

FEBRUARY 2022

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VIRTUAL SCIENCE CAFÉ

CAPTURING CO₂

Water-lean Solvents for Carbon Dioxide Capture
by Dr. Deepika Malhotra

Please join us for the first Science Café of the year on **February 25, 2022 at 6:00 pm**. The presentation will be given by Dr. Deepika Malhotra, entitled "Water-lean Solvents for Carbon Dioxide Capture". Dr. Malhotra currently serves as our LS Chair-Elect and Program Chair. We will have a 25-minute presentation followed by a 5-minute question and answer (Q&A). *Following the presentation, ACS Richland LS Members will vote for the annual budget.*

SUMMARY: The capture of Carbon Dioxide (CO₂) from power generation is prerequisite for its conversion or sequestration. Solvent-based technologies including alkanolamines such as monoethanolamine (MEA) or diethanolamine (DEA) have been deployed for the post-combustion CO₂ capture processes to reduce CO₂ emissions in the industrial processes. These solvent amines display low CO₂-rich viscosity, faster kinetics, and favorable thermodynamics albeit prohibitively high energy requirements. Consequently, the development of new solvent chemistries remains attractive to realize a significant reduction in the costs, enhanced stability for large-scale industrialized applications. In the past decade, our group at PNNL has successfully identified design principles to find a few water-lean diamine-based solvents for CO₂ capture by tuning the acid/base equilibria and the rational placement of hydrogen bonds. The comprehensive assessment of one of our single-component water-lean diamine analogues N-(2-ethoxyethyl)-3-morpholinopropan-1-amine (2-EEMPA) was performed for post-combustion CO₂ capture and it exhibited superior durability, >90% CO₂ capture with no evidence of phase separations, foaming, or solid precipitation during testing. This talk will provide an overview of carbon capture, with an emphasis on the energy penalties, the technical challenges, and the advancement of water-lean solvents without co-solvents.

PLEASE REGISTER FOR THIS EVENT HERE:


<https://american-chemical-society.zoom.us/meeting/register/tZwsc0-rrTovHNWHyLbwd93V0-g0gDLKi9yT>

GREETINGS FROM NEW SECTION CHAIR Cristina Padilla Cintron



I am honored to serve as Chair of the Richland Local Section, and I am looking forward to an exciting year filled with events for our chemical community! Please join me in giving our sincerest thanks to our past board members for their service and dedication to our local section. Our past chair, Dr. Mariefel Olarte, successfully guided our section through another difficult pandemic year. The success of our section is the result of the combined efforts of our board members and many volunteers.

We will begin our year with a Science Café on February 25 at 6pm via Zoom. The featured speaker will be Dr. Deepika Malhotra and we will vote for our proposed 2022 budget.


 This year, despite ongoing challenges, we can use these periods of change as opportunities to strengthen the public's understanding of chemistry in our community. As chair, some of my many goals are to expand our efforts on diversity, equity, inclusion, and respect (DEIR) by connecting with the Tri-Cities community; grow the strength of our collaborations with other ACS local sections, student chapters, and international chemical science chapters (ICSCs); and work towards a program focusing on you (our members) in which you feel supported in doing your best work.

Thank you all for being wonderful colleagues, collaborators, supporters, and friends. I am proud to be a member of this incredible family and to have been trusted by you to lead our efforts. If you have suggestions and ideas helpful to our mission, please send them to cristina.padilla-cintron@pnnl.gov. Look for additional updates at our newly refreshed website: <https://acsrichland.org>

FAREWELL FROM PAST SECTION CHAIR Mariefel V. Olarte



The past year, 2021, seemed to have flown by so fast. We hoped that the pandemic due to the SARS-COVID-2 would be done in 2020, but that was not meant to be. And yet, despite the many challenges, I am so very proud of what the dedication of our executive committee, volunteers, and members was able to accomplish through a mostly virtual platform.

 We saw the long-awaited revamp of our local section website (<https://acsrichland.org/>) through the METT grant awarded to the local section in 2020. Kudos to Mr. Steve Krogsrud for spearheading this effort. Please check it out when you get the chance and let us know what you think.

We developed and coordinated the "Exploring Covid 19" activity that was implemented through funding by the 2020 Diversity, Inclusion, Equity, and Respect Grant. In partnership with Stevens Middle School, this activity involved close to 400 people including local section volunteers who led, organized, and prepared the material kits, and the teachers and students, who watched through the video and performed the hands-on activities. Ms. Cristina Padilla, then Chair-Elect, led this effort.

The local section started participating in the National Chemistry Olympiad again this year, hugely because of the enthusiasm and efforts of Dr. Padmaja Gunda. Three local students were able to reach and participate in the national-level competition. We are looking forward to increased interest and participation in the coming year.

We provided virtual activities for members, including:

- Virtual Science Café
- Interactive Virtual Family Night
- Presentation and demo on Virtual Beer Tasting
- Chemistry advocacy training by the Government Affairs Committee

- Workshop on the science of performance management (by Lucas Engineering and Management staff, Mr. Joe Estey)
- Active bystander training (by PNNL staff, Ms. Tanya Bowers)
- Honoring some of our local Women Chemists Committee members (with the Portland ACS LS)

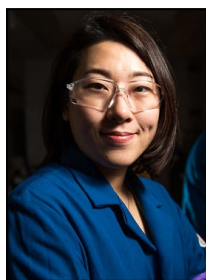
In K-12 activities, we also continued our support of the Eastern Oregon University Chem Club activities including Saturday Market Outreach, Girls in Science, Festival of Trees and ChemClash: Rival Reactions. We encouraged the formation of the Columbia Basin College Chem Club and their interaction with the more established EOU Chem Club. We continued our participation and support of the Mid-Columbia Science and Engineering Fair.

We hosted a well-attended virtual Annual Social which recognized accomplishments of ACS Richland LS members and honoring of Dr. Janet Bryant for her service to both the local and national ACS. Dr. Lori Anna Valentin, a forensic scientist working at the NY State Police, gave an overview of "A Day in the Life of a Forensic Scientist".

Lastly, the local section was a national finalist in three ChemLuminary award nominations and won the Outstanding Public Outreach Event Organized by a Student Group. For a local section our size, being finalist for the other two awards, Outstanding NCW Event for a Specific Audience and Outstanding Performance Awards – Medium Size Category, was indeed a great honor.

It was a great honor for me to serve as the chair of the ACS Richland LS in 2020. I am constantly inspired and humbled by the energy, creativity, and dedication of my fellow board members and volunteer members that made serving our local section through another difficult pandemic year much easier. I am looking forward to another great year for the local section with our new set of officers in 2022 - another year of service, fun and knowledge-building through the ACS Richland LS. Thank you very much for your support!

2022 RICHLAND SECTION BUDGET FOR MEMBER REVIEW & APPROVAL



Katherine Koh,
Treasurer

As the Covid-19 pandemic continued last year, our section activities and plans were limited, but we successfully held most of our events virtually. Our 2022 goals are for better communication between members and Richland communities. This year, we will continuously encourage students to engage in the Richland local section and help our members exchange scientific knowledge, broaden networking, and develop a career. This will ultimately expand chemistry initiative and participation to support chemistry research and education.

Several factors drive our 2022 budget variance relative to the previous year:

1. The local section received an extra support of \$7665 (Revenue, Item 1) as part of the local section annual allocation in 2021.
2. Environmental Improvement Committee events will launch this year. This will help understand the advanced sustainability and use of chemistry (21s).
3. Chemical Safety Day is a new event to impact chemical safety (21t).

As we have allocated extra funds from 2021, our budget is still enough to cover all our 2022 future events. The executive committee has reviewed this budget in detail and approves its focus and details. The budget decisions are from the members' votes and approval. Please contact Katherine Koh ([Katherine.koh@pnnl.gov](mailto:koh@pnnl.gov)) if you have any questions.

Members attending the February 25th science cafe (via Zoom) will have the opportunity to vote on the budget.

	2021 Final	2022 Proposed
REVENUES		
(1) Annual ACS Allotment (plus dues)*	\$15,330	\$7,842
(2) New member commissions	\$15	\$0
(3) Donations, contributions	\$0	\$0
3a) Bequests and/or trusts	\$0	\$0
(4) Rebate from ACS for Councilor travel expenses	\$0	\$2,500
(5) ACS Awards or Grants received (e.g., METT, IPG, ACS Inter-Chapter Relations Grant)	\$3,970	\$0
(6) Program revenue (short courses, lecture series etc.)	\$0	\$0
(7) Local section dues, affiliate dues	\$1,260	\$1,200
(8) Interest, dividends	\$15	\$50
(9) Special events and activities	\$0	\$0
(10) Meals (include total meals in revenue)	\$0	\$0
(11) Other revenue (describe and itemize)		
a) AIChE contribution to summer picnic	\$0	\$0
b) Early bird discount for leadership training	\$0	\$250
c) NORM 2018	\$0	\$0
(12) TOTAL REVENUES	\$20,590	\$11,842

EXPENSES		
(13) Subsidies to subsections, topical groups, or affiliate groups	\$0	\$0
(14) Awards, scholarships, grants, etc.		
a) Travel awards/Registration for ACS student members	\$0	\$3,500
b) HS Teacher Grants	\$0	\$500
c) Outstanding Teacher Award	\$0	\$100
d) General Awards	\$0	\$300
e) Supplemental awards	\$0	\$200
(15) Administrative expenses (not including postage, printing, & shipping)	\$49	\$100
(16) Printing, publications, newsletters, meeting announcements, postage		
a) Newsletter	\$1,035	\$1,300
b) Public relations	\$0	\$300
c) Web update	\$915	\$500
d) Miscellaneous	\$78	\$75
(17) Local Meetings (include speakers' expenses)		
a) Speakers	\$0	\$300
b) ACS Picnic	\$0	\$300
c) ACS Annual social	\$530	\$1,800
d) Science Cafes	\$27	\$400
(18) Meals	\$0	\$200
(19) Travel subsidies to Councilors	\$0	\$3,500
(20) Travel subsidy and fee for Local Section Leadership Conference	\$0	\$2,400
(21) Other expenses (describe and itemize)		
a) K-12 outreach	\$0	\$500
b) Grant (METT, IPG, other ACS grants)	\$5,928	\$4,000
c) NCW	\$402	\$500
d) Olympiad	\$81	\$100
e) Science Fair and award	\$450	\$500
f) Girls in Science	\$600	\$600
g) Bridging the gap minigrant (communication equipment)	\$0	\$300
h) Diversity Affairs Committee	\$0	\$500
i) Boy Scouts Nuclear Science Merit Badge	\$0	\$75
j) Earth Day	\$0	\$200
k) Project SEED	\$0	\$900
l) Joint society meeting	\$0	\$100
m) Career fair	\$0	\$50
n) Women Chemists Committee	\$333	\$600
o) Expanding Your Horizons	\$0	\$600
p) Government Affairs Committee	\$0	\$1,000
q) 2019 Strategic Planning Retreat	\$0	\$0
r) In kind support for Washington State Chemistry Club	\$0	\$500
s) Environmental improvement committee	\$0	\$500
t) Chemical safety day	\$0	\$600
(22) TOTAL EXPENSES	\$10,427	\$27,900
(23) EXCESS (DEFICIT)	\$10,163	(\$16,058)

*ACS allocated extra funds \$7665 as part of LS annual allocation in 2021

*21s, 21t new items in 2022

'22 OFFICERS & COUNCILORS

Meet your newly elected ACS Richland Section Officers and Councilors. They are volunteering their time and talents to help make this section the best it can be. Please help them in any way you can by volunteering your ideas and time to help our events succeed.



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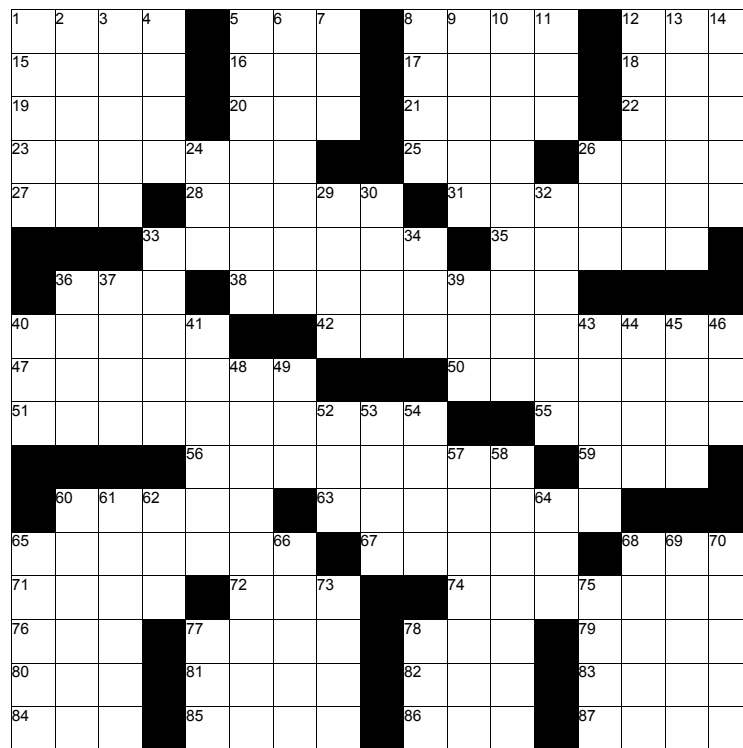
CROSSWORD PUZZLE - CHEMISTRY OR NOT?

ABOUT THE AUTHOR Robert Pike is a professor of chemistry at The College of William & Mary. He is an inorganic chemist with interests in Materials for Sensors and Catalysts, Metal-Organic Networks Chemistry, X-Ray Crystallography, and Chemistry Education, in addition to creating crossword puzzles.

Chemistry or Not? Robert D. Pike

ACROSS

- Electron property or partisan lens?
- Philosophical fad
- $KAl(SO_4)_2 \cdot 12H_2O$
- Courtesy title, abbrev.
- Hiro-_____ 20th century Japanese emperor
- Early Apple computer innovation
- The _____ Ranger
- Environmental prefix
- Force applied over distance, abbrev.
- Hoops league
- Norse All-Father god
- Confederate
- Blood-revealing compound in forensics
- Narcissism
- Kind of duck
- Vinyl records
- Kind of ballerina
- Braid
- Rolling musical effect
- Smooths out
- Sault _____ Marie
- Portray as the bad guy
- Vader to his friends
- Ban from school or opaque mixture?
- Seaweed-based polysaccharide gel
- Add-ons to the docket
- A time apart or chromatography?
- Dive down rapidly
- New companies
- Radical sensing techn.
- Gallic farewell
- Addition to a motorcycle
- Salon activity
- Describing a developing ecosystem
- Mao's country, abbrev.
- As well
- Fitting
- Nickname for Vlad Dracula, with "The"
- Institute legal proceedings against
- French verb to be



© Literate Software Systems

- Part of a drum kit
- Spaghetti sauce brand
- Reason for discount, abbrev.
- A criterion for scholarship eligibility
- Fruit juice
- Wee bit
- Those in France
- Dentists' degrees
- Newest computer drives, abbrev.
- Large group of things or garden pest?
- Neutral or dues-paying workers?
- Human males
- Contained inside
- "_____ Eleven"
- Kind of gas or of good blood?
- High-brow radio
- Third number in the Fibonacci series
- Maters
- Baseball family of Moises
- They are found in graphs
- Greek prefix for four
- Toggle switch positions
- Wise one
- Snare
- Hopsy brew
- Prosecutors
- _____ around (frolicked)
- Underground system
- Slang for non-functional device
- Smell
- Siesta
- Full of solute or rich in color?
- When you'll get there, abbrev.
- Tax collection agy.
- Elevator inventor
- Pantyhose color
- Columns on the table or full stops?
- Cheated
- Attraction
- Dispensers of meds
- _____ Jima
- Swiss mountain
- Alkaline or simple?
- Site of first gas attack in WWI
- Aristotle's teacher
- Kingly
- Impure or profane?
- Talks by smarties
- Biblical Syria
- Terminus
- Grad students in undergrad labs

DOWN

- Electron group or mullusk covering?
- The most famous was Betty Grable
- Things
- Edible seaweed
- Didn't listen to
- Convert a solid to a gas or wonderful?
- "Mamma _____"
- Soothing plant extract
- Henry Cabot _____

FIND THE SOLUTION
AT ACSRICHLAND.ORG/NEWS

NEW STUDENT CHEMISTRY CLUBS

Hanford High School (HHS) and **Columbia Basin College (CBC)** now have student chemistry clubs! Richland Section member Dr. Padmaja Gunda, a chemistry professor at Columbia Basin College, was instrumental in helping the clubs get started. At Hanford High, section member Satish Nune serves as an advisor in collaboration with Mr. Koch (AP chemistry teacher at HHS) who is serving as a mentor and allows students to use his classroom. Right now the students are studying for the U.S. National Chemistry Olympiad and doing experiments from previous olympiads once a month.

Speaking of the **Chemistry Olympiad**, Dr. Gunda is also heading up that effort locally. "Right now, I have eight students from HHS, three students from Richland High, and four students from Moses Lake High School. Registrations are due in February, and I am expecting a couple more students to enroll," said Gunda.

The chemistry club at CBC is very active and members are excited to help with outreach activities at elementary and middle schools. They are also looking forward to participating in **Mid-Columbia Science Fair** judging in March. In February they have two outreach activities lined up, (1) Lewis & Clark Elementary School (5th grade Quest class), and (2) Orchard Elementary 5th grade classes. They are also looking forward to setting up a table for STEM Night at local middle schools in the spring.

SAVE THE DATES!

On **February 26, 2022**, at 8:00 AM, Mr. Frank Walworth will present a webinar on the history of the ACS titled, "**The Past as Prologue: Essential Elements of ACS History**". Mr. Walworth recently retired as Assistant Secretary for Governance Affairs at the ACS. The talk is being presented as a collaborative effort of the Richland Section along with the Cornell, Puerto Rico, and Rochester sections, and the International Chemical Sciences Chapter of United Arab Emirates. Details, such as the Zoom link for the talk, are being finalized and will be provided to the membership in a separate email.

On **Thursday, March 3, 2022**, at 4:00 PM, the Richland section is planning a **talk by ACS Chair-Elect Judith Giordan in honor of Women's History Month**. Ms. Giordan has held R&D positions at companies such as Henkel and Pepsi-Cola and is currently the founder and managing director of ecosVC, a venture development and training company. Again, the talk is in the planning stages and members will be provided the details in a separate email.

The details of these two meetings will also be posted on the section's website calendar in the **EVENTS** tab. The section's website address is <https://acsrichland.org>



Community Volunteer Opportunity

On **June 11th and 18th** the Richland Section is planning hands-on chemistry activities for children at the two branches of the Mid-Columbia library in Pasco. The tentative time is 12-5 PM. We are looking for volunteers!

Please contact the section chair, Cristina Padilla, if you have questions. More details will be posted on the section's website as they become available:

<https://acsrichland.org>

NEW COMMITTEES ESTABLISHED

The Richland Section is establishing two new committees this year. The first is the **Committee on Environmental Improvement**. The goal of this committee is to provide section members and the local community with the knowledge and tools needed to create and implement sustainable, environmentally sound practices.

The second committee is the **Committee on Chemical Safety**. This committee will provide collaborative leadership and resources to advance safety in all activities of the chemistry enterprise.

Both of the new local section committees mirror established committees, of the same name, at the ACS national level. If you are interested in learning more about these committees, or are interested in being a committee member, please contact the Section Chair, Cristina Padilla at cristina.padilla-cintron@pnnl.gov, or you can send her a message by clicking on "CONTACT" in the upper right of the section's website homepage <https://acsrichland.org>.

UPCOMING EVENTS

FEBRUARY 25
CAPTURING CARBON DIOXIDE
BY DR. DEEPIKA MALHOTRA
VIRTUAL SCIENCE CAFE 6-7PM

[CLICK HERE TO REGISTER](#)

FEBRUARY 25
BUDGET APPROVAL
VOTE AT SCIENCE CAFE

FEBRUARY 26
HISTORY OF THE ACS WEBINAR
8AM

MARCH 3
WOMEN'S HISTORY MONTH TALK BY
ACS CHAIR-ELECT JUDITH GIORDAN
4PM For more info: wcc.richland@gmail.com

JUNE 11 & 18 FROM 12-5PM
HANDS-ON CHEMISTRY ACTIVITIES FOR KIDS
12-5PM

Pasco Branch of Mid-Columbia Libraries - Volunteers needed!
For more info: cristina-padilla.cintron@pnnl.gov

LOUIS PASTEUR TELLS A JOKE...

HIPPOCRATES, TWO ALCHEMISTS, MARIE CURIE'S UNCLE, THREE WINEMAKERS, LAVOISIER, ARISTOTLE AND A TEN-YEAR-OLD BOY ARE BEING CHASED BY A MAD DOG DOWN A STREET IN AVIGNON...



The Pasteur cartoon can be commented in a humorous way with the help of a French popular poet, Jacques Prévert. In this cartoon, Pasteur recites a nonsensical/humorous series of items. This is also what a French popular poet Jacques Prévert did in his poem 'Inventaire' (Inventory), where at the end of each incongruous list of entities, Prévert adds "un raton laveur," "a raccoon!"

When someone utters a nonsensical list of unrelated items, one may add ironically (and may not be so kindly) "et un raton laveur," "and a raccoon!" So, I would have added to Pasteur's (and cartoonist Sidney Harris') list: "and a raccoon!"

You can hear Prévert at https://www.youtube.com/watch?v=cU2JEC_e-mc

– Jean-Marie Lehn, Université de Strasbourg (1987 Nobel Prize)

POINT TO PONDER

Never let the fear of striking out keep you from playing the game.

– Babe Ruth

LEARN MORE ONLINE <https://acsrichland.org>