Phone.: (012) 2952832, room 013, Fax: (012) 6372192

e-mail: l.major@imim.pl

Employment and positions

Institute of Metallurgy and Materials Science, Polish Academy of Sciences: Ph.D. studies (2002-2007), associate professor (from 2014).

Scientific Career

M.Sc.: AGH-University of Science and Technology, 2002

Ph.D.: Institute of Metallurgy and Materials Science, Polish Academy of Sciences, 2007

Ph.D. D.Sc: Institute of Metallurgy and Materials Science, Polish Academy of Sciences, 2014

The post graduate study: "Project management and comercialization of the research results" and IPMA certification level D; Economic University 2012

Scientific achievements

Author or co- author of **55** publications, including 44 which were published after Ph.D. defense. Out of all papers:

25 were published in journals from the JCR list (after Ph.D. defense)

17 were published in highly scored domestic and foreign journals out of JCR list (after Ph.D. defense)

2 papers are chapters in books (after Ph.D. defense); monographic elaborations

Information about citations number and H-index for ST panels (social sciences) and NZ (life sciences):
Source: Web of Science
Total citation number of all publications, without self- citation: **333, H index: 14**

The most relevant publications during last 5 years

1.

J.M. Lackner, W. Waldhauser, R. Major, **L. Major,** P. Hartmann: Biomimetics in thin film design - Wrinkling and fracture of pulsed laser deposited films in comparison to human skin; Surface & Coatings Technology 215 (2013) 192-198

2.

L. Major: Wear mechanisms of multilayer TiN/Ti/a-C:H coatings investigated by transmission electron microscopy technique; Archives of Civil and Mechanical Engineering 14 (2014) 615 -621

3.

L. Major, J.M. Lackner, M. Kot, M. Janusz, and B. Major: Contribution of TiN/Ti/a-C:H multilayers architecture to biological and mechanical properties; Bulletin of the Polish Academy of Sciences Technical Sciences, 62 (2014) 565- 570

4.

L. Major, J. M. Lackner, B. Major: Bio-tribological TiN/Ti/a-C:H multilayer coatings development with a built-in mechanism of controlled wear; RSC Advances 4 (2014) 21108-21114

5.

L. Major, M. Janusz, M. Kot, J. M. Lackner, B. Major: Development and complex characterization of biotribological Cr/CrN + a-C:H (doped Cr) nanomultilayer protective coatings for carbon-fiber composite materials; RSC Advances 5 (2015) 9405-9415

6.

L. Major: The Wear Mechanisms Description of Multilayer Coatings, Performed by Transmission Electron Microscopy- an Overview of the Own Research Work; Archives of Metallurgy and Materials 60 (2015) 2319- 2326

7.

L. Major, M. Janusz, J.M. Lackner, M. Kot, B. Major: Microstructure characterization of advanced protective Cr/CrN+a-C:H/a-C:H:Cr multilayer coatings on carbon fiber composite (CFC); Journal of Microscopy 262 (2016) 191- 202 doi: 10.1111/jmi.12364

8.

L. Major, J.M. Lackner, M. Kot, B. Major: Bio-tribological properties and microstructure characterization of the polytetrafluorethylene (PTFE) coatings on polyaryletheretherketone

(PEEK) substrate; Tribology International 104 (2016) 309- 320

9.

L. Major, M. Janusz, J.M. Lackner, M. Kot, M. Dyner, B. Major: Wear mechanisms of the bio-tribological nanocomposite a-C:H coatings implanted by metallic nanoparticles; Journal of Microscopy, 268 (2017) 94-104

10.

M. Janusz, **L. Major**, M. Kot, M. Dyner, J.M. Lackner, B. Major: Wear Mechanisms Characterization Operating in Micro- and Nanoscale of the a-C:H Coating Implanted by Ag-Pt; Biotribology, 13 (2018) 16-22

11.

L. Major, A. Kupczyk, M. Kot, J.M. Lackner, B. Major: Ex situ and in situ nanoscale wear mechanism characterization of Zr/ZrxN tribological coatings; Wear (2018) (accepted)

Research Projects

Projects from Ministry of Science and Higher Education

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Polish Artificial Heart- number 2/0-PW/PO1-PBZ-MNiSW/2007; periode: 2008- 2011 (contractor)

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KomCerMet; POIG.01.03.01.-14-013/08; periode: 2009- 2012; (contractor)

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ZAMAT; POIG.01.01.02.-00-015/09; periode: 2010- 2014; (contractor)

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MATRANS: Micro and Nanocrystalline Functionally Graded Materials; CP-FP 228869-2 7PR; periode: 2010- 2013; (contractor)

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Polish- Austrian Exchange project: Bio- mimetic thin films for heart supporting devices development: new strategies basis on vacuum deposition of self- organizing bio- materials; number 023/2012/2013/2014; 8548/R 12/R 14; coordinator: Institute of Metallurgy and Materials Science Polish Academy of Sciences in Cracow; periode: 2012-2014; (contractor)

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National Research Project (National Center of Science; Pol. NCN): Elaboration and diagnosis of multifunctional ceramic/ hydrogenated, amorphous carbon coatings for components on pumps of artificial heart chambers; number 3066/B/T02/2011/40; periode: 2011- 2013 (project leader)

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National Research Project (National Center of Science; Pol. NCN): Self- assembling, biomimetic porous scaffolds in terms of inhibiting the activation of the coagulation system; number 2011/03/D/ST8/04103; coordinator: Institute of Metallurgy and Materials Science Polish Academy of Sciences in Cracow; periode: 2012- 2015 (contractor)

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National Research Project (National Center of Science; Pol. NCN): Multilayered, wear resistant, self- healing, protective coatings elaboration for carbon fiber- composite materials; number 2012/06/M/ST8/00408; periode: 2013- 2016 (project leader)

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CERGRAF: project realized in the frame of „GRAF-TECH" program: Ceramic composites with grafene for cuting tools and machine parts with unique properties; number: GRAF-TECH/NCBR/03/05/2012; coordinator: Warsaw University of Technology; periode: 2012-2015 (contractor)

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National Research Project (National Center of Science; Pol. NCN): Bio-mechanical and microstructure analysis of multilayer nano- composite, protective coatings for metallic substrates for tissue interaction; number: 2012/07/B/ST8/03396; periode: 2013- 2016 (project leader)

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National Research Project (National Center of Science; Pol. NCN): Biomimetic, self- healing, multilayer structures elaboration on thermoplastic polymer materials; number: 2014/15/B/ST8/00103; periode: 2015- 2018 (project leader)

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Project (NCN): Bio- compatibile, wear resistant, decorative coatings for biological, corrosive fluids interaction- development and their multiscale research; number 2015/19/B/ST8/00942; periode: 2016- 2018 (main contractor)

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Project (NCBiR): Anti-bacterial optimization of high-strength, severe-plastic-deformed titanium alloys for spinal implants and surgical tools SPD-BioTribo; nr: DZP/M-ERA.NET-2015/285/2016; periode: 2015- 2018 (project leader)

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Project (NCN): Interdisciplinary methods of creating and functionalization of biomimetic materials based on tissue origin extracellular matrix; nr 2016/23/B/ST8/01481; periode: 2017-2019 (project leader)

Cooperation

JOANNEUM RESEARCH-Materials, AUSTRIA

laboratory of tribology at the AGH University of Science and Technology, Cracow, POLAND

Foundation of Cardiac Surgery Development- cooperation in the frame of innovative materials surface modification of Surgical Robot

Experience gained abroad

2004, 2005 (one month), 2007 (two months- scholarship of the Flemish community): University of Antwerp "EMAT: Electron Microscopy for Materials Science". Belgium

2005, 2006, 2007, 2008 (one week): Research Institute for Technical Physics and Materials Science; Hungarian Academy of Sciences, H-1121 Budapest, Konkoly Thege ut 29-33. Hungary

2008 (one month) Technical University in Eindhoven. The Netherland

2009- 2018 (each year per one week)- JOANNEUM RESEARCH- Materials- Institute for Surface Technologies and Photonics; Leobner Strasse 94; 8712 Niklasdorf, Austria

Prizes and awards

2005- E-MRS Symposium K on "Protective Coatings and Thin Films", Fellowship

2007- Ph.D. work defense with honors Institute of Metallurgy and Materials Science Polish Academy of Sciences (entitled: Structure and properties of multilayer, composite materials produced by pulsed laser ablation)

2007- Flemish Community Fellowship (2 months in Belgium- Antwerp, prof. Gustaf Van Tendeloo)

2011- XIVTh International Conference on Electron Microscopy- first price for the best conference poster, Wisła - Poland

2013 - Award of the Director of the Institute of Metallurgy and Materials Science PAS, for taking the second place in the group of young scientists in the assessment of scientific and research achievements for the years 2011 - 2012

2014- the III stage award of the rector of the AGH University of Science and Technology for research achievements with cooperation with AGH scientists

2015- Award of the Director of the Institute of Metallurgy and Materials Science PAS, for taking the third place in the assessment of scientific and research achievements for the years 2013 - 2014

2017- Silver Cross of Merit awarded by the President of Poland- Andrzej Duda

2017- the III stage award of the rector of the AGH University of Science and Technology for research achievements with cooperation with AGH scientists

Activity in education

supervisor of the PhD work of MSc Eng. Marta Janusz (Instititue of Metallurgy and Materials Science Polish Academy of Sciences) and a coordination of the PRELUDIUM project (National Science Center abbr. NCN) number: 2015/17/N/ST8/00020 (periode: 2016- 2019). The PhD work has been defended

supporting supervisor of MSc Marta Gajewska (The Ph.D studium with lectures in english language- Instititue of Metallurgy and Materials Science Polish Academy of Sciences). The PhD work has been defended

presentations about TEM techniques for students from Jagiellonian University, AGH University of Science and Technology and from Technical University in Cracow

Electron microscopy classes as part of the subject "Modern engineering materials" for students of the AGH University of Science and Technology, faculty of Mechanical Engineering and Robotics, 1st year, 24 hours

Reviews of PhD works

Institute of Fundamental Problems of Technic of the Polish Academy of Sciences (MSc. Eng. Justyna Chrzanowska-Giżyńska). Work entitled: Thin layers of tungsten borides deposited by laser impulse and magnetron sputtering method - influence of process parameters on layer deposition. The defense took place on 8.12.2017

Activity in Organizations

I have introduced the FIB thin foils preparation in the Institute

Participation in the Organizing Committee of the CALPHAD 2004 Conference

Participation in the Organizing Committee of the AMT 2010 Conference

Participation in the Organizing Committee of the 60th anniversary of the Institute of Metallurgy and Materials Science Polish Academy of Sciences (2012)

Participation in Scientific organisations

Member of Nanomaterials section of the Committee of Materials Science

Member of Metallic Materials section of the Committee of Materials Science

Member of the Project Menagement-Poland organisation

Main scientific interest

Electron microscopy techniques particularly High Resolution Transmission Electron Microscopy and analitical techniques.

Mechanical and bio-corrosive (in body fluids) wear of multilayer coatings characterisation by transmission electron microscopy technique.

Reviewer publications in the journal: Materials Science & Engeeniering (Elsevier)