



NEWSLETTER

Oklahoma Section American Chemical Society

Volume 26 Number 2

November 2021

Section Meeting
Thursday 18 Nov 2021

USING CELL CYTOMETRY AND RAMAN SPECTROSCOPY TO CHARACTERIZE MICROPLASTIC PARTICLES <300 MICRONS IN WATER SAMPLES



Mark Nanny
Dept of Civil Eng & Environmental Sci
Univ Oklahoma, Norman, OK

The environmental hazards associated with microplastics come from the physical accumulation of particles in a myriad of organisms, as well as the increased exposure of life forms to chemicals and biofilm-associated microorganisms associated with polymer surfaces. Concern is growing over the presence of microplastic particles <10 micron that are found in water, soils, and air samples. Typically, optical microscopy is used to quantify and chemically characterize larger microplastic particles (≥ 50 microns), however smaller particle analysis becomes extremely challenging and is fraught with operator bias. To address the need for an accurate, rapid, unbiased, and quantitative characterization of microplastics ≤ 300 microns, multistage fractionation was used to separate particles into less than 300- and 70-micron subsamples, followed

continued on page 2 with the speakers' biographical sketches. →

The meeting will be virtual via ZOOM.

6:30-7:00 pm Social Time

Join early to meet Oklahoma chemistry students and professionals from around the state.

7:00 –8:00 pm Presentation

[ZOOM LINK](#)

Meeting ID: 940 8226 4116

Passcode: 913789

This meeting has a waiting room. Please wait for the host to let you in.



zoom link

\$50 available for Chemistry Club Watch Parties!

Join the meetings via Zoom with your friends. The Section will provide \$50 toward snacks for Chemistry Clubs to host watch parties for the Oct and Nov Section meetings. Watch Parties start at 6:30 pm the night of the meeting. Ask your faculty sponsor to apply to Dr. Stephanie Jones (sjones116@uco.edu).

PHOTO GALLERY FROM THE NATIONAL CHEMISTRY WEEK EVENT *Fast or Slow Chemistry Makes it Go!* SATURDAY 23 OCTOBER SCIENCE MUSEUM OKLAHOMA

This year's event was attended by 75–100 people. Tables were provided by groups from OSU (Prof. Bolliger, the ACS student chapter, and the Electrochemical Society) and from UCO (Prof. Ferguson and the Chemistry Club).



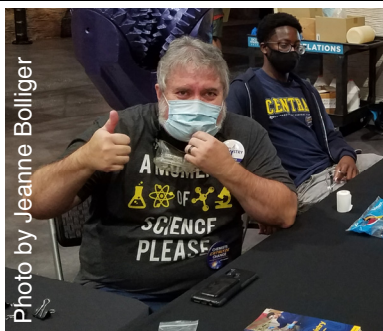
Photo by Jeanne Bolliger

OSU ACS student chapter table. Megan Hays (front right) demonstrates making slime.

OK ACS SECTION ELECTIONS

Ballot in this Newsletter

Cast Ballots due on or before 5 PM on 18 Nov



Left UCO) Prof. Michael Ferguson (front) and Ryan Webb (back). Right OSU) Prof. Jeanne Bolliger.



OSU ACS student chapter table. Undergraduate students, left to right, Alyssa Barkley (front left), Rachel Crittall (back), Jacob Solomon (front), Martha Halihan (back), Megan Hays (front right).



UCO Chemistry Club was represented by (left to right) sitting: Aria Hansen, Maggie Ward. Standing: Alex Keck, Ryan Webb.



OSU Chapter of the Electrochemical Society table. Participating were graduate students Zhuo Wang (seated), Tom Moulton, and Akansha Sharma (latter two not pictured).

(Speakers—continued from front page)

by counting using a cell cytometer. This procedure allows for the quantification of microplastic particles as small as 1 micron and allows for replicate measurements to determine the statistical distributions of particle size and mass. Multiple Raman spectral scans of the subsamples, followed by spectral deconvolution, provides chemical information related to polymer composition and degree of oxidative weathering. Known amounts of polyethylene microspheres of a specific diameter are added as an internal standard to samples as they are easily distinguished from microplastic particles and provide a measure of percent recovery. This methodology was used to characterize microplastics ≥ 1 micron in size present in real-world water samples ranging from agricultural runoff with a high suspended clay content to samples collected from open water columns.

Mark Nanny Biographical Sketch

Mark Nanny is a Professor in the School of Civil Engineering and Environmental Science and in the Institute for Energy and the Environment at the University of Oklahoma. He is also the CEO and Cofounder of OptoKhemia Analytical LLC, a company that develops analytical methodology and sensors for quantifying emerging environmental contaminants. Mark received a B.S. in chemistry (1986) from Wayne State University, and a M.S. in chemistry (1989) and a Ph.D. in environmental chemistry (1994) from the University of Illinois, Champaign-Urbana. He spent two years as a post-doctoral researcher at Pennsylvania State University, before arriving at the University of Oklahoma in 1996. As an environmental chemist, his research interests focus on the environmental fate and transformation of anthropogenic compounds in complex systems and processes such as ground water aquifers and surface waters, soils and sediments, landfills, oil and gas produced waters, microbial influenced corrosion of steel infrastructure, and the reuse of treated wastewater. His passion for interdisciplinary research at the chemical-microbial interface has provided him the opportunity to mentor graduate students in environmental science, environmental engineering, and his collaborations with the OU Department of Chemistry and Biochemistry as well as in the Department of Microbiology and Plant Biology, to mentor graduate students in analytical chemistry, physical chemistry, and microbiology. His expertise in numerous spectroscopic, electrochemical, and chromatographic analytical methods led him in 2019 to form with four colleagues, OptoKhemia Analytical, a company that designs and implements in-situ nanophonic sensors and sensor networks for real-time and continuous detection of contaminants in water and air. As a PI or CoPI, Mark has brought in over \$22.8M in research funding through various programs in the National Science Foundation, the Office of Naval Research, US Environmental Protection Agency, United States Geological Survey, the OK State Department of Education, as well as Conoco Philips and EcoPetrol Colombia. He has published 69 research papers and book chapters, coedited the book Nuclear Magnetic Resonance Spectroscopy in Environmental Chemistry, and has two patents: one for the bioconversion of coal to methane and another for flow-through nanophotonic sensors.



Two SMO Apprentices assist at the OSU table demonstrating the chromatography of inks. The Apprentice Program at SMO is a volunteer opportunity for students grades 7–12.



OSU ECS table. Zhou Wang demonstrates electrochemical copper plating.

SOLICITING NOMINATIONS

Oklahoma Section Awards for Undergraduate Students

- The *Roger Baldwin Graduate Student Award* provides \$500 for students entering graduate school in chemistry or a chemistry related field. The application deadline is May first every year.
- The *Terrill Smith Travel Award* is a grant of up to \$600 for travel to present a paper or poster at a national or regional ACS meeting. The application deadline is 4 weeks prior to the meeting start date.

For more information and forms please visit the web site:

<https://tinyurl.com/4a7nczch>

—Chuck Rice (Awards Committee)



Pentasectional Meetings

The Pentasectional meetings are tentatively planned to resume on the following schedule.

2022 Northern Oklahoma
2023 Oklahoma with SWRM 2023
2024 Tulsa
2025 Wichita Falls-Duncan

No meeting was held in 2020 or 2021 due to the COVID-19 pandemic.

SWRM 2023

chemistry energized

15–18 Nov at the Omni OKC

hosted by the Oklahoma Section



ACS
Chemistry for Life™



CHEMISTRY OLYMPIAD

2022 Calendar

- March 1–31 — Local Section Competitions
- April 23–May 1 — National Exam (exact date TBA)
- June 6–17 — Study Camp
- July 10–20 — 54th IChO

Contact Reza Latifi for more information

reza.latifi@okstate.edu 405.744.4330

If your school has not participated before please contact Reza so he knows that you are interested and has good contact information.

2021 Oklahoma ACS Section Officers and Standing Committee Chairs

Stephanie L. Jones	Chair
Jeanne L. Bolliger	Chair Elect
Naga Rama Kothapalli	Immediate Past Chair
Lloyd A. Bumm	Secretary + interim Newsletter ed.
Jason Wickham	Treasurer
Allen Applebitt	Councilor + Nominations Com.
John Michael Ferguson	Alternate Councilor
Charles V. Rice	Awards Com.
Reza Latifi	Chemistry Olympiad Com.
John Michael Ferguson	National Chemistry Week Com.
Cheryl Frech	Public Relations
Nicholas F. Materer	Web Master

Oklahoma ACS Calendar of Events.



L. A. Bumm
Oklahoma Section of the ACS
Homer L Dodge Dept of Physics & Astronomy
The University of Oklahoma
440 W Brooks St
Norman, OK 73019-2061

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CALENDAR OF EVENTS
2021 Dates & Speakers

Oct 31–Nov 03 SWRM 2021
Austin, TX

Nov 18 (Thu) via Zoom
Mark Nanny, Dept of Civil Eng & Environ Sci, Univ Oklahoma, Norman, OK
Using Cell Cytometry and Raman Spectroscopy to Characterize Microplastic Particles <300 Microns in Water Samples

2023

15-18 Nov SWRM 2023
Oklahoma City, OK
hosted by the Oklahoma section