The American Association of Petroleum Geologists (AAPG) Imperial Barrel Award Program (IBA) is an educational program sponsored by AAPG that engages graduate geoscience students to experience what it is like to work as a New Ventures Group of an operating oil and gas company to evaluate the geology and geophysics of a prospective basin. The annual competition is adjudicated by industry professionals, and University teams compete among 6 regional groups from around the world. The winners are awarded scholarship funds for their geoscience department along with international recognition.

The IBA or The "Barrel Award", started 1976 as part of the MSc Petroleum Geoscience course at Imperial College in the United Kingdom. AAPG adopted the program concept in 2007 and created a competition that provides primarily Master’s level students a unique learning experience using real dataset (geology, geophysics, land production infrastructure) to evaluate an area for petroleum production. Following an eight-week period that precedes their regional competition, each team delivers their results in a 25-minute presentation to a panel of industry experts. Regardless of how teams place, they will receive feedback from a panel that works in industry, and the opportunity impress potential employers in the audience.

Student teams are assigned the task of making a detailed assessment of the petroleum potential within the given area. They are expected to "think outside the box" and identify new exploration models based on the most recent published research. Teams are scored on the basis of technical quality (best use of the current state of the art), clarity, and originality of presentation. In addition to the usual judging criteria such as meeting deadlines, team effectiveness and good oral presentations, teams must demonstrate evidence of rigorous and creative evaluations of the petroleum potential of the basin/area, along with the ability to make decisions based on incomplete or inadequate data. IBA guidelines provide a comprehensive list of topics that should be addressed in the project data analysis, which supports how the team defines the key plays in a real exploration area. They also make recommendations on future exploration activity based on prevailing technical and economic conditions. Their analyses reflect modern petroleum exploration workflows, including a quantitative analysis of resource and risk assessment at both play and prospect levels.

Teams may consult with their company’s Exploration Manager, typically a Faculty Advisor, plus an expert external consultant. Professor Dale Sawyer is the Rice Faculty Advisor and mentor for Rice IBA teams. A veteran of AAPG, Sawyer specializes in Marine geophysics and tectonophysics, which brings together active source seismology, geodynamic modeling, and remote-sensing to investigate the structure and evolution of the crust and sedimentary basins. "In 2008 when AAPG established the IBA, there were not enough MSc students available at Rice. In 2011, I encouraged 5 students, and away it went," said Sawyer. Sawyer teaches a course on 3D seismic reflection data interpretation that includes IBA topics. It is a computational-based class that focuses on interpreting horizons and faults and tying those interpretations to well data, analyzing seismic attributes, and other relevant topics. Similar to the IBA it places emphasis on workflows used in hydrocarbon exploration.

Rice competes with 10 other Universities in the Gulf-Coast section, five of which come from Texas. There are four sections in the US whose winners compete at the regional and then the international levels. While the Rice team did not place in the top spot, they did receive glowing reviews and compliments on their work and style from industry professionals. The winner, which was the University of Houston, went on to win the top prize in the International competition, highlighting the prestige of the Gulf Coast Section. One of this year’s team members, Subsurface Geoscience MSc student Calyn Jew sums up her experience and provides advice for future Rice IBA teams:

"The best part about the IBA experience is learning the fundamental workflows of hydrocarbon exploration while engaging in a truly collaborative team setting. The program grants teams access to industry level software, the essential tools that make high tech science possible. The hardest part about IBA is the time commitment. It essentially mimics the workload of an internship while it occurs during the academic spring semester.

For those interested in entering the oil and gas industry, IBA is a worthwhile endeavor because the skills acquired throughout this eight-week challenge have direct practical application in this field. This highly competitive competition offers challenges that a real-world exploration geoscientist faces from proposing a prospect given a limited dataset, to managing a project in a time-sensitive environment. Every IBA participant that I have talked to agrees that it has been an overall rewarding experience.

A few suggestions for future IBA teams would be to maintain a steady pace with set achievable weekly goals and to communicate often among team members. There is a lot of work to do in a short amount of time, therefore, efficient knowledge transfer is key to integrating everyone's work and maintaining a consistent level of understanding."
SUMMER 2017 • Outcroppings

DROP PHOTOGRAPHY: VISUALIZING FLUID DYNAMICS
BY JACQUELINE RIOS ‘17

The Visualizing Nature course at Rice is one of the many reasons why I love Rice. In an attempt to combine the humanities with STEM fields, this course allows us scientists to explore the many wonders of nature and document our creativity. For my project, I worked on Water Drop Photography. At first I started out in my home-laundry room with a medicine dropper, a camera, and my own personal study lamp before moving on to Dr. Lenardic’s lab where I could use better equipment and have greater control.

Visualizing Nature is a collaborative, experimental course offered with support from Rice’s Arts Initiative Fund.

Professors Adrian Lenardic (DEEPS) and Geoffrey Winningham (Department of Visual and Dramatic Arts) have worked together to evolve this course since 2013, recognizing that close observation of the natural world are at the core of the best science and visual art alike. Visualizing Nature continues to evolve, encouraging students to freely explore, carefully observe, and photographically record aspects of the natural world, using both scientific and artistic methods. During the spring semester of 2017, 11 students from a wide variety of disciplines and departments were guided to focus their attention on aspects of the natural landscape found entirely within the city of Houston. In order to ensure broad coverage, the city was divided into 12 geographical zones. Additionally, 6 important “streams” or “trails” (i.e. Buffalo Bayou, Main Street, White Oak Bayou, Shepherd Drive) were identified. For 14 weeks, students — working largely in pairs — explored Houston, looking for compelling images of the natural landscape as it thrives, struggles, and survives within the city. Each student was also required to pursue a science project related to the landscape of the city. Observation of water flow in the bayous of the city led to this visual study of water splashes. Fifty-six photographs were chosen to be displayed at the Moody Art Center for their combination of truth and beauty, as well as for the various regions and streams of the city that they represent. - A. Lenardic

Sometimes we take for granted the beauty in everyday science. Take for example snowflakes or champagne bubbles, these are all wonderful in their own way. In my project with the help of the graduate students, I was able to capture beautiful images of water splashes, jets, crowns, drops, and the most fascinating, water drop impacts. Next time when you see rain falling, perhaps grab a camera that can capture 1/800s images of your own, or rather I invite you to test your creativity and try the experiment yourself! Trust me, it will be worth it!

“...that the images that we captured are astonishing, capturing both the complexity and simplicity of water drops...”

- J. Rios
DEEPS partnered with BioSciences to share their appreciation for the oceans and marine life and ways we can help in their conservation. Post doctoral fellows Dr. Travis Swanson and Dr. Lauren Simkins, with the assistance of graduate students Lindsay Prothro and Tian Dong, developed a hands-on demonstration on ‘The Texas coast and its response to sea level change.’ The demonstration focuses on two questions: (1) what is sea level? and (2) how does the coast change when sea level rises? A miniature wave tank, along with informational material was used to show the important processes that influence sea level rise and coastal change that may impact the Texas coast. “Most of us live on land and it’s a nice break to mentally switch and for us to think about the ocean for a day”, said Swanson. Visitors got to see the physical action of waves and rising water and how it affected barrier islands. Graduate student Tian Dong who assisted with the demonstration was interviewed by NEWSFIX.
Hello. My name is Laurence, and I am proud to be a scientist.

I wasn't always a scientist, though. When I was a kid, I wanted to make it to the NBA; I wanted to be the next Michael Jordan. I would practice for hours every day after school: dribbling; lay-ups; the signature fade-away jumper. And by age 12, it seemed that the practice had paid off: I led my team to a league championship that year. Clearly, I was destined for great things. Unfortunately, these included great disappointment, as I saw my teammates come back taller every year, while I more or less stayed the same height. I got left behind. Some dreams are simply not meant to be.

I eventually found Earth and Environmental science by way of Chemistry. I had always done well at Chemistry in school and I enjoyed the mix of math with explosions. In particular, I liked how math could be used to make explosions bigger. Thanks to a wonderful chemistry professor, Mr. Elrod, I would later discover that chemists did more than just blow things up. They had helped clean polluted air when they learned how smog formed; they are helping heal the ozone layer by finding alternatives to harmful CFCs; and they are helping us understand climate change by piecing together how our climate changed in the past. Mr. Elrod showed me how to use what I learned in school to do some good, and to dedicate my life to something larger than myself.

Today, my work at Rice University is focused on understanding the machinery that controls our environment. How does life alter the atmosphere? How does the atmosphere affect life? If we know how the system works, we should have a better sense of how to keep it humming along.

What I have learned in studying the Earth is a greater appreciation for context; a greater appreciation for time. In essence, an appreciation for the circumstances that brought us here today. Continents grow, they collide, and erode over hundreds of millions of years. Thick sheets of ice flow like rivers, grinding away at the bedrock, delivering nutrients to faraway valleys and distant oceans. It is these interconnected actions of Mother Nature that give us our purple mountain majesties, our fruited plains, and our amber waves of grain.

We exist at a time of great technologies, technologies that let us do in minutes what Mother Nature can only do in millennia. We, too, can move mountains. We can change the air we breathe and the water we drink. Science is our way of asking: Are we doing okay? Is everything in good shape? There are some things that only Mother Nature, in her infinite experience, can tell us. Today, on Earth day, of all days, we should listen to our mother.

After all, we are all in this together, sometimes in ways we won't understand or appreciate until much later. My father immigrated to this country on a boat—seven thousand miles on a boat—to study physics. The distance didn't matter; science was his path to opportunity. Studying science gave him a job that would later let my mother stay at home, to raise my brother and me with warmth and tough love; to find a community where a short, asthmatic 12-year-old could be a bona fide basketball star, if only for a moment; where that same kid could find joy and meaning in serving others; and where he could discover his own way to carry the flame forward.

You could say I owe my childhood dream to science. Science supported my family, and my dreams of playing in the NBA. It supported hours and hours of practice, and the idea that hard work pays off. We scientists are more than just stewards of knowledge; we are also stewards of hopes and dreams, for many lives not yet lived. This is what science gives: Essential things. Vital things. Things that make life worth living. We march for science today so that others can dream, much as I did, and so that others can find their own place in this marvelous tapestry.

My name is Laurence, and I am thankful for science. I am proud to be a scientist.
AAPG Report  by Pankaj Khanna

AAPG Student Chapter at Rice University’s DEEPS aims to provide information relating to geology and the associated technology of petroleum, natural gas, and other energy mineral resources; to inspire and train next generation geologists; to inform and develop high level professional conduct among the members; and to advance the professional network of Rice University student members. In order to achieve those goals each year, the AAPG club organizes several talks, workshops, field trips, and information sessions. Under my leadership in 2016-17, the club has exponentially increased its interaction of the department student body with industry by adding several new events to fulfill the main goal of the AAPG club.

The club organized the following events during 2016-17 academic session: 1) Orientation in early September to welcome new members and to inform them about the yearly club activities (scholarships, field trips, workshops, seminars), 2) AAPG RIGS (A new event to invite Rice Alums and other industry professionals to interact with students) which consisted of 3 consecutive Fridays, which included a Career Info Session and Resume Review Session (1st Friday organized with help from DEEPS Alumni liaison and historian Martha Lou Broussard who is the AAPG student chapter mentor), Student talks (2nd Friday), and student posters (3rd Friday), 3) AAPG Houston Student Expo, George R. Brown (Downtown)- Rice student Chapter, with Martha Lou Broussard, helped in organizing this event in which 50 different universities participated, 4) Workshop by Fred Schroeder – Extracting Geology from Seismic Wiggles) November 2016, 5) Info session for Imperial Barrel Award (November), 6) Core Facility Field trip to ALS Oil and Gas with Jim Tucker, 7) Seminar by Paul Mitch Harris (February), 8) The highlight of the Spring semester – Ainsa Deepwater Outcrops Field trip which was funded by Shell (see page 32 for a first hand account by one of the participants.)

To conduct all the activities, the club is highly dependent on funding and would like to thank Shell, Chevron, and the department for their continuous support, and thank BP for their new commitment to our yearly list of donors.

2016-17 academic session was a great experience for me as a leader, but no leader can succeed without a team. I would like to thank our staff members, and the department for the support provided to us this year.

We have updated our website and you could visit us at www.earthscience.rice.edu/aapg/ for more info.
Looking back!

Social events:
Planet Earth & Brownies!

Rocks & Reindeer

Academic Planning:
Talking to students in the quad and giving advice on field camp.

Fundraisers:
Halloween Candy Grams

Buy our T-shirts! Contact Leila Wahab for information

Congratulations to the 2017-2018 officers!
President- Leila Wahab
Vice President- Oliver Lucier
Treasurer- Jackson Stiles
Social- Shannon Wang
WebMaster- Kendra Baldwin

Thank you to our sponsor
Dr. Carrie Masiello! We would not be here without you!

Words from our seniors!

“T am so proud to have been the president of RUGS this past 2016-2017 school year! Being part of this club and the Earth Science community in general has been so refreshing. All of the seniors graduating this year are so diverse in their career options, which I think is sensational. You know, we have taken courses together where we have studied and struggled together and I am just so proud to have grown with all of them. They will forever be my Earth Science family. You guys rock!” – Jackie Rios

“Being part of RUGS has brought me closer to my fellow Earth Science majors and made me feel more at home in our department. We’ve done a lot this year to try and form a community among the Earth Science undergraduates so everyone feels welcomed and supported. From watching Planet Earth and baking brownies to writing reports and working on problem sets together, RUGS has been so important especially to my senior year but also to my entire experience as an Earth Science major. I’m thankful for all the people I’ve gotten to know through RUGS and am excited to see what amazing things we all do!” – Audrey Odwour

“T am so proud to say that my Rice experience includes Rice ESCI, and that my Rice family includes the Rice ESCI department. It was an immense honor to spend my years at Rice with the other undergrads and my fellow RUGS officers, the grad students, and the amazing faculty members and their frequent guests. From friends and field trips, to lab work and late nights spent mapping anticlines in New Mexico, I have so many fond memories to look back on after graduation. Thank you, Rice ESCI!” – Savannah Ezelie

“Thanks to everyone I have met in the Earth Science Department for being so awesome! I have loved being with all of you and pursuing my passion here. I will miss you now that I am moving on. Keep doing cool stuff; there are opportunities everywhere!” – Sarah Gerenday

“I am glad to have been a part of such a tight knit community as the Earth Science department during my time at Rice. We helped one another learn and grow as people, and have developed lasting friendships. As former social chair of RUGS, I mainly just wanted to give back to everyone who helped me along the way. I wish everyone the best as they go off to do great things.” – Ian Mellor- Crumme

“I love RUGS” – Garrett Lynch