



# **Ray P. Authement**

## **College of Sciences**

### **Department of Physics**



**Report on Professional Activities 2010 - 2015**

**Natalia A. Sidorovskaia, Department Head**

## Summary

The Department of Physics was established in 1935. Our mission is *“the advancement of Physics through excellence in research and the extension of scientific heritage through education.”* Over the years the department has created and nurtured a unique blend of applied and fundamental research to improve our understanding of the world around us and to respond to the needs of our community. Our research efforts are primarily in the areas of acoustics, computational physics, cosmology, Earth and planetary sciences, environmental physics, ion beam physics, geophysics, and materials science (physics.louisiana.edu). The department consists of six full-time research-oriented faculty, one instructor, four emeritus professors, and about 30 undergraduate and graduate students. We offer both Bachelor’s of Science (BS) and Master’s of Science (MS) degrees in Physics. The department has partnered with the School of Geosciences to build an interdisciplinary doctoral program which will focus on research in energy, the environment, and the physics of the earth.

This booklet summarizes the professional accomplishments of the research-active physics faculty from 2010 to 2015. Since 2010, the physics faculty have served as Principle or Co-Principle Investigators on 43 research grants totaling \$9,494,270 which is on average \$226,054 per year per faculty member. Since 2010, we have published 90 peer-reviewed journal articles (2.14 per faculty per year), eight book chapters, and 20 conference proceedings papers. The expertise of the physics faculty is recognized by invitations to deliver 24 plenary and invited international conference talks and to serve as referees of 35 scientific journals, including Science and Nature. The faculty also authored and co-authored 20 conference presentations and organized 8 special sessions and meetings. Our faculty pride themselves in educating future scientists and teachers: we served as chairs and co-chairs on 20 MS Theses and Doctoral dissertations committees.

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## 1. REFERRED JOURNAL PAPERS (PUBLISHED)

1. **J.B. Dent**, L.M. Krauss, J.L. Newstead, and S. Sabharwal, "A General Analysis of Direct Dark Matter Detection: From Microphysics to Observational Signatures", Physical Review D 92 (2015) 063515, arXiv:1505.03117.
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## 2. REFERRED JOURNAL PAPERS (ACCEPTED)

None.

## 3. BOOK CHAPTERS

1. Ross S. Fontenot, Kamala N. Bhat, **W.A. Hollerman**, and Mohan D Aggarwal, Highly Triboluminescent Europium Dibenzoylmethide Triethylammonium, Chapter 3, Europium: Synthesis, Characteristics and Potential Applications, Edited by Mohamed Said Attia Moustafa, Nova Publishers, 85-160, 2013.
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6. **Sidorovskaia, N.A.**, Ackleh, A.S., Ma, B., Tiemann, C.O, Ioup, J.W., and Ioup, G.E. (2016). “Passive acoustic monitoring of environmental impact of oil exploration in the Gulf of Mexico,” in book: “Effects of Noise on Aquatic Life II,” Popper, Arthur, Hawkins, Anthony (Eds.), Vol. 875 of the series Advances in Experimental Medicine and Biology, 1007-1014.
7. Ioup, G.E., **Sidorovskaia, N.A.**, et al. “Environmental Acoustic Recording System (EARS) in the Gulf of Mexico,” In book “Listening in the Ocean: new discoveries and insights on marine life from autonomous passive acoustic recorders,” Whitlow Au (Ed.), Springer (submitted to the editor, under review)
8. Donald Vasco, Thomas Daley, **Rui Zhang**, Caprock Integrity in Geological Caprock Storage, AGU Monography, Section 3.1 (in press).

#### 4. CONFERENCE PROCEEDING PAPERS

1. **W.A. Hollerman**, R.S. Fontenot, K.N. Bhat, M.D. Aggarwal, C.J. Guidry, and K.M. Nguyen, Review of Triboluminescence Impact Research at Projectile Speeds of 1 m/s to 6 km/s, *Procedia Engineering*, 58, 392-400 (2013).
2. **W.A. Hollerman**, R.S. Fontenot, B.M. Broussard, S.M. Goedeke, and C.J. Guidry, Developing Impact Marking Projectiles Using Triboluminescent Materials, Abstract Published in the Bulletin of the American Physical Society, 17th APS Topical Conference on Shock Compression of Condensed Matter (Chicago, IL), <http://meetings.aps.org/link/BAPS.2011.SHOCK.Y4.2> (2011).
3. **J.R. Meriwether et al.** “Geomorphic and Ecological Effects of Hurricanes Katrina and Rita on Coastal Louisiana Marsh Communities” One of several co-authors, USGS Report, 2010, 185 pages.
4. L Jenkins, L Fourel, S Goes, **G Morra**, Arc Evolution in Response to the Subduction of Buoyant Features, 2015 EGU General Assembly Conference Abstracts 17, 10984
5. B Fischer, **G Morra**, Towards Modeling Resonating Bubbly Flow in Magmatic Conduit, 2015 GSA Southeastern Section Meeting 47 (1), ISSN 0016-7592
6. **Gabriele Morra**, David A Yuen, Joao F Justo, Renata Wentzcovitch., Upwelling through the iron spin transition in the lower mantle and a volatile rich upper mantle transition zone, presented at the Central Asian Tectonics And Western Pacific Geodynamics International Conference in Wuhan, Hubei, China, June 6, 2015  
[http://logs.whigg.ac.cn/catwpg/lib/exe/fetch.php?media=meeting\\_schedule.pdf](http://logs.whigg.ac.cn/catwpg/lib/exe/fetch.php?media=meeting_schedule.pdf)
7. **Gabriele Morra**, Fast Numerical Methods for Modeling Gas-Magma Interaction, department seminar at the Department of Earth Sciences, University of Minnesota, Minneapolis, USA.  
<https://www.esci.umn.edu/Spring-2015-Seminar-Series>, April 2, 2015
8. **Gabriele Morra** and Natalia Sidorovskaia, Acoustic Detection And Numerical Models Of Landslide Induced Tsunamis In The Gulf Of Mexico, presented at the GSA South East, - 64th Annual Meeting, Paper No. 37-8, March 20, 2015, <https://gsa.confex.com/gsa/2015SE/webprogram/Paper253914.html>
9. **G. Morra**, L. E. Quevedo, D. A. Yuen, P. Chatelain, 2011, Ascent of Bubbles in Magma Conduits Using Boundary Elements and Particle, in *Procedia Computer Science*, V 4, P 1554–1562, doi: 10.1016/j.procs.2011.04.168
10. L. Quevedo, **G. Morra**, R. D. Mueller, 2010, Parallel Fast Multipole Boundary Element Method for Crustal Dynamics, *Proceeding 9th World Congress and 4th Asian Pacific Congress on Computational Mechanics*, doi: [iopscience.iop.org/1757-899X/10/1/012012](https://doi.org/10.1016/j.procs.2011.04.168)
11. **A. Petculescu**, “A physical model for predicting the sound speed and attenuation coefficient in Titan’s atmosphere based on Cassini-Huygens data,” *Proceedings of Meetings on Acoustics, ICA-ASA 2013*
12. T. G. Leighton and **A. Petculescu**, “Extraterrestrial music,” *Proceedings of the 1st EAA Congress on Sound and Vibration, European Acoustics Association and Slovenian Acoustical Society (EuroRegio 2010) 2010*
13. **Sidorovskaia, N.**, Ames, A., Fuselier, J., Greenhow, D., Griffin, S., Heath, B., Lingsch, B., Marks, K., Ninke, T, Pierce, S., Pierpoint, C., Richter, C., Royston, J., Rutter, D., Scala, L., and Seward, G. (2015). *Proc. LADC-GEMM 2015 Gulf of Mexico Experiment*. Lafayette, LA (LADC-GEMM), 50 p.

14. **Sidorovskaia, N.**, Griffin, S., Kusel, E., and Richter, C. (2015). Proc. LADC-GEMM 2015 Gulf of Mexico Experiment. Part II: Recovery Cruise. Lafayette, LA (LADC-GEMM), 24 p.
15. Malekhanov, A.I., **Sidorovskaia, N.A.**, Khil'ko, A.I., Borodina, E.L., Smirnov, I.P. (2013) "Formation of stable space-time structures at propagation of broadband pulses in oceanic waveguides and their destruction at randomly distributed inhomogenities," Proceedings of the XIV L.M. Brekhovskikh's conference , Москва, ГЕОС 2013 г., pp. 384-387 [In Russian with summary translated in English]
16. Сидоровская, Н.А., Ioup, G.E., Ioup, J.W., Tashmukhambetov, A.M., Ekimov, A.E. (2011). "Использование пассивных акустических методов для изучения влияния индустриальной деятельности человека на морскую мегафауну ", [ **N.A. Sidorovskaia**, G.E. Ioup, J.W. Ioup, A.M. Tashmukhambetov, A.E. Ekimov, " Using passive acoustic methods to study anthropogenic noise impact on oceanic megafauna," ] In "Ocean acoustics", Proceedings of the XIII th L.M. Brekhovskikh's conference , Москва, ГЕОС 2011 г., pp. 270-276 [In Russian with summary translated in English]
17. Andrea Borgia, Curtis M. Oldenburg, **Rui Zhang** and T. S. Ramakrishnan, TOUGH Symposium 2015, Lawrence Berkeley National Laboratory.
18. **Rui Zhang**, Bo Zhang, 2015, Seismic reflectivity attributes, SEG 835nd Annual meeting Houston.
19. **Rui Zhang**, Donald Wyman Vasco, Thomas M. Daley and William Harbert, 2015, Characterization of a fracture zone using seismic attributes at the In Salah CO2 storage project, SEG 835nd Annual meeting Houston.
20. **Zhang, R.**, Thomas Daley, and Donald Vasco, 2015, Study of seismic diffraction wave caused by a fracture zone at In Salah carbon dioxide storage project, Engineering Mechanism Institute Conference 2015 Stanford University.

## 5. PLENARY AND KEYNOTE PRESENTATIONS

### **James B. Dent**

“New particle searches confronting the first LHC Run-2 data”, held at the IPMU in Kashiwanoha Japan in September 2015

### **Gabriele Morra**

Gabriele Morra, David A Yuen, Sang Mook Lee, Computational Methods for Volcanology: application to Central Asian Volcanism, invited 1 hour talk at the Institute of Geodesy and Geophysics. Chinese Academy of Sciences, Wuhan, Hubei, China, June 11, 2015

"Subduction, megathrusts and underwater landslides: What the 2011 Japanese tsunami has taught us about tsunami hazard." - South Western Louisiana Geophysical Society, 2014

## 6. INVITED CONFERENCE / WORKSHOP TALKS

### James B. Dent

Fermilab meeting on Dark Matter at a Future 100TeV Collider, December 2015 at Fermilab in Batavia, Illinois

Coherent Neutrino Scattering Workshop held at Texas A&M University in November 2015

Mitchell Institute's Dark Matter Workshop held at Texas A&M University in May of 2015

Aspects of Inflation Workshop, Texas A&M University, April 2011

### William A. Hollerman

Triboluminescent Materials: Uses in Smart Sensors and Technology, 8th Energy, Materials, and Nanotechnology (EMN) Meeting, Orlando, FL, November 22, 2014.

Triboluminescence and its Properties, NASA Marshall Space Flight Center Technology Transfer Office, Huntsville, AL, August 16, 2012.

Inexpensive Student-Based Payload Projects, NASA Academy of Aerospace Quality (AAQ) Mini-Workshop, Port Canaveral, Florida, March 27, 2012.

Overview of the Student-Related Payload Projects at UL Lafayette, Next Generation Suborbital Researchers Conference, University of Central Florida, Orlando, FL, March 2, 2011.

Overview of the Space-Related Research Projects at UL Lafayette, Baton Rouge Astronomical Society, Baton Rouge, LA, April 12, 2010.

### John J. Matese

"Searching the Catalogue of Cometary Orbits for Evidence of an Impulsive Component of Oort Cloud Flux". Lille Observatory Workshop, "Dynamics and Formation of the Oort Cloud"; 27-30 September (2011); Lille, France

### Gabriele Morra

University of Lausanne - special workshop for the 50 years of Yuri Podlatchikov, 2014

Organization of the Tectonic Plates in the past 200 Myrs. American Geophysical Union Fall Meeting, San Francisco, December 2013

Applications of the Multipole Boundary Element Method in Geodynamics, Mathematical Methods in Geosciences, Padua, June 2013

Slabs and plumes crossing a broad density/ viscosity discontinuity in the mid lower mantle, American Geophysical Union Fall Meeting, San Francisco, December 2010

## Andi Petculescu

“Assessing the detectability of thunder from potential cloud-to-ground lightning on Titan: a model based on Cassini-Huygens measurements,” 3rd Workshop on Titan’s Past, Present and Future. Johns Hopkins University Applied Physics Laboratory, Laurel, MD, 8-10 April 2014.

Molecular acoustics: theory and applications, Universite de Montreal, Canada, June 2013.  
Molecular acoustics: modeling sound propagation in polyatomic gases, University of New Orleans, February 2012.

## Natalia Sidorovskaia

**Natalia Sidorovskaia**, Christopher O. Tiemann, George E. Ioup, and Juliette W. Ioup, "Passive acoustic monitoring to assess marine mammal population trends in vicinity of the Deepwater Horizon oil spill," *J. Acoust. Soc. Am.* 128(4) Pt.2, 160<sup>th</sup> ASA Meeting/7<sup>th</sup> Iberioamerican Congress of Acoustics, 17 th Mexican Congress on Acoustics, Cancun, Mexico, 15-19 November 2010, p. 2384 (2010)

**Sidorovskaia, N.**, P. Schexnayder, G. E. Ioup, J. W. Ioup, C. O. Tiemann, A. Ekimov, J. Sabatier (2010). “Contextual rhythmic analysis of beaked whale clicks for passive acoustic identification,” *J. Acoust. Soc. Am.*, **127** (3) Pt. 2, 159<sup>th</sup> ASA Meeting/NOISE-CON, Baltimore, Maryland, 19-23 April, 2010, p. 2004

Ioup, J.W., George E. Ioup, Lisa A. Pflug, **Natalia A. Sidorovskaia**, Philip Schexnayder, Christopher O. Tiemann, and Alan Bernstein (2010). “Acoustic Identification of individual beaked whales using self-organizing maps for automated classification of clicks in Littoral Acoustic Demonstartioon Center (LADC) data,” *J. Acoust. Soc. Am.*, **127** (3) Pt. 2, 159<sup>th</sup> ASA Meeting/NOISE-CON, Baltimore, Maryland, 19-23 April, 2010, p. 2004

Ioup, J.W., George E. Ioup, Lisa A. Pflug, **Natalia A. Sidorovskaia**, Christopher O. Tiemann, and Charles Thompson (2010). “Clustering classification methods for acoustic applications including the analysis of clicking whale data,” *J. Acoust. Soc. Am.*, **127** (3) Pt. 2, 159<sup>th</sup> ASA Meeting/NOISE-CON, Baltimore, Maryland, 19-23 April, 2010, p. 2042

Ioup, G. E., J. W. Ioup, L. A. Pflug, C. O. Tiemann, **N. A. Sidorovskaia** (2010). Using click change detection to modify cluster analysis for acoustically identifying individual sperm whales with changing aspect,” *J. Acoust. Soc. Am.*, **127** (3) Pt. 2, 159<sup>th</sup> ASA Meeting/NOISE-CON, Baltimore, Maryland, 19-23 April, 2010, p. 2004



## 7. COLLOQUIA AND SEMINAR TALKS

### James B. Dent

Invited seminar speaker for the Fermilab VHEPP meeting, October 2015 (talk done by phone)

Invited seminar speaker at LSU in April 2015

Seminar speaker at the University of Louisiana at Lafayette, November 2015

Invited Seminar on Inflation given at the University of New Orleans, April 2014

Invited Seminar on the current status of dark matter given at Louisiana Tech University, November 2014

Public talk at the SMART Festival, Lafayette, LA, October 2014

Invited Seminar, Arizona State University, November 2013

Public Lecture, SMART Festival, Lafayette, LA, October 2013

Invited Talk, LSU-S, October 2013

Invited Seminar, Vanderbilt University, April 2013

Invited Colloquium, University of Louisiana-Lafayette, Feb 2012

Invited Seminar, University of New Mexico, March 2011

Invited Seminar, University of Melbourne, March 2011

Invited Seminar, Texas A&M University, November 2010

### William A. Hollerman

Potential of Using Triboluminescence to Detect Damage or Impacts in Spacecraft, 61st International Instrumentation Symposium, Huntsville, AL, May 13, 2015.

A Research Review of Highly Triboluminescent Europium Tetrakis Dibenzoylmethide Triethylammonium Phosphors, 61st International Instrumentation Symposium, Huntsville, AL, May 13, 2015.

Triboluminescent Materials: Uses in Smart Sensors and Technology, Department of Physics, Auburn University, Auburn, AL, November 20, 2015.

Using Luminescent Materials to Detect Space Radiation, UL Lafayette Physics Seminar, Lafayette, LA September 10, 2014.

Capabilities of the Louisiana Accelerator Center, Engineering Directorate, NASA Marshall Space Flight Center (MSFC), Huntsville, Alabama, April 3, 2013.

Effects of Ionizing Radiation on Materials, Lecture to students in a 600 Level Course in Materials Science/Applied Physics, Department of Physics, Alabama A&M University, February 12, 2013.

Beyond Glow Ammo: Behind the Scenes at a Student-Inspired Research and Development Program:

- Department of Chemistry and Physics, Southeastern Louisiana University, Hammond, LA, March 23, 2012.
- Department of Physics, University of New Orleans, New Orleans, LA, February 22, 2012.
- Department of Physics, University of Louisiana at Lafayette, Lafayette LA, February 11, 2011.

Recent Advances in Triboluminescence Research:

- Center for Integrated Nanotechnologies (CINT), Albuquerque, NM, September 3, 2010.
- Structures and Controls Branch, Air Force Research Laboratory, Wright-Patterson Air Force Base, OH, June 21, 2010.

Advances in Triboluminescence Research, NSF-RISE Workshop, Development and Study of Advanced Materials and Nanophotonics, Alabama A&M University, Normal, AL, July 9, 2010.

## **Gabriele Morra**

Invited department seminar at the University of Minnesota in Minneapolis, 2015

Gabriele Morra, David A Yuen, Sang Mook Lee, Computational Methods for Volcanology: application to Central Asian Volcanism, 20 minute seminar at the School of Geosciences, University of Wuhan, Hubei, China, June 10, 2015

"Fractal Plate Tectonics and Global Plate Reorganizations" - University of Texas at Dallas - Geosciences Dep - Department Seminar, 2014

"Subduction, megathrusts and underwater landslides: what the 2011 Japanese tsunami has taught us about tsunami hazards" - University of Texas at Dallas - Geosciences Dep - Lunch Seminar, 2014

"Plate tectonics, megaquakes and underwater landslides: what the 2011 Japanese earthquake taught us about tsunami hazard" - University of New Orleans - Physics Dep. - Department Seminar, 2014

Seminar talk at the Department of Physics, UL Lafayette, September 11, 2013

Seminar talk at the School of Earth and Environmental Sciences, Seoul National University, November, 2010

## **Andi Petculescu**

Molecular acoustics: theory and applications, Universite de Montreal, Canada, June 2013 (invited).

Molecular acoustics: modeling sound propagation in polyatomic gases, University of New Orleans, February 2012 (invited).

## **Gabriela Petculescu**

Presentation: “Ultrasonic probe for sensitization,” to ONR and NSWC-CD NDE branch, Carderock, MD, July 16th, 2015.

Seminar: “Sensitization of Aluminum Alloys - Ultrasound as a Possible Characterization Tool,” ONR Summer Faculty Program – Seminar Series, NSWC - CD, MD and sister NSWC centers (by broadcast), Carderock, MD, July 15th, 2015.

“Elastic Interactions in Ferromagnetic Fe-based Alloys,” ONR Summer Faculty Program – Seminar Series, NSWC at Carderock, MD and also broadcasted, July 8<sup>th</sup>, 2014;

“Elastic Interactions in Ferromagnetic Fe-based Alloys,” University of New Orleans, Physics Department Seminar, Feb 2012.

"Resonant Ultrasound Spectroscopy and its role in understanding magnetoelasticity in Fe-based alloys," George Mason University, Physics Department Seminar, Jan 2010.

## **Natalia Sidorovskaia**

Seminar, Institute of Applied Physics (Russia), November 2012

Seminar, Nizhny Novgorod State University (Russia), November 2012

Seminar, Physics Department, UL Lafayette November 2011

“Littoral Acoustic Demonstration Center – LADC: Assessing the long-term impact and recovery of marine mammal populations after the oil spill in the Gulf of Mexico,” Marine Mammal Commission, May 11, 2011 New Orleans

“Modeling Short Term Dynamics of Marine Mammal Populations Near the BP Oil Spill Site (Gulf of Mexico),” Poster, LSU, April 2011

## **Rui Zhang**

The University of Texas at Austin, 2015

## 8. CONTRIBUTED TALKS

### James B. Dent

PHENO 2010 Madison, WI, May 2010

### Gary A. Glass

“High energy heavy ion assisted wet etch of silicon”, Jack Manuel, Bibhudutta Rout, Gary A. Glass, 21st International Conference on the Application of Accelerators in Research and Industry (CAARI 2010), August 9-13, 2010, Forth Worth, TX.

“Fish gelatin thin film standards for biological applications of PIXE”, James W. Deaton, Jack Manuel, Gary A. Glass, 21st International Conference on the Application of Accelerators in Research and Industry (CAARI 2010), August 9-13, 2010, Forth Worth, TX.

“High energy heavy ion lithography”, Gary A. Glass, 3rd International Meeting on recent developments in the study of radiation effects in matter, 24-28 October, 2010, Gramado, Brazil.

### William A. Hollerman

Europium Tetrakis Dibenzoylmethide Triethylammonium: A Bright Functional, 8th Energy, Materials, and Nanotechnology (EMN) Meeting, Orlando, FL, November 24, 2014.

### John J. Matese

“Searching the WISE Preliminary Catalog for Massive Planets in the Oort Cloud”. Joint Session of the European Planetary Science Congress / Division of Planetary Science – American Astronomical Society; 02-07 October (2011); Nantes, France

### Andi Petculescu

Absorption and Dispersion in Venus' Lower and Middle Atmospheres, ASA Pittsburgh, June 2015.

A physical model for predicting the sound speed and attenuation coefficient in Titan's atmosphere based on Cassini-Huygens data, ICA-ASA 2013, Montreal, Canada, June 2013.

Modeling thunder propagation and detectability on Titan, 161<sup>st</sup> Meeting of the Acoustical Society of America, 31 Oct–4 Nov 2011 (Seattle, WA).

Gasdynamic modeling of strong shock wave generation from lightning in Titans troposphere, 161<sup>st</sup> Meeting of the Acoustical Society of America, 31 Oct–4 Nov 2011 (Seattle, WA).

The characteristics of thunder on Titan, 159<sup>th</sup> Meeting of the Acoustical Society of America, 19–23 April 2010 (Baltimore, MD).

Extraterrestrial music, 1<sup>st</sup> EAA-SAS Congress on Sound and Vibration (EuroRegio 2010), 15–18 September 2010 (Ljubljana, Slovenia)

Constraining the acoustic energy radiated from collisions of polypropylene balls, 159<sup>th</sup> Meeting of the Acoustical Society of America, 19-23 April 2010 (Baltimore, MD).

### **Gabriela Petculescu**

“Response of ultrasound to aluminum alloys sensitization,” IEEE International Ultrasonics Symposium, Chicago, IL Sept. 4<sup>th</sup>, 2014

2 contributed talks given by collaborators on common projects at 59<sup>th</sup> MMM conference, Honolulu, HI, Nov. 2014

“A search for new iron-based magnetostrictive materials,” International Workshop on Acoustic Transduction Materials and Devices, State College PA, May 2013.

“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 2012.

“Temperature dependence of magnetoelastic properties of  $\text{Fe}_{100-x}\text{Si}_x$  ( $5 < x < 20$ ),” 56<sup>th</sup> MMM Conference, Scottsdale AZ, October 2011.

“Magnetostriction, elasticity, and  $\text{D0}_3$  phase stability in Fe-Ga and Fe-Ga-Ge alloys,” 55<sup>th</sup> Magnetism and Magnetic Materials Conference, Atlanta GA, November 2010.

“Magnetostrictive and elastic properties of  $\text{Fe}_{100-x}\text{Mo}_x$  ( $2 < x < 12$ ) single crystals,” 11<sup>th</sup> Joint MMM–Intermag Conference, Washington DC, January 2010.

“The effect of partial substitution of Ge for Ga on the elastic and magnetoelastic properties of Fe-Ga alloys,” 11<sup>th</sup> Joint MMM–Intermag Conference, Washington, DC, January 2010.

### **Natalia Sidorovskaia**

**Sidorovskaia, N.A.**; Li, K.; Tiemann, C.O.; Ackleh, A.; Tang, T.; Ioup, G.E.; Ioup, J.W. OS13A-2024: Targeted Acoustic Data Processing for Ocean Ecological Studies, AGU Fall Meeting, San Francisco, Dec 14-18, 2015

**Sidorovskaia, N.A.**; Li, K.; Ackleh, A.; Tang, T.; Tiemann, C.O.; Ioup, J.W.; Ioup, G.E. Classification of beaked whale and dolphin clicks measured by environmental acoustic recording system buoys in the northern Gulf of Mexico Meeting of the Acoustical Society of America, Jacksonville, FL, Nov. 02-06, 2015

**Sidorovskaia, N.** Littoral Acoustic Demonstration Center - Gulf Ecological Monitoring and Modeling (LADC-GEMM): Consortium Introduction 2015 Oil Spill Science Conference, Houston, TX , Feb. 16-19, 2015

**Natalia Sidorovskaia**, Baoling Ma, Azmy S. Ackleh, Christopher O. Tiemann, Juliette W. Ioup and George E. Ioup (2014). "Acoustic Studies of the Effects of Environmental Stresses on Marine Mammals in Large Ocean Basins," presented as a poster (OS21C-1155) at the AGU meeting, 15-19 December 2014, San Fransisco, CA

Carl Richter, Lindsey Horton, Gary Acton, **Natalia Sidorovskaia**, Francisco Sierro, Chuang Xuan, Kenneth Verosub (2014). "Relative Geomagnetic Paleointensity, Environmental Magnetism, and Cyclicity of Contourites from the West Iberian Margin (IODP Site U1389)," presented as a poster (GP23B-3686) at the AGU meeting, 15-19 December 2014, San Fransisco, CA

**Natalia Sidorovskaia**, Azmy Ackleh, Baoling Ma, Christopher Tiemann, Juliette W Ioup, and George E Ioup, "Using an autonomous passive acoustic observational system to monitor the environmental impact of the Gulf of Mexico oil spill on deep-diving marine mammals," AGU Fall meeting, December 3-7 2012.

**Natalia Sidorovskaia**, Azmy Ackleh, Christopher Tiemann, Juliette Ioup, and George Ioup, "Comparison of the first-year response of beaked and sperm whale populations to the Northern Gulf oil spill based on passive acoustic monitoring," J. Acoust. Soc. Am. 132, 2009 (2012)

Arslan M. Tashmukhambetov, George E. Ioup, Juliette W. Ioup, **Natalia A. Sidorovskaia**, Joal J. Newcomb, James M. Stephens, Grayson H. Rayborn, and Phil Summerfield, "The measured 3-D primary acoustic field of a seismic airgun array," J. Acoust. Soc. Am. 132, 2056 (2012)

Arslan M. Tashmukhambetov, George E. Ioup, Juliette W. Ioup, **Natalia A. Sidorovskaia**, Joal J. Newcomb, James M. Stephens, Grayson H. Rayborn, and Phil Summerfield, "Experimental determination of the three-dimensional primary field of a seismic airgun array," J. Acoust. Soc. Am. 129 (4), pp. 2602 (2011). Program abstracts of the 161st meeting of the Acoustical Society of America

George E. Ioup, Juliette W. Ioup, Christopher O. Tiemann, and **Natalia A. Sidorovskaia**, "Complementary techniques for robust acoustic identification of individual sperm and beaked whales," J. Acoust. Soc. Am. 129 (4), pp. 2602-2602 (2011). Program abstracts of the 161st meeting of the Acoustical Society of America

**Natalia Sidorovskaia**, Azmy Ackleh, Nabendu Pal, Juliette W. Ioup, George E. Ioup, and Christopher O. Tiemann. "Using acoustic cue statistics in matrix population models to study short-term and long-term marine mammal population dynamics in the northern Gulf of Mexico," J. Acoust. Soc. Am. 129 (4), pp. 2372-2372 (2011). Program abstracts of the 161st meeting of the Acoustical Society of America

**Sidorovskaia, Natalia**; Ackleh, Azmy S.; Ma, Baoling; Tiemann, Christopher; Ioup, George E.; Ioup, Juliette W. "Long-term acoustic monitoring of marine mammal response to the 2010 oil spill in the Northern Gulf of Mexico," The Journal of the Acoustical Society of America, 130(4), p. 2537 (2011). Program abstracts of the 162nd meeting of the Acoustical Society of America.

**Natalia Sidorovskaia**, "Modeling of broadband acoustic energy evolution in dynamic ocean environments using high-performance computing resources," *J. Acoust. Soc. Am.* 128(4) Pt.2, 160<sup>th</sup> ASA Meeting/7<sup>th</sup> Iberioamerican Congress of Acoustics, 17<sup>th</sup> Mexican Congress on Acoustics, Cancun, Mexico, 15-19 November 2010, p. 2334 (2010)

**Natalia Sidorovskaia**, Christopher O. Tiemann, George E. Ioup, and Juliette W. Ioup, "Integrating techniques for identifying individual sperm whales acoustically," *J. Acoust. Soc. Am.* 128(4) Pt.2, 160<sup>th</sup> ASA Meeting/7<sup>th</sup> Iberioamerican Congress of Acoustics, 17<sup>th</sup> Mexican Congress on Acoustics, Cancun, Mexico, 15-19 November 2010, p. 2299 (2010)

Tashmukhambetov, Arslan M., George E. Ioup, Juliette W. Ioup, **Natalia A. Sidorovskaia**, Anca Niculescu, Joal J. Newcomb, James M. Stephens, Grayson H. Rayborn, and Phil Summerfield (2010). "The three-dimensional acoustic field of primary arrivals from a seismic airgun array," *J. Acoust. Soc. Am.*, 127 (3) Pt. 2, 159<sup>th</sup> ASA Meeting/NOISE-CON, Baltimore, Maryland, 19-23 April, 2010, p. 1787.

Azmy S. Ackleh, Nabendu Pal, **Natalia Sidorovskaia**, "Modeling Short Term Dynamics of Marine Mammal Populations Near the BP Oil Spill Site (Gulf of Mexico)," NSF Sponsored Oil Spill Conference in New Orleans, Oct 31 – Nov 2, 2010

## 9. JOURNAL REFEREES

### James B. Dent

Monthly Notices of the Royal Society (2013)  
Astroparticle Physics (2013)

### William A. Hollerman

Journal of Luminescence (2009-Present)  
IEEE Sensors Journal (2012-Present)  
Journal of Physics D: Applied Physics (2012-Present)  
IEEE Transactions on Nuclear Science (1998-Present)

### Gabriele Morra

Chief editor AGU Book, "Subduction Dynamics: From Mantle Flow to Mega Disasters"

- Geophysical Journal International (2 reviews)
- Physics of the Earth and Planetary Interiors
- Journal of Geodynamics

Geophysical Journal International  
Journal of Geophysical Research  
Physics of the Earth and Planetary Interiors  
Earth and Planetary Science Letters  
Acta Geotechnica  
Geoscience Frontiers  
Tectonophysics  
Annals of Geophysics  
Science

### Andi Petculescu

Journal of the Acoustical Society of America  
Icarus  
Planetary and Space Sciences  
IEEE Sensors

### Gabriela Petculescu

Elsevier, Physica B  
IEEE Transactions on Magnetics  
Journal of Applied Physics  
Journal of Alloys and Compounds, Elsevier  
Journal of the Acoustical Society of America  
Wave Motion



Europhysics Letters  
Journal of Materials Science  
Nature  
National Science Foundation

**Natalia Sidorovskaia**

Journal of Acoustical Society of America  
Canadian Acoustics Journal  
Physics Essays  
AIP  
McGraw-Hill, Addison Wesley

## 10. ORGANIZED SPECIAL SESSIONS AND CONFERENCES

### **James B. Dent**

Organizing Committee for the Primordial Magnetism Workshop held at ASU, April 2011

Organizing Committee for the New Directions in Cosmology Workshop held at ASU, January 2012

### **William A. Hollerman**

Meeting Organizer and Host, NASA Academy of Aerospace Quality (AAQ) Expert User Group, October 20, 2014.

Innovative Phosphor-Based Sensors for Extreme Environments, Tutorial, 9th Annual IEEE Conference on Sensors, Waikoloa, HI, November 1, 2010.

Developing Impact Marking Projectiles Using Triboluminescent Materials, 17<sup>th</sup> International Conference of the American Physical Society Topical Group on Shock Compression of Condensed Matter, Chicago, IL, July 1, 2011.

### **Gabriele Morra**

The geodynamics of plate tectonics, Session at the American Geophysical Union Fall Meeting, December 2012.

First international conference on geodynamics. Title of the conference "Slab Dynamics". Jeju Island, South Korea. August 2011. Main organizer and Chief editor of the following AGU Book.

### **Natalia Sidorovskaia**

Special Session of the Acoustical Society of America: "Acoustics and the Deepwater Horizon Oil Spill I", November 2010, Cancun

## 11. GRADUATE STUDENTS

### James B. Dent

#### **Chair of the Committee, Master of Science in Physics, UL Lafayette**

Chase Gaudet, December 2013  
Alex Sylvester, December 2015

### Gary A. Glass

#### **Chair of the Committee, Master of Science in Physics, UL Lafayette**

James Deaton, Summer 2010  
Jack Manuel, Fall 2011  
Dustin Phillips, Fall 2011  
Henry Luyombya, Summer 2011  
Boyko Perfanov, Fall 2011

### William A. Hollerman

#### **Chair of the Committee, Master of Science in Physics, UL Lafayette**

Ross S. Fontenot, Spring 2010  
Brandon T. Payne, Fall 2010  
Mark Roberts, Spring 2011  
Lika Kobakhidze, Fall 2012

#### **Member of the Ph.D. Committee**

Ross S. Fontenot, May 2013, Alabama A&M University  
Noah Bergeron, February 2014, Louisiana Tech University

### Andi Petculescu

#### **Chair of the Committee, Master of Science in Physics, UL Lafayette**

Joshua Riner, Spring 2011  
Akinjide Akintunde, Spring 2014

### Gabriela Petculescu

#### **Chair of the Committee, Master of Science in Physics, UL Lafayette**

Andra Mandru (thesis), Spring 2010  
Kobe Ledet, Fall 2012  
C. U. Chukwunonye, May 2014

**Natalia Sidorovskaia**

**Chair of the Committee, Master of Science in Physics, UL Lafayette**

Anca Niculescu, Spring 2010 (Non-Thesis option)  
Fatemeh Karbalaei Saleh, Spring 2014

## 12. EXTERNAL FUNDING

### James B. Dent

PFUND Grant, \$8050, 2013

Co-PI with Dr. Hollerman on a \$6000 LYRA award for undergraduate student John Miller, 2015

### Garry Glass

Novel Delivery Modes for Small Molecule Inhibitors of Medulloblastoma, Children's Brain Tumor Foundation, 2008-2010, \$150,000

MRI: Acquisition of Advanced Scanning Proton Microprobe, National Science Foundation, 2008-2010, \$127,120

Installation of Magnetic Quadruple Focusing System at The University of Massachusetts Lowell  
The University Of  
Massachusetts – Lowell, 2011 \$114,000

ARRA: MRI-R2: Development of Electrostatic High Energy Focused Ion Beam (HEFIB) Nanoprobe System, National Science Foundation, 2010-2013  
\$610,879

Installation of Magnetic Quadrupole Doublet Focusing System at Amethyst Research Corporation, Office of Naval Research, 2010-2011, \$206,000

### William A. Hollerman

Building a Robust Geiger Counter to Fly on the HASP Balloon, Louisiana Space Grant (LaSPACE) Consortium, \$52,150, 2009-2011, Principal Investigator.

Developing Prototype Hybrid Luminescent Ammunition (HLA), U.S. Army Armament Research, Development and Engineering Center (ARDEC), Picatinny Arsenal, New Jersey, \$630,000, 2009-2011, Principal Investigator.

Collecting High-Speed Camera Data From Microwave Induced Visible Electroluminescence, Links with Industry, Research Centers, and National Labs (LINK), Louisiana Board of Regents, \$4,000, Principal Investigator.

Feasibility of EuD4TEA-Based Sensors to Detect Space Radiation, Louisiana Space Grant (LaSPACE) Consortium, \$28,700, 2014-2015, Principal Investigator, Submitted, April 2014, Awarded August 2014.

Procurement of a First Generation EMCO LabKit Apparatus for, Louisiana Board of Regents Pilot Funding for New Research (PFUND), \$10,000, 2014-2015, Principal Investigator, Submitted April 2014, Awarded August 2014.

Feasibility of EuD<sub>4</sub>TEA-Based Sensors to Detect Space Radiation, Louisiana Space Grant (LaSPACE) Consortium, Additional Funds of \$6,500 for Total of \$35,200, 2014-2015, Principal Investigator.

Low Energy Nuclear Astrophysics Research For Student John Miller Using the 5SDH-2 Pelletron at the Louisiana Accelerator Center, Louisiana Space Grant (LaSPACE) Undergraduate Research Assistantship (LURA), \$6,000, 2015-2016, Principal Investigator.

### **John Meriwether**

Forest Hydrology and accretion modeling to evaluate the impacts of Hurricane Sandy , US Geological Survey, Co-PI, \$315,000, 2013-2016.

### **Gabriele Morra**

Planet-scale reorganizations of the plate–mantle system, Australian Research Council Discovery Grant, AUD 300,000 (\$262,747 USD), 2009-2012

A Fast Multipole Approach to Modeling Tsunami Waves, Board of Regents - pFund. \$10,000 (PI), 2014-2015

Computational Development of the Fast Multipole - Boundary Element Method for Modeling Three Dimensional Geodynamic Problems, Board of Regents - RCS. \$119,000 (PI), 2014-....

### **Andi Petculescu**

Interstitial Gas Effects on Granular Dynamics. The "Pure Granular" State (BoR: LEQSF (2007-10)-RD-A-37), \$131,638, 2007-2011

Computational Fluid Dynamics Simulation of Thunder on Titan (Louisiana Space Consortium LURA Award #51968), \$6,000, 2011-2012

Pilot Study: Modeling Thunder on Titan, as a Tool to Corroborate Titanian Lightning (Louisiana Space Consortium LURA Award #44305), \$6,000, 2011-2012

Understanding Infrasound Absorption in the Lower Thermosphere as a Step Toward Quantitative Infrasonic Aeronomy (BoR/NSF–EPSCOR: LEQSF (2013)-PFUND-339), \$10,000, 2013

Understanding Infrasound Absorption in the Lower Thermosphere as a Step Toward Quantitative Infrasonic Aeronomy (\$10,000, NSF–EPSCOR: LEQSF (2013)-PFUND-339): Jan 2014-Dec 2014

Infrasound Sensing on Mars Based on Deployable Dome Structures: a Feasibility Study Louisiana Space Consortium GSRA Award #101623, \$7,775, 2015

Pilot Study for a Distributed Acoustic Interface for Manned Space Habitats Louisiana Space Consortium GSRA Award #101623, \$33,700, awarded in 2015

## **Gabriela Petculescu**

RCS grant, LA Board of Regents Support Fund, amount: \$121,000, 2007-2011

ONR grant # N00014-10-1-0809, amount: \$10,000, 2010

NASA–LaSPACE award # NNX10AI40H, amount: \$20,000, 2010-2011

NSF-LINK award NSF(2013)-LINK-81, amount \$6,000, 2013

ONR Summer Fellowship, total amount \$102,000, (2008, 2009, 2010, 2011, 2012, 2013)

“Enhanced-Magnetostriction Materials and Iron Stability,” NSF(2013)-LINK-81, \$6,000, completed Sept. 2014.

SFRF – ONR, including \$20,000, laboratory space w/ instrumentation not available at ULL, samples, and physics student for 10 weeks, May-July 2014.

“Elastic interactions in solids: a tool for new materials development and improved structural safety,” NSF(2015)-LINK-99 \$6,000, funded April 2015

STEP grant for revitalization of Physics Lab. computers: \$7,760, funded Dec. 2015

Contract: SFRF–ONR, includes \$22,000, laboratory, and summer student, May-July 2015

## **Natalia Sidorovskaia**

“Development of the Ocean Acoustic propagation Model for the Louisiana Immersive Technologies Enterprise (LITE) environment”, Information Technology Initiative (ITI), UL Lafayette, \$49,164

“Modeling of Short-Term and Long-Term Marine Mammal Population Trends in the Vicinity of the Deepwater Horizon Oil Spill Using Passive Acoustic Monitoring Cues,” NSF RAPID, \$192,197, August 2010-December 2011 (granted to UL: Mathematics and Physics Depts.)

Source Characterization Study 2007 (Data Analysis/Modeling Component) Amnd. 2; OGP; \$34,016 to UL, August 2010-June, 2011

Travel grant from the Russian ministry of education, \$10,000 (2012-2013)

Travel Grant from the organizing committee of the International Conference on “The Effects of Noise on Aquatic Life,” Budapest, August 11-16, 2013, \$3,000 (2013)

Travel Grant from the American Petroleum Institution \$3,000 (2013)

Littoral Acoustic demonstration Center – Gulf Ecological Monitoring and Modeling (LADC-GEMM) Consortium ([www.ladcgemm.org](http://www.ladcgemm.org)), GOMRI, \$5,238,174, 2015-2017 (Consortium Director)

**Rui Zhang**

Department of Energy, Energy Efficiency & Renewable Energy, Integrated Enhanced Geothermal Systems (EGS) Research and Development: Push-pull well testing using CO<sub>2</sub> with active source geophysical monitoring, Control Number: 0842-1554. 2014, total funding \$750K, ULL subcontract \$54K.



### 13. AWARDS / HONORS

#### **James B. Dent**

KITP Scholar (Kavli Institute of Theoretical Physics at the University of California at Santa Barbara), 2015

Outstanding Advisor Award from the University of Louisiana at Lafayette, 2015

The Dr. and Mrs. Sammie W. Cospers Endowed Professorship, 2014-2017

Blavatnik Award Nominee for UL-Lafayette, 2014

Rising Star Award for the College of Sciences, 2014

Blavatnik Award Nominee for UL-Lafayette, 2013

#### **Gary A. Glass**

Dr. and Mrs. Sammie W. Cospers/BORSF Endowed Professor of Physics, 2008-2011

#### **William A. Hollerman**

Innovator Award, UL Lafayette Research Office, Completed research as part of the non-burning tracer patent, May 2013.

#### **Gabriele Morra**

Hensarling/Chapman Endowed Professorship in Geology from the School of Geosciences at UL Lafayette.

#### **Gabriela Petculescu**

National award: Office of Naval Research (ONR) Summer Fellowship (SFFP), May-July 2015

Innovator award – UL Lafayette for academic year 2013-2014

Office of Naval Research Summer Faculty Research Fellow, at Naval Surface Warfare Center, West Bethesda MD: 2008, 2009, 2010, 2011, 2012, 2013.

#### **Natalia Sidorovskaia**

Coca-Cola/BORSF Endowed Professorship, 2014-2017

Fellow of the Acoustical Society of America, 2013

## 14. OTHER PROFESSIONAL ACTIVITIES

### James B. Dent

TedX speaker at TedX Vermilionville, September 2015 in Lafayette, LA

Youtube link: <https://www.youtube.com/watch?v=pFAFepiieIA>

### MEMBERSHIPS

American Physical Society

American Association of Physics Teachers

### Gary A. Glass

Associate Editor for *Radiation Effects and Defects in Solids*, 2009-2010

### William A. Hollerman

#### PATENTS

**W.A. Hollerman**, N.P. Bergeron, and B.M. Broussard, *Hybrid-Luminescent Munition Projectiles*, U.S. Patent and Trademark Office (USPTO) Patent Number 8,402,896, March 26, 2013.

#### MEMBERSHIPS

American Institute of Aeronautics and Astronautics

IEEE Nuclear and Plasma Society

International Society for Optical Engineering (SPIE)

Sigma Pi Sigma, Physics Honor Society

### Gabriele Morra

#### MEMBERSHIPS

American Association of Physics Teachers

American Geophysical Union

European Geosciences Union

Summer school in Nancy, Ecole National Superior, July 2013,  
(<http://www.gocad.org/w4/index.php/newsmenu/sumer-course>)

## **Andi Petculescu**

### **MEMBERSHIPS**

Acoustical Society of America  
American Physical Society  
Audio Engineering Society

Guest Editor for the Special Issue “Acoustic and Related Waves in Extraterrestrial Environments,” of the Journal of the Acoustical Society of America (2015-present, invited)

Associate Editor for the Journal of the Acoustical Society of America (2014-present, invited).

Reviewer for the Journal of the Acoustical Society of America, IEEE Sensors, Sensors and Actuators--Chemical, Measurement Science and Technology, Planetary and Space Sciences.

Associate Editor for the Journal of the Acoustical Society of America  
Co-Editor for JASA’s first Special Issue “Acoustic and Related Waves in Extraterrestrial Environments”

## **Gabriela Petculescu**

### **MEMBERSHIPS**

Acoustical Society of America  
American Physical Society  
Sigma Xi, The Scientific Research Society

NSF Graduate Research Fellowship Program, Jan. 2015, National Panel Review for proposal review and selection.

Research program evaluation for promotion for an outside institution, 2015

Patent: System and Methods for Determining the Degree of Sensitization Using an Ultrasonic Sensor, filed Sept 2<sup>nd</sup>, 2014

Part of approved proposal to Oak Ridge National Lab CNMS, ID: CNMS2014-256. Project Title: “Investigation into the BCC Structure of Iron and its anomalies above 400 K.” This grant provides access to the User Nanoscience Research Program at the Center for Nanophase Materials Sciences (CNMS) for one week for our group.

## **Natalia Sidorovskaia**

### **MEMBERSHIPS**

Acoustical Society of America

American Geophysical Union  
Sigma Pi Sigma National Physics Honor Society

Active in the Technical Committees on Underwater Acoustics and Signal Processing;

Participated in organizing the 75<sup>th</sup> Anniversary meeting of Acoustical Society of America; -  
Chairing the session at the 75<sup>th</sup> Anniversary meeting of Acoustical Society of America;

Participated in four Technical Program Organizing Meetings for Signal Processing, Underwater acoustics, and Animal Bioacoustics Technical Committees.

## 15. OUTREACH

### **William A. Hollerman**

Speaking of Science (SoS):

- Rockets and Starships, Loranger Elementary School, Loranger, LA April 17, 2015.
- Rockets and Starships: Overview of Space Travel for the 21<sup>st</sup> Century, LSTA/LATM Joint Math and Science Conference, November 11, 2015.

### **Natalia Sidorovskaia**

“Whale's Stories From the Gulf,” November 10, 2015 presentation at Lake Castle Madisonville Private School