Lectures are held in Chautauqua Hall, unless otherwise noted.

Changing Sources of Energy

10:30 a.m., Monday: Oil & Gas Energy Sources with Andrew Thomas, JD

Oil and gas have transformed the civilized world, revolutionizing travel and providing a cheap source of raw material for plastics. But, the boom-busts cycles have played havoc on economies, including Ohio, which has historically imported oil and gas – notwithstanding that the business was first developed in Cleveland. Today, however, a new oil and gas extraction technology has developed what appears to be a long-term, inexpensive source for natural gas right here in Ohio. This remarkable development is rapidly turning the Ohio-Pennsylvania-West Virginia shale basin into the leading oil and gas producing region in America. The long-term implications to the economy, environment and world geopolitics are momentous. This lecture will discuss these new developments, and what it means to the region.

Andrew Thomas received his JD from Loyola University and his bachelor's and master's degrees from Kent State University. He is Executive-in-Residence at the Levin College of Urban Affairs at Cleveland State University where he leads research for the Energy Policy Center. Thomas joined Cleveland State in 2008. He worked in the New Orleans' energy industry for 20 years as a geophysicist with Shell Oil Company and as a lawyer with private law firms. Thomas is an adjunct at the Cleveland Marshall School of Law along with other international venues where he teaches energy law and policy. He is also currently an oil and gas commissioner for the State of Ohio.

1:30 p.m., Monday: The Energy of Fuel Cells with Andrew Thomas, JD

In 2005, oil was more than $120 per barrel, and America was spending more than $50 million a day for imported oil. Sixty percent of the U.S. trade deficit was from it. Peak oil was projected for 2025, and with it, came projections of all sorts of global unrest, trouble and war over diminishing resources. As a result, America invested heavily into research for fuel cell technology, which holds promise to replace the internal combustion engine with a device that runs on hydrogen and emits water as a waste product. By 2015, oil had dropped to $38 per barrel. American oil production had surged ahead of Saudi Arabia, and today, oil imports make up only 10% of the U.S. trade deficit. So, should people care about fuel cells anymore? The answer is yes. For both environmental and economic reasons, fuel cells are still the best strategy for America to wean itself off of its addiction to oil, to clean up the environment and to reduce geopolitical mischief.

10:30 a.m., Tuesday: The Power of Electricity with Matthew Brakey, JD

Electricity is a unique commodity because it must be produced and consumed simultaneously. There currently is no cost effective way to store it in large quantities. This quirk has far reaching consequences. A vast interconnected system consisting of generation, transmission and distribution infrastructure crisscrosses the country. Regional Transmission Organizations serve as the "air traffic controllers" for electricity, dispatching generation assets and alleviating grid congestion. A complex market structure – that actually has two different spot markets – can produce price spikes 100 times normal levels (as happened in the polar vortex) and then flip to where prices actually go negative. This lecture will provide a basic overview of how the electricity infrastructure and markets work, and how that translates to the electric bills residential, commercial and industrial customers pay. Attendees will achieve a base level understanding of electric markets, which will better inform the evaluation of the world's energy challenges.

Matthew Brakey is President of Brakey Energy, which provides commission-free comprehensive energy management services to approximately 90 energy-intensive businesses that operate in the state of Ohio. These clients include large commercial operations, manufacturers, universities and institutional users, such as the Cleveland Cavaliers, Cleveland Indians, Progressive Casualty Insurance, American Greetings, John Carroll University and the Greater Cleveland Regional Transit Authority. Brakey represents clients at meetings of the Industrial Energy Users of Ohio (IEU-Ohio). He is Secretary of IEU-Ohio, which works with regional, state and national energy stakeholders with the aim of achieving reliable electricity at reasonable prices. He was named a *Crain's Cleveland Business's* Forty Under 40 award winner in 2013 for his professional success and civic contributions. Brakey holds a JD from the Cleveland-Marshall College of Law at Cleveland State University and a bachelor's degree from Miami University.

1:30 p.m., Tuesday: Solar & Wind Power with Alan Frasz

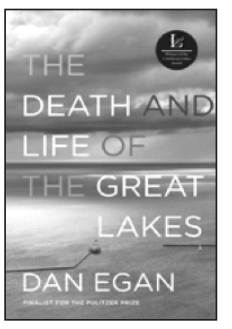
Homeowners and businesses have embraced solar power and have started to implement a significant number of systems across the country. Alan Frasz, President of Dovetail Solar and Wind, will present an overview of solar systems. He will also discuss where a wind turbine makes sense, show examples of different types of implementations, and explain why the adoption of renewable energy is accelerating across the region. The lecture will cover important benefits of the technology, as well as the key characteristics prospective owners should consider in selecting a system and installer. He will detail the projected return on investment and environmental benefits, as well as the utility savings, available tax incentives, grants and renewable energy credits that are making renewable energy a great investment for residential, commercial, agricultural and government projects.

Alan Frasz is President and principal owner of Dovetail Solar and Wind. Dovetail is one of Ohio's oldest and largest renewable energy design and installation companies. Frasz joined the firm in 2006 after spending 28 years in the information technology industry where he held management, sales and technical positions. He earned his bachelor's degree at Case Western Reserve University. Frasz has led the transformation of Dovetail from a small start-up to a regional leader with more than 500 installations totaling 19.1 megawatts and more than 70,000 solar panels. He regularly meets with state and federal law makers to educate them on the economic value, job creation and environmental impact of renewables. Frasz has been a member of the Green Energy Ohio (GEO) Board of Directors since May 2009, chairing the GEO Membership Committee. His contributions were recognized by GEO who selected him to receive their prestigious Pioneer of the Year in Renewable Energy 2010 Award.

Lake Erie & the Great Lakes

11 a.m., Wednesday: *The Death and Life of the Great Lakes* with Dan Egan (Hoover Auditorium) *Please note special time and location.*

The Great Lakes—Erie, Huron, Michigan, Ontario and Superior—hold 20% of the world's supply of surface fresh water and provide sustenance, work and recreation for tens of millions of Americans. Currently though, the Great Lakes are under threat as never before, and their problems are spreading across the continent. Dan Egan's book, *The Death and Life of the Great Lakes*, recently reviewed by *The New York Times*, explores why outbreaks of toxic algae, stemming from the over application of farm fertilizer, have left massive biological "dead zones" that threaten the supply of fresh water. It also examines fluctuations in the levels of the lakes caused by manmade climate change and overzealous dredging of shipping channels. The book reports on the chronic threats to siphon off Great Lakes water to slake drier regions of America or to be sold abroad.



Egan will share his research and advocate for the simple things every person can do to protect the Great Lakes. He is the Great Lakes reporter for the *Milwaukee Journal Sentinel*. He has twice been a finalist for the Pulitzer Prize for explanatory reporting and has won the Alfred I. duPont–Columbia University Award, John B. Oakes Award, AAAS Kavli Science Journalism Award, and J. Anthony Lukas Work-in-Progress Award. He is a graduate of Columbia Journalism School.

Dan Egan Book Signing

A book signing will follow the lecture. Egan's book, *The Death and Life of the Great Lakes*, is available at The Fine Print bookstore and will also be available for purchase in Hoover Auditorium before and after the lecture.

This program is sponsored by the Lake Erie Foundation, Lakeside Environmental Stewardship Society and Lakeside Chautauqua.

1:30 p.m., Wednesday: Lake Erie Research Initiatives with Kristen DeVanna Fussell, PhD (Orchestra Hall)

Lake Erie is arguably the most important lake in the world, but its ecosystem is severely stressed. Its biggest problems are sediment and nutrient loading, harmful algal blooms, the "dead zone," aquatic invasive species and climate change. Addressing and solving these problems requires a well-organized and coordinated program of research, education and outreach to identify and implement new resource management policies and behavioral changes within the watershed. During this lecture, Lake Erie's most critical issues, current research being conducted and a more in-depth look at what is driving the algal bloom issues will be discussed.

Kristen DeVanna Fussell has been an active researcher in the western basin of Lake Erie since 2004, when she began her graduate research at the University of Toledo's Lake Erie Center. She earned her master's degree from the University of Toledo in 2006 and her PhD in 2011. She then worked as a post-doctoral research scientist in the Department of Evolution, Ecology and Organismal Biology at The Ohio State University.

DeVanna Fussell began working for Ohio Sea Grant in 2014 and currently manages Ohio Sea Grant's research program as it relates to grants funded or managed by Ohio Sea Grant and also development of research proposals and programs within Ohio Sea Grant to be funded by external sources. In this role, she regularly interacts with the investigators funded through Ohio Sea Grant and works with the education team to develop new curriculum for formal and informal educators in environmental education. In addition, she instructs a course at Stone Laboratory each summer.

10:30 a.m., Thursday: Response to the *Argo* Shipwreck with Commander Anthony Migliorini (Orchestra Hall)

This lecture will focus on the multi-agency environmental response to the sunken tank barge, *Argo*. The tank barge foundered and sunk during a storm in western Lake Erie on Oct. 20, 1937, carrying more than 200,000 gallons of petroleum products. In a 2013 report, the *Argo* was identified by the National Oceanic and Atmospheric Administration as one of the top underwater legacy environmental threats on the Great Lakes. The exact resting place of the barge remained a mystery for nearly 80 years until it was discovered by the Cleveland Underwater Explorers in 2015. Once discovered, the U.S. Coast Guard, along with 13 partner agencies and contractors, worked for nearly two months to remove all environmentally harmful products from the barge.

Lieutenant Commander Anthony Migliorini assumed command of the Coast Guard Marine Safety Unit (MSU) Toledo in 2015. MSU Toledo is responsible for executing the Coast Guard's Port Safety and Security, Marine Environmental Protection and Commercial Vessel Safety missions from Monroe, Mich. to Huron. His previous positions include serving as the Supervisor of the Coast Guard's Container Inspection Training & Assistance Team, Assistant and Chief of Inspections at Sector San Juan, Puerto Rico, Chief of the Facility & Container Inspection Division, Assistant Chief of the Marine Environmental Protection Division at Sector Los Angeles-Long Beach and Social Media & Community Relations Officer at Coast Guard Headquarters in the Office of Public Affairs.

Migliorini also served as the Assistant Supervisor of the Coast Guard's Redeployment Assistance & Inspection Detachment (RAID) responsible for assisting Army units with the safe shipment of containerized hazardous material cargos from Iraq, Afghanistan and Kuwait. Migliorini graduated from the U.S. Merchant Marine Academy at Kings Point, N.Y. with a bachelor's degree in logistics and intermodal transportation. He holds a Master of Public Administration from the University of Oklahoma.

2 p.m., Thursday: 2017 Harmful Algal Bloom Forecast for Lake Erie Webinar *Please note special time.*

Lakeside Chautauqua will broadcast a live webinar, hosted by the Ohio Sea Grant and Stone Laboratory, which will discuss NOAA's seasonal forecast of harmful algal blooms for Lake Erie this year. The program will feature expert commentary, a discussion of the history of this issue on Lake Erie and the U.S. response to the problem.

Speakers include: **Dr. Christopher Winslow**, Director, Ohio Sea Grant & Stone Laboratory; **Dr. Laura Johnson**, Research Scientist, National Center for Water Quality Research, Heidelberg University; **Dr. Rick Stumpf**, Oceanographer, National Center for Coastal Ocean Science, NOAA; **Dr. Stu Ludsin**, Associate Professor, Aquatic Ecology Lab, The Ohio State University; **Melinda Huntley**, Executive Director, Ohio Travel Association; **Dr. Kenneth Hensley**, Associate Professor, Department of Pathology, University of Toledo; and **Greg LaBarge**, Agronomic Crops Field Specialist, Ohio State University Extension.