

The Chemical Record

Volume 59 — Number 1 — February, 2017

Columbus Section of the American Chemical Society, Inc.

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ABOUT THE COLUMBUS SECTION



The Columbus Section of the American Chemical Society comprises approximately 1,500 members who live and work in the following central Ohio counties: Delaware, Fairfield, Fayette, Franklin, Hocking, Knox, Licking, Madison, Marion, Morrow, Muskingum, Perry, Pickaway, Ross, and Union.

The Mission of the American Chemical Society (ACS) is to encourage in the broadest and most liberal manner the advancement of the chemical enterprise and its practitioners. Toward that end, the ACS advances scholarly knowledge, provides professional services and support, communicates with varied audiences, and is actively involved in the science, education, and public policy arenas.

The Columbus Section of the ACS adheres to this mission and the strategic thrusts of the national organization and leadership by providing programs and networking opportunities for Chemistry professionals in Central Ohio.

We invite ACS members and scientists in the community to lend their expertise and talents to our activities in science education, government and legislative policy issues, safety in our industrial plants and in our communities, and care of our land.



MEETING NOTICE

Columbus Section of the American Chemical Society, Inc.

columbus.sites.acs.org

Meeting #886

DNA Origami: Engineering on the Small Scale

Alex Marras

Ph.D. Candidate in Mechanical Engineering, The Ohio State University

Wednesday February 15, 2017

Mozart's Cafe

4784 North High Street

Columbus, OH 43214

614-268-3687

PROGRAM DETAILS

5:00 – 6:00 PM	Executive Committee Meeting – All members are welcome to attend.
6:00 – 7:00 PM	Social Hour – Adult beverages available
7:00 – 7:45 PM	Dinner <ul style="list-style-type: none">• Breads• Garden Salad – greens topped with tomato, cucumber and red onions• Entrées:<ul style="list-style-type: none">○ Beef Stroganoff – Tender beef, mushrooms and onions braised in a red wine demi-glace, topped with a dollop of sour cream.○ Pork Wiener Schnitzel – lightly breaded cutlet cooked to a delicate golden brown.• Accompaniments:<ul style="list-style-type: none">○ Redskin Mashed Potatoes○ Market Vegetables (Special diet option also available)



	<ul style="list-style-type: none"> • Beverages – water, coffee, tea, and soft drinks • Plated Dessert
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7:45 – 8:45 PM Program	Lecture by Alex Marras: “DNA Origami: Engineering on the Small Scale”
Cost	The charge for dinner is \$20 per person for members and non-members, \$5 for retired and unemployed members, and \$5 for students. Payment will be collected at the door; cash and checks accepted. There is no cost to attend the program only. <i>Remember that this is a dinner order and must be paid. Please help control costs by honoring your order.</i>
RSVP	To avoid dropped reservations please use the Meeting Reservation Form on the section's website (http://columbus.sites.acs.org/). Alternatively, please send an e-mail with the same information to us at the following e-mail address: columbusacs@gmail.com providing the information listed below.
E-mail Reservations Template	<ul style="list-style-type: none"> • First and last name • Membership category: member, non-member, retired, emeritus, unemployed, student • Employer, if any • Your choice of entrée: Beef Stroganoff or Pork Wiener Schnitzel, or advise if you have special needs • Please indicate if you will join us for <u>Dinner & Program</u> OR <u>Program Only</u> • Your phone number, in case we need to contact you.
Reservation Deadline	Thursday, February 9, 2017 at 5:00 pm
Program Contact	James J. Wasil , 614-271-5970; jim.wasil@scenarial.com
Directions & Parking (Mozart's is on North High Street between East Cooke and Morse Roads)	<p>From the North - Take I-71 South towards Columbus. Take Exit 116 for Sinclair Road. Turn Left onto Sinclair Road. Turn Right onto Morse Road. Turn Left onto North High Street. Destination will be on the left.</p> <p>From the East - Take I-70 West towards Columbus. Continue to Exit 43 A, following signs for I-70 West/Columbus and merge onto I-70 West. Take Exit 101 A for I-71 North. Take the Henderson Rd exit. Turn right onto W. Henderson Road. Turn left onto N. High St. Destination will be on the right.</p> <p>From the West - Take I-70 East towards Columbus. Take Exit 2B to merge onto OH-315 North. Take the Henderson Rd exit. Turn right onto W. Henderson Road. Turn left onto N. High St. Destination will be on the right.</p> <p>From the South - Take I-71 North toward Columbus. Take exit 106 A - 106 B for OH-315 North towards Worthington. Take the Henderson Rd exit. Turn right onto W Henderson Road. Turn left onto N High St. Destination will be on the right.</p> <p>Parking is free</p>



ABOUT THE TALK:

DNA ORIGAMI: ENGINEERING ON THE SMALL SCALE

Structural DNA nanotechnology – specifically DNA origami – enables the precise fabrication of nanoscale geometries. Here, we demonstrate an approach to engineer complex and reversible motions of DNA origami mechanisms.

Following a traditional macroscopic machine design approach, we developed nanoscale kinematic rotational and linear joints that integrate stiff, double-stranded DNA components and flexible, single-stranded DNA components to constrain motion along a single degree of freedom and demonstrate the ability to tune flexibility and range of motion. Multiple joints were then integrated into various higher-order mechanisms including a crank–slider that couples rotational and linear motion.

We have also demonstrated multiple actuation methods to achieve reversible conformational changes *via* input DNA strands to form new connections distributed throughout the mechanisms. We have recently developed another actuation method using weakly complementary DNA connections that can be controlled by adjusting cation concentration. We expect these approaches can increase actuation rates because they do not rely on a competitive strand displacement process.

Our results provide a framework for controllable 2-D and 3-D DNA-based mechanisms and materials that could be used for measuring biomolecules, bio-sensing, and triggered drug delivery.

ABOUT THE SPEAKER:

ALEX MARRAS

Alex Marras grew up in Columbus and earned his B.S. (2011) and M.S. (2013) degrees in Mechanical Engineering at The Ohio State University. He was a member of TBDBITL while an undergrad. He is currently working on his Ph.D. in Mechanical Engineering under the guidance of Assist. Prof. Carlos Castro and expects to finish this coming summer. He received the 2016 Presidential Fellowship – the most prestigious award given by the Graduate School – recognizing outstanding scholarly accomplishments and potential of students entering the final phase of their dissertation research.



SPRING 2017, 253RD ACS NATIONAL MEETING AND EXPOSITION
APRIL 2-6, 2017
SAN FRANCISCO, CA



21ST ANNUAL GREEN CHEMISTRY & ENGINEERING CONFERENCE
JUNE 13-15, 2017

Join us in 2017 at the must-attend event for green chemists and engineers. The 21st Annual Green Chemistry & Engineering Conference (GC&E), hosted by the ACS Green Chemistry Institute®, will be held in Reston, Virginia on June 13-15, 2017. GC&E provides an opportunity for a diverse network of over 500 academic, industrial and government stakeholders to network and learn about the newest ideas in sustainable approaches to chemistry, chemicals, processes and products. Featuring over 30 technical sessions, a robust poster session, keynote lectures, workshops, social events and a Green Expo, GC&E is the premiere forum for sustainable and green chemistry and engineering.

The overarching theme of the conference in 2017 will be "Making Our Way to a Sustainable Tomorrow." The conference invites scientists and leaders from all sectors to come together to address critical topics such as the design of sustainable chemicals, flexible chemical manufacturing, more efficient processes, green chemistry curricula, circular economy considerations, sustainable materials, academic-industry collaborations, chemicals policy and more.

UPCOMING ACS WEBINARS
FROM THE ACS WEBSITE

**How to Make Chocolate for your Special Valentine:
Flowers Bloom, Chocolate Shouldn't**

Thursday, February 9, 2017 @ 2-3pm ET

Rich Hartel of the University of Wisconsin-Madison is returning to share how to properly make chocolate to avoid the moldy looking "bloom" that can occur when it is done incorrectly.



**Natural, Sustainable Innovation: L'Oréal's Commitment
to Renewable Materials and Eco-Friendly Processes**

Thursday, February 16, 2017 @ 2-3pm ET

Michel Philippe will discuss the importance of using renewable raw materials, designing resource-efficient synthesis methods with minimal environmental impact, and developing substances with favorable environmental profiles designed with their subsequent degradation in mind.



Fighting Cancer: Epigenetic Targets for Oncology

Thursday, February 23, 2017 @ 2-3pm ET

Stuart Conway from the University of Oxford will introduce current understanding of the molecular basis of epigenetic processes, and explain how these findings are being exploited in medicinal chemistry to develop medicines with innovative new mechanisms of action.



Why Attend ACS Webinars®?

FAST – Get right to the heart of addressing issues important to you in 60-minutes.

CONVENIENT – Listen from the comfort and convenience of your home or desk.

EASY – Online access is all you need. Register, then click the link in your email confirmation, and you're in!

ACTIONABLE – Learn from luminaries and subject matter experts on strategies and tactics you can use immediately after the webinar.

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AFFORDABLE – A free weekly online event provided to by the American Chemical Society.

All recordings of ACS Webinars® are available as a benefit to current ACS members. Live weekly ACS Webinars® continue to be available to the general public.

Editor's Note: For more details about the webinars described above, please visit <https://www.acs.org/content/acs/en/acs-webinars.html>

UPCOMING ACS SHORT COURSES
FROM THE ACS WEBSITE

Upcoming Courses in Orlando, FL

February 22 – 24, 2017

American Chemical Society will be holding Short Courses in Orlando, FL on February 22 – 24, 2017 to help you gain invaluable training in just a few days. Short Courses from the ACS give you the tools to stay on top of new technology, growing trends in the science industry and basic skills you need to advance in your career. [See all courses »](#)



Register for “Survey of Flavor Science”

April 3 – 4, 2017

American Chemical Society will be holding “Survey of Flavor Science”, developed in partnership with the [Flavor Research and Education Center](#) at Ohio State University, on April 3 – 4, 2017 to help you learn about important flavor chemistry and technology topics from seasoned experts. Short Courses from the ACS give you the tools to stay on top of new technology, growing trends in the science industry and basic skills you need to advance in your career. [Read more »](#)

Editor's Note: For more details about the short courses described above, visit www.proed.acs.org/.

FROM CHEMICAL & ENGINEERING NEWS FEBRUARY 6, 2017
NEW SUNSCREENS INSPIRED BY NATURE

Humans aren't the only organisms that need sunscreen to avoid DNA damage inflicted by ultraviolet light. Many tiny inhabitants of shallow waters such as cyanobacteria and algae also need sun protection, but they make their own. A team led by Diego Sampedro at the University of La Rioja were inspired to design new sun protection for humans based on these microbe-produced sunscreens.

The scientists focused on a family of small molecules called mycosporine-like amino acids (MAA), which contain a central cyclohexenone or cyclohexenimine ring that is further decorated by a variety of chemical substitutions (*Angew. Chem. Int. Ed.* 2017, DOI: 10.1002/anie.201611627).

These molecules have a lot of characteristics desired by sunscreen makers: They're low weight, they're thermally and photochemically stable, and they dissipate the energy from absorbed UV light as heat. The molecules' downside is their elaborate chemical decoration: Building many of these MAAs in a lab takes more than a dozen steps—too many to make their production financially feasible for sunscreen makers.

So Sampedro's team used computer modeling of MAAs to predict the simplest core structure that might still produce desirable UV

protection. Using this as a starting scaffold, the team built a collection of analogs that were more amenable to large-scale production. When the team added its new compounds to commercial products, the sunscreens boosted protection against both UV-A and UV-B wavelengths.

The team hopes the molecules could provide UV protection in nonsunscreen applications as additives to polymers, resins, paints, or coatings.

COLUMBUS SECTION ACS CALENDAR OF EVENTS

Year	Month	Date	Day	Location	Comments
2017	February	9	Thursday		5:00 pm: Deadline for reservations for February, 2017 Section meeting.
2017	February	15	Wednesday	CAS	Monthly Section Meeting; see details elsewhere in this issue of <i>The Chemical Record</i> .

ABOUT THE CHEMICAL RECORD

The Chemical Record, official newsletter of the Columbus Section of the American Chemical Society, Inc., is published monthly, February-May and September-December (eight issues per year.) Opinions expressed by editors or contributors do not necessarily represent the official position of the Columbus Section or of the editorial staff. We welcome your contributions to your *Chemical Record*. Please submit them via postal or electronic mail to **Ashish Deshmukh**, 2690 Fishinger Road, Columbus, Ohio 43221, ashishdeshmukh@hotmail.com. Electronic mail contributions should be in MS Word file attachments (preferred) or plain-text messages. *Thank you very much!*

CHANGE OF ADDRESS

Changes in postal or e-mail address should be reported to the Membership Chair, **David Speth**, 614-688-5162, drspeth@sbcglobal.net. David will forward the change-of-address information to ACS Headquarters.

ADVERTISING RATES

Advertising rates for *The Chemical Record* are as follows (per single insertion): Full Page, \$250; Half page, \$150; Quarter Page, \$120; Eighth Page: \$60; Business Card, \$50. Discounts: 5% for four insertions or 10% for eight insertions during a calendar year. There is no charge for "help wanted" ads.