

# ANNUAL REPORT 2014











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# 2014: CENTER FOR ENERGY STUDIES

DAVID DISMUKES  
EXECUTIVE DIRECTOR  
[enrg.lsu.edu](http://enrg.lsu.edu)



## Dismukes Named Executive Director

This past year, the Center moved forward with implementing its executive succession plan by promoting David Dismukes, the long-time associate executive director, to the executive director's position. David replaces Allan Pulsipher, who has served as CES' executive director for the past decade. Allan will switch places with David and become the associate executive director, providing advice and counsel to David as he acclimates to his new administrative responsibilities.

The Center, as well as the LSU Administration, appreciates Allan's considerable efforts and achievements as executive director. During Allan's tenure, the Center completed its transition from one primarily leveraging the resources of other academic units on campus to one that conducted a large and impressive level of research in and of itself. Allan expanded the Center's in-house research faculty and oversaw a huge increase in the Center's productivity based upon a wide range of measures that include publications, media citations, presentations, and externally-funded research. Allan's leadership saw the growth of the Center's prestige and recognition both nationally and internationally. In addition to assisting with Center administration, Allan will focus on externally-funded research, mentoring the growing number of newer and younger faculty members being added to the Center, and continuing his important service-related work that includes his ongoing appointment as a member of the Secretary of Energy's prestigious National Petroleum Council.

Dismukes assumes the executive director's position after 20 years of service at LSU. David has risen through the ranks at the Center starting out as a new assistant professor and rising to the rank of full professor. He has served as the associate executive director for the past decade. David has led a number of the Center's research efforts on topics associated with many aspects of the energy industry. He has given more than 200 energy-related presentations to civic, professional, and trade groups. His opinions on energy industry trends and issues have been quoted in the *Wall Street Journal*, *Washington Post*, *New York Times*, *Los Angeles Times*, and *USA Today*, as well regional and local newspapers and trade newsletters.

Dismukes also has a joint appointment as a professor in the Department of Environmental Sciences and serves as the director of the Coastal Marine Institute, both of which are in the LSU School of the Coast and the Environment. He received his M.S. and Ph.D. in economics from the Florida State University.



## Dismukes Leads LSU's Energy Initiative

Over the past year, LSU has begun the process of highlighting its expertise and strengths in energy research through the auspices of a major "Energy Initiative." The purpose of the Energy Initiative has been twofold: first, to highlight and communicate LSU's energy research strengths, and second, to develop various strategic plans in energy-related research, education, and service-related work. Part of this process included the creation of an "Energy Council" within the University consisting of at least one faculty member from each of the University's colleges and major units. In 2014, K.T. Valsaraj, the vice president of Research and Economic Development, named CES Executive Director David Dismukes as the chair of the University's Energy Council. One of the first charges of the Energy Council was the development of a comprehensive report assessing LSU's current energy research capabilities, opportunities, and challenges.

The report, released in spring 2015, shows that:

- A large portion of LSU's energy research is supported by federal sources. Industry ranks as the second largest energy research funding source.
- LSU's energy research funding is heavily concentrated in a few large awards.
- Surprisingly, most of LSU's energy research funding is in renewables and environmental issues, not fossil fuels.
- Agriculture and engineering dominate most schools in terms of externally-funded energy research.

College/Research Unit	Budget (FY 2014/15)	Research Funding (2007-2014)	Percent of Total
Agriculture	\$ 7,488,438	\$ 38,642,116	516%
Art & Design	\$ 6,945,356	\$ 2,460,000	35%
Business School*	\$ 16,999,443	\$ 1,257,973	7%
Center for Energy Studies	\$ 1,953,889	\$ 4,492,286	230%
Engineering	\$ 23,035,977	\$ 32,713,937	142%
School of Coast & Env.	\$ 6,201,707	\$ 12,033,649	194%
College of Science	\$ 37,172,392	\$ 6,328,234	17%
<b>Total</b>	<b>\$ 99,797,202</b>	<b>\$ 97,928,195</b>	<b>98%</b>

\*State operating budget 2013/14

*The LSU Energy Initiative report shows that agriculture continues to dominate energy research funding on a relative basis, as a share of appropriated budget. The Center for Energy Studies ranks second, followed closely by the School of the Coast & Environment.*

Industry	Funding	Percent of Total	Number of Projects	Average Award per Project
Advanced Energy Consortium	\$ 1,890,462	17%	1	\$ 1,890,462
BP	\$ 1,456,203	13%	4	\$ 364,051
Chevron	\$ 2,759,583	25%	3	\$ 919,861
Shell	\$ 2,172,708	19%	2	\$ 1,086,354
Other	\$ 2,973,761	26%	10	\$ 297,376
<b>Total</b>	<b>\$ 11,252,717</b>	<b>100%</b>	<b>20</b>	<b>\$ 562,636</b>

Note: "Other" includes ANGA, Cameron Int'l, Enervana Technologies, EXCO Resources, Gold Leaf Energy, InnoVida, LA Tank Inc., Lanza Tech, Mariner Energy, Inc. and RPSEA.

*The two major companies funding the most energy-related research have been Chevron and Shell. Funding estimates do not include donations, only funding for energy research.*



*USDA and DOE support the overwhelming amount of LSU's federal energy research funding.*

Federal Agency	Funding	Percent of Total	Number of Projects	Average Award per Project
DOE	\$ 21,861,561	30%	8	\$ 2,732,695
DOI	\$ 3,367,852	5%	16	\$ 210,491
DOL	\$ 1,253,000	2%	1	\$ 1,253,000
DOT	\$ 2,162,000	3%	2	\$ 1,081,000
EPA	\$ 2,067,505	3%	3	\$ 689,168
GSA, NRC, USGS	\$ 1,977,113	3%	13	\$ 152,086
NASA	\$ 2,132,129	3%	3	\$ 710,710
NOAA	\$ 1,803,615	2%	3	\$ 601,205
NSF	\$ 9,453,723	13%	29	\$ 325,990
USAF	\$ 1,060,931	1%	2	\$ 530,466
USDA	\$ 26,119,384	36%	6	\$ 4,353,231
<b>Total</b>	<b>\$ 73,258,813</b>	<b>100%</b>	<b>86</b>	<b>\$ 851,847</b>

## Recommendations

Based on the survey findings, the committee prepared a set of recommendations for specific projects that will primarily target industry-related research funding (or joint private/public projects) in order to: 1) diversify total energy funding streams; 2) potentially diversify energy research funding sources (particularly if the sources are non-federal); and 3) position LSU to strike more easily on big-ticket research funding opportunities when they arise.

## Energy Educational Focus

In addition to the research survey, the Energy Council report also assessed, and made recommendations on, a variety of energy-related courses and concentrations that could be offered as part of an undergraduate or graduate level degree program, or as part of some professional certification process. The report finds that, while the University has a number of energy-related courses, they are relatively few in nature, are uncoordinated, and more importantly, do not lead to any meaningful formal energy-based certification or degree specialization. The report states that one of the first and best opportunities LSU has to move its broader Energy Initiative forward is through the development of a comprehensive and cohesive energy educational focus.

Potential energy-based programs could include the following:

- Engineering/science-directed concentrations, such as energy technology, energy management, and energy and earth sciences.
- Environmental-directed concentrations, including energy and the environment, regulation and permitting, and alternative energy.
- Business-directed programs featuring energy economics and finance, energy accounting and auditing, business development, and project management with an energy focus.
- Law-directed concentrations with an emphasis on energy and mineral law, energy and environmental law, and energy regulation.
- Public policy-directed concentrations focusing on energy policy, public administration and regulation of energy, media, communications and public relations, and international energy issues.

## Next Steps

The University is moving forward on the recommendations of the Energy Council's report. All of the major colleges are assessing potential "energy concentrations." The E.J. Ourso College of Business, for instance, will be offering an energy concentration within each of its majors starting Fall 2015. The business school will also begin offering an energy concentration within its various MBA programs at the same time. The College of Science and the School of the Coast and Environment are also working diligently on establishing their own programs that could begin sometime in early 2016.



## LSU Energy Council

David Dismukes, Chair  
*Center for Energy Studies*

James A. Richardson, Co-Chair  
*E. J. Ourso College of Business*

Troy C. Blanchard  
*College of Humanities &  
Social Sciences*

John Day  
*School of the Coast & Environment*

Emily Frank  
*LSU Libraries*

Keith B. Hall  
*LSU Law Center*

Robert Holton  
*College of Art & Design*

Gus Kousoulas  
*Office of Research & Economic  
Development*

Amy L. Reynolds  
*Manship School of Mass  
Communication*

John S. Russin  
*LSU AgCenter*

Karsten Thompson  
*College of Engineering*

Angela Webb  
*College of Human Sciences &  
Education*

Carol Wicks  
*College of Science*



## Power Players Promote Energy-Industry Partnership Potential

On February 18, 2014, LSU's Office of Research and Economic Development, with Communications and University Relations, launched a marketing initiative to promote the University's energy research endeavors. The goal of the campaign, titled "Power Players," is to stimulate research partnerships between the University and industry. The campaign includes print ads, videos, and op-eds featuring faculty involved in energy-related fields. Several researchers, including Dismukes, are featured in a Power Players video interviews and Q&As. The Power Players website is [www.lsu.edu/powerplayers](http://www.lsu.edu/powerplayers)





## Research

### CES Partners with CPRA, RAND for Coastal Land Loss Study

David Dismukes and Sid Narra, CES research associate, began work this past year with the E.J. Ourso College of Business to conduct a Gulf Coast-wide Economic Impact Evaluation. This project, sponsored by the Louisiana Coastal Protection and Restoration Authority, is also being conducted in conjunction with researchers from the RAND Corporation. The project, which includes a steering committee made up of representatives from government agencies, businesses and coastal researchers, will quantify the economic impact of coastal Louisiana land loss to the rest of the U.S. Analyses should predict the financial implications of future land loss and flood impacts upon jobs, business revenues, amount of river, truck and rail traffic through the region, housing stock, fisheries, agriculture, and gasoline prices, as well as the value of the coastal ecosystem.

### Oil & Gas Journal Features Kaiser's Haynesville, Decommissioning Research

In two separate series of articles for the *Oil & Gas Journal*, Mark Kaiser, professor and director of the Research & Development Division, with co-authors Yunke Yu, CES research associate, and Mingming Liu and Zhen Wang, both of China University of Petroleum, examines both the trends and prospects for the Haynesville shale and the end-of-life production in the deepwater Gulf of Mexico.

The Haynesville Update series summarizes drilling, production, and reserves statistics for the play; looks at well construction costs; uses public data from the Strategic Online Natural Resources Information System (SONRIS), as well as Louisiana tax records, to analyze the economics and profitability of Haynesville wells; and predicts short- and long-term production outcomes for the play.

The Deepwater Gulf Decommissioning series looks at end-of-life production in the deepwater Gulf of Mexico and forecasts the expected removal times for structures located in water depths greater than 400 ft. The series reviews the life-cycle stages of offshore production and summarizes historical installation and removal trends, economic-limit statistics, and the revenue and lease status of structures. Short-, medium- and long-term removal forecasts are made for the deepwater inventory of fixed and floating structures.

### CES Conducts Oil Spill Fund Adequacy Analysis

David Dismukes and Greg Upton, CES assistant professor, in conjunction with Stephen Barnes in the E.J. Ourso College of Business, conducted a study reviewing the financial adequacy of the Louisiana Oil Spill Contingency Fund for the Louisiana Oil Spill Coordinator's Office (LOSCO). The analysis was contracted by LOSCO in order to comply with the study requirements defined under Act Number 394 of the 2013 Regular Session of the Louisiana Legislature.

The year-long study examined the Fund, including its uses, revenues, expenditures, and projected needs for oil spills in the future. To provide relevant context, the report starts with a broad picture of Louisiana's historic crude oil supply, which has fluctuated to meet the needs of Louisiana's refineries and, to a lesser extent, as Louisiana's role as a transportation hub has changed over time. Next, historic oil spill trends are reviewed using data on spill notifications from the National Response Center. These data show an increasing trend in the number of reported spills, as well as total reported volume spilled. Additionally, this report provides a survey of the Fund and the historical oil spill related expenditures of the Louisiana Oil Spill Coordinator's Office and other state agencies as they relate to the Fund.

One of the primary purposes of this research is to determine whether the recently modified fee mechanism, which assesses a quarter-cent per barrel fee on all crude oil received by a refinery for storage or processing, is adequate given anticipated spill volumes (a half-cent per barrel fee will be imposed from July 1, 2014 to December 31, 2015 and may be imposed under specified circumstances thereafter). The study noted that, in some regards, the recent changes to the fee collection mechanism represent an improvement to the previous fee structure by broadening the fee base to cover a more significant portion of oil moving through the state and eliminating a fund cap above which no fees are collected. However, the new structure still appears to provide inadequate resources for the state to deal with a likely scenario of an increasing number of spills and volume of oil spilled. This report combines the three oil supply scenarios with a range of assumptions regarding spill probabilities and agency costs, which results in 18 scenarios projecting the Fund's adequacy into the future, as it relates to covering agency costs.



## To view or download CES publications, visit [www.enrg.lsu.edu/publications](http://www.enrg.lsu.edu/publications)

Dismukes, David E. "The Least Effective Way to Invest in Green Energy." *Wall Street Journal*. Journal Reports: Energy. New York: Dow Jones & Company, October 2.

--. Combined heat & power in Louisiana: Status, potential, and policies. Three Volumes. Louisiana Department of Natural Resources. August 11.

--. Economic impact of Gulf of Mexico ecosystem goods and services and integration into restoration decision-making." With Shepard, A.N., J.F. Valentine, C.F. D'Elia, D.W. Yoskowitz. *Gulf Science*.

--. "Economic and Policy Issues in Sustaining an Adequate Oil Spill Contingency Fund in the Aftermath of a Catastrophic Incident." With Stephen R. Barnes and Gregory B. Upton. *Proceedings of the Thirty-seventh AMOP Technical Seminar on Environmental Contamination and Response*. June: 506-524.

--. *Beyond the Energy Roadmap: Starting Mississippi's Energy-Based Economic Development Venture*. Report prepared on behalf of the Mississippi Energy Institute, 310 pp.

--. *Onshore Oil and Gas Infrastructure to Support Development in the Mid-Atlantic OCS Region*. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2014-657. 360 pp.

Dismukes, David E. (with Stephen R. Barnes). Analysis of Louisiana oil spills, the Louisiana Oil Spill Contingency Fund, and future oil spill response. Report prepared in response to Act 394 of the Louisiana Legislature on behalf of the Interagency Council for the House Committee on Appropriations, the House Committee on Natural Resources, the Senate Committee on Finance, and the Senate Committee on Natural Resources.

Dismukes, David E. (with Emily C. Jackson). "Hydraulic Fracturing: A Look at Efficiency and the Environmental Effects of Fracking" (2014). *Environmental Science and Technology: Proceedings from the 7th International Conference on Environmental Science and Technology*. Volume 1 of 2: edited by George A. Sorial and Jihua Hong. (Houston, TX: American Science Press, ISBN: 978-0976885368): 42-46.

Kaiser, Mark J. Clarifying GOM decom costs. 1: Settled-liability data provide insight for cost estimates. *Oil & Gas Journal* 112 (12):70-74.

-- . Gulf cleanup continues after five major hurricanes. *Oil & Gas Journal* 112 (7):70-81.

-- . Multiple well lease decomposition and forecasting strategies. *Journal of Petroleum Science and Engineering* 116 (April):59-71.

Kaiser, Mark J. and Sid Narra. Application of AIS data in service vessel activity description in the Gulf of Mexico. *Maritime Economics & Logistics* 16 (4):436-466.

Kaiser, Mark J. and Yunke Yu. Haynesville update. 2: North Louisiana drilling costs vary slightly 2007-12. *Oil & Gas Journal* 112 (1):54-61.

--. Hayneville update. 3: Low gas price constrains profitability. *Oil & Gas Journal* 112 (2):52-59.

--. Haynesville update. 4: Haynesville outlook hinges on gas price. *Oil & Gas Journal* 112(3):62-65.

Kaiser, Mark J. (with Mingming Liu). Decommissioning cost estimation in the deepwater U.S. Gulf of Mexico - Fixed platforms and compliant towers. *Marine Structures* 37 (July):1-32.

--. Deepwater Gulf decommissioning. 1: Aging platforms, ownership changes pose special risks. *Oil & Gas Journal* 112 (2):60-67.

--. Deepwater Gulf decommissioning. 3: Lease, revenue status determine short-term decommissioning activity. *Oil & Gas Journal* 112 (4):92-96.

--. Deepwater Gulf decommissioning. 4: Pace of decommissioning to accelerate over next decade. *Oil & Gas Journal* 112 (5):70-78.

Kaiser, Mark J. (with Mingming Liu and Zhen Wang). Deepwater Gulf decommissioning. 2: Structure inventory runs gamut of deepwater technologies. *Oil & Gas Journal* 112(3):76-82.

Snyder, Brian F. Solving conservation's money problems. *Conservation Biology* (online).

--. Tax and trade: A hybrid climate policy instrument to control carbon prices and emissions. *Climate Policy* (online).



## Outreach & Education



*Energy Summit™ 2014 was the Center's most successful to date, with an attendance of more than 150 and significant press coverage.*

### Energy Summit™ 2014

On October 22, CES hosted Energy Summit™ 2014, "The Future of Louisiana Energy," drawing approximately 150 attendees, the largest turnout to date. After an opening address by Senator David Vitter, the audience heard from energy industry experts on the future of Louisiana's shale plays, wholesale power markets, industrial usage, exports, workforce and the environment. A few of the takeaways included the following:

- Although drillers in the Tuscaloosa Marine Shale have improved efficiency, drilling activity will undoubtedly be affected by low prices.
- Low natural gas prices will impact Haynesville Shale production until proposed export terminals are up and running.
- Some chemical and other manufacturers that depend on natural gas as a feedstock for an energy source oppose exports on the basis that gas prices could rise.
- Because of increased demand due to new gas-fired power plants, the manufacturing renaissance and LNG exports, some are concerned about how much natural gas will be available to meet the growth in demand.
- By 2030, the price of natural gas is predicted to hit about \$10 per thousand cubic feet.



*U.S. Senator David Vitter welcomes Energy Summit™ participants and speaks about the state's energy future.*



## BP Energy Forum

On Tuesday, March 18, 2014, the Center for Energy Studies and the Grow Louisiana Coalition hosted “Energy Outlook 2035: The Global Energy Industry and Its Impact on Louisiana.” The featured speaker was industry analyst Mark Finley, general manager, Global Energy Markets & U.S. Economics, BP.

Panelists were: James Richardson, director, LSU Public Administration Institute; Gifford Briggs, Louisiana Oil & Gas Association; Chris John, president, Louisiana Mid-Continent Oil and Gas Association; and David Dismukes.

In his address, Finley explained that U.S. gas production would increase by 45 percent between 2012 and 2035, with shale gas production increasing an average of 4.3 percent during that time. The current boom means the U.S. will become a net exporter of liquefied natural gas in 2016.

His energy outlook included a prediction that oil would continue to serve as the primary transportation fuel through 2035; however, full hybrid vehicles will likely account for 24 percent of auto sales, and “mild” hybrids (internal combustion engines equipped with an electric machine), will account for 38 percent.

Finley’s prediction regarding renewable energy sources, including biofuels, is an increase from 2 percent to 7 percent, surpassing that of nuclear power by 2025 and attaining the same level as hydro by 2035.

Coal is predicted to remain king for non-Organisation for Economic Cooperation and Development Countries through 2035, but for North America, the EU, and China, natural gas will serve as the primary power source.

## American Shale & Manufacturing Partnership

In partnership with the American Shale & Manufacturing Partnership, or ASMP, the Center hosted a Manufacturing Renaissance Series discussion event on May 9, 2014, at the Hilton Baton Rouge Capitol Center. The purpose of this and other Manufacturing Renaissance Series events held around the country was to thoroughly explore issues, challenges and opportunities associated with shale

development and the manufacturing supply chain. The ultimate objective of the series was to create a playbook, or blueprint, on what must be done to return manufacturing back to the United States.

A recurring theme throughout the discussions was the need for a build-out of infrastructure before manufacturing could expand to fully realize the potential offered by the abundance of natural gas and associated liquids. Earlier discussions were initially focused almost solely on manufacturing and the supply chain; however, after participants began discussing infrastructure and workforce development, the ASMP broadened the discussion to also focus on construction and related craft trades. Topics included workforce development and jobs creation; infrastructure; environment; federal and state policies; and research and innovation.

On January 28, 2015, the ASMP released its report, titled “Empower America’s Emerging Shale-Based Manufacturing,” at the Capitol Visitor Center in Washington, D.C. The event featured a Congressional briefing and a senior-level discussion with a panel of ASMP leaders.



On Friday, May 9, 2014, CES and the American Shale & Manufacturing Partnership (ASMP) hosted the “Manufacturing Renaissance Discussion Series Regional Event,” at the Hilton Capitol Center.

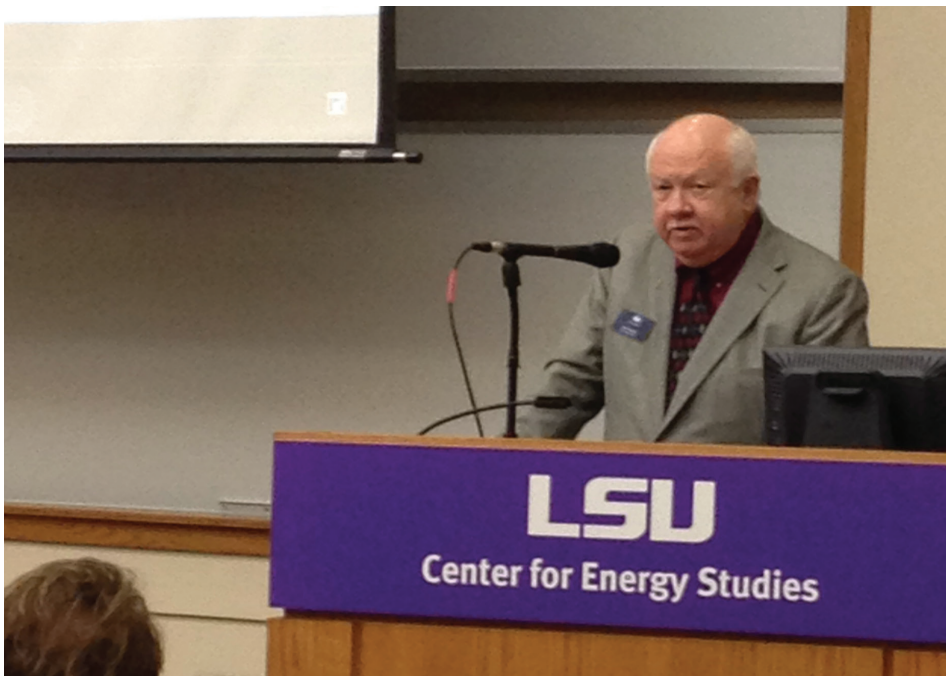


## LPSC Workshop

On June 25, 2014, CES conducted a one-day workshop to inform Louisiana Public Service Commission staff members of recent directions in combined cooling, heating, and power (CHP), distributed energy resources (DER), and microgrids. The purpose of the workshop was to explore new technological, economic, and regulatory opportunities and challenges to both large- and small-scale on-site generation, with a focus on the efficiency and renewable energy attributes of various on-site generation configurations.

Speakers included Ken Rose, research fellow and consultant, MSU Institute of Public Utilities; Joydeep Mitra, associate professor, electrical and computer engineering, Michigan State University; Frank Felder, associate professor and director, CEEEP, Rutgers University; Dan Phillips, vice president, development, NRG Energy; Edward Yanoshita, general manager, Corix; and CES's David Dismukes.

The workshop was the sixth LPSC workshop conducted by CES since 2010.



*Earl Heard, CEO and founder of BIC Alliance, addresses audience members at the screening of the documentary FrackNation in December.*

## FrackNation Film Screening

On December 12, 2014, the Center hosted a screening of the documentary film *FrackNation*, sponsored by the BIC Alliance and the La. Mid-Continent Oil & Gas Association. The film attempts to address what the filmmakers say is misinformation about the process of hydraulic fracturing by examining details of the process and addressing concerns highlighted in the fracking-critical film *Gasland*.







### CES Meets World

In 2014, the Center assisted with the University's international relations when David Dismukes met with representatives from several nations who were interested in learning about Louisiana's energy industry. In August, Dismukes and Karsten E. Thompson, professor and department chair, Craft & Hawkins Department of Petroleum Engineering, participated in the U.S.-Israel Energy Summit in New Orleans, which was organized to create opportunities for Israeli students at

Gulf Coast universities and in industry, encourage Gulf Coast scientists and engineers to teach in the Israeli programs, foster joint research of Israeli and American scientists and engineers and advance joint projects such as NSF-BSF and exploration of the East Mediterranean.

In October, Argentine MBAs with an interest in oil and gas visited campus during the American Production and Inventory Control Society conference in New Orleans. Dismukes met with the group and provided an overview of CES.

In spring 2015, the Center would continue to welcome representatives from abroad, including visitors from the Science & Innovation department of the British Consulate-General in Houston, and a delegation from Iraq, sponsored by the New Orleans Citizen Diplomacy Council and the State Department.



## Dismukes Gives Overview of EPA's Proposed Clean Power Plan, Impacts for La.

At a meeting of the Clean Cities Coalition on November 5, 2014, David Dismukes provided an overview of the Environmental Protection Agency's proposed Clean Power Plan, or CPP. The goal of the plan, which the EPA proposed in June 2014, is to reduce carbon emissions by an average of 38 percent in 2020 (interim target) and 42 percent by 2030, both from 2012 levels.

Dismukes' analysis indicates some problems and challenges with the EPA rule:

- Its carbon emissions regulation plan is inefficient. The method fails to examine cost-effectiveness and represents poor command and control regulation by (a) not utilizing market-based approaches and (b) forcing resource decisions upon states regulators.
- The stress is on regulatory resource planning instead of environmental regulation.
- The costs to Louisiana ratepayers could be considerable, with the possibility of a significant near-term reliability challenge.

## 2014 Speaking Engagements

*By Executive Director David Dismukes*

"Some Unconventional Thoughts on Regional Unconventional Gas and Power Generation Requirements." Gulf Coast Power Association Meetings, New Orleans. February 6.

"Natural Gas and the Polar Vortex: Has Recent Weather Led to a Structural Change in Natural Gas Markets?" National Association of State Utility Consumer Advocates Monthly Gas Committee Meeting. February 19.

Discussion Panelist. Energy Outlook 2035: The Global Energy Industry and Its Impact on Louisiana. Grow Louisiana Coalition, Baton Rouge. March 18.

"Industry Investments and the Economic Development of Unconventional Development." 2014 Tuscaloosa Marine Shale Conference & Expo, Natchez. March 31.

"The Technical and Economic Potential for CHP in Louisiana and the Impact of the Industrial Investment Renaissance on New CHP Capacity Development." Electric Power 2014, New Orleans. April 1.

"Regional Natural Gas Demand Growth: Industrial and Power Generation Trends." Kinetica Partners Shippers Meeting, New Orleans. April 30.

"The Gulf Coast Industrial Investment Renaissance and New CHP Development Opportunities." Industrial Energy and Technology Conference, New Orleans. May 20.

"The Past, Present and Future of CHP Development in Louisiana." Louisiana Public Service Commission CHP Workshop, Baton Rouge. June 25.

"Natural Gas Leveraged Economic Development in the South." Southern Governors Association Meeting, Little Rock. August 16.

"Unconventional Development & Energy Independence." 2014 SONRIS to Sunset Annual Conference, Louisiana Department of Natural Resources. August 27.

"Unconventional Oil & Natural Gas: Overview of Resources, Economics & Policy Issues." Society of Environmental Journalists Annual Meeting, New Orleans. September 4.

"The Conventional Wisdom Associated with Unconventional Resource Development." National Association for Business Economics Annual Conference, Chicago. September 28.

"Trends in Energy & Energy-Related Economic Development." 2014 Government Finance Officer Association Meetings, Baton Rouge. October 9.

"A Look at America's Growing Demand for Natural Gas." Louisiana Chemical Association Annual Meeting, New Orleans. October 23.

"Impacts on Louisiana from EPA's Proposed Clean Power Plan." (2014). Air & Waste Management Annual Environmental Conference (Louisiana Chapter), Baton Rouge. October 29.

"Estimating Critical Energy Infrastructure Value at Risk from Coastal Erosion." With Siddhartha Narra. 7th Annual Summit on Coastal and Estuarine Habitat Restoration. Washington, D.C. November 3-6.

"Overview EPA's Proposed Clean Power Plan and Impacts for Louisiana." Clean Cities Coalition Meeting. November 5.

"Overview EPA's Proposed Rule Under Section 111(d) of the Clean Air Act: Impacts for Louisiana." Louisiana State Bar: Utility Section CLE Annual Meeting, Baton Rouge. November 7.

View or download CES presentations at  
[www.enrg.lsu.edu/presentations](http://www.enrg.lsu.edu/presentations)



## CES in the News

In 2014, CES Executive Director David Dismukes was regularly called upon to respond to media requests for information on energy issues making the news, in particular, the effects of lower oil prices on the state's economy, the slowdown in Haynesville Shale production, and developments in LNG. For state media outlets, such as *The Advocate*, *Nola.com* and *The Greater Baton Rouge Business Report*, Dismukes was repeatedly interviewed on breaking energy news topics. Online energy industry news outlet *EnergyWire*, *The Shreveport Times*, and Wisconsin Public Radio also reached out to Dismukes in 2014 for his expertise.



Gregory Brian Upton, Jr.

## Personnel Update

### Upton, Sloan Join CES

In 2014, **Gregory Brian Upton, Jr.**, joined the CES faculty as assistant professor. His research interests are related to the analysis of economic, statistical and public policy issues in energy and regulated industries. Upton received his Ph.D, M.S. and B.S. in economics, with a focus on empirical analysis, from LSU. He also serves as an adjunct professor in the Department of Economics in the E.J. Ourso College of Business at LSU and is a member of the Southern Economic Association (SEA) and International Association of Energy Economics (IAEE).



Paul Sloan

**Paul Sloan** joined the Center for Energy Studies staff as a research associate in September 2014. His areas of expertise include law and business. His research focus at the center includes economic and infrastructure modeling of the oil, gas, and refining industries. Sloan holds a master of business administration degree from the University of Illinois at Urbana-Champaign, a juris doctor from New York Law School, and a bachelor of science degree from LSU.



### CES Scholarships

The Center for Energy Studies now offers three scholarships to LSU students in energy-related fields:

#### LMOGA/Robert R. Brooksher Scholarship

Named for the late Robert R. Brooksher, Jr., an executive vice president of Louisiana Mid-Continent Oil and Gas Association and founding member of the LSU Center for Energy Studies' Advisory Council, the scholarship supports the educational goals of LSU students interested in energy-related fields, with a particular emphasis on energy policy related to the oil and gas industry. The annual scholarship is awarded in the amount of \$1,000.

The 2014-2015 Robert R. Brooksher Scholarship recipient is **Meredith R. Lester**, senior in petroleum engineering.

#### F. Malcolm Hood Scholarship

Created to honor the late F. Malcolm Hood, a highly regarded energy industry spokesman who served as an advisor when the Center was created and was a member of its Advisory Council, this scholarship supports the educational goals of LSU students interested in energy-related fields, with a particular emphasis on energy policy. Two scholarships are awarded in the amount of \$1,000 each.



The 2014-2015 **F. Malcolm Hood Scholarship** recipient is **Cara Leigh Oliver**, a senior in mechanical engineering.

Beginning in 2015, the Center will offer a third scholarship, the **David Olver Memorial Scholarship**, provided by the Gulf Coast Power Association emPOW-ERing Foundation. The David Olver Memorial Scholarship is intended for LSU students interested in future careers in the electric power industry. The annual award amount is \$5,000.

## Personnel

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### *Administration*

**David E. Dismukes, Ph.D.**, executive director, director of the Policy Analysis Division, and professor

**Allan G. Pulsipher, Ph.D.**, associate executive director and Marathon Oil Company Professor of Energy Policy in the Center for Energy Studies

**Diana Reynolds**, assistant to the executive director

**Marybeth Pinsonneault**, communications manager

### *Division of Policy Analysis*

**Gregory B. Upton, Jr., Ph.D.**, assistant professor

**Mike McDaniel, Ph.D.**, professional-in-residence (retired) and an adjunct professor of environmental sciences in the School of the Coast and Environment

**Don Goddard, Ph.D.**, associate professor (retired)

**Elizabeth Dieterich**, research associate

**Kathryn Perry**, research associate

### *Division of Research & Development*

**Mark J. Kaiser, Ph.D.**, director of the Research & Development Division and professor

**Brian Snyder, Ph. D.**, research associate

**Siddhartha Narra, Ph.D.**, research associate

**Yunke Yu**, research associate

**Paul Sloan, J.D.**, research associate

### *Division of Energy Information & Data*

**Omowumi (Wumi) Iledare, Ph.,D.**, (retired) director of the Energy Information and Data Division, professor of petroleum economics and policy research, adjunct professor of petroleum economics at the Craft & Hawkins Department of Petroleum Engineering at LSU and the University of Ibadan.

**Versa Stickle**, librarian

**Ric Pincomb**, research associate

**Stacy Retherford**, computer analyst

**Mike Surman**, computer analyst





# MINERALS PROCESSING RESEARCH DIVISION

RALPH PIKE, DIRECTOR  
[www.mpri.lsu.edu](http://www.mpri.lsu.edu)

Application information, as well as information on how to contribute to the scholarship funds, is available online at <http://www.enrg.lsu.edu/scholarships>. The mission of the Minerals Processing Research Division (MPRD), established in 1979 by Federal legislation as one of 31 State Mineral Institutes associated with the U.S. Department of Interior, includes facilitating research and public service programs in process research and technology transfer, sustainable development, energy management, energy sustainability, and inherently safer design. The minerals processing research and public service activities of the MPRD complement, and benefit from, the energy research and geological research performed by the Center for Energy Studies and the Louisiana Geological Survey.

The MPRD continues to focus on energy optimization in the chemical production complex in the lower Mississippi river corridor and on the use of biomass feedstocks by plants to supply the same products as current plants in this complex. Cooperative research agreements with Monsanto, Motiva Enterprises and Mosaic allow for collaborative research and technology transfer with process and plant engineers at these and other companies.

## Emissions Prediction Model Completed

In 2014, MPRD completed an emissions prediction model utilizing the well-known GRI-Mech 3.0. The model, which can predict emissions from energy sustainability systems including cogeneration systems and combustion based biomass conversion systems, will be made available online soon at [www.mpri.lsu.edu](http://www.mpri.lsu.edu).

## Resilient Critical Infrastructure Research Expanded

MPRD has initiated research with the objective to improve the resilience of the infrastructure of the Chemical Processing Industry (CPI). The project will use and further develop a chemical production complex based on multiple plants in the lower Mississippi River corridor, from below New Orleans to Baton Rouge, to evaluate the capability of the complex to absorb and recover from adverse events and of the impact of these events on the supply chain of critical chemicals.

The chemical industry is one of the 16 critical infrastructures identified in policy guides to improve the nation's resiliency from executive orders and presidential policy directives (DHS, 2014). Enhancing the nation's resilience to disasters, which encompasses both natural and human-induced events, is a national imperative that benefits the nation's economics, environment and national security (National Academy Report, 2012).

The research is using the Chemical Complex Analysis System that currently describes the chemical production complex in the lower Mississippi River corridor, which has 13 production units, plus associated utilities for power, steam, cooling water, and facilities for waste treatment. The Chemical Complex Analysis System is a methodology that was developed to determine the best configuration of plants in a chemical production complex based on economic, energy, environmental, and sustainable costs. It is an integrated computer system that is used by plant and design engineers to convert their company's goals and capital into viable projects that are profitable and meet economic, energy and sustainability requirements.





The project objectives include expanding the Chemical Complex Analysis System with additional plants in the benzene-toluene-xylene chain, the agricultural chemicals chain and chloro-alkali industries (Pellegrino, 2000). At each expansion step, the System is used to evaluate the capability of the complex to absorb and recover from adverse events. These evaluations will be performed with the assistance of the MPRD Industrial Advisory committee and the ExxonMobil Operations Integrity Management System to ensure realistic evaluations are performed. A key part of the evaluations will be to determine how the chemical complex can evolve to enhance protection from adverse events and ameliorate the impact of these events, becoming more resilient. The methodology developed at the National Infrastructure Simulation and Analysis Center of Sandia National Laboratories (Ehlen, et al., 2014) using an agent-based chemical supply chain model will be included in the evaluations, and collaboration with this group will be developed.

The System is being enhanced using new computer methodology, as described by Knopf (2012) and ultimately most chemical production plants in the lower Mississippi river corridor will be included. These chemical plants account for over 25 percent of the ethylene, propylene, benzene, and styrene production in the United States; all of which are critical to the U.S. economy.

The results of this research will be reported the MPRD Industrial Advisory Group, the engineering groups at Monsanto Enviro-Chem, Motiva Enterprises, and Kaiser Aluminum and Chemicals, who collaborated in developing the Complex and the System. Also, presentations will be made to national meetings of professional societies and published in engineering journals. The current version of the program for the Chemical Complex Analysis System and users' manual can be downloaded from the LSU Minerals Processing Research Division's web site: [www.mpri.lsu.edu/chemcomplex.html](http://www.mpri.lsu.edu/chemcomplex.html)

### **Pike, Sengupta Chair Technical Sessions**

Ralph Pike and Debalina Sengupta, research associate at Texas A&M University, chaired three technical sessions at the American Institute of Chemical Engineers' Annual Meeting in Atlanta, November 16-21, 2014. Each session included eight presentations from industry engineers and university researchers on numerous aspects of developing innovative processes to produce fuels and chemicals from renewable resources. The sessions were "Sustainable Fuels: Advances in Innovative Processes," "Sustainable Chemicals: Advances in Innovative Processes," and "Sustainable Fuels from Renewable Resources."

### **Layer of Protection Analysis Course Offered**

A new professional development course on Layer of Protection Analysis (LOPA) is being completed and will be available on the MPRD website, [www.mpri.lsu.edu](http://www.mpri.lsu.edu). This self-study course adds to and complements other process safety related courses available on the website. Layer of Protection Analysis is used as an extension of HAZOP analysis to identify potentially hazardous events using independent layers such as standard operating procedures, process control systems alarms with defined operator response, safety instrumented systems. LOPA is used to evaluate scenario risk and compare it with risk tolerance criteria to decide if existing safeguards are adequate, and if additional safeguards are needed. Results from recent safety research are included to show industry applications.

## Technology Transfer Courses Available

Two technologies that have immediate and substantial energy savings on chemical plants and refineries are “pinch technology” and “on-line optimization.” Large companies have corporate level groups that routinely apply pinch technology and on-line optimization. Small- to medium- sized chemical companies in Louisiana do not have the trained personnel needed to apply this technology. The MPRD makes available upon request two short courses on these topics.

### References

Ehlen, M. A. A. C. Sun, M. A. Pepple, E. D. Eidson and B. S. Jones, 2014, “Chemical Supply Modeling for Analysis of Homeland Security Events,” *Computers and Chemical Engineering* 60 (2014) 102–111.

Knopf, F. C., 2012, *Modeling, Analysis and Optimization of Process and Energy Systems*, John Wiley & Sons, Hoboken, N.J.

National Academy Report, 2012, *Disaster Resilience: A National Imperative*, Committee on Increasing National Resilience to Hazards and Disasters; The National Academies Press, Washington, D.C.

Pellegrino, J. L., 2000, *Energy and Environmental Profile of the U. S. Chemical Industry*, Energetics, Office of Industrial Technologies, DOE, Washington, D.C.

## Personnel

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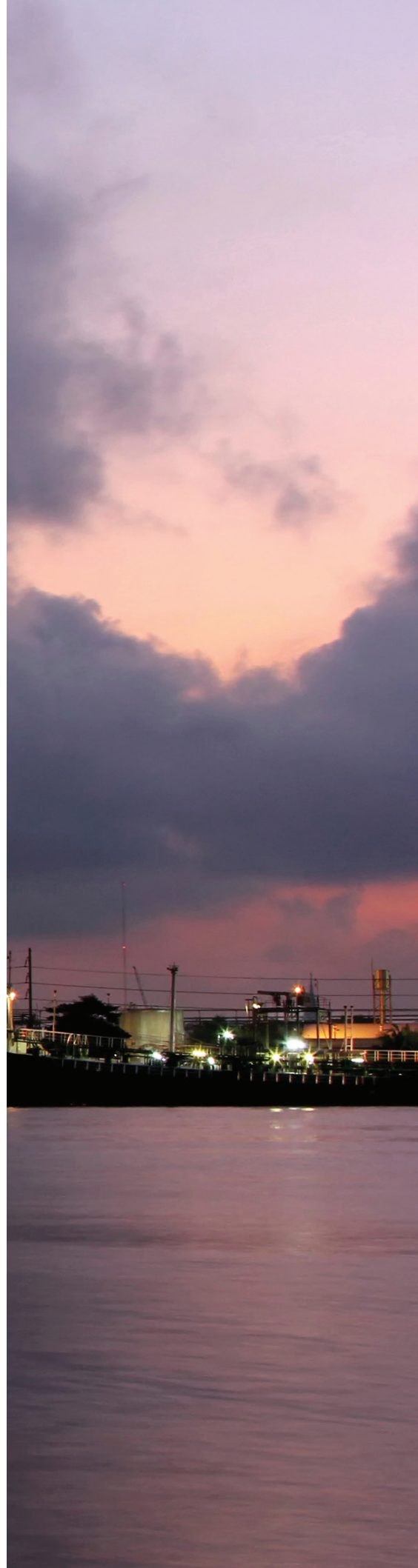
**Ralph W. Pike**, director, Horton Professor of Chemical Engineering

**F. Carl Knopf**, associate director, Anding Professor of Chemical Engineering

**Abhijith Kondapally**, M.S. student

**William Fernandez**, Biological Engineering major, Chancellors Student Aid

**Jennifer Le**, Health Sciences major, student research assistant





# LOUISIANA GEOLOGICAL SURVEY

**CHACKO J. JOHN**  
**DIRECTOR & STATE GEOLOGIST**  
[www.lgs.lsu.edu](http://www.lgs.lsu.edu)

The Louisiana Geological Survey (LGS) was first organized in 1869 and was permanently established by Act 131 of the Louisiana State Legislature in 1934. It was legislatively transferred from the Louisiana Department Natural Resources to Louisiana State University (LSU) in 1997 and currently reports through the Executive Director of the LSU Center for Energy Studies to the LSU Vice Chancellor of Research and Economic Development.

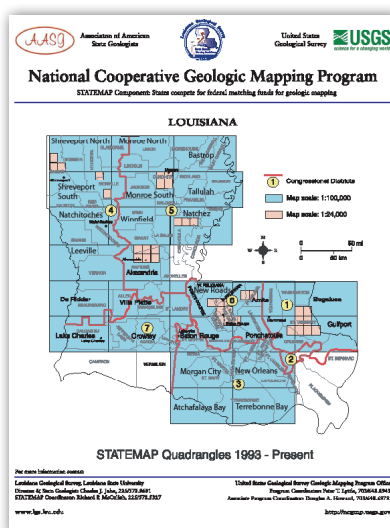
Geological investigations ongoing at LGS generally reflect its primary mission of promoting environmentally sound economic development of energy, mineral, water and environmental resources of the state. Reports of investigations are provided to the funding sponsors of the project and after approval, are made available to all interested parties. LGS research publications are provided to those interested through articles in professional journals, LGS publications and presentations at appropriate technical conferences and other venues as and when needed. Currently, LGS has 14 full-time and two part-time staff including all categories of personnel. Research projects are conducted primarily under four sections:

- Geologic Mapping and Mineral Resources Section conducts investigations of the Surface Geology of Louisiana and does surface mapping under the federally funded State Map Program managed by the U.S. Geological Survey and produces maps at 1:100,000 and 1:24,000 scales.
- The Basin Research Energy Section conducts oil, gas, and coal related research projects.
- The Water and Environmental Section currently monitors and provides data on streams to add to the state's water data base and also supports the efforts of the USGS and the Department of Natural Resources for management of the state's water resources.
- The LGS Cartographic Section prepares the final maps and other LGS publications, and does GIS work on research projects. Over the years it has received many major awards for excellence of its products.

## Northeastern La. Latest STATEMAP Project

The Louisiana Geological Survey is the only research organization doing geologic mapping in the state of Louisiana. The continuing mapping effort is supported by cooperative agreements with the U.S. Geological Survey (USGS) under the STATEMAP component of the National Cooperative Geologic Mapping Program approved by the U.S. Congress.

The STATEMAP project for fiscal year 2013-2014 involved geologic mapping and compilation of the final two remaining uncovered 30 X 60 minute quadrangles, Bastrop and Tallulah, in the northeastern corner of the state, completing 1:100,000-scale state coverage with a mix of cartographically prepared lithographs and draft GIS compilations. LGS cooperative agreements with the USGS under the STATEMAP program through fiscal year 2013 have resulted in 25 compilations of 30 X 60 minute geologic quadrangles, 15 of which are published LGS lithographs and 10 of which are open-filed GIS compilations. Another five 30 X 60 minute geologic quadrangles were produced in-house entirely by LGS or with partial support from other sources.



Since the late 1990s LGS also has prepared 7.5 minute geologic quadrangles at 1:24,000 scale totaling 46 sheets. Thirty-six were prepared with STATEMAP support, and the other ten were prepared for the U.S. Army Corps of Engineers in the Fort Polk region, west-central Louisiana. The fiscal year 2014-2015 STATEMAP project resumes 1:24,000-scale field mapping with three 7.5 minute quadrangles in the Lake Charles area.

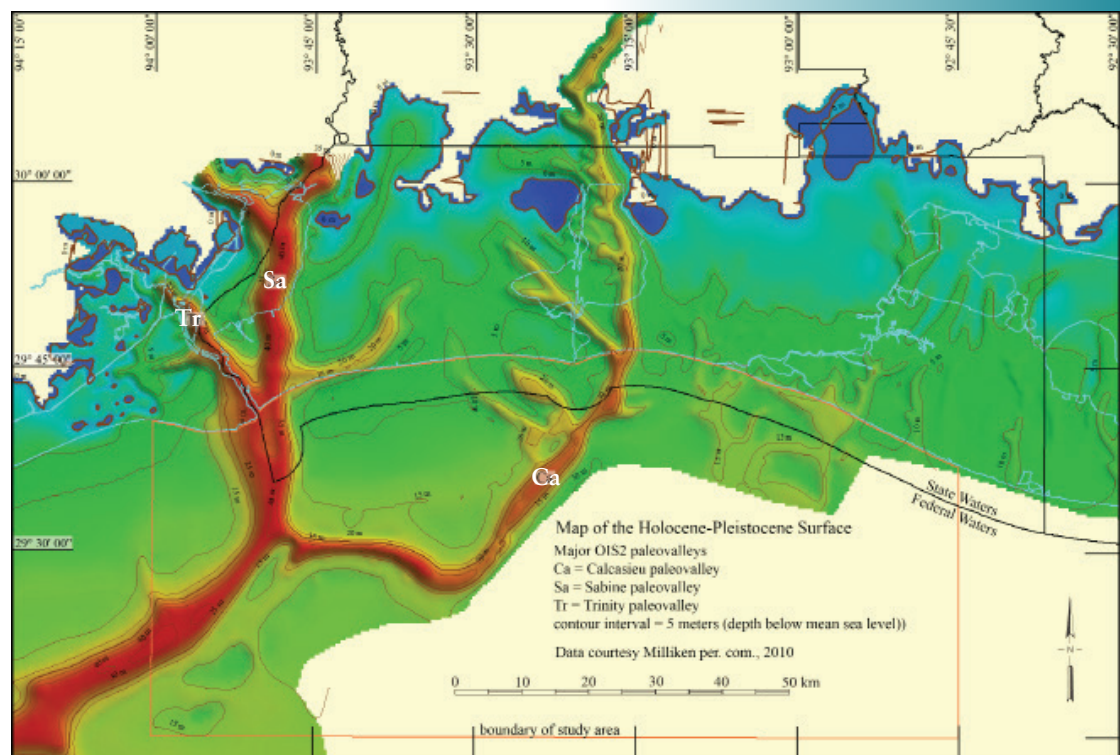
### CPRA-Funded Coastal Zone Project in Second Year

A two-year (2013-2015) project funded by the Louisiana Coastal Protection and Restoration Authority (CPRA) continues in its second year. For the first year, a detailed structural map of the unconformity that forms the base of Holocene sediments within the Louisiana Coastal Zone and report were prepared for its eastern part, which consists of the Mississippi River Delta plain.

Work for the second year is focused on preparing a detailed structural map of this unconformity for the entire Louisiana Coastal Zone. This unconformity, which is known as the "Holocene-Pleistocene surface," is a critical geologic feature because the overlying thickness of typically under-consolidated Holocene sediments is a major factor governing local subsidence rates and depth to solid sediments for the foundation of major structures.

### Late Quaternary Stream, Estuarine Systems Project Near Completion

The LGS is completing work on "Late Quaternary Stream and Estuarine Systems to Holocene Sea Level Rise on the OCS Louisiana and Mississippi: Preservation Potential of Prehistoric Cultural Resources and Sand Resources" for a cooperative agreement from the Bureau of Ocean Energy Management (BOEM), Bureau of Safety and Environmental Enforcement (BSEE) to investigate possible sand resources and possible archeological sites in the Louisiana state waters in the Outer Continental Shelf. It is examining the responses of Late Quaternary stream and estuarine systems to Holocene sea level rise. The research team has developed a geophysical and geologic database for the study area that contains more than 118 offshore hazards maps, boring data, and seismic track line locations. This data is currently being used to develop geologic/stratigraphic models and predictive models for paleo-landscape preservation potential for the evaluation of sand resources of paleo-fluvial channel fills within the study area. An understanding of these processes should result in the evaluation and refinement of models used to predict cultural and non-fuel mineral resources within the offshore continental shelf. A fully functional Geographic Information System (GIS) will be developed from all collected geospatial data.







## Geologic Review Continues Unique Service to DNR, USACE

Since 1982, the Geologic Review has provided regulatory technical assistance to the Coastal Management Division of the Louisiana Department of Natural Resources and the U.S. Army Corps of Engineers (USACE). Renewed annually, the program reviews drilling permit applications in Louisiana's coastal zone to avoid and/or minimize environmental damage to the wetlands by proposing alternate concepts, such as reducing the size of ring levees and slips, reducing lengths of board roads and canals, directional drilling and potential use of alternate access routes. The successful program is believed to be the only one of its kind in operation in the U.S.

## Surface Water Gaging Project Supports Resource Management

The Louisiana Department of Natural Resources (LDNR) awarded LGS a three-year contract (2012-2015) titled "Surface Water Gaging Network Improvements." The main objective of the project is to provide additional data to supplement efforts to monitor and manage surface and groundwater resources being conducted by the USGS for DNR. During the first two years of the project, 50 gaging stations were selected for discharge measurements. The data obtained was used to develop new rating curves and profiles or revise them if there was existing data. Four new surface gaging sites were also established where there were none. Further, LGS compiled hydrologic and geologic data for publicly owned reservoirs and lakes from existing records. During the second and third years of the project, the monitoring work will be continued and the data will be kept updated and revised as needed.

## Survey Contributes to National Coal Resources Data System Research

Louisiana Geological Survey is investigating the occurrence of coal in Louisiana and its potential for exploitation as an economically significant source of natural gas. The current effort, begun in 2010 under contract with the U.S. Geological Survey as part of the National Coal Resource Data System, focuses on the distribution and abundance of coal seams in the Paleocene-Eocene Wilcox group confined to the subsurface in the northern half of the state (north of the 31° parallel). This study has produced stratigraphic correlation cross-sections depicting modern subsurface structure over a comprehensive set of N-S and W-E traverses. Information from these cross sections combined with data from additional well logs yielded a set of structural contour maps for the upper and basal contact surfaces of Wilcox. During 2012-2013, selected well logs were analyzed to correlate coal seams to stratigraphic horizons in Wilcox and to produce isopach maps of coal for the entire study area. Narrative text crafted in 2014-2015 will be combined with revised and updated maps and cross-sections for a final report to be submitted at the close of fiscal year 2015.



## Historic Louisiana Geologic Maps, Publications Inventoried

LGS continues an effort begun in 2010 to systematically inventory and catalog its extensive cartographic repository of historic maps, cross-sections, and other geologic and topographic data. Thousands of published and unpublished geologic maps, cross-sections, sample site maps, petroleum mapping and other geo-data dating back to the 1870s exist in Louisiana Geological Survey (LGS) cartographic storage rooms. The material consists of lithographic prints, working drafts, historic reference maps, and many original manuscripts on linen, vellum, positive and negative film, contact prints, and even some metal plates. Much of this data is from publications long out of print, and some are unpublished manuscripts unknown to the research community. An estimated 6,000 map sheets are involved. This material has been kept in climate-controlled rooms, but it has been moved many times over the decades and original inventories have not survived.

The inventory of all documents in tube rack storage was completed in 2010 and one of all documents in fireproof vertical cabinets in a 2011 project. In 2014, the map documents that reside in more than 40 flat map filing cabinets were processed. The project also selected candidates for digital archiving based on the inventory database. Paper and film documents were converted to high resolution digital formats, stored on permanent media, and metadata records were prepared for entry into the National Digital Catalog. A relational database was created to index the material. The project will result in vastly improved accessibility of the LGS cartographic archival material for LGS research, the geologic research community, and the general public.

## Research in Unconventional Energy Resource Potential Planned

The last major LGS study on unconventional shale energy resources was completed in 1997 and the results were published in the Basin Research Institute (now part of LGS) bulletin in the following paper:

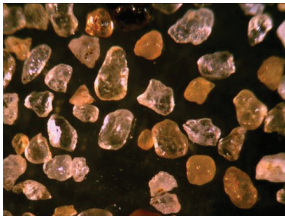
John, C.J., B.L. Jones, J.E. Moncrief, Reed Bourgeois and Brian J. Harder, 1997, An Unproven Unconventional Seven Billion Barrel Oil Resource - the Tuscaloosa Marine Shale: Basin Research Bulletin, Louisiana State University, v.7, August, p.3-23.

As is now well known, the Tuscaloosa Marine Shale (TMS) has become an active major oil play covering parts of Louisiana and Mississippi with many completed successful oil wells. This LGS paper remains a landmark reference for the continuing commercial development of the TMS.

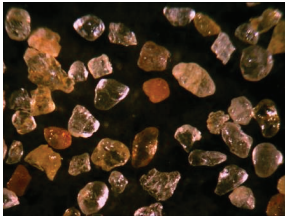
Similarly, the geopressured-geothermal unconventional resources of the Gulf Coast represent a future major energy resource when the technology is developed and the economics of commercial development become profitable and feasible. LGS was a participant in the U.S. Department of Energy Gulf Coast Study on this topic (1975-1992) and a contributor of temperature and geologic data to the National Geothermal Data System (NGDS) project. These projects have provided critical data and information needed for the commercial development of this unconventional resource over time. LGS plans to initiate a statewide investigation to evaluate the existence of unconventional potential shale gas/oil plays, including bypassed oil/gas sources and are currently looking for funding sources.

The entire article can be viewed at [www.lgs.lsu.edu/deploy/uploads/Tuscaloosa%20Marine%20Shale.pdf](http://www.lgs.lsu.edu/deploy/uploads/Tuscaloosa%20Marine%20Shale.pdf)

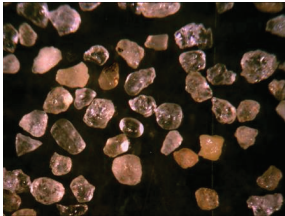




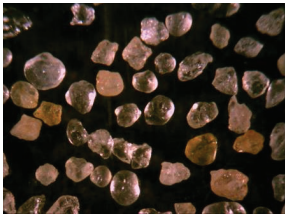
FS-1 40/70



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FS-3 40/70



FS-4 40/70

Standard (40x) photomicrographs of individual sand samples tested as proppant for hydraulic fracturing (40/70 sieve size fraction).

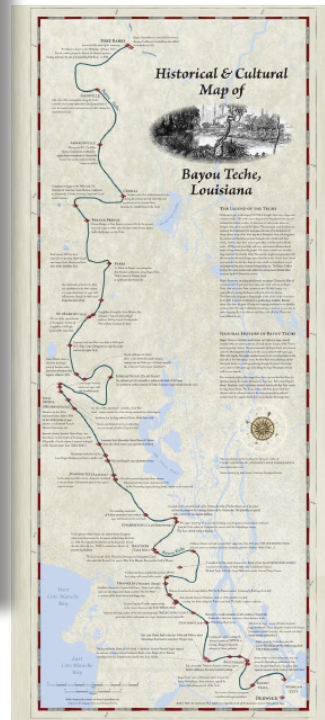
## Study Assesses State's Sand Resources, Suitability for Hydro-Fracture Operations

LGS conducted a preliminary study of sand resources in four areas to determine its suitability for use as proppant in hydraulic fracturing and to assess its potential for economic development. Samples were collected in the Catahoula sandstone near Sicily Island and from the Amite River Basin. After laboratory analysis, it appeared that all the samples analyzed were on the borderline of acceptance for use as proppant. Initial findings of this study were also reported in the *AAPG Explorer* (September 2014) in an article by Louise Durham titled "Getting Down to the Nitty Gritty of Fracturing." LGS intends to expand this initial study into a statewide investigation subject to the availability of funds.

## Cartography Section Produces Award-winning Bayou Teche Paddle Map

Lisa Pond and Robert Paulsell of the LGS cartographic section designed and produced the 2014 *Bayou Teche Paddle Trail and Historical and Cultural Map* for The TECHE Project in Lafayette, La. In spring 2015, the map was awarded "Best of Category in the Recreational/Travel Map Category" in the Cartography and Geographic Information Society (CaGIS) Map Competition. The two-sided waterproof map shows canoe and kayak access points on Bayou Teche beginning at Port Barre traveling over 131 miles to Morgan City, La. Informative symbols show paddlers what to expect along their journey. The reverse side, *Historical and Cultural Map of Bayou Teche*, highlights locations and events that have happened throughout the years along the bayou, as well as text entries titled "The Legend of the Teche" and "Natural

History of the Bayou." Native American place names are shown in the language of the local Chitimacha tribe.



## Survey Represented at 2014 Annual RSGIS Workshop

Robert Paulsell of the LGS Cartographic Section presented "GIS Support for Mapping of Late Quaternary Paleovalleys on the Outer Continental Shelf Off-shore Louisiana" (Robert Paulsell, Paul V. Heinrich, Riley Milner, and Richard P. McCulloh) at the 2014 Annual Remote Sensing and Geographic Information Systems (RSGIS) workshop March 13, 2014, in New Orleans. The workshop highlights regional projects that utilize cutting edge GIS and GNSS technology.

## Research Showcased at 64th Annual GCAGS Convention

Gulf Coast Association of Geological Societies (GCAGS) Annual Conventions are among the most important professional meetings that relate to the research performed by LGS. The 64th annual convention was hosted by the Lafayette Geological Society October 5-7, 2014. LGS was well represented, with an exhibit booth displaying publications and posters showing ongoing research projects. LGS research faculty and staff made four research presentations which were also published in the *GCAGS Transactions*. Papers included the following:

Carlson, D., 2014, Is there a significant hydraulic connection between the Mississippi River, nearby oxbow lakes, and ground water within the Mississippi Alluvial Aquifer?: *Gulf Coast Association of Geological Societies Transactions*, v. 64, p.81-89.

Carlson, D., C. Carter, and M. Horn, 2014, Is public perception of water quality accurate in north western Louisiana?: *Gulf Coast Association of Geological Societies Transactions*, v. 64, p. 91-104.

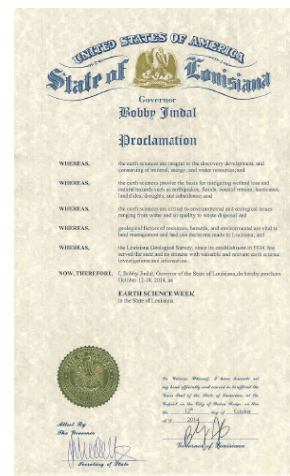
John, C. J., B. J. Harder, and R. Bourgeois, 2014, Developing the untapped potential of geopressured-geothermal energy resources in the Gulf Coast: *Gulf Coast Association of Geological Societies Transactions*, v. 64, p. 547-549.

Milner, L. R., and C. J. John, 2014, Potential for economic development of silica sand deposits in Louisiana for use as proppant in hydraulic fracking: *Gulf Coast Association of Geological Societies Transactions*, v. 64, p. 561-570.

## Outreach Activities

**Earth Science Week:** Earth Science Week is sponsored annually by the American Geosciences Institute (AGI) and its member societies. At the request of the LGS, Governor Jindal issued a proclamation declaring October 12-18, 2014, as Earth Science Week in Louisiana. The theme for the week was "Mapping Our World." LGS received 50 educational kits from AGI which were distributed to school earth science teachers through the program coordinator of the East Baton Rouge Parish School System, Division of Standards, Assessment and Accountability.

**Rockin' at the Swamp:** LGS participated in "Rockin' at the Swamp," a one-day educational outreach event for schools organized by Baton Rouge Parks and Recreation which was held on March 8, 2014. The LGS exhibit booth displayed rocks and minerals found in Louisiana and other places and thin sections. Fossils specimens were also displayed. The LGS booth proved to be one of the star attractions for the hundreds of school students and adults attending the event. The event also featured gem and mineral vendor booths and natural science exhibits.



## Personnel

### Administrative Personnel

**Chacko J. John, Ph.D.**, director and state geologist, professor-research

**Patrick O'Neill**, LGS Publications Sales and Resource Center

### Basin Research Energy Section

**Brian Harder**, research associate

**Reed Bourgeois**, computer analyst

### Geological Mapping & Minerals Mapping Section

**Richard McCulloh**, research associate

**Paul Heinrich**, research associate

### Water & Environmental Section

**Marty Horn**, assistant professor-research

**Douglas Carlson**, assistant professor-research

**Riley Milner**, research associate

### Cartographic Section

**John Snead**, cartographic manager

**Lisa Pond**, research associate

**Robert Paulsell**, research associate

**R. Hampton Peele**, research associate

### Staff

**Melissa Esnault**, administrative coordinator

**Jeanne Johnson**, accounting technician





*RSO radiation specialist Amin Hamideh (left) and technical assistant Charles Wilson measure the radiation level of the tomography beamline at the LSU J. Bennett Johnston, Sr., Center for Advanced Microstructures and Devices.*



# RADIATION SAFETY OFFICE

WEI-HSUNG WANG, DIRECTOR  
www.radsafety.lsu.edu



## General Information

LSU delivers quality education and nationally competitive research that contribute to the economic development of the state and nation. The Radiation Safety Office (RSO), a radiological control unit under the direction of the Radiation Safety Committee (RSC), provides regulatory-mandated guidance and support of academic activities in teaching, research, and clinical services involving the use of sources of ionizing and non-ionizing radiation at LSU. The RSO is responsible for implementing radiation compliance policies and procedures as well as ensuring safe practice to not only comply with federal and state regulations and licensing/registration conditions but also assure adequate protection of people, the environment, and the integrity of the University.

The University's radiation protection program is sanctioned in the LSU System's Permanent Memorandum-30 (PM-30): *Radiation Protection Program* and LSU Policy Statement-99 (PS-99): *Radiation Safety Violations*, while the LSU System's *Safety Procedures for Non-Ionizing Radiation* governs the non-ionizing radiation safety program. The RSO directly supports LSU's research programs and thus reports to the Office of Research and Economic Development, with administrative supervision and assistance through the Center for Energy Studies. The RSO/RSC also reports to the LSU System's Radiation Safety Committee.

In fiscal year 2013-2014, LSU researchers brought in \$27,865,645 of grant funds that involved the use of radioactive materials or radiation producing equipment. Currently, there are 873 approved radiation workers in 199 radiation laboratories under LSU's radiation protection program, including the Pennington Biomedical Research Center and associated facilities such as the Center for Advanced Microstructures and Devices, the Louisiana Emerging Technology Center, and the National Center for Biomedical Research and Training. The RSO provides training and monitoring for radiation workers and performs surveys, inspections, calibrations, leak tests, and radioactive waste management to fully comply with regulatory requirements and licensing conditions. The RSO also evaluates and inspects inventoried Class 3B and Class 4 laser systems for laser intra beam hazards and provides user training. There are 81 active Class 3B and Class 4 laser systems, 107 approved laser users (including 21 laser principal investigators), and 32 laser laboratories.

## Radioactive Waste Materials Disposal Services

The contract for disposal of low level radioactive waste materials expired on June 30, 2014. The Radiation Safety Office worked closely with the LSU Office of Accounting Services to prepare the solicitation for disposal of low level radioactive waste materials. Specifically, line items on the term contract were revised and the description of each line item was clarified. The solicitation closed on May 22, 2014. After review of the bid results, the radioactive waste materials disposal contract was awarded to Bionomics, Inc., in Kingston, Tenn., and a purchase order number was assigned.



## Monitoring of Accumulative Annual Radiation Exposure

Per revised PM-30 (effective July 1, 2014), to adequately track total occupational radiation exposures to LSU employees who (1) are approved radiation workers by the LSU Radiation Safety Office and (2) may have the potential for radiation exposure at multiple facilities, including LSU and non-LSU facilities, procedures shall be established to identify those LSU employees who have been issued radiation monitoring devices at each facility. A modified Radiation Worker Application Form has been developed and used to address this directive. Specifically, the following questions on the application form are to be answered by the applicant before a personal radiation monitoring device will be ordered and issued.

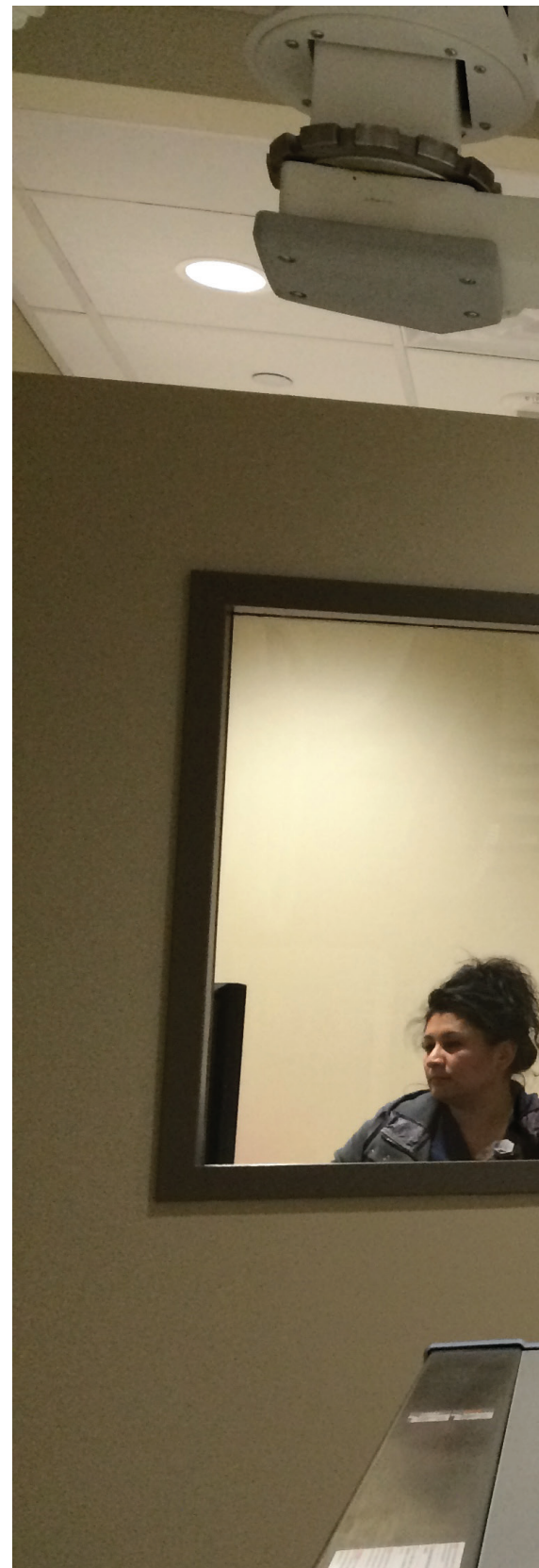
In addition, the Radiation Safety Office will cooperate with the affected LSU employees and radiation safety personnel at the other facilities by notifying them when an LSU employee receives an exposure which exceeds 20 percent of the applicable regulatory limit.

Do you currently wear a radiation monitoring device? Yes ___ No ___ If yes, where? _____ Since? _____
Have you previously worn a radiation monitoring device at another institution? Yes ___ No ___ If yes, where? _____ When? _____
Have you ever been told that you have been exposed to radiation over the allowable limit? Yes ___ No ___ If yes, where? _____ When? _____
For compliance, if you, as an approved LSU radiation worker, receive radiation monitoring dosimeter(s) at another organization(s) in the future, you shall notify the Radiation Safety Office immediately.
Please initial (Applicant): _____

## Inspection by the Louisiana Department of Environmental Quality

Radioactive material license, Increased Controls, and analytical radiation producing equipment inspections were conducted by an inspector from the Louisiana Department of Environmental Quality's (DEQ's) Radiation Surveillance Section. The inspector examined the policies, procedures, and implementation for Increased Controls and Unescorted Access. He reviewed the records of personnel radiation monitoring, investigation of elevated personal exposure, escorted access to Increased Controls areas, radiation user training and approval, radioactive waste disposal, inventory and leak tests of sealed radioactive sources, and surveys for opening and close-out of radiation laboratories. He also inquired about the membership and meetings of the Radiation Safety Committee, enforcement authority, the current status of the National Source Tracking System, the Radiation Safety Manual, and the functions and applications of the Health Physics Assistant software. In addition, he looked over the procedures for radiation user training and approval, opening and close-out of radiation laboratories, radioactive waste handling, ordering and receiving of sources of radiation, and radiation laboratory contamination surveys.

The inspector physically checked the Increased Controls areas, looked into the alarm monitoring system, and verified the list for individuals with Unescorted Access. He walked through the survey meter calibration station, the radioanalytical laboratories of the RSO, and the radioactive waste storage facilities. In addition, he visited 23 radiation laboratories. During the laboratory visits, he







*Blanca Desharnais (left), medical specialist at the Pennington Biomedical Research Center, assists RSO radiation specialist Amin Hamideh (middle) and manager Jabari Robinson in conducting an inspection on a diagnostic X-ray machine.*





*RSO technical assistant Irielle Washington conducts a routine radiation laboratory contamination survey using a pancake Geiger-Mueller probe survey meter.*





checked the radiation levels, calibration of survey meters, inspection frequency of hoods, and posting requirements. He also questioned the approved radiation users about the operational knowledge in handling radioactive materials and quality assurance of radioanalytical equipment and radiation control devices as well as the recordkeeping for the use logs and transfer of radioactive material, in-house radiation laboratory surveys, and radioactive waste disposal. After the walk-through, an exit interview was held and no areas of concern were listed on the DEQ's Field Interview Form.

### Professional Contributions

#### Participation in Health Physics Society's Professional Development School in "Radiation Safety in Medicine"

In February, LSU and the Mary Bird Perkins Cancer Center hosted a three-day professional development school titled "Radiation Safety in Medicine" at the LSU Lod Cook Conference Center. The school offered continuing education to practicing radiation protection professionals, clinicians, and graduate students.

Wei-Hsung Wang, CES associate professor and RSO director, served as a co-academic dean and chaired the "Management of an ALARA Radiological Control Program" session. He presented a course on "How to run an efficient radiation safety program under the economic downturn" at the school. Wang emphasized the importance of the program for radiation professionals. "Continuing education has been a key factor in achieving excellent radiation safety practice in medicine, research, and teaching," he said.

More than 90 radiation professionals, mostly from the United States, who are engaged in advanced technology of radiation therapy, diagnostic radiology, and nuclear medicine, attended the event. The school was sponsored by the Health Physics Society, the American Association of Physicists in Medicine, the National Council on Radiation Protection and Measurements, and other organizations.

#### Journal manuscripts reviewed (by Wei-Hsung Wang):

- Paper 15667 "Carbon disulfide (CS<sub>2</sub>) as a contributor to formation of carbon dioxide (CO<sub>2</sub>) in the atmosphere from unconventional shale gas extraction and processing operations." Reviewed for *Environmental Health Insights*, 2014 (Timothy Kelley, editor-in-chief).
- Paper 15657 "Assessing the impacts of nearby gas drilling and production on neighborhood air quality and human health." Reviewed for *Environmental Health Insights*, 2014 (Timothy Kelley, editor-in-chief).
- Paper 14-901 "Estimated dose rates to members of the public from external exposure to patients with 131I thyroid treatment." Reviewed for *Med Phys*, 2014 (Kenneth Matthews, associate editor).
- Paper HPJ-D-14-00076 "Reactor health physics operations at the NIST Center for Neutron Research." Reviewed for *Health Phys*, 2014 (Robert N. Cherry, associate editor).

### Scholarly Activities

#### Grants Awarded

- A novel type of industrial air purifier using x-ray technology. Jia G, Matthews II KL, Wang W-H, Board of Supervisors of LSU and A&M College, Contract #LIFT-14A-01.
- LSU-HSC: Radiological Physics for Residents. Matthews II KL, Wang W-H, Dey J, Jia G, LSU-Health Science Center, Contract # 42511-1.





*RSO technical assistant Daniel DiMarco prepares smears from the routine radiation laboratory contamination surveys for analysis using a gamma counter.*

## Publications

- Marceau-Day LM, Wang W-H, Robinson J, Hamideh AM. Radiation dose distribution inside a synchrotron ring with a new insertion device. *Health Phys* 107:S59; 2014.
- Hamideh AM, Wang W-H, The Commencement of a health physicist. The 47th Midyear Topical Meeting of the Health Physics Society, February 9-12, Baton Rouge, LA, 2014.

## Personnel

**Wei-Hsung Wang, Ph.D.**, CHP, CSP, CLSO, director

**Jabari Robinson, M.S.**, operations manager & laser safety officer

**Amin M. Hamideh**, radiation specialist & laser safety officer

**Richard E. Teague**, RRPT, senior technologist

**Lorraine Day, Ph.D.**, CAMD liaison

**Lorrie Gaschen, D.V.M., Ph.D.**, SVM liaison

**Christy White, D.V.M.**, PBRC Liaison

### *Technical Assistants*

Dylan Albers

Daniel DiMarco

Jamie Dismukes

Jeremy Dismukes

Jennifer Kenyon

Isai Martinez

Gregory Martini

Irielle Washington

Charles Wilson IV

## Contact Information

### LSU Center for Energy Studies

1067 Energy, Coast & Environment Building  
Louisiana State University  
Baton Rouge, LA 70803  
Telephone: 225-578-4400  
Fax: 225-578-4541  
[www.enrg.lsu.edu](http://www.enrg.lsu.edu)

### Minerals Processing Research Division

1139 Energy, Coast and Environment Building  
Louisiana State University  
Baton Rouge, LA 70803  
Telephone: 225-578-3428  
Fax: (225) 578-1476  
[www.mpri.lsu.edu](http://www.mpri.lsu.edu)

### Louisiana Geological Survey

3079 Energy, Coast & Environment Building  
Louisiana State University  
Baton Rouge, LA 70803  
Telephone: 225-578-5320  
Fax: 225-578-3662  
[www.lgs.lsu.edu](http://www.lgs.lsu.edu)

### Radiation Safety Office

112 Nuclear Science Building  
Louisiana State University  
Baton Rouge, Louisiana 70803-5820  
Telephone: 225-578-2008  
Fax: 225-578-2094.  
[www.radsafety.lsu.edu](http://www.radsafety.lsu.edu)

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Send correspondence to Marybeth Pinsonneault, communications manager,  
at [mpinsonn@lsu.edu](mailto:mpinsonn@lsu.edu) or 1077 Energy, Coast & Environment Building, Louisiana State University, Baton Rouge, LA 70803

Designer: Lisa G. Pond, Louisiana Geological Survey

LSU is an equal opportunity/access university.





## Support a Scholar

To donate to either or both of the Center for Energy Studies' scholarship funds, in support of LSU students majoring in energy-related fields, please complete the form below and mail to

### Center for Energy Studies

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City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Email address: \_\_\_\_\_

Check which applies:

- Robert R. Brooksher Scholarship Fund  
 F. Malcom Hood Scholarship Fund

Amount of donation: \$ \_\_\_\_\_

Check should be made to:  
LSU Foundation–Center for Energy Studies

*Thank you.*