Curriculum Vitae

dr Andjelka Hedrih, MD, PhD

Department of Mechanics
Mathematical Institute of Serbian Academy of Sciences and Arts (MI SANU)
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Current research interests:
Biomechanics, reproductive biomechanics, mathematical modeling of biological systems, regenerative medicine, DNA elasticity, ageing phenomenon, chaos in biological systems, nonlinear dynamics of biological systems.

Scientific career
October 2016-. Department of Mechanics, Mathematical Institute of Serbian Academy of Sciences and Arts, Belgrade, Serbia

2009. -2016. Department for bio-chemical and medical science, State University of Novi Pazar, Novi Pazar, Serbia,

April-Juley 2008. researcher. Subject: Encapsulation of human sperm in alginate polymers, INEP (Institut za primenu nuklearne eneregije), Zemun, Serbia.

February -Jun 2008 assistant- PhD student for Anatomy and Physiology for Engineers, Mechanical Faculty University of Belgrade, Serbia.

2002. Student assistant for practical lectures for medical students in Pathology, Medical Faculty University of Nis, Serbia

University Education
2016.- PhD in Multidisciplinary scientific field: Biomedical engineering and technologies, University of Belgrade, Serbia
   Doctoral thesis: "Oscillatory behavior of mouse Zona Pelucida before and after fertilization"

2005- Graduet paper: "Functional asimetry of the hemispheres",
1997-2005. Medical Faculty University of Nis, Serbia

Scholarships and awards:
2012.-One month scholarship by The Austrian Agency for International Cooperation in Education & Research *(OeAD-GmbH).*
2011. **EUROMECH ENOC Young Scientist Prize 2011, La Sapienza University Rome,** at 7th European Nonlinear Dynamics Conference, 26-29. July 2011, Rome.
2000-2004. Scholarship of Foundation for Young Scientists and Artists, Serbia
2000. scholarship of Norwegian Government "For a generation that promises",

Project participation:
2011-2020.–reseracer on a project: "Dynamics of hybrid system of complex structures. Mechanics of Materials." No147001 financed by Ministry Of Education, Science And Arts Republic Of Serbia, coordinated trough Mathematical Institute SANU. Head of the Project Katica (Stevanovi) Hedrih, Mathematical Institute SANU.

January 2006 -Octobar 2009. scholarship researcher of Ministry of Science, Republic of Serbia working on a project: **"**Interaction of immobilized cells, tissues and biologically active molecules in bioreactor systems." No: 142075. Head of project Branko Bugarski, professor at the Faculty of Technology and Metallurgy, University of Belgrade.

Organiser of the International symposiums and summer schools:
„School on Information, Noise, and Physics of Life", 19-30. September, Nis, Serbia,
https://indico.ictp.it/event/9826/
Mini-symposium "Biomechanics and mathematical biology", at 8th International congress of Serbian Society of mechanics, Kragujevac, Serbia, 2021, http://www.ssm.kg.ac.rs/congress_2021/topics/
7th International congress of Serbian Society of mechanics, Sremski Karlovci, Serbia, 2019,
https://www.ekapija.com/event/2505947/7th-international-congress-of-serbian-society-of-mechanics

Reviwer for scientific jurmals:
Psychology, Health & Medicine
Journal of the Royal Society Interface
Regulatory Toxicology and Pharmacology
Chaos, Solitons and Fractals

Professional membership:
Serbian Chamber of Medicine, Serbian Society of Mechanics, European Society of Mechanics
Language skills: English fluent in spoken and written, German A2 level, Serbian: native language

Selected references:

1. Katica Hedrih, **Andjelka Hedrih.** Mathematical modelling of nonlinear oscillations of a biodynamical system in the form of a complex cantilever. Applied Mathematical Modelling Special Issue "VSI: DSTA 2021"2022, 112:110-135.
https://doi.org/10.1016/j.apm.2022.07.010

2. **Andjelka N. Hedrih,** Katica (Stevanović) Hedrih. Oscillations and stability of dynamics of hybrid biostructure. European Physical Journal Special Topics. SI. Ed Hose Emanuel Balthasar 2021 23018. 230 (2021) 3573–3580. https://doi.org/10.1140/EPJS/S11734-021-00240-8.

3. **Andjelka N. Hedrih,** Biological Oscillators, Zbornik Radova, Dynamics of hybrid systems of complex structures, Guest Editor Katica (Stevanović) Hedrih, 2022, Issue: 19(27), Chapter 13**,** pp. 413 – 451, 2022. 455 str.Non-periodical issues – proceedings of Mathematical Institute SASA, Belgrade [Collection of Papers] Series of thematic collection of papers that is published occasionally.
ISSN: 0351-9406
http://elib.mi.sanu.ac.rs/pages/browse_issue.php?db=zr&rbr=27&start=10

4. **Andjelka N. Hedrih**, Katica (Stevanović) Hedrih, Jasmina Bogdanovic-Jovanovic. Rayleigh function of energy dissipation in modelling oscillatory behaviour of moving sister chromatids in anaphase of mitosis. In International Conference on Mathematical Analysis and Applications in Science and Engineering – Book of Extended Abstracts. Series Editors Carla M.A. Pinto, School of Engineering, Polytechnic of Porto and Centre for Mathematics, University of Porto Jorge Mendonça, School of Engineering, Polytechnic of Porto Lurdes Babo, Porto Accounting and Business School Dumitru Baleanu, Cankaya University. 2022: 111-114, Publisher ISEP, P.PORTO, pp 646.
Book ISBN & DOI: 978-989-53496-3-0; https://doi.org/10.34630/20734

5. **Andjelka Hedrih**, Ana Mitrovic-Jovanovic, Mihailo Lazarevic. Influence of the sperm velocity on fertilization capacity in the oscillatory model of mouse zona pellucida. Ch 1. In APM 2019, LNME proceedings, D. A. Indeitsev and A. M. Krivtsov (Eds.), Springer Nature Switzerland AG 2021 APM 2019, LNME, pp. 1–21, 2021. https://doi.org/10.1007/978-3-030-49882-5_1. Book ID.488229_1_En

6. Andjelka N. Hedrih, Ivana Atanasovska and Djordje Jovanovic. Inflorescence inspired complex oscillatory systems. In Booklet of Abstracts of Symposium "Nonlinear Dynamics –Scientific work of Prof. Dr Katica (Stevanović) Hedrih", 04.-06. September Belgrade, Serbia, 2019, Editors: Ivana Atanasovska, Anđelka Hedrih, Milan Cajić, Mathematical Institute of the Serbian Academy of Sciences and Arts, Belgrade 2019(Sven, Niš), pp. 117-118.

7. Andjelka Hedrıh, Stevo Najman, Vladimir Hedrih, Olivera Milosevic-Djordjevic. Structure of relations between the frequency of micronuclei in peripheral blood lymphocytes and age, gender, smoking habits and socio-demographic factors in sought-east region of Serbia". Facta Universitatis. Series: Medicine and Biology. Vol. 20, No 2, 2018, pp. 47-54. DOI: 10.22190/FUMB180102008H UDC 576.3:612.112:616-053.2/.8

8. Andjelka Hedrih, Katica (Stevanović) Hedrih. Kinetic energy of dyads of sister chromatids in a biomechanical oscillatory model of the mitotic spindle. RAD Conference Proceedings, vol. 3, pp. 225-230, 2018. Publisher: RAD Asocciation, Nis, Serbia www.rad-proceedings.org http://www.rad-proceedings.org/index.php?id=3 DOI: 10.21175/RadProc.2018.47 ISSN 2466-4626 (online).

9. Andjelka N. Hedrih, Katica (Stevanović) Hedrih. Resonance as potential mechanism for homolog chromosomes separation trough biomechanical oscillatory model of mitotic spindle. Proceedings (Eektronski izvor) The 6th International Congress of Serbian Society of Mechanics, Mountain Tara, Serbia, June 19-21, 2017. Editied by Mihailo P. Lazarevic et al. Minisimposia-Bioengineering (M3), pp. 1-10. Belgrade: Serbian Society of Mechanics: Faculty of Mechanical Engineering, University of Belgrade, 2017 (Aranđelovac: Đurđevdan) -1 USB fleš memorija 9x5 cm (u obliku kartice).

10. Andjelka N. Hedrih, Zona pelucida as a mechano-responsive polymer, Short Paper, Abstract book of 24rd International Congress of Theoretical and Applied Mechanics, (IUTAM ICTAM Montreal, 2016), 21-26 August 2016, Montreal , Canada, SM01—1.07.198.pp.1719-1720. ISBN: NR16-127/2016E-EPUB, Catalogue Number: 978-0-660-05459-9

11. Andjelka Hedrih, Katica (Stevanovic) Hedrih. Multi-parametric dependence of deformation work of Zona Pelucida in fertilization process through quasi-static continual shell -like ZP model. Discontinuity, Nonlinearity, and Complexity 6(4) (2017) 465–476.

12. Katica R. (Stevanović), Hedrih, Andjelka N.Hedrih. Phenomenological mapping and dynamical absorptions in chain systems with multiple degrees of freedom. Journal of Vibration and Control. 2016, 22(1):18–36.

13. Andjelka Hedrih; Milan Banic. The effect of friction and impact angle on the spermatozoa - oocyte local contact dynamics. Journal of Theoretical Biology. 2016, 393:32–42.

14. Andjelka Hedrih, Mihailo Lazarevic, Ana Mitrovic- Jovanovic. Influence of sperm impact Angle on successful fertilization through mZP oscillatory spherical net model, Computers in Biology and Medicine. 2015, 59:19–29.

15. Andjelka N. Hedrih, Katica R. (Stevanovic) Hedrih. Deformation work of Zona Pelucida in process of fertilization. *13th International Conference on Dynamical Systems – Theory and Applications, Proceedings-Mechatronics and Life Sciences, DSTA Lody 2015, Edited by J.A. Awrejcewicy, M. Kazmierczak, J. Mrozowski, P. Olejnik, Lodz, December 7-10, 2015, Poland, ISBN 978-83-7283-707-3, Department of Automation, Biomechanics and Mechatronics, Lodz, , pp. 217-226.*

16. Andjelka Hedrih. Transition in oscillatory behavior in mouse oocyte and mouse embryo trough oscillatory spherical net model of mouse Zona Pellucida ch in *Applied Non-Linear Dynamical Systems*, Springer Proceedings in Mathematics & Statistics (ed: J. Awrejcewicz), 2014, Vol 93, pp. 295-303. Springer International Publishing Switzerland 2014 DOI 10.1007/978-3-319-08266-0__21.

17. Andjelka N. Hedrih, Katica R. (Stevanović) Hedrih. Modeling Double DNA Helix Main Chains of the Free and Forced Fractional Order Vibrations. Ch 7 In: Advanced Topics on Applications of Fractional Calculus on Control Problems, System Stability and Modeling (eds: Mihailo Lazarevic, Nikos Mastorakis. 2014, pp. 145-183. and Appendix E pp. 192-200. WSEAS Press.

18. Andjelka N. Hedrih and Katica R. (Stevanović) Hedrih. Analysis of energy state of discrete fractional order spherical net model of mouse *zona pelucida* before and after fertilization. Special issue of International Journal of Mechanics, Dedicated to Centennial jubilee of Russian Academician Yury N. Rabotnov, 2014, 8:371-376.

19. Andjelka Hedrih, Katica (Stevanovic) Hedrih, Branko Bugarski. Oscillatory Spherical net model of Mouse Zona Pellucida. Journal of Applied Mathematics and bioinformatics. 2013, 3(4):225-268.

20. Andjelka Hedrih and Marinko Ugrcic. Vibrational properties characterization of mouse embryo during microinjection. Theoretical and applied mechanics, 2012, 40 (S1-Address to Mechanics,):189-202.

21. Andjelka N. Hedrih. Mechanical models of the double DNA. International Journal of Medical Engineering and Informatics. 2011, 3(4):394–410.

22. Andjelka Hedrih. Modeling oscillations of zona pelucida before and after fertilization. Young Scientist Prize Paper. EUROMECH Newsletter 40, December 2011, Europian Mechanics Society, 40, pp. 6-14.

23. Katica R. (Stevanović) Hedrih, Andjelka N.Hedrih. *Eigen modes of the double DNA chain helix vibrations,* Journal of Theoretical and Applied Mechanics. 2010, 48(1):219-231. (Polish Society of Theoretical and Allied Mechanics).

24. Andjelka N. Hedrih, Mihailo Lazarević. Multi-layer oscillatory spherical net model of mouse zona pelucida. Proceedings of 5th International Congress of Serbian Society of Mechanics, Jun15-17th 2015, Arandjelovac, Serbia. Published by Serbian Society of Mechanics and Faculty of Technical Sciences Novi Sad, Editors: Spasić T.D, Lazarević M, Grahovac N, Žigić M, ISBN 978-86-7892-715-7, COBISS.SR-ID 296997639.Electronic USB Proceedings.1-2 pp. 8

25. Hedrih Andjelka, Lazarevic Mihaio, Mitrovic-Jovanovic Ana. Fertilization as a biomechanical oscillatory phenomenon in mammals. Proceedings of 4th International Congress of Serbian Society of Mechanics, 4-7th June 2013, Vrnjačka Banja, Serbia, Editors: Stevan Maksimović, Tomislav Igić, Nataša Trišović. –Belgrade: Serbian Society of Mechanics, 2013 (Bograd: Beotele Prom), D-01 pp. 579-584.