Anastasia S. Desyatova

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EDUCATION

Ph.D., Mechanical Engineering and Applied Mechanics, 2012
Department of Mechanical and Materials Engineering
University of Nebraska-Lincoln

B.S., Civil Engineering, 2005
Department of Civil Engineering
Saratov State Technical University, Russia

ACADEMIC APPOINTMENTS

2019 - current **Assistant Professor**
Department of Biomechanics
University of Nebraska Omaha, Omaha, NE

2018 – 2019 **Instructor**
Department of Surgery
University of Nebraska Medical Center, Omaha, NE

2015 – 2018 **Post-doctoral Fellow, NIH/NHLBI**
Department of Surgery
University of Nebraska Medical Center, Omaha, NE

2013 – 2015 **Post-doctoral Research Associate**
Department of Mechanical and Materials Engineering
University of Nebraska-Lincoln, Lincoln, NE

2012 **Instrument Specialist** (part-time)
Biomechanics, Biomaterials and Biomedicine (BM^3) Instrumentation Facility
University of Nebraska-Lincoln, Lincoln, NE

2006 – 2012 **Graduate Research Assistant**
Department of Engineering Mechanics, Department of Mechanical and Materials Engineering
University of Nebraska-Lincoln, Lincoln, NE

2005 – 2006 **Researcher**
Laboratory of Mathematical Modeling in Biomechanics
Saratov State University, Saratov, Russia

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RESEARCH INTERESTS

- Windkessel-preserving stent-grafts for aortic repair.
- Characterization of aortic growth and remodeling in young patients after thoracic endovascular reconstruction (TEVAR) and investigation of long-term performance and durability of different stent-graft designs.
- Computational and constitutive modeling of femoropopliteal arteries under complex mechanical deformations during limb flexion, and computational assessment of stent-artery interactions.
- Engineering of interfaces on micro and nano scales to create materials with improved toughness and durability.

GRANTS AND RESEARCH SUPPORT

Active

Effects of aortic compliance and Windkessel reduction on cardiac and aortic pathophysiology
Funding Agency: NIH R01 (1R01HL147128)
Project Period: 2019 - 2024
Budget: $3,040,498
Role: PI

Optimal stent selection for the femoropopliteal artery
Funding Agency: NIH R01 (1R01HL125736)
Project Period: 2014 - 2020
Budget: $3,568,587
Role: Investigator (MPI: Kamenskiy/MacTaggart)

Completed

Computational tool to assess performance of the aortic trauma stent-grafts
Funding agency: NIH F32 (F32HL124905)
Project Period: 2015 - 2018
Budget: $165,354.00
Role: PI

HONORS & AWARDS

2018 NSF travel award for participation in the “Finding your inner modeler” workshop as a project presenter

2015-2018 Ruth L. Kirschstein Postdoctoral Individual National Research Service Award, NIH/NHLBI.

2013 NSF travel grant to participate in the Midwest Plant Cell Dynamics conference

2011 NSF travel grant for participation in the ASME Society-Wide Micro/Nano Technology Poster Forum at IMECE

2011 NSF travel award to participate in a Student Poster Symposium at the ASME International Mechanical Engineering Congress and Exposition in Denver, CO

2011 NSF ADVANCE travel award to participate in a Negotiating the Ideal Faculty Position workshop at Rice University, Houston, TX

2010 Graduate student fellowship award from the University of Nebraska-Lincoln

2005 B.S. degree summa cum laude (GPA 4.0), Saratov State Technical University, Russia

2004 Fellowship from the President of the Russian Federation to outstanding university students

2003 1st degree diploma for the best scientific and innovative work among young scientist and students of all Russian universities

PATENTS AND INVENTIONS

Windkessel-preserving aortic stent-graft. USA Provisional patent application. April 2018. USA patent application. April 2019.

PUBLICATIONS

Refereed Journals Publications

Journal	Impact Factor
Nature Plant	11.5
Annals of Surgery	9.0
Acta Biomaterialia	6.0
Bone	4.4
Journal of the Royal Society Interface	4.2
Journal of Mechanical Behavior of Biomedical Materials	3.6
Journal of Vascular Surgery	3.5
Annals of Biomedical Engineering	3.4
Biomechanics and Modeling in Mechanobiology	2.8
Journal of Biomechanics	2.7
Journal of Trauma and Acute Care Surgery	2.7
Journal of Vascular and Endovascular Surgery	1.1

* As corresponding author

***Desyatova A**, MacTaggart J, Kamenskiy A. Effects of longitudinal pre-stretch on the mechanics of human aorta before and after thoracic endovascular aortic repair (TEVAR) in trauma patients. *Biomechanics and Modeling in Mechanobiology*. 2019. doi: 10.1007/s10237-019-01217-2.

Rokidi S., Paschalis E.P., Klaushofer K., Vennin S., **Desyatova A**., Turner J.A., Watson P., Lappe J., Akhter M.P., Recker R.R. Organic matrix quality discriminates between age- and BMD-matched fracturing versus non-fracturing post-menopausal women: A pilot study. *Bone*. V127, pp 207-214. 2019. doi: 10.1016/j.bone.2019.06.017.

Jadidi M., **Desyatova A**., MacTaggart J., Kamenskiy A. Mechanical stresses associated with flattening of human femoropopliteal artery specimens during planar biaxial testing and their effects on the calculated physiologic stress-stretch state. *Biomechanics and Modeling in Mechanobiology*. 2019. doi: 10.1007/s10237-019-01162-0.

Anttila E., Balzani D., **Desyatova A**., Deegan P., MacTaggart J., Kamenskiy A. Mechanical damage characterization in human femoropopliteal arteries of different ages. *Acta Biomaterialia*. V90, pp225-240. 2019. doi: 10.1016/j.actbio.2019.03.053.

MacTaggart J, Poulson W, Seas A, Deegan P, **Desyatova A**, Maleckis K, Kamenskiy AV. Stent design affects femoropopliteal artery deformation. *Annals of Surgery*. V270(1), pp180-187. 2019. doi:10.1097/SLA.0000000000002747.

Desyatova A, Poulson W, MacTaggart J, Maleckis K, Kamenskiy AV. Cross-sectional pinching in human femoropopliteal arteries due to limb flexion, and stent design optimization for maximum cross-sectional opening and minimum intramural stresses. *Journal of the Royal Society Interface*. V15 (145). 2018. doi: 10.1098/rsif.2018.0475.

Maleckis K, Anttila E, Aylward, P., Poulson W., **Desyatova A**, MacTaggart J, Kamenskiy AV. Nitinol stents in the femoropopliteal artery: a mechanical perspective on material, design, and performance. *Annals of Biomedical Engineering*. V 46(5), pp. 684-704. 2018. doi:10.1007/s10439-018-1990-1.

Desyatova A., MacTaggart J., Romarowski R., Poulson W., Conti M., Kamenskiy A. Effect of aging on mechanical stresses, deformations, and hemodynamics in human femoropopliteal artery due to limb flexion. *Biomechanics and Modeling in Mechanobiology*. V17(1), pp. 181-189. 2018. doi: 10.1007/s10237-017-0953-z.

Desyatova A., MacTaggart J., Kamenskiy A. Constitutive modeling of human femoropopliteal artery biaxial stiffening due to aging and diabetes. *Acta Biomaterialia*. V64, pp50-58. 2017. doi: 10.1016/j.actbio.2017.09.042.

Maleckis K., Deegan P., Poulson W., Sievers C., **Desyatova A**., MacTaggart J., Kamenskiy A. Comparison of femoropopliteal artery stents under axial and radial compression, axial tension, bending, and torsion deformations. *Journal of Mechanical Behavior of Biomedical Materials*. V75, pp160-168. 2017. doi: 10.1016/j.jmbbm.2017.07.017.

Desyatova A., Poulson W., Deegan P., Lomneth C., Seas A., Maleckis K., MacTaggart J., Kamenskiy A. Limb flexion-induced twist and associated intramural stresses in the human femoropliteal artery. *Journal of the Royal Society Interface*. V14(128). 2017. doi: 10.1098/rsif.2017.0025.

Vennin S, **Desyatova A**, Turner JA , Watson PA, Lappe JM, Recker, RR, Akhter MP. Intrinsic material property differences in bone tissue from patients suffering low-trauma osteoporotic fractures, compared to matched non-fracturing women. *Bone*. V97, pp 233-242. 2017. doi: 10.1016/j.bone.2017.01.031

***Desyatova A**., MacTaggart J., Poulson W., Deegan P., Lomneth C., Sandip A., Kamenskiy A. The choice of a constitutive formulation for modeling limb flexion-induced deformations and stresses in the human femoropopliteal arteries for different ages. *Biomechanics and Modeling in Mechanobiology.* V16(3), pp 775-785. 2017. doi: 10.1007/s10237-016-0852-8.

Kamenskiy A, Seas A, Deegan P, Poulson W, Antilla E, Sim S, **Desyatova A**, MacTaggart J. Constitutive description of human femoropopliteal artery aging. *Biomechanics and Modeling in Mechanobiology.* V16(2), pp 681-692. 2017. doi:10.1007/s10237-016-0845-7.

MacTaggart JN, Poulson WE, Akhter M, Seas A, Thorson K, Phillips NY, **Desyatova AS**, Kamenskiy AV. Morphometric roadmaps to improve accurate device delivery for fluoroscopy-free resuscitative endovascular balloon occlusion of the aorta. *The Journal of Trauma and Acute Care Surgery*. 80(6), pp. 941-6. 2016. doi: 10.1097/TA.0000000000001043.

Kamenskiy A, Seas A, Bowen G, Deegan P, **Desyatova A**, Bohlim N, Poulson W, MacTaggart J. In situ longitudinal pre-stretch in the human femoropopliteal artery. *Acta Biomaterialia*. V32, pp. 231-237. 2016. doi: 10.1016/j.actbio.2016.01.002.

Yanagisawa M., **Desyatova A.S.**, Belteton S., Mallery E., Turner J. A., Szymanski D. B. Patterning mechanisms of cytoskeletal and cell wall systems during leaf trichome morphogenesis. *Nature Plant*. V1, No 15014. 2015. doi:10.1038/nplants.2015.14.

Kamenskiy A.V., Pipinos I.I., Dzenis Y.A., Phillips N.Y., **Desyatova A.S.**, Kitson J., Bowen R., MacTaggart J.N. Effects of age on the physiological and mechanical characteristics of human femoropopliteal arteries. *Acta Biomaterialia*. V11, pp 304-313. 2015. doi: 10.1016/j.actbio.2014.09.050.

MacTaggart JN, Phillips NY, Lomneth CS, Pipinos II, Bowen R, Baxter BT, Johanning J, Longo GM, **Desyatova AS**, Moulton MJ, Dzenis YA, Kamenskiy AV. Three-dimensional bending, torsion, and axial compression of the femoropopliteal artery during limb flexion. *Journal of Biomechanics.* V47(10), pp 2249-2256. 2014. doi: 10.1016/j.jbiomech.2014.04.053.

Kamenskiy AV, Dzenis YA, MacTaggart J, **Desyatova AS**, Pipinos II. In vivo three-dimensional blood velocity profile shapes in the human common, internal and external carotid arteries. *Journal of Vascular Surgery*. V54 (4), pp.1011-1020. 2011. doi: 10.1016/j.jvs.2011.03.254.

Kamenskiy A.V., Pipinos I.I., **Desyatova A.S.**, Salkovskiy Y.E., Kossovich L.Y., Kirillova I.V., Bockeria L.A., Morozov K.M., Polyaev V.O., Lynch Th.G., Dzenis Yu.A. Finite element model of the patched human carotid. *Journal of Vascular and Endovascular Surgery*. V43 (6), pp. 533-541. 2009. doi: 10.1177/1538574409345030.

Bockeria LA, Pirzhalaishvili ZK, Morozov KM, Kamenskiy AV, Salkovskiy YE, **Desyatova AS**, Dzenis YA, Kossovich LY, Kirillova IV, Guliaev YP, Ostrovskiy NV, Polyaev VO. Reconstruction of the carotid artery using various patching materials: search for the optimal material to improve the outcomes of the carotid bifurcation repair. *Annals of Surgery*. V2, pp. 5-19. 2008 (in Russian).

***Desyatova A.S.**, Zhigalov M.V., Krys'ko V.A., Saltykova O.A. Dissipative dynamics of geometrically nonlinear Bernoulli-Euler beams. *Mechanics of Solids*. V43 (6), pp. 128-136. 2008.

Bockeria LA, Morozov KM, Kossovich LY, Kirillova IV, Guliaev YP, **Desyatova AS**, Kamenskiy AV, Salkovskiy YE, Ostrovskiy NV, Polyaev VO. Endarterectomy and Patching of the Human Carotid Artery Using Different Materials. *Biomedical Technologies and Radio Electronics*. V12, pp. 33-41. 2006 (in Russian)

Ostrovskiy NV, Kirillova IV, **Desyatova AS**, Kamenskiy AV, Polyaev VO. Use of computer technologies for comparison of patch materials used to close carotid endarterectomies. *Issues of Reconstructive and Plastic Surgery*. V2 (17), pp. 42-45. 2006 (in Russian)

Kossovich LY, Kirillova IV, Guliaev YP, **Desyatova AS**, Kamenskiy AV, Salkovskiy YE, Ostrovskiy NV, Polyaev VO, Morozov KM. Revascularization of the human carotid artery using different patching materials. *Saratov Scientific Medical Journal*. V2 (12), pp. 32-42. 2006 (in Russian)

Desyatova A.S., Krysko V.A. Vibrations of the Euler-Bernoulli's beam on the Winkler and Vlasov foundations. *Construction*. No 7 (547), pp. 20 – 27. 2004 (in Russian)

Books and book chapters

Kossovich LY, Kirillova IV, Guliaev YP, Kossovich EL, Kamenskiy AV, Salkovskiy YE, **Desyatova AS**, Ostrovskiy NV, Polyaev VO, Morozov KM. Mathematical Modeling of Blood Vessels Behavior. Chapter in Methods of Computer Diagnostic in Biology and Medicine. Textbook for students of nano and biomedical departments. Saratov. - 120 pages. P74-95. 2007 (in Russian).

Publications at Professional Conferences

Kamenskiy A, Maleckis K, Keiser C, Aylward P, **Desyatova A**, MacTaggart J. Biomimetic reinforced nanofibrillar elastomeric bypass grafts with physiologic longitudinal pre-stretch for below-knee lower extremity peripheral arterial disease. Abstract for poster presentation. International Society for Applied Cardiovascular Biology – ISACB+ISVTE 2019. Zurich, Switzerland. June 19-21. 2019

Paschalis E, Rokidi S, Klaushofer K, Vennin S, **Desyatova A**, Turner J, Watson P, Lappe J, Akhter M, Recker R. Organic Matrix Quality discriminates between age-and BMD-matched fracturing versus non-fracturing post-menopausal women. Annual meeting of the American Society for Bone and Mineral Research. Sept 28 – Oct 1 2018. In *Journal of Bone and Mineral Research*, vol. 33, pp. 311-311

Desyatova A., Szymanski D. Multi-scale mechanical modeling of leaf epidermal morphogenesis. Abstract for platform presentation. Finding your inner modeler. Chicago. August 16-17, 2018.

Desyatova A., Pipinos I., MacTaggart J. Effects of age and longitudinal pre-stretch on the mechanics of young human aorta repaired with a thoracic trauma stent-graft. Abstract for poster presentation. 8th World congress of biomechanics. July 8-12, 2018.

Desyatova A., Pipinos I., MacTaggart J. On the importance of incorporating longitudinal aortic prestretch in computational models of aortic stent-grafting. Abstract for platform presentation. 7th International conference on mechanics of biomaterials and tissues – ICMOBT2017. December 10-14, 2017.

Desyatova A., MacTaggart J., Romarowski R., Poulson W., Conti M., Kamenskiy A. Effect of aging on mechanical stresses, deformations, and homodynamics in human femoropopliteal artery due to limb flexion. Abstract for poster presentation. 7th International conference on

mechanics of biomaterials and tissues – ICMOBT2017. December 10-14, 2017.

Desyatova A., MacTaggart J., Poulson W., Deegan P., Lomneth C., Kamenskiy A. Torsion and intramural stresses in the human femoropopliteal artery due to limb flexion. Abstract for platform presentation. 5th International conference on computational and mathematical biomedical engineering – CMBE2017. April 10-12, 2017.

Desyatova A., Poulson W., Deegan P., Lomneth C., MacTaggart J., Kamenskiy A. The effect of limb flexion on torsional deformations and stresses in the human femoropopliteal artery. Abstract for poster presentation. Biomedical Engineering Society Annual meeting. October 5-8, 2016.

Desyatova A., Poulson W., Deegan P., Lomneth C., MacTaggart J., Kamenskiy A. Effect of aging on arterial stresses due to limb flexion. Abstract for platform presentation. 15th Biennial meeting of International Society for Applied Cardiovascular Biology. Banff, Canada. September 7-10, 2016.

Desyatova AS, MacTaggart J., Lomneth C., Dzenis Y., Kamenskiy A. Effects of stenting on the natural limb flexion-induced deformations of the human femoropopliteal artery. Abstract for platform presentation. 6th International Conference on Mechanics of Biomaterials and Tissues. Waikoloa, HI. December 6-10, 2015

Desyatova AS, Rudrappa D, Blum P, Turner J. Characterization of thermomechanical properties of recombinant resilin using atomic force microscopy. Abstract for platform presentation. 23rd World Forum on Advanced Materials PolyChar23. Lincoln, NE. May 11-15, 2015

Stockdale T., Andalib MN, **Desyatova AS**, Cheng S, Dzenis Y. Manufacturing of polyimide fiber-reinforced nanocomposites. Abstract for poster presentation. 23rd World Forum on Advanced Materials PolyChar23. Lincoln, NE. May 11-15, 2015

Desyatova AS, Yanagisawa M, Belteton S, Turner JA, Szymanski D. Experimental and computational approaches to discover how cytoskeleletal and cell wall systems control cell morphogenesis. Abstract for platform presentation. Plant Biology 2014. Portland, OR. July 12-16, 2014

Yanagisawa M, **Desyatova AS**, Belteton S, Turner JA, Szymanski D. Integration of ROP signaling with cytoskeletal and cell wall systems during Arabidopsis trichome morphogenesis. Abstract for platform presentation. Keystone Symposia 2014: Plant signaling. Breckenridge, CO. February 5-10, 2014

Yanagisawa M, **Desyatova AS**, Belteton S, Mallery E., Fessenden A., Turner JA, Szymanski D. ARP2/3 mediated patterning of cytoskeletal and cell wall systems during leaf trichome morphogenesis. Abstract for platform presentation. MidWest Plant Cell Dynamics. Madison, WI. June 4-6, 2014.

Desyatova AS, Belteton S, Yanagisawa M, Wu T-C, Szymanski D, Umulis DM, Turner JA. Computational Modeling of Plant Trichome Branch Growth Using Finite Element and Imaging Approaches. Society of Engineering Science. Providence, RI. July 28-31, 2013

Desyatova AS, Belteton S, Yanagisawa M, Wu T-C, Szymanski D, Umulis DM, Turner JA. Modeling of Trichome Branch Growth by Combining Imaging and Finite Element Approaches. MidWest Plant Cell Dynamics. Madison, WI, June 5-7, 2013

Desyatova AS, Dzenis YA. Engineered Interfaces: Towards Next Generation Supertough Structural Materials. NSF Student Poster Symposium at the 2011 ASME International Mechanical Engineering Congress and Exposition. Denver, CO, Nov. 11-17, 2011

Desyatova AS, Dzenis YA. Engineering of Interfaces at Multiple Scales. ASME Society-Wide Micro and Nano Technology Forum at the 2011 ASME International Mechanical Engineering Congress and Exposition. Denver, CO, Nov. 11-17, 2011

Kamenskiy AV, Dzenis YA, **Desyatova AS**, Lynch TG, MacTaggart JN, Pipinos II. Toward optimal hemodynamics in the endarterectomized carotid: a finite element study. J of Surg Research. Abstracts for the Fifth Annual Academic Surgical Congress. San Antonio, TX. V158(2). P302. Feb 3-5, 2010.

Desyatova AS, Dzenis YA. Effect of Interface Geometry on Fracture Parameters at Corrugated Interfaces. Extended Abstract in Proceedings of the 2009 ASME International Mechanical Engineering Congress & Exposition. IMECE2009-12082. Lake Buena Vista, FL. November 13-19, 2009.

Desyatova AS, Dzenis YA. Multiscale Engineering of Interfaces for Fracture Resistance. Abstract at 2009 NSF Engineering Research and Innovation Conference. Honolulu, HI. June 22-25, 2009.

Desyatova AS, Dzenis YA. Engineering of Interfaces for Fracture Resistance. Oral poster presentation at the Nebraska Research & Innovation Conference EPSCoR. Omaha, NE. Sep. 29, 2009.

Kamenskiy AV, Pipinos II, **Desyatova AS**, Salkovskiy YE, Kossovich LY, Kirillova IV, Bockeria LA, Morozov KM, Polyaev VO, Lynch TG, Dzenis YA. Finite Element Model of the Endarterectomized and Patched Human Carotid Bifurcation. Oral poster presentation at the Nebraska EPSCoR Sep 29 2009.

Desyatova A.S., Wu X., Dzenis Yu.A. Engineered Interfaces. Oral presentation at 2008 NSF Engineering Research and Innovation Conference. Knoxville, TN. January 7-11, 2008.

Kamenskiy AV, Pipinos II, **Desyatova AS**, Salkovskiy YE, Kossovich LY, Kirillova IV, Bockeria LA, Morozov KM, Polyaev VO, Lynch TG, Dzenis YA. Finite Element Model of the Endarterectomized and Patched Human Carotid Bifurcation. Oral poster presentation at the 32nd Annual Meeting of the Midwestern Vascular Surgical Society, Madison, WI. Sep 11-13, 2008.

Desyatova AS, Kamenskiy AV. Modeling of the Human Carotid Artery Reconstruction Using Different Repair Materials. Proceedings of the 3d All-Russian Science Conference “Mathematical Modeling and Boundary Problems”. Vol. 1, pp. 66 – 69. Samara, 2006 (in Russian)

Desyatova AS. A Bloodflow of Spiral Vertebral Artery. Proceedings of the Mathematics – Mechanics. Publishing House of Saratov State University. No 8. 2006 (in Russian)

Desyatova AS, Abubekirov RN, Erofeev NP. Computer-Based Modeling of the Stochastic Vibrations of the Constructions in the Supersonic Gas Flow. Proceedings of the Final Federal Innovation Conference on the Engineering and Social Sciences. Pp. 16-18.

Saratov, 2004 (in Russian)

Desyatova AS, Krys'ko VA. A Scenario of the Transition of Flexible Beam to Chaos under the Alternating Shear Load. Proceedings of the 1st All-Russian Science Conference "Mathematical Modeling and Boundary Problems". VI, pp. 129-131. Samara, 2004 (in Russian)

Desyatova AS, Krys'ko VA. Dynamic Stability of the Flexible Multi-Layer Beams on Elastic Foundation with the Coulomb Friction. Proceedings of the VI International Conference "Problems of Fastness of Materials and Constructions on Transport". Pp. 191 – 197. St. Petersburg, 2004 (in Russian)

Desyatova AS, Krys'ko VA. Beam Vibrations on the One-Parameter Elastic Foundation with the linear and non-linear dissipation. Proceedings of the XIII Intercollegiate Conference "Mathematical Modeling and Boundary Problems". Vol. 3, pp. 97-100. Samara, 2003 (in Russian).

Desyatova AS, Savel'eva NE, Kravzova IV. Computer-Based Modeling of the Stochastic Vibrations of the Beams, Spherical, Sectorial and Cylindrical Shells. Proceedings of the Final Federal Innovation Conference on the Engineering and Social Sciences. Pp. 9-10. Moscow, 2003 (in Russian)

Desyatova AS, Krys'ko VA. Beam Vibrations on the Two-Parameter Elastic Foundation with the linear and non-linear dissipation under different types of loading. Proceedings of the International Conference "Nonlinear vibrations of mechanical and biological systems". Pp. 35-40. Saratov. 2003 (in Russian).