nanocompozite TiAlCN aditivate cu MoS2 pentru aplicabilitate la componentele maşinilor de cusut industrial*, Grant de cercetare CNCSIS Cod 683, MedC, CNCSIS Bucureşti, 2004-2005, director de proiect D. Biro, www.upm.ro

11. *Microstructure investigation of TiAlN multilayer structures developed in graded composition by reactive sputtering*, activitate de cercetare desfăşurată la RITPMS-Budapesta in calitate de cercetător ştiinţific invitat în cadrul proiectului "NATO Fellowships Programme Science for Peace", RITPMS-Budapesta, NATO –Hungary, 2003-2004, director de proiect D. Biro, http://www.nato.int/science, http://www.om.hu

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14. *Depuneri dure de nitruri ale metalelor de tranzitie, realizate in structura gradient-multistrat, obtinute prin pulverizarea reactiva tip magnetron dc*, Grant de cercetare finanţat de către MCT-ANSTI prin Contract de Grant Nr. 6051/7.07.2000, director de proiect D. Biro
15. *Tribochemistry in metal cutting. Processing of hard coatings*, Contract de Grant STSM in cadrul Proiectului EU Action COST 516, EU European Co-operation in the Field of Scientific and Technical Research, Directorate Brussels, bursier D. Biro, www.cost.esf.org
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I. Premii, distincţii:
Pentru rezultate deosebite obţinute în cercetarea ştiinţifică în 2011 Distincţia "*Arany János"* acordată de Academia de Ştiinţe din Ungaria.

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K. Alte realizări semnificative

Începând cu anul universitar 2008/2009, autorul devenind cadru didactic titular la Universitatea Sapientia, a contribuit la reorganizarea activităţii de cercetare în cadrul Facultăţii de Stiinţe Tehnice şi Umaniste din Tîrgu-Mureş. În cadrul laboratorului nou înfiinţat pentru fizica şi ştiinţa materialelor nanocompozite, dezvoltate în straturi subţiri nanostructurate, desfăşurăm activitate interdisciplinară de cercetare fundamentală şi cercetare tehnologică aplicativă în scopul obţinerii şi caracterizării materialelor

multicomponente pe bază de nitruri şi carbonitruri ale metalelor de tranziţie (Ti, Zr, Al, Cr, Si, N, C, MoS_2, etc.). Scopul cercetării a urmărit dezvoltarea sistemului de control performant al procesului reactiv de realizare în structura multistrat a depunerilor funcţionale, asigurţnd performanţe mecanice deosebite, având caracteristici tribologice marcate prin rezistenţă ridicată la uzură abrazivă, duritate şi tenacitate extrem de mare, coeficient de frecare foarte redus.

Investigarea microstructurală şi fazică a depunerilor obţinute prin tehnologia *PVD*, se realizează sub conducerea autorului prin microscopie electronică *SEM* şi microscopie electronică de transmisie *TEM*, folosind procedurile de analiză *BF*, *DF* şi *SAED*, inclusiv a probelor subţiate în secţiune transversală, prin aplicarea tehnicii ataculuі ionic (metoda ion milling) şi analiza *XTEM*.

Principalele realizări ale colectivului coordonat de D. Biró se leagă de dezvoltarea controlului automat al procesului co-depunerii straturilor subţiri nanostructurate ale fazelor mixte dure *TiAlCN* dopate cu MoS_2, respectiv straturi *DLC* dehidrogenate. Pe baza proiectului original al autorului s-a realizat, prin contribuţia financiară şi tehnică a firmei româno-germane S.C. "*Durkopp-Adler" Srl.,* o instalaţie performantă *PVD* de cercetare. Cercetările experimentale au demonstrat performanţa remarcabilă a sistemului versatil de pulverizare reactivă, cu funcţionare în regim de control automat. Sistemul cu trei surse magnetron cuplate magnetic, având ţinte planare rectangulare de *Cr*, *TiAl,* MoS_2, respectiv grafit, constituie o soluţie originală propusă de autor pentru dezvoltarea *tunului de plasmă* în vederea obţinerii structurii multistrat $CrN/TiAlN/MoS_2$, dezvoltat în compoziţie de gradient.

D. Biró în calitate de *director de proiect al Grantului de cercetare* Cod *CNCSIS* 683/2004 cu titlul "*Straturi tribologice nanocompozite TiAlCN aditivate cu* MoS_2 *pentru aplicabilitate la componentele maşinilor de cusut industrial*" a beneficiat de sprijinul financiar al *MEdC*-lui în valoare de 324 milioane lei. Scopul proiectului cu derulare pe o perioadă de doi ani a fost dezvoltarea tehnologiei depunerii straturilor dure de acoperire şi caracterizarea depunerilor nanostructurate multifazice cu coeficient de frecare cca. 0,03 în vederea obţinerii unor performanţe solicitate de partenerul industrial "*Durkopp-Adler"*.

In cadrul grantului de cercetare *CNCSIS* Cod 663/2005, condus de domnul profesor dr. ing. Vasile Bolos, în calitate de membru participant, autorul D. Biró a dat aportul fundamental la realizarea temei „*Cercetări privind utilizarea straturilor tribologice nanocompozite pentru acoperirea flancurilor angrenajelor spiroide în vederea creşterii siguranţei în funcţionare*", contract în valoare de 55.000 RON/ (2006-2007).

În *perioada 2004-2007* autorul a coordonat în cadrul Universităţii Sapientia lucrările proiectului de cercetare fundamentală *"Straturi subţiri antiuzură – obţinerea şi caracterizarea microstructurală prin microscopie electronică XTEM*" („Kopásálló vékonyrétegek előállítása és mikroszerkezeti kutatása XTEM eljárás szerint"). Proiectul de cercetare european realizat în cadrul programului cadru EU COST 532, tema Cod CH13, realizată sub conducerea D. Biró, a beneficiat şi de sprijinul financiar şi tehnic acordat de Institutul Programelor de Cercetare KPI al Fundaţiei Sapientia.

- Obţinerea şi caracterizarea microstructurală a straturilor bifazice TiAlN-nc/a-Si_3N_4 *superdure nanocompozite, (TiAlSiN összetételű tribológiai vékonyrétegbevonatok megvalósítása és mikroszerkezeti vizsgálata).* Grant de cercetare IPC 34/4/22.03.2011., KPI-EMTE, Fundaţia Sapientia, 2010-2011.

- În *perioada 2010-2015*, colectivul de cercetare a realizat sub conducerea autorului două proiecte internaţionale finanţate de Academia Ungară, în tema de cercetare fundamentală dezvoltată pentru obţinerea şi caracterizarea structurilor multifazice aditivate:
- *Investigarea influenţei oxigenului aditivat asupra evoluţiei structurii stratului TiN* (*Oxigén hatásának feltárása TiN vékonyrétegek szerkezetének kialakulására*. MTA, Budapest, 2010-2011.
- *Obţinerea şi caracterizarea prin microscopie electronică a straturilor TiO_xN_y realizate cu parametri predefiniţi în vederea elucidării mecanismului de tranziţie a texturii preferenţiale. (TiO_xN_y rétegek elállítása tervezett paraméterű reaktív plazmaporlasztással, TEM minták preparációja és transzmissziós analitikai mikroszkópiai vizsgálata a textúra-váltás folyamatainak feltárása céljából)* MTA Budapest, Contract 37/6865/, 2014-2015.

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