

Gabriela Petculescu

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EDUCATION:

- 1996-2002 **PhD in Physics, Ohio University, USA**
Topic: Physical acoustics
Thesis: "Fundamental measurements in standing-wave and traveling-wave thermoacoustics"
- 1989-1995 **BS and MS in Physics, University of Bucharest, Romania**
Topic (BS): Optical technologies with plasma and lasers
Thesis: "A new kind of plasma discharge: the thermionic vacuum arc"
Topic (MS): Vacuum and plasma physics
Thesis: "Miniature vacuum pump based on the thermionic vacuum arc in Titanium"

APPOINTMENTS:

- 2012-2019 **Associate Professor**, University of Louisiana at Lafayette, LA
2006-2012 **Assistant Professor**, University of Louisiana at Lafayette, LA
2004-2006 **Postdoctoral Fellow**, Northwestern University, Evanston, IL
Topic: Structural Health Monitoring (SHM) using Lamb-wave sensors in composite materials
2002-2004 **Postdoctoral Research Associate**, National Center for Physical Acoustics, Oxford, MS
Topic: Resonant Ultrasound Spectroscopy in thermoelectric and magnetoelastic materials
1996-2002 **Graduate Research Assistant**, Ohio University, Athens, OH
Topic: Thermoacoustics
1994-1996 **Research Scientist**, Inst. of Phys. and Technology of Radiation Devices, Bucharest, RO
Topic: Plasma discharge, vacuum systems

AWARDS:

- 2008-2015 Office of Naval Research Summer Faculty Research Fellow,
2017-2018 carried out at the Naval Surface Warfare Center – Carderock Division (NSWC-CD)
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- 2017 Outstanding Teaching Award, College of Sciences, UL-Lafayette
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- 2014 Innovator Award, UL-Lafayette
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- 2001 Fellowship of the Condensed Matter and Surface Science Program of Ohio University
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- 2001 Scholarship from the Technische Universiteit Eindhoven to present and attend the First International Workshop on Thermoacoustics
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- 2000-2001 John Cady Graduate Fellowship awarded to one Ohio University student per year
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- 1999-2000 Outstanding Physics Teaching Assistant, Ohio University
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- 1995 Bronze medal at UNESCO's "Creativity-Innovation" international contest, Bucharest, RO,
with the project "Miniature vacuum pump"
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TEACHING (UL-Lafayette PHYS codes):

201/202 General Physics I/II (Calc-based), **204** Honors General Physics II (Calc-based), **207/208** Introductory Physics I/II (Alg-based), **213** Conceptual Physics, **301** Modern Physics, **311/312** Modern Physics Laboratory I/II, **411** Computational Physics Laboratory, **521/523** Ultrasonics in the Solid State

- Additional teaching (individual studies taught to students in theory and experimental work):
497/498 Senior Research I/II, **597/598** Directed Individual Study, **599** Thesis

RESEARCH ADVISER for UL-Lafayette students:

- Ian Carper – BS **2019** (UG Senior Research)
- Damilola Dada – MS candidate, entered 2018
- Sonny Osunkwo – MS **2018** (Thesis Chair)
- Shankar Kharal – MS **2017** (Thesis Chair)
- Adam Trahan – BS **2016** (UG Senior Research and Summer Internship Res. Adv. at NSWC-CD)
- Tamika Thomas – BS **2014** (UG Senior Research)
- Chukwunonye Chukwunonye – MS **2014** (Thesis Chair)
- Jessica Dupuis – B.Ed. **2013** (UG Senior Research)
- Kobe Ledet – MS **2012** (Thesis Chair and Summer Fellow Res. Adv. at NSWC-CD)
- Andrada Mandru – MS **2010** (Thesis Chair)
- Jared LeBlanc – MS **2009** (Thesis Chair and Summer Fellow Res. Adv. at NSWC-CD)
- Rick Montgomery – BS **2007** (UG Senior Research)
- Katherine Zaunbrecher – Grad. Research for one year in **2007** – moved to PhD program
- Committee member for numerous candidates to the MS degree in Physics, UL-Lafayette

RESEARCH ADVISER for non UL-Lafayette students (summer research at NSWC-CD):

- Catherine Chan – **2017**, BS - Catholic University
- Sydney Jupitz – **2014**, BS - St. Mary's College of Maryland
- Paul Lambert – **2011**, PhD - John Hopkins University
- Abbigale Boyle – **2009**, BS - University of Maryland
- Holly Schurter – **2009**, MS - University of Maryland

DEVELOPMENT and TRAINING:

- **2017**, February 2017, Joint Graduate Education and Bridge Program Conference, by the American Institute of Physics (AIP), College Park, MD
- **2011**, June 27-30, Workshop for New Physics and Astronomy Faculty, by the American Institute of Physics (AIP) and the American Association of Physics Teachers (AAPT), College Park, MD
- Magna Publications Monday Morning Mentor, through UL-Lafayette Academic Affairs subscription

EDUCATIONAL GRANTS (at UL-Lafayette):

- **2018** Graduate School doctoral recruitment funds, \$1,600
- **2017, 2018** Graduate School minority recruitment grants, \$1,000
- **2015** STEP grant, amount \$7,760
- **2013** Instructional Improvement grant (IIG), amount \$840
- **2013** STEP grant, amount \$23,900

ADVISER and COORDINATOR (at UL-Lafayette):

- **2017–present:** Graduate Director, PhD Program, Earth and Energy Sciences
- **2013–present:** Graduate Adviser and Coordinator, MS Program, Physics Department
- **2007–2013:** Faculty Adviser – The Society of Physics Students and $\Sigma\Pi\Sigma$, the Physics Honor Society

SERVICE (at UL-Lafayette):

- **2018** Professorship Review Committees
- **2017–2019** Tenure and Mid-Tenure Review Committees, Physics Department and School of Geosciences
- **2017** Commencement Committee, College of Sciences
- **2016–2018** Committee for Gen Ed Assessment, College of Sciences
- **2016** Educational Grants Reviewer
- **2014** Ad-hoc subcommittee on raises, Faculty Senate
- **2013–2019** Member of the Faculty Senate
- **2013** QSN, College of Sciences
- **2013–2016** Peer Review Committee, College of Sciences
- **2012–2015** Minors Committee, College of Sciences

- **2009–2016** Graduate Appeals Committee

SERVICE (through national professional affiliation):

- **2018** Adopt-a-Physicist, American Institute of Physics
- **2017** Organizing Committee, 174th Meeting of the Acoustical Society of America
- **2017** Special Technical Session Organizer and Chair, 174th Meeting of the Acoustical Society of America, “Sound used as an investigative tool for industrial solutions”

REVIEWER (research journals and funding agencies):

- AIP Advances • Europhysics Letters • IEEE Transactions on Magnetics • IEEE Access • Physica B
- Journal of Applied Physics • Journal of Alloys and Compounds • Journal of Materials Science
- Journal of the Acoustical Society of America • Journal of Magnetism and Magnetic Materials
- Nature • Materials and Design • Wave Motion
- National Science Foundation (regular proposals and Graduate Fellowships Review Panel)

AFFILIATIONS:

The American Physical Society, The Acoustical Society of America, Sigma Xi, The Scientific Research Society, The Institute for Materials Research and Innovation (UL-Lafayette)

PATENTS:

“Method for determining the Degree of Sensitization using an Ultrasonic Sensor” – application to the United States Patents Office (USPO) submitted September 2015

FUNDING:

- “Ultrasonic-based characterization and model validation of 3D-printed metals,” NSF EPSCoR-CIMM Seed, \$10,000 for 01/2018-12/2018 (PI-100%)
- “Recruitment of Superior Graduate Students in Physics,” \$44,000 for 08/2018-05/2020 (PI-100%)
- “Failure prevention for sensitized structural alloys used in coastal transportation,” from the LA Department of Transportation, \$30,000 for 07/2016-06/2017 (PI-100%)
- ONR Summer Faculty Research Fellowship, \$120,000 for 10 summer weeks for 2012-15, 2017-2018 (PI-100%)
- **Before 2012:** over \$250,000 in research funding (PI-100%)

PUBLICATIONS:

Citations for all peer-reviewed publications: **821** (32 are self-citations)
(most cited – **324** citations, 2nd most cited – **148** citations, 3rd most cited – **71** citations)

Book chapters (peer-reviewed):

► “Magnetoelasticity of bcc Fe-Ga Alloys”, by G. Petculescu, R. Q. Wu and R. McQueeney, in *Handbook of Magnetic Materials*, Vol. 20 edited by K. H. J. Buschow, North Holland, pp.123-226 (2012)
HMM is “the most comprehensive work to date on the subject of ferromagnetism” according to Physics Today; the first volume appeared in 1980.

Published (peer-reviewed only):

- C. U. Chukwunonye, N. J. Jones, G. Petculescu, “Sensitization in Aluminum Alloys: Effect on Acoustic Parameters,” *Corrosion Journal* **74** (11), 1237 (2018)
- N. J. Jones, J. H. Yoo, R. T. Ott, P. K. Lambert, G. Petculescu, D. Schlagel, T. A. Lograsso “Magnetostrictive Performance of Additively Manufactured CoFe-based Rods using the LENS System”, *AIP Advances* **8**, 056403 (2017)
- N. J. Jones, G. Petculescu, M. Wun-Fogle, J. B. Restorff, A. E. Clark, K. B. Hathaway, D. Schlagel, and T. A. Lograsso, “Rhombohedral magnetostriction in dilute iron (Co) alloys,” *J. Appl. Phys.* **117**, 17A913 (2015)

- T. A. Lograsso, N. J. Jones, D. L. Schlagel, G. Petculescu, M. Wun-Fogle, J. B. Restorff, A. E. Clark, K. B. Hathaway, "Effects of Zn additions to highly magnetoelastic FeGa alloys," J. Appl. Phys. **117**, 17E701 (2015)
- J.B Restorff, M. Wun-Fogle, K.B. Hathaway, A.E. Clark, T. A. Lograsso, and G. Petculescu, "Tetragonal Magnetostriction and Magnetoelastic Coupling in Fe-Al, Fe-Ga, Fe-Ge, Fe-Si, Fe-Ga-Al, and Fe-Ga-Ge Alloys," J. Appl. Phys. **111**, 023905 (2012)
- G. Petculescu, P. K. Lambert, A. E. Clark, K. B. Hathaway, Q. Xing, T. A. Lograsso, J. B. Restorff, and M. Wun-Fogle, "Temperature dependence of magnetoelastic properties of Fe_{100-x}Si_x (5<x<20)," J. Appl. Phys. **111**, 07A921 (2012)
- G. Petculescu, K. L. Ledet, M. Huang, T. A. Lograsso, Y. N. Zhang, R. Q. Wu, M. Wun-Fogle, J. B. Restorff, A. E. Clark, and K. B. Hathaway, "Magnetostriction, elasticity, and D03 phase stability in Fe-Ga and Fe-Ga-Ge alloys," J. Appl. Phys. **109**, 07A904 (2011)
- G. Petculescu, A. O. Mandru, W. Yuhasz, T. Lograsso, M. Wun-Fogle, J. B. Restorff, A. E. Clark, K. Hathaway, "The effect of partial substitution of Ge for Ga on the elastic and magnetoelastic properties of Fe-Ga alloys," J. Appl. Phys. **107**, 09A926 (2010)
- M. Huang, A. O. Mandru, G. Petculescu, A. E. Clark, M. Wun-Fogle and T. A. Lograsso, "Magnetostrictive and elastic properties of Fe_{100-x}Mo_x (2 < x < 12) single crystals," J. Appl. Phys. **107**, 09A920 (2010)
- G. Petculescu, J. B. LeBlanc, M. Wun-Fogle, J. B. Restorff, W. C. Burton, J. X. Cao, R. Q. Wu, W. M. Yuhasz, T. A. Lograsso, A. E. Clark, "Magnetoelasticity of Fe_{100-x}Ge_x (5<x<18) single crystals from 81 K to 300 K," IEEE Trans. Magn. **45**, 4149 (2009)
- G. Petculescu, J. B. LeBlanc, M. Wun-Fogle, J. Restorff, D. Wu, T. Lograsso, A. Clark, "Magnetoelastic coupling in Fe_{100-x}Ge_x single crystals with 4<x<18," J. Appl. Phys. **105**, 07A932 (2009)
- A. E. Clark, J.-H. Yoo, J. R. Cullen, M. Wun-Fogle, G. Petculescu, and A. Flatau, "Stress Dependent Magnetostriction in Highly Magnetostrictive Fe_{100-x}Ga_x, 20<x<30," J. Appl. Phys. **105**, 07A913 (2009)
- G. Petculescu, S. Krishnaswamy, and J. D. Achenbach, "Group delay measurements using modally selective Lamb wave transducers for detection and sizing of delaminations in composites," Smart Mater. Struct. **17**, 015007 (2008)
- G. Petculescu and J. D. Achenbach, "Schedule Based NDT and Structural Health Monitoring of safety Critical Composite Structures," Materials Evaluation **65**, 731 (2007) – invited
- G. Petculescu, K. B. Hathaway, T. A. Lograsso, M. Wun-Fogle, A. E. Clark, "Magnetic field dependence of Galfenol elastic properties," J. Appl. Phys. **97**, 10M315 (2005)
- A. E. Clark, M. Wun-Fogle, J. B. Restorff, T. A. Lograsso, G. Petculescu, "Magnetostriction and elasticity of bcc Fe_{100-x}Bex alloys," J. Appl. Phys. **95**, 6942 (2004)
- V. Ponnambalam, S. J. Ponn, G. J. Shiflet, V. M. Keppens, R. A. Taylor, G. Petculescu, "Synthesis of iron-based bulk metallic glasses as nonferromagnetic amorphous steel alloys," Appl. Phys. Lett. **83**, 1131 (2003)
- A. E. Clark, K. B. Hathaway, M. Wun-Fogle, J. B. Restorff, T. A. Lograsso, V. M. Keppens, G. Petculescu, R. A. Taylor, "Extraordinary magnetoelasticity and lattice softening in bcc Fe-Ga alloys," J. Appl. Phys. **93**, 8621 (2003)

- G. Petculescu, L. A. Wilen, “Traveling-wave amplification in a non-toroidal geometry,” ARLO (Acoustics Research Letters Online) **3**, 71-76 (2002)
- G. Petculescu, L. A. Wilen, “High-amplitude thermoacoustic effects in a single pore,” J. Acoust. Soc. Am. **109**, 942-948 (2001)
- G. Petculescu, L. A. Wilen, “Thermoacoustics in a single pore with an applied temperature gradient,” J. Acoust. Soc. Am. **106**, 688-694 (1999)
- G. Musa, A. Popescu, G. Leu (Petculescu), “The pumping speed of a Thermionic Vacuum Arc (TVA) titanium pump,” Romanian Reports in Physics **48**, 657-662 (1996)

SELECTED PRESENTATIONS

- “Acoustics: a powerful tool for materials exploration,” Timbuktu Academy seminar, Southern University Baton Rouge, LA, Oct. 2018
- “Nontraditional uses of resonant ultrasound spectroscopy (RUS),” Summer Faculty Seminar Series, Naval Surface Warfare Center, West Bethesda, MD, Aug. 2018
- “Acoustic Monitoring of Aluminum-Alloy Sensitization,” 174th Meeting of the Acoustical Society of America, New Orleans, LA, Dec. 2017
- “Acoustics: a powerful tool for materials exploration,” Sciences Interdisciplinary Monthly Meeting Series, UL-Lafayette, Nov. 2017
- “Sensitization in aluminum alloys and ultrasonic parameters,” Summer Faculty Seminar Series, Naval Surface Warfare Center, West Bethesda, MD, Aug. 2017
- “Acoustics: a powerful tool for materials exploration,” LA-Tech University Physics Seminar, Oct. 2016
- “Sensitization of Aluminum Alloys - Ultrasound as a Possible Characterization Tool,” Summer Faculty Seminar Series, Naval Surface Warfare Center, West Bethesda, MD, July 2015
- “Ultrasonics: a solution to the sensitization problem,” Naval Future Force S&T EXPO, Feb. 2015
- “Elastic Interactions in Ferromagnetic Fe-based Alloys,” Summer Faculty Seminar Series, Naval Surface Warfare Center, West Bethesda, MD, July 2014
- “Response of ultrasound to aluminum alloys sensitization,” IEEE International Ultrasonics Symposium, New York, NY, Sept. 2014
- “Tetragonal Magnetostriction and Magnetoelastic Coupling in Fe-Al, Fe-Ga, and Fe-Ga-Al Alloys,” International Workshop on Acoustic Transduction Materials and Devices, State College, PA, May 2013
- “Elastic Interactions in Ferromagnetic Fe-based Alloys,” University of New Orleans Physics Department Seminar, Feb. 2012
- “Temperature dependence of magnetoelastic properties of $\text{Fe}_{100-x}\text{Si}_x$ ($5 < x < 20$),” 56th MMM Conference, Scottsdale, AZ, Oct. 2011
- “Resonant Ultrasound Spectroscopy and its role in understanding magnetoelasticity in Fe-based alloys,” George Mason University Physics Department Seminar, Jan. 2010
- “The effect of partial substitution of Ge for Ga on the elastic and magnetoelastic properties of Fe-Ga alloys,” 11th Joint MMM–Intermag Conference, Washington, DC, Jan. 2010
- “Iron-galium (Galfenol) transduction alloys: magnetic and mechanical properties,” 158th Meeting of the Acoustical Society of America, San Antonio, TX, Oct. 2009
- “Magnetoelasticity of $\text{Fe}_{100-x}\text{Ge}_x$ ($5 < x < 18$) single crystals from 81 K to 300 K,” IEEE International Magnetism Conference, Sacramento CA, May 2009
- “Magnetoelastic coupling in $\text{Fe}_{100-x}\text{Ge}_x$ single crystals with $4 < x < 18$,” 53rd MMM, Austin, TX, Nov. 2008
- “Large elastic softening in highly magnetostrictive Fe-based alloys,” 156th Meeting of the Acoustical Society of America, Miami, FL, Nov. 2008
- “Ultrasonic probes for the solid matter,” Naval Surface Warfare Center, West Bethesda MD, Aug. 2008
- “Resonant Ultrasound Spectroscopy and its applications,” Northwestern University Physics Department Theory Group seminar, Evanston, IL, Jan. 2005
- “Magnetoelastic coupling in Fe-Ga alloys,” 147th Meeting of the Acoustical Society of America, New York, NY, May 2004