John P. Domann

Contact Information

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Research Interests:

The dynamics of coupled electro-magneto-mechanical systems with integrated smart materials. This research enables the creation of disruptive energy efficient multiferroic electronics, with emphasis on biomedical applications.

Education:

Ph.D.	Mechanical Engineering: Solid Mechanics University of California, Los Angeles - Los Angeles, CA (May 2017)
M.S.	Bioengineering: Product Development University of Kansas - Lawrence, KS. *With Honors* (May 2011)
B.S.	Mechanical Engineering University of Kansas - Lawrence, KS. (December 2008)

Professional Experience:

Assistant Professor	Biomedical Engineering and Mechanics Virginia Polytechnic Institute and State University Blacksburg, VA (2017-Present)
Research Scientist	Spine Biomechanics Laboratory University of Kansas Lawrence, KS (2011-2013)
Entrepreneurial Lead	NSF Innovation-Corps (I-Corps) University of Kansas Lawrence, KS (2012)

Contracts and Grants

DARPA AMEBA $417k - Vibrational Antennas for Long Wave Applications (VIBRANT). Subcontract from Hughes Research Labratories LLC., PI: John Domann (September 2017 - May 2021)

NSF I-Corps $50k - Spine Fusion Implant Made From a Tough Piezoelectric Composite Biomaterial. PI: Lisa Friis (July 2012 - December 2012)

Institute for Advancing Medical Innovation $150k - Tough Piezoelectric Composite Biomaterial and Spinal Fusion Implant Design. PI: Lisa Friis (December 2011 - May 2013)

Teaching Experience:

Assistant Professor	ESM 3124 - Intermediate Dynamics (Fall 2018) Biomedical Engineering and Mechanics Virginia Polytechnic Institute and State University Blacksburg, VA
Instructor	Matlab Workshop (2013, 2014) School of Engineering University of California, Los Angeles Los Angeles, CA
Lecturer	ME 311 - Mechanics of Materials (2012-2013) Department of Mechanical Engineering University of Kansas Lawrence, KS
Teaching Assistant	Math 365 - Statistics (2008) Department of Mathematics University of Kansas Lawrence, KS

Professional Activities

Chair	Best Student Paper Competition, SPIE Smart Stuctures / NDE (2018)
Reviewer	International Journal of Mechanical Sciences (2018 - Present)
Reviewer	Transactions on Antennas and Propagation (2018 - Present)
Reviewer	Polymer Composite (2018 - Present)
Reviewer	Journal of Biomedical Materials Research Part A (2017 - Present)
Reviewer	Smart Materials and Structures (2015 - Present)
Reviewer	Physics Letters A (2015 - Present)
Reviewer	Journal of Intelligent Material Systems and Structures (2014 - Present)

Journal Publications:

[1] **Domann, J. P.**, Wu, T., Chung, T.-K., Carman, G. P., "Strain-Mediated Magnetoelectric Storage, Transmission, and Processing: Putting the Squeeze on Data." In: *MRS Bulletin* 43 (Nov. 2018).

[2] Wang, Q., **Domann, J.**, Yu, G., Barra, A., Wang, K. L., Carman, G. P., "Strain-Mediated Spin-Orbit-Torque Switching for Magnetic Memory." In: *Physical Review Applied* 10.3 (Sept. 25, 2018), p. 034052. DOI: 10.1103/PhysRevApplied.10.034052.

[3] Barra, A., **Domann, J.**, Kim, K. W., Carman, G., "Voltage Control of Antiferromagnetic Phases at Near-Terahertz Frequencies." In: *Physical Review Applied* 9.3 (Mar. 2018), pp. 034017–034017. DOI: 10.1103/PhysRevApplied.9.034017.

[4] Crum, R. S., **Domann, J. P.**, Carman, G. P., Gupta, V., "Propagation and Dispersion of Shock Waves in Magnetoelastic Materials." In: *Smart Materials and Structures* 26.12 (2017). DOI: 10.1088/1361-665X/aa973d.

[5] **Domann, J. P.**, Carman, G. P., "Strain Powered Antennas." In: *Journal of Applied Physics* 121.4 (2017). DOI: 10.1063/1.4975030.

[6] Wang, Q., Li, X., Liang, C. Y., Barra, A., **Domann, J.**, Lynch, C., Sepulveda, A., Carman, G., "Strain-Mediated 180° Switching in CoFeB and Terfenol-D Nanodots with Perpendicular Magnetic Anisotropy." In: *Applied Physics Letters* 110.10 (2017), pp. 102903–102903. DOI: 10.1063/1.4978270.

[7] **Domann, J. P.**, Sun, W.-Y., Schelhas, L., Carman, G., "Strain-Mediated Multiferroic Control of Spontaneous Exchange Bias in Ni-NiO Heterostructures." In: *Journal of Applied Physics* 120.14 (2016). DOI: 10.1063/1.4964808.

[8] Goetzinger, N., Tobaben, E., **Domann, J. P.**, Arnold, P., Friis, E., "Composite Piezoelectric Spinal Fusion Implant: Effects of Stacked Generators." In: *Journal of Biomedical Materials Research - Part B Applied Biomaterials* 104.1 (2016). DOI: 10.1002/jbm.b.33365.

[9] **Domann, J. P.**, Loeffler, C. M., Martin, B. E., Carman, G. P., "High Strain-Rate Magnetoelasticity in Galfenol." In: *Journal of Applied Physics* 118.12 (2015), pp. 123904–123904. DOI: 10.1063/1.4930891.

[10] Tobaben, E., Goetzinger, N., **Domann, J. P.**, Barrett-Gonzalez, R., Arnold, P., Friis, E., "Stacked Macro Fiber Piezoelectric Composite Generator for a Spinal Fusion Implant." In: *Smart Materials and Structures* 24.1 (2015). DOI: 10.1088/0964-1726/24/1/017002.

[11] Tobaben, N. N. E., **Domann, J. P.**, Arnold, P. M. P., Friis, E. A. E., "Theoretical Model of a Piezoelectric Composite Spinal Fusion Interbody Implant." In: *Journal of Biomedical Materials Research Part A* 102.4 (2013). DOI: 10.1002/jbm.a.34750.

[12] **Domann, J. P.** "Development and Validation of an Analogue Lumbar Spine Model and Its Integral Components." In: (2011).

Submitted / In Preparation

[1] **Domann, J. P.**, Chen, C., Carman, G. P., Candler, R. N., "Multiferroic Micro-Motors With Deterministic Single Input Control (Under Review Phys. Rev. Appl.)" 2018.

[2] Hu, J., Liang, C.-Y., Keller, S., **Domann, J. P.**, Carman, G. P., Sepulveda, A. E., "Strain Mediated Bennet Clocking of Magnetoelastic Logic Devices (Under Review)." 2017.

Conference Presentations:

[1] Hu, J.-Z., **Domann, J.**, Keller, S. M., Carman, G., Sepulveda, A. E., "Broadband Electrically Small Antennas with Strain Powered Multiferroics." In: *Bulletin of the American Physical Society*. APS March Meeting 2018. American Physical Society.

[2] Wang, Q., **Domann, J.**, Yu, G., Barra, A., Wang, K., Carman, G., "A Hybrid Magnetic Random-Access Memory Using Spin-Orbit Torque and Multiferroics." In: *Bulletin of the American Physical Society*. APS March Meeting 2018. Los Angeles, CA: American Physical Society.

[3] **Domann, J. P.** "Single Input Straintronics for Micro / Nanoscale Antennas and Motors." In: *62nd Annual Conference on Magnetism and Magnetic Materials*. Ed. by IEEE Magnetics. AIP Publishing, 2017, pp. 17–17.

[4] Hu, J.-Z., Wang, Q., **Domann, J. P.**, Keller, S., Carman, G. P., Sepulveda, A. E., "Broadband Electrically Small Antennas with Strain Powered Multiferroics." In: *62nd Annual Conference on Magnetism and Magnetic Materials*. Ed. by IEEE Magnetics. AIP Publishing, 2017, pp. 85–85.

[5] Wang, Q., **Domann, J. P.**, Yu, G., Carman, G. P., "Strain Assisted Field-Free Deterministic Switching of Perpendicular Magnetization by Spin-Orbit Torque." In: *62nd Annual Conference on Magnetism and Magnetic Materials*. Ed. by IEEE Magnetics. AIP Publishing, 2017, pp. 200–200.

[6] **Domann, J. P.**, Carman, G. P., "Strain Mediated Multiferroic Motors (Conference Presentation)." In: *SPIE Smart Structures/NDE 2017*. Ed. by Nakhiah C. Goulbourne. Vol. Session: B. International Society for Optics and Photonics, Mar. 2017, pp. 1016517–1016517. DOI: 10.1117/12.2263403.

[7] **Domann, J. P.**, Carman, G. P., "Strain Powered Magnetic Antennas (Conference Presentation)." In: *SPIE Smart Structures/NDE 2017*. Ed. by Nakhiah C. Goulbourne. Vol. Session: B. International Society for Optics and Photonics, Mar. 2017, pp. 1016503–1016503. DOI: 10.1117/12.2263330.

[8] **Domann, J. P.**, Crum, R., Gupta, V., Carman, G. P., "Magnetoelastic Shockwave Response (Conference Presentation)." In: *SPIE Smart Structures/NDE 2017*. Ed. by Nakhiah C. Goulbourne. Vol. Session: B. International Society for Optics and Photonics, Mar. 2017, pp. 1016514–1016514. DOI: 10.1117/12.2263254.

[9] **Domann, J. P.**, Carman, G. P., "Magnetoelastic Antennas: {T}unable Magnetic Damping and Near Field Communication." In: *Gordon Research Conference: Multi-Functional Materials*. 2016.

[10] **Domann, J. P.**, Carman, G. P., "Strain-Mediated Electromagnetic Coupling in Magnetoelastic and Piezoelectric Materials: Mechanical Dipole Antennas." In: *ASME 2016 International Mechanical Engineering Congress and Exposition (IMECE)*. Vol. Session: 5. 2016.

[11] **Domann, J. P.**, Crum, R., Gupta, V., Carman, G. P., "Nonlinear Magnetoelastic Laser Shock Response: Experimental and Numerical Analysis." In: *ASME 2016 International Mechanical Engineering Congress and Exposition (IMECE)*. Vol. Session: 1. 2016.

[12] **Domann, J. P.**, Crum, R., Gupta, V., Carman, G. P., "Shock Induced Magnon-Phonon Coupling in {G}alfenol ({F}e81.6{G}a18.4)." In: *Magnetism and Magnetic Materials / International Magnetics Conference*. 2016.

[13] **Domann, J. P.**, Carman, G. P., "Magnetoelastic Coupling in Response to Impact." In: *International Materials Research Congress*. 2015.

[14] **Domann, J. P.**, Arnold, P. A., Friis, E. A., "Effect of Soft and Hard Tissues on the Stability of the Lumbar Spine." In: *Transactions of the 2012 North American Spine Society: Spine Across the Sea*. 2012.

[15] **Domann, J. P.**, Mar, D., Johnson, A., James, J., Friis, E., "Effect of Soft Tissues on the Stability of an Analogue Lumbar Spine: A Systematic Dissection." In: *The Spine Journal*. Vol. 11. Elsevier, 2011, S91–S91.

[16] **Domann, J.**, Mar, D., Johnson, A., James, J., Friis, E., "The Analogue Spine Model: The First Anatomically and Mechanically Correct Synthetic Physical Model of the Lumbar Spine." In: *The Spine Journal*. Vol. 11. Elsevier, 2011, S155–S156.

[17] **Domann, J. P.**, Johnson, A., James, J., Friis, E. A., "Development of a New Synthetic Vertebral Cancellous Bone." In: *Transactions of the 2010 Society for Biomaterials Conference*. 2010.

Patents:

[1] Friis Elizabeth Annamaria KS, U., Domann John Patrick KS, U., "Piezoelectric Composites and Methods of Making." U.S. pat. 20150134061A1. 2016.

[2] Friis, E. A., **Domann, J. P.,** "Piezoelectric Composites and Methods of Making." U.S. pat. 20150134061A1. 2013.

Awards and Honors:

Fellowship	Department of Mechanical and Aerospace Engineering University of California Los Angeles - Los Angeles, CA (2013)
Fellowship	Institute for Advancing Medical Innovation University of Kansas - Lawrence, KS (2009-2011)
Grad. Ambassador	School of Engineering University of Kansas - Lawrence, KS (2009-2011)
Pi Tau Sigma	Mechanical Engineering Honor Society University of Kansas - Lawrence, KS (2007)
Scholarship	Department of Mechanical Engineering University of Kansas - Lawrence, KS (2004-2008)