



**Sustainable
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Organization**

Research | Education | Responsibility

SNO REPORT

VOLUME 10, ISSUE 1

April 2022

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President's Letter



Dear SNO Community,

It has been a pleasure to assume the role of the President of this thriving organization—the primary venue that hosted my research, made space for my students, and gave me a platform for more than a decade. I am humbled to serve in this capacity and am looking forward to keeping up the promise that my predecessor Professor Vinka Craver has left behind.

First, I want to formally thank Vinka for her exceptional efforts throughout the years. She is an extraordinary individual, who is a strong woman of few words. Vinka has quietly done it all for SNO, starting from setting up registration tables to running entire in-person and virtual conferences. I extend gratitude from all SNO members to you Vinka, for being such an exceptional leader of this great organization. Second, I want to congratulate the founding members Barbara Karn and Wunmi Sadik for being the vanguard of sustainable nanotechnology and champions of all thing's "nano". Their contribution and dedication to SNO have kept this organization alive.



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President's Letter

I thank them for their warm welcome and assistance in every step of the way.

Finally, I want to thank you all for being a part of this organization. We all have enjoyed your scholarly discussions. Without you, this organization will not survive.

I want to conclude this address with a few words on my vision. I envision continuing SNO's core vision "to be the authoritative voice for the wider nanotechnology-related disciplines" and its aim "to continue to advocate for the value of nanotechnology to society", which are aligned with mine. I aim to continue facilitating leadership in research and attracting new talents from other relevant areas. I intend to further SNO's education and outreach efforts. One of my main missions is to expand SNO's reach and possibly include international scholars. I hope to achieve it by hosting a conference internationally and inviting exceptional scholars for presentations at all future SNO conferences.

Speaking of conferences, I am excited to invite you to the long-awaited in-person SNO conference this Fall (November 10-13) in my hometown, Austin, TX. Austin is particularly pretty at that time of the year. See you all in person, as we win over the curse of COVID.

Again, it is an honor to serve as your President.

Navid Saleh

SNO President (2021-present)

Associate Professor of Environmental Engineering

University of Texas at Austin



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ORGANIZERS of 10th Nano Conference 2020

Barbara Karn, Co-founder, Executive Director,
Sustainable Nanotechnology Organization

Vinka Oyanedel Craver, Professor of Civil and
Environmental Engineering / PI, University of
Rhode Island

Navid Saleh, Associate Professor, University of
Texas at Austin



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Highlights from 10th Nano Conference 2021 Virtual - November 3-5, 2021

Concurrent Sessions

**Occupational and
Environmental
Exposure Assessment/
Green/Sustainable
Nanomaterials**

**Food and
Agriculture**

**Water, air, soil
treatment and
remediation**

**Fate and
transport**

Education

Nanosensors

**Emerging
Investigators in
Sustainable
Nanotechnology**

**Poster
Session**

**Ecotoxicology and
Human toxicology**



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Highlights from 10th Nano Conference 2021 Virtual

Chairs of Sessions

- **Emerging Investigators in Sustainable Nanotechnology:** Mitra Majumdar, FDA and Xing Xie, GaTech
- **Water, air, soil treatment and remediation:** Achintya Bezbaruah, NDSU and Stetson Rowles III, Ga State U
- **Education:** Deb Newberry Newberry Technology Associates
- **Food and Agriculture:** Mariya Khodakovskaya, UALR and Cristina Sabliov, LSU
- **Fate and transport:** Onur Apul, UMaine Adeyemi Adeleye, UCI, and Navid Saleh, UTAustin
- **Nanosensors:** Wunmi Sadik, NJIT
- **Ecotoxicology and Human toxicology:** Leanne Gilbertson, University of Pittsburgh
- **Poster Session -** Ilya Medina Velo, HBU





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Highlights from 10th Nano Conference 2021 Virtual

101 Attendees from

USA
Canada
Israel
Chile
Portugal
Mexico
Singapore



USA REPRESENTATION: 22 states

Poster session: 21 national and international participants



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Highlights from 10th Nano Conference 2021 Virtual

10th Nano Conference Plenary Speakers



Mihail Roco, Ph.D. – “Nanotechnology challenges at 20 years of NNI”

Dr. Roco is the Senior Advisor for Science and Engineering at the National Science Foundation and founding chair of the U.S. National Science and Technology Council's subcommittee on Nanoscale Science, Engineering and Technology (NSET). He opened the SNO 2021 conference with the plenary talk “Nanotechnology challenges at 20 years of NNI”.



Cafer Yavuz – “10-year celebration of SNO Conference”

Dr. Yavuz's research interests focus on developing sustainable nano & porous materials chemistry to address global challenges in the environment, particularly those related to CO₂, water, and methane. His current projects include dry reforming of methane for circular carbon economy, CO₂ capture with tethered amines, CO₂ conversion to cyclic carbonates, water capture from air, methane storage in porous polymers, electrocatalytic water splitting, electronic waste recycling, seawater mining, and micro pollutant removal from water.



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Highlights from 10th Nano Conference 2021 Virtual

WORKSHOP

“Infectious Diseases and Nanotechnology”

TOPICS and SPEAKERS:



*Nanotechnology and oral delivery in
infectious diseases.*

Dr. Ameya Kirtane - Brigham and Women's
Hospital, Harvard Medical School



*Smart antibacterial
and antifungal
nanoparticles*

Dr. Anita Shukla -
Brown University



*Carbon Nanotubes as Wearable Fluorescence
Biosensors*

Dr. Daniel Roxbury - University of Rhode
Island



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Highlights from 10th Nano Conference 2021 Virtual



Twelve student awards were given out at the 2021 SNO Conference. Students received complementary conference registration and a cash bonus. Three undergraduate awardees presented posters or oral talks along with one master's student and eight PhD candidates.

Areej Qamar (New Jersey Institute of Technology), Caroline Canales (University of Rhode Island), Eban Hanna (Louisiana State University), Gabriel Cerron Calle (Arizona State University), Genesis Herrera (University of Houston), Hongchen Shen (George Washington University), Marfua Mowla (University of Houston), Mengqiao (Grace) Li (George Washington University), Seju Kang (Virginia Tech), Ting Wang (Georgia Institute of Technology), Xiaofan Cai (Houston Baptist University), Ziwei Han (University of California, Irvine)



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Highlights from 10th Nano Conference 2021 Virtual

Best Student Poster Awards

This year, the poster session took place in the online platform Remo.

A total of 21 posters were presented. Awards were given to:



Marfua Mowla
University of Houston



Honchen Chen
George Washington University



Genesis Herrera
University of Houston

Honorable Mentions



Xiaofan Cai
Houston Baptist University



Preston Clubb
Missouri State University



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Highlights from 10th Nano Conference 2021 Virtual

2021 SNO Emerging Investigator Award - Dr. Onur Apul



Onur G Apul, Ph.D., P.E.
**Assistant Professor of
Civil
and Environmental
Engineering**

Dr. Onur Apul is an Assistant Professor of Environmental Engineering at University of Maine. Dr. Apul advances knowledge for the application of carbon nanomaterials by garnering molecular-level insights of adsorbate-carbon surface interactions. His research group has a vision for responsibly applying carbon nanomaterials in real-life engineering practice. His earlier work focuses on understanding unique opportunities posed by properties of carbon-based nanomaterials. Dr. Apul published early observations regarding the suppressed competition between small molecular weight organic pollutants and natural organic matter when graphene nanosheets are used as adsorbents. The graphene adsorption work led to creation of non-woven graphene-coated polystyrene fibers with superior adsorption capacities despite the polymer-carbon interactions. The disposition of graphene's on the exterior surfaces of 3D fiber networks were accomplished owing to the generous electron budget of graphene sheets and unique 2D structures responding to high voltages applied during electrospinning process. In recent years, Dr. Apul has been investigating the hyperreactivity of carbon nanomaterials under microwave irradiation. His work highlighted the possibility of using carbon nanomaterials as regenerable adsorbents. The selective edge- and corner functionalization of graphene nanosheets allow preservation of pi-electron density on the basal plane of nanosheets and enable interpretation of molecular level interactions between oxygen-containing functional groups and adsorbates. His recent advances in developing finely tailored graphene nano-adsorbents may create infinitely regenerable adsorbents, which would be a major accomplishment for safe and sustainable nano-enabled water treatment.



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Research Highlight

Dr. Robert H. Hurt

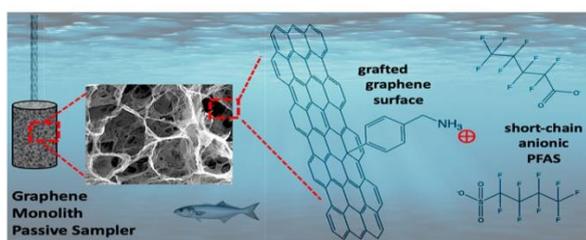


Robert Hurt is a Professor of Engineering at Brown University in Providence, Rhode Island. He received degrees from Michigan Tech. and MIT, and held prior posts Bayer AG in Leverkusen, Germany and Sandia National Laboratories in California. He was the founding Director of Brown's materials and nanosciences institute, IMNI, served as Director of Brown's NIEHS-supported Superfund Research Program Center. and as Editor-in-Chief for the materials and nanotechnology journal *Carbon*. He has published over 160 peer-reviewed scientific articles and has H-factor of 70. He received the Graffin Lecturer and the Charles E. Pettinos Award from the American Carbon Society, and has received an NSF CAREER Award, the Tau Beta Pi *Dedicated Faculty Award* at Brown, and the Silver Medal of the Combustion Institute.

The R. Hurt laboratory develops materials-based technological solutions to challenges in environmental and human health protection. The group is currently focusing on two-dimensional nanomaterials, which are a broad class of atomically thin, sheet-like solids are at the forefront of modern materials science discovery and innovation.

“2D materials are a fascinating new tool kit for technology development, and we are excited to explore how their novel geometries and properties may be exploited to protect health and the environment”

A natural application for 2D materials is in molecular barriers. We showed that graphene oxide in textiles can provide protection from chemical toxicants in the environment, while retaining *breathability* – the ability to pass water vapor from human sweat and allow the user to regulate body temperature. The same graphene films inhibit mosquito biting behavior, and surprisingly this effect is also *chemical* in nature - the films block sweat-associated organic compounds and prevent mosquito chemoreceptors from identifying a nearby blood meal.



Graphene nanosheet suspensions can also be processed into porous cylinders for use as passive samplers for PFAS in natural waters (image). New grafting techniques can alter graphene surface chemistry and capture short-chain PFAS more effectively. Finally, when graphene oxide sheets stack, they create nanochannels with regular, sub-nm dimensions of interest in water treatment membranes. We have shown how to align the graphene sheets to create membranes with *vertical* nanochannels that allow water to flow directly and at high rate across the membrane.

Selected Recent Publications:

Liu M, Weston P.J, Hurt R.H. “Controlling Nanochannel Orientation and Dimensions in Graphene-Based Nanofluidic Membranes” *Nature Communications*, 12, 507 (2021).

Chen PY, Zhang M, et al., “Ultra-Stretchable Graphene-Based Molecular Barriers for Chemical Protection, Detection, and Actuation” *ACS Nano*, 12 (1), pp 234–244 (2018).

Castilho CJ, Li et al., “Mosquito Bite Prevention through Graphene Barrier Layers”, *PNAS*, 116 (37) 18304-18309 (2019).

Becanova J, Saleeba Z, et al., “A Graphene-Based Hydrogel Monolith with Tailored Surface Chemistry for PFAS Passive Sampling”, *Enviro. Sci. Nano*, 8, 2894-2907 (2021).

Liu M, Fernandes DCC, Saleeba Z, Hurt RH, “Controlled Release of Molecular Intercalants from Two-Dimensional Nanosheet Films”, *ACS Nano* 15, 20105–20115 (2021).



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2022 SNO Conference Announcement

SAVE THE DATE

2022 SNO Conference
November 11-13
Austin TX, USA
(Hilton Austin Airport)

Pre-conference workshop
Transport at the nano-scale for sustainability:
Science and applications
November 10
Hilton Austin Airport