

Westchester Chemical Society
New York Section of the American Chemical Society

THE DISTINGUISHED SCIENTIST AWARD AND DINNER,
A SALUTE TO EXCELLENCE
AND THE STUDENT ACHIEVEMENT AWARDS

THURSDAY, APRIL 23, 2020

Social 5:00 p.m. Lecture and Awards 6:00 p.m. Dinner 7:00 p.m.

Trisiloxane Alkoxylates as Adjuvants for Agriculture

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Research Fellow

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DISTINGUISHED SCIENTIST 2020:

Mr. George Policello for *Contributions to the Discovery, Development & Application of Trisiloxane Alkoxylates as Agricultural Adjuvants.*



ABSTRACT:

Trisiloxane-based surfactants have been used for over 35 years as spray adjuvants for agricultural applications. Relative to conventional adjuvants, trisiloxane surfactants provide an extremely low aqueous surface tension (~21 mN/m at 0.1%). This surface activity, coupled with a compact hydrophobe (trisiloxane portion of the molecule), makes these unique surfactants “Super-spreaders”, where the spray droplet is transformed into a thin film on the leaf surface. Therefore, trisiloxane solutions easily wet almost any waxy leaf surface, and the overall coverage on a target plant is significantly increased. This results in spray volume reductions of up to 90%, benefiting areas where water is in short supply. Additionally, a reduction in water usage allows the grower to treat more acres per tank-load, thereby saving time, labor and energy.

Another extraordinary property of trisiloxane surfactants is their ability to promote rapid uptake of spray solutions via stomatal flooding in as little as 20 seconds. Active ingredients taken up into the plant via this pathway become immediately rainfast (resistant to wash-off), thereby reducing waste, and in some cases allowing for a reduction in pesticide usage.

Silwet L-77 adjuvant was the first trisiloxane-based surfactant developed for agricultural applications. This unique class of “Super-spreading” wetting agents was introduced into agriculture in 1985, in response to the inability of many herbicides to control gorse (*Ulex europaeus*), a noxious invasive weed in New Zealand. Union Carbide, in collaboration with the Forest Research Institute in NZ, quickly realized that Silwet L-77 adjuvant significantly enhanced the performance of herbicides that were

previously incapable of controlling gorse. In fact, only Silwet L-77 adjuvant had the ability to effectively wet the waxy surface of gorse, thereby enabling a 70% reduction in pesticide requirements, while delivering effective control.

This presentation will detail the historical development of “Super-spreading” trisiloxane-based wetting agents, including examples illustrating how commercial growers use such surfactants as a regular part of their spray program, including their use in organic farming.

BIOGRAPHY:

George Policello is a Technology Research Fellow with Momentive Performance Materials, in Tarrytown, NY. His primary responsibilities include the direction of new product development and platform technology research programs focused on agricultural applications that enable decreased agricultural spray volumes, reduced active ingredient dosage, and improved spray control and efficiency.

George began his career in 1980 with Union Carbide in Tarrytown, focusing on the synthesis of organomodified silicones for a broad range of applications, including coatings, textiles and personal care. In 1985 he joined Lever Research in Edgewater NJ, where he studied the interactions between polyether-modified silicone surfactants and conventional wetting agents. He rejoined Union Carbide in 1987 (subsequently Crompton Corporation, OSi Specialties, GE Silicones, and Momentive Performance Materials) where he has since been responsible for the development of silicone surfactants, specifically trisiloxane alkoxylates as agricultural spray adjuvants. George has contributed to the understanding of the super spreading mechanism associated with these unique surfactants, as well as the role of spreading on the uptake and efficacy of agrochemicals on and into foliar surfaces. Additionally, his research on surfactant-pair interactions between trisiloxane alkoxylates and conventional surfactants has added to the understanding of how dynamic surface tension influences spray droplet adhesion on leaf surfaces.

George graduated from Mercy College in Dobbs Ferry, NY in 1979 with a Bachelor of Science degree in Biology. He holds more than 45 patents related to silicone surfactants and agricultural applications, and is the author of more than 70 external publications and presentations. Additionally George has been involved with the Silicones Environmental Health and Safety Council (SEHSC), and the Counsel of Producers & Distributors of Agrotechnology (CPDA).

Pace University
861 Bedford Road – Entrance #1, Pleasantville, NY 10570
The Stephen Friedman Room, Wilcox Hall
Directions attached
(914)-773-3200

Cost: \$30; Students \$20

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Westchester Chemical Society Webpage:

http://www.newyorkacs.org/sub_west.php

Directions To Pace Campus

Saw Mill River Parkway– Northbound

Take exit 26, "Taconic State Parkway." The first exit on the Taconic Parkway is for Pace University at Pleasantville – Route 117. At the end of the exit there is a traffic light. Entrance one to the campus is directly in front of you, straight across the intersection. Wilcox Hall (number 24 on the campus map, below) is the first building on your right. Parking is in front of it.

Saw Mill River Parkway- Southbound

Take Exit 29, "Manville Road/Pleasantville." At the stop sign, turn left onto Manville Road. Travel 2/10 of a mile. At the stop sign, turn right onto Route 117 (Bedford Road). The campus is 3/10 of a mile on the right. You will see three entrances, marked three, then two, then one. Entrance one will be last. Then see above.

Sprain Brook Parkway and the Taconic State Parkway – Northbound

Take the Sprain Brook Parkway northbound. At the Hawthorne interchange, the Sprain Brook will lead directly onto the Taconic State Parkway. The first exit on the Taconic Parkway is for Pace University at "Pleasantville – Route 117." See above.

Taconic State Parkway– Southbound

Take the exit "Pleasantville Road/Pleasantville." At the end of the exit, at the light, turn left and proceed under the Taconic Parkway. Continue on Pleasantville Road to the third traffic light. Turn right at this light and proceed 2/10 of a mile. At the stop sign turn right onto Route 117 (Bedford Road). The campus is 3/10 of a mile on the right. You will see three entrances, marked three, then two, then one. Entrance one will be last. See above.

Cross Westchester Expressway – Route 287 –Westbound

Take exit 3 to the Sprain Brook Parkway northbound and proceed north as above.

Tappan Zee Bridge and Cross Westchester Expressway – Route 287 –East

After paying the toll on the Tappan Zee Bridge, stay in the right lane and proceed south on Route 87 (New York State Thruway). Get off at Exit 8A, which is marked: Route 87South/Rte 119/SawMill Parkway NORTH. Remain in the right lane as the exit splits. Follow the Saw Mill River Parkway North and get off at exit 26, "Taconic State Parkway." Then proceed as above.

From Manhattan and Bronx:

Major Deegan – New York State Thruway -Route 87 - Northbound

Take exit 7A "Saw Mill River Parkway North" and follow the directions above.

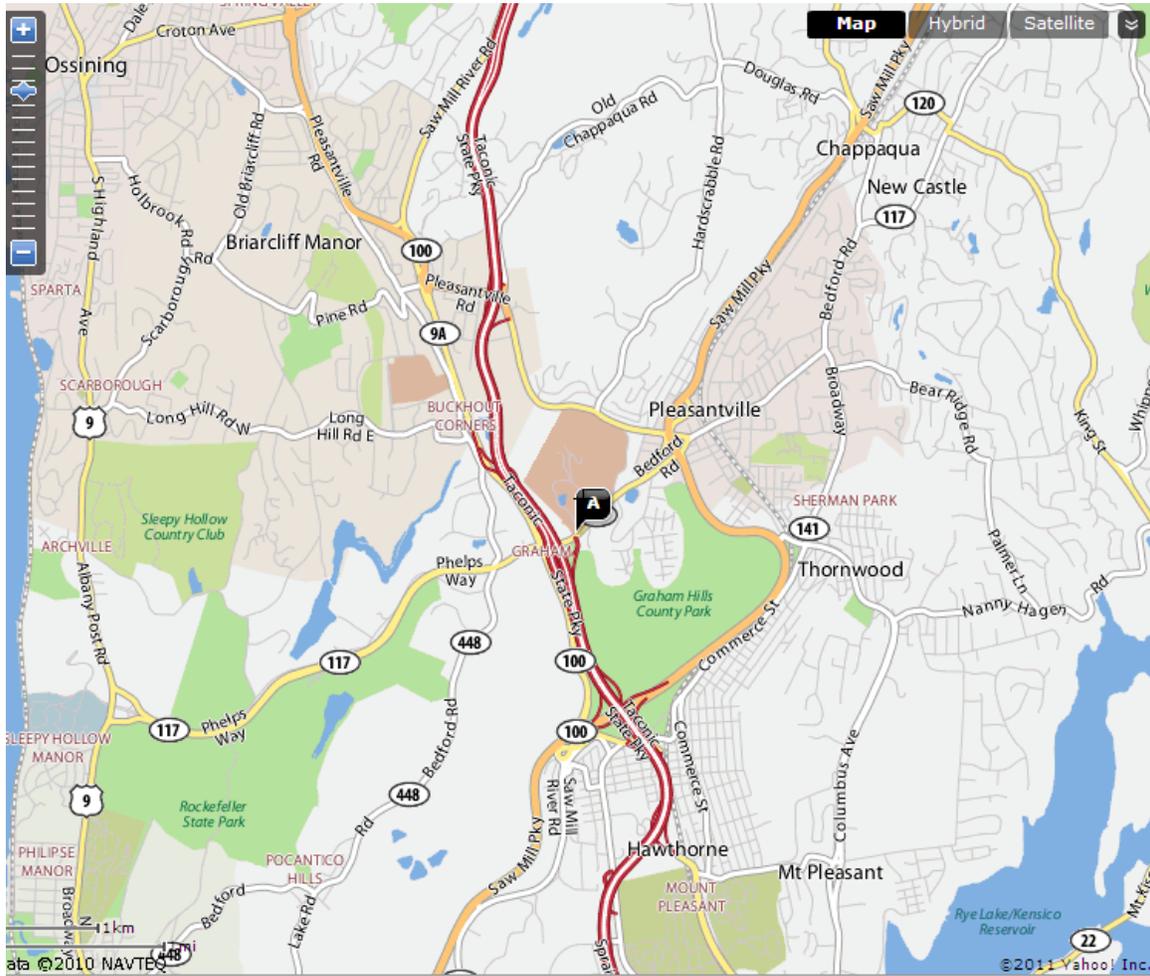
Route 9A – Northbound

Follow Rte 9A north and exit at "Route 117/Sleepy Hollow/Pleasantville." This will be a left lane exit. At the end of the exit, at the traffic light, turn right and proceed under the Taconic State Parkway to the first traffic light. Turn left into entrance one and proceed as above.

Route 9A – Southbound

Follow Route 9 into Croton on Hudson and take the exit for Route 9A "Briarcliff Manor." Exit at Route 117/Sleepy Hollow/Pleasantville. This will be a left lane exit. At the top of the exit, at the light, turn left and proceed as above.

Map next page. Campus Map last page.



See the map on the next page. It is best to enter the campus using entrance 1 off of Route 117. Wilcox Hall is the first building on the right. The parking lot is in front of the building.



Legend

Administrative Center, Undergraduate Admission, Financial Aid, Office of Student Assistance (OSA)	2
Alumni Hall	8
Ann and Alfred Goldstein Health, Fitness, and Recreation Center	6
Art Barn	21
Buchsbaum House	20
Choate House	12
Costello House	25
Dyson Hall	26
Environmental Center Complex	4
Field House	10
Finnerty Field	5
Football/ Multi-purpose Field	11
Gannett House (Career Services)	3
Goldstein Academic Center	22
Ianniello Field House	16
Kessel Student Center	13
Lienhard Hall	17
Marks Hall-Welcome Center	23
Martin Hall	9
Miller Hall	18
Mortola Library	19
North Hall	15
Paton House	7
Residence Hall B	14
Softball Field	28
The Vineyard Building (Graduate Admission)	27
Townhouses	1
Wilcox Hall	24