Learning Labs: Who Kidnapped Mike the Tiger?

Mike the Tiger has been investigating a pollution scandal on campus. Someone has been dumping toxic waste into the LSU lakes, and Mike decided to try to find out who. He was getting close to the truth when, earlier today, someone broke into the lab and kidnapped Mike. Can you look at the clues and figure out who kidnapped Mike?

In Spring 2017, two students, Hana Malkawi and Spencer Duet, both majoring in Chemistry with a concentration in Secondary Education, took on a unique research opportunity in CHEM 4005, under the tutelage of Dr Linda Allen, Director of Undergraduate Laboratories. Hana and Spencer developed experiments to use in the Learning Lab, a laboratory room set up for visiting middle school and high school students to come and do experiments at LSU. Their mandate was to find experiments that would appeal to students whilst simultaneously addressing various grade level expectations and learning targets that meet common core standards in science. They decided to focus on environmental experiments with a tie into forensic science. The level of the experiments is customizable to the grade of the students. Hana and Spencer also created TA (teaching assistant) notes for other future leaders of the experiments.

The storyline, with Mike the Tiger investigating lake pollution, shows the application of chemistry to solve problems in the real world. Students perform a series of experiments to test the water and soil samples from the LSU lakes, to make a polymer “worm” and compare it to waste products found in the LSU lakes, and finally to develop a fingerprint left behind by the kidnappers. An additional experiment for high school students involves paper chromatography, enabling them to identify the ink used in the ransom note.

The first group of students to visit the lab were upcoming 8th graders who were attending the LSU Middle School Math & Science Circle (MSMSC) this past summer. Sam Bynum and Chase Chambers, graduate student TAs, guided the students’ activities. Their visit concluded with Dr Linda Allen demonstrating the synthesis of liquid nitrogen ice-cream. The students pronounced the Chemistry half-day as THE BEST DAY of the week! Geaux Chemistry!

A significant measure of a great university is the support it receives from its alumni. Join us as we work on the leading edge of discovery and innovation to educate the next generation of scientists. If you would like to support LSU Chemistry, regardless of the amount, we would be most appreciative. All donations are tax deductible and qualify for Tiger Athletic Foundation (TAF) points.

To make your gift online, go to www.lsufoundation.org/givetochemistry. Click ‘Designations’ and choose ‘Chemistry Development Fund’. To make your gift by mail, make your check payable to “LSU Foundation, ” note “Chemistry Development Fund” on the memo line and mail your check to:

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Searching for the Next Patrick F. Taylor Chair

ENVIRONMENTAL IMPACT OF HAZARDOUS WASTE - POSITION #18430

The faculty search is underway to appoint a distinguished scientist to the Patrick F. Taylor Chair for the Environmental Impact of Hazardous Waste. The Chair was endowed by a generous gift from the late Patrick F. Taylor and matching funds from the State of Louisiana. Patrick Taylor was born in Beaumont, TX. In 1955 he came to LSU on a scholarship and graduated with a degree in petroleum engineering in the late 1950s. According to the Patrick F. Taylor Foundation website, he also had “an eye for oil, and a desire to ensure all young people have an opportunity for a college education.” He went onto a career in the oil industry, founding the Taylor Energy Company that he served as Chairman, CEO and President until his untimely death in 2004.

From 1998 to 2015, the Patrick F. Taylor Chair was held by Professor Barry Dellinger whose research focused on thermal degradation kinetics and degradation profiles of organic compounds with a special focus on hazardous organic pollutants. In 2008, Barry received the Arestes USA Foundation Award for having significantly contributed to scientific research that improved public health and he was the 2014 recipient of the ACS Award for Creative Advances in Environmental Science and Technology. Professor Dellinger retired in 2015 and passed away early in 2016. Professor Dellinger represents the caliber of person we seek to fill the Taylor Chair.

These are big shoes to fill, with the job advertisement calling for “an innovative research program in the development of technologies to monitor, treat, and reduce or eliminate hazardous environmental contamination, with the goal of sustainable chemistry and a scientific basis for alleviating state, national and international environmental contaminant problems.” If you know of anyone who might measure up and be interested, direct them to our homepage or contact Les Butler (Chair, Search Committee, lbutler@lsu.edu) or Carol Taylor (Department Chair, cmctaylor@lsu.edu).
**Southern Sisters**

Professor George Stanley demonstrated stoichiometry by exploding balloons

**20th Anniversary of ChemDemo**

On the Tuesday of 1997, Professors George Stanley and Pat Limbach began sending LSU students out into the community to teach lessons that featured exciting, hands-on demonstrations ... and so was born ChemDemo. Limbach, now VP for Research at the University of Cincinnati, said, “Honestly, this program was really George’s baby. I just served as a young assistant professor guinea pig to help him make his dream a reality.”

At noon on Saturday, September 16th, the Baton Rouge Local Section of the ACS hosted a jambalaya lunch on the Chopin/Williams concourse. At 1 pm in the Williams 103 auditorium, Department Chair, Carol Taylor, gave a welcome and background on the ChemDemo Program. Eight demonstrations ensued by assorted student groups and faculty:

- Silly Putty (RU Johnson, NOBCChE)
- Liquid Nitrogen (Carson Szt, James Morvant and Patrick Dickens, SAACS)
- Acids & Bases (Chris Sumner, Nichole Kaufman and Peter Piers, CGSC)
- Styrofoam & Starch (Assistant Professor Daniel Kuroda)
- Quantum Fireballs (Assistant Professors Noémie Elgrishi and Matt Chambers)
- LSU Clock Reaction (Assistant Professor Semin Lee)
- Energy – When 50,000 Volts Won’t Kill You (Associate Dean Andy Maverick)
- Stoichiometry - aka Exploding Balloons - (Cyril & Tuttle Vetter Alumni Professor George Stanley)

The event concluded with the synthesis of liquid nitrogen icecream by Heidi Nowakowski and her SAACS team in the Chopin Lobby. The event was sponsored by the ACS Baton Rouge Local Section and the LSU Department of Chemistry. Ongoing contributions to the ChemDemo program are gratefully acknowledged from: Albemarle, Dow Chemical Company, the ExxonMobil Foundation and Mrs Margaret Vail Rousse.

**ChemDemo for All Ages**

On Tuesday, November 7th, four members of the Student Affiliates of the American Chemical Society (SAACS) visited St James Place. The event was coordinated by Ms Margaret Vail Rousse (resident and friend of LSU Chemistry), Ms Tarnlyn McBride (St James’ Life Enrichment Manager) and Carol Taylor (LSU Chemistry Chair). The LSU undergraduate students performed demonstrations that featured liquid nitrogen. They described the physical principles involved as balloons filled with gas, shriveled on cooling and expanded again on warming to room temperature. Frozen flowers were passed around, giving folks the chance to see how brittle they become. Attendees included Neil and Arlene Kestner (also good friends of LSU Chemistry) and James Place.

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Alumni Return to Share Experiences with Current Students

Over the past few years, we have been gathering profiles of alumni on our website. We showcase one or two of these in each issue of the newsletter. In the next phase of putting current and former students in touch, alumni are visiting LSU to give a seminar about their science, professional experiences and share words of wisdom with current students. The first of these took place on November 17th, 2017. Dr Rolanda Johnson Wilkerson received her BS from Southern University in 1989 and her PhD from LSU in 2003, conducting her research with Rob Strongin. She is currently a Principal Scientist and Senior Manager of Scientific Communications in Beauty Care at Proctor & Gamble in Cincinnati, OH. In her talk, titled From the Chemistry Lab to Developing Consumer Products: The Journey of a PhD Chemist, Rolanda described how one experience builds on another. She explained how chemistry is vital to the design of haircare (and other) products and that her willingness to take chances, her scientific expertise and her communication skills are what has brought her to her current position. We welcomed Dr Ed Doomes (LSU PhD ’02, Poliaoff), his colleagues Kinesha Harris and Conrad Jones and several of their students from Southern University to the event. We all look forward to hearing about Rolanda’s endeavors into the future.

UPCOMING ALUMNI SEMINARS:

These talks are held in the Life Sciences Annex Auditorium, A-101, at 3:30 pm on Fridays, followed by a reception in the Choppin Lobby. Consider yourself invited!

January 19th, 2018: Ms Sharon Vercellotti (BS ’63, undergraduate research with Jim Traynham), President, V-LABS, and her husband and partner Dr John R. Vercellotti. From LSU Chemistry in 1963 Through Forty Years as an Entrepreneur at V-LABS in Covington, LA, Serving the Glycosciences

February 9th: Dr Emmanuel Waddell (PhD ’00, Soper), Associate Dean, University of Alabama at Huntsville, 2017-19 National President of NOBCChE

Kinetically Speaking: Move at Your Rate

April 6th, 2018: Dr Pernendu (Sandy) Dasgupta (PhD ’77, West), Hamish Small Chair in Ion Analysis and Jenkins Garrett Professor of Chemistry and Biochemistry, University of Texas at Arlington

An Ion Chromatograph for Extraterrestrial Explorations. A Mission to Mars?

April 20th, 2018: Dr Curt Holmes (BS ’65), Greatbatch, Inc. Lithium Batteries for Implantable Biomedical Devices – Chemistry and Applications

Southern Sisters (continued)

better work ethic and how to work smart.” Kandace is responsible for teaching the students in the Science Residential College and in Spring 2017, she received a University College Tiger Athletic Foundation Teaching Award. She enjoys the classroom but sees that she can contribute more broadly to the areas of curriculum development and assessment. She currently serves on an ad hoc College of Science committee geared toward retention of science majors and, in 2018, is becoming involved in a bridge program to better prepare incoming science majors for their university experience.

Of their time at LSU, both Jasmine and Kandace are grateful for a supportive environment and the opportunities to get engaged in seminars, conferences, events and organizations. Despite their different paths, they are both ambitious and dedicated to their faculty positions and their families. When asked if they share trials and tribulations of the profession with each other, Kandace responded, “Always! It is such a privilege to be able to regularly share stories with someone close to me that ‘gets it.’” I often call Jasmine on my way home.”

Deck the Halls

On Thursday, December 14th, the Department hosted its annual holiday party on the unfinished fifth floor of the Chemistry and Materials Building.

Chemistry Graduate Student Council sponsored commemorative twinek: Hay Nguyen, Chris Surmey, Peter Pern, MP Hayes, Ryan ’97 Johnson and Rob Strongin

Professor Emerita Saundra McGuire and Associate Professor Doug Géman join in teh festive game of bingo.

Kelly Pitts (former Assistant to the Chair) and Vickie Tate Thornton (Operations Manager)

Professors Emeriti Gresdna Doty (Theater) and Jim Traynham (Chemistry)
On Friday, October 6th, Dr Emory Chan delivered an elegant lecture titled, “High-Throughput Design of Doped Colloidal Nanocrystals.” He explained the energy transfer pathways of lanthanide-doped upconverting nanoparticles and we learned about the combinatorial synthesis of these carefully designed nanoparticles, using robots called WANDA and HERMAN. We observed “the pork chop experiment,” i.e., you don’t want to cook the tissue that you are imaging. In more sophisticated experiments, an undergraduate researcher used nanoparticles to image cross-sections of rat brains. The nanoparticles were optimized for excitation by near-infrared lasers for biological sensing and simulation.

Dr Chan received his BS with Honors and Distinction from Stanford University and his PhD from the University of California at Berkeley. He was a graduate student in the Alivisatos Group at the University of California at Berkeley. He was labeled the “Lair of Boussert.” Boussert family mate and showed a photo of their “gear.” Ben’s box was in attendance as an undergraduate at LSU. In early slides, Emory Chan shared his reminiscences of his “glowbox” and showed a photo of their “gear.” Ben’s box was labeled the “Lair of Boussert.” Boussert family members in attendance were Anne and Christian, both his parents being faculty members. Professor Robin L. McCarley and Dr CJ Dubois (and their son Benjamin) and Steve Damo and Christine Micheel (and their son Benjamin).

Further recognition of the merit of research in the McCarley Group is the award of three NSF Graduate Fellowships to current members: Ansonia Badgett, Heidi Nowakowski and Nghi Tran with their sweet treats.

In Fall 2016, Professor McCarley spent a sabbatical at the National Cancer Institute in Bethesda, MD, forging a collaboration with Dr Hisataka Kobayashi, an MD/PhD surgeon working at the forefront of ovarian cancer imaging. Using mouse xenograph models for ovarian cancer, they were able to obtain quantitative measures of target-to-background imaging for tissues that overexpress NQO1 (NAD(P)H quinone dehydrogenase 1). The ratios were better than anything seen before, and they were able to detect tumors as small as 1 mm. Downstream, surgery using these imaging techniques will be able to remove tumors with clear margins more effectively, decreasing the likelihood of recurrence.

In September 2017, NSF awarded McCarley a “special creativity extension” in the form of two additional years of funding for related research. Such creativity extension awards are rare, with roughly 30 faculty in the US receiving them each year out of a total 43,000 active NSF grants. According to the NSF Grant Proposal Guide, “The objective of such extensions is to offer the most creative investigators an extended opportunity to attack adventurous, ‘high-risk’ opportunities in the same general research area, but not necessarily covered by the original/current proposal.” Indeed, during the first two years of the project, upon which these prestigious awards are based, the McCarley Group published 10 papers, some in high impact chemistry journals like Chemical Communications and Analytical Chemistry. According to McCarley, one of the greatest challenges is writing to new audiences, with papers being published in Cancer Research and ACS Chemical Biology.

In October 2016, LSU Chemistry and Chemical Biology hosts a special event for the annual Benjamin P. Boussert Lecture. The lecture this year was given by Dr Emory Chan, an LSU University Medalist who became a graduate student in the Alivisatos Group at the University of California at Berkeley. He was tragically killed in a car accident a few months before defending his dissertation. In introductory remarks, Professor Robin L. McCarley and Dr CJ Dubois (Dupont) remembered Ben and his days as an undergraduate at LSU. In early slides, Emory Chan shared his reminiscences of his “glowbox” and showed a photo of their “gear.” Ben’s box was labeled the “Lair of Boussert.” Boussert family members in attendance were Anne and Christian, Joel, Kelly and Margot. In addition to Emory, other friends of Benjamin Boussert able to attend the lecture this year were CJ Dubois (and his son Benjamin) and Steve Damo and Christine Micheel (and their son Benjamin).

McCarley Research Group Looking at Cancer Cells in New Ways

Professor Robin L. McCarley joined the faculty at LSU in 1992 as an assistant professor. Since 2007, he has been the Barbara Womack LSU Alumni Association Endowed Professor. A former LSU Distinguished Research Master in STEM (2011), he broadly describes his research as the “development of new materials for measurement science applications and the methodologies needed to evaluate such materials.”

A current major project, titled “Enzyme Activatable Substrate Probes for Fluorescence Imaging and Quantification in Cells,” was funded by the Chemical Measurement and Imaging Program of the Chemistry Division of NSF in 2015. The program involves the design and synthesis of smart dye molecules that are “turned on” in the presence of enzymes that are expressed at higher levels in cancer cells relative to healthy cells. High sensitivity and reliability of the real-time assays are being tested by microscopy and cell-counting methods.

In Fall 2016, Professor McCarley spent a sabbatical at the National Cancer Institute in Bethesda, MD, forging a collaboration with Dr Hisataka Kobayashi, an MD/PhD surgeon working at the forefront of ovarian cancer imaging. Using mouse xenograph models for ovarian cancer, they were able to obtain quantitative measures of target-to-background imaging for tissues that overexpress NQO1 (NAD(P)H quinone dehydrogenase 1). The ratios were better than anything seen before, and they were able to detect tumors as small as 1 mm. Downstream, surgery using these imaging techniques will be able to remove tumors with clear margins more effectively, decreasing the likelihood of recurrence.

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Further recognition of the merit of research in the McCarley Group is the award of three NSF Graduate Fellowships to current members: Ansonia Badgett (2015), Milica Jackson (2016), and Chris Summer (2017). Professor McCarley works closely with his talented students to provide them with training in interdisciplinary science, preparing them in a more general sense, to solve complex scientific problems.