



# THE SALZBERG CHEMISTRY SEMINAR SERIES



The City College  
of New York



Monday, November 14, 2022 @ 12:00 noon – MR1027

## Atomically Precise Materials

Colin Nuckolls

Department of Chemistry

Director, Columbia MRSEC on Precision Assembled Quantum Materials (PAQM)

Columbia University



**Abstract:** This presentation will focus on 2D materials that have superatoms as building blocks. One of the superatomic building blocks is  $\text{Re}_6\text{Se}_8\text{Cl}_2$ , which forms into a layered, van der Waals material. This material can be exfoliated, and electrical devices show that it spans the range from small band gap semiconductor to superconductor depending on what is substituting the halogens. This material forms the basis for very active oxygen evolution electrocatalyst. The second superatomic 2D material that will be discussed is a two-dimensional crystalline polymer of  $\text{C}_{60}$ . This material is the intellectual union of graphene and fullerenes, which we have termed graphullerene. This is a new allotrope of carbon, and it exhibits unusual properties, such as enhanced thermal conductivity and nanoscale photoluminescence.

**Biography:** Colin Nuckolls was born at the Lakenheath RAF base in Great Britain in 1970. He carried out his undergraduate studies at the University of Texas at Austin, studying with Marye Anne Fox, and he received his Ph. D. in 1998 from Columbia University, where he studied with Thomas Katz. He was an NIH post-doctoral fellow with Julius Rebek, Jr., at the Scripps Research Institute. He joined the faculty at Columbia University in 2000, was promoted to the rank of Full Professor in 2006, and was the Chairman of the Department from 2008–2011. He is currently the Sheldon and Dorothea Professor of Material Science where his research, at the intersection of organic chemistry, materials science, and nanoscience, is directed toward the synthesis of new types of electronic materials and uniquely functioning devices. He is working to achieve these goals by combining the synthesis of new molecular species, state of the art lithography, unique reaction chemistry, and unusual modes of self-assembly. Nuckolls has authored over 200 research publications. He is an associate editor for Nanoletters. Awards he has received for his achievements include the following: Elected Member of the American Academy of Arts & Sciences (2020), “Honorable Professor” at Shanghai Normal University (2011-2013), Wheland Medal at University of Chicago (2012), Leo Hendrik Baekeland Award (2009), Columbia University’s Lenfest Distinguished Faculty Award (2008), and American Chemical Society Arthur C. Slope Award (2008)

Join Meeting in-person at MR-1027 or on Zoom at:

<https://cnny.zoom.us/meeting/register/tZYuf-2orDorG9EdR3m8V2yHJsoO9O4cusPY>