



Dr. Bego Gerber

- Chemists Without Borders: Past, Present and Future



Dr. Ronda Grosse

- Applying Chemistry to Solve Problems in the Developing World



Dr. Bakarr Kanu

- Studying Abroad in Chemistry: An Opportunity for Undergraduate Chemistry Researchers to have an International Impact in Chemical Education



Dr. Steven Chambreau

- Chemists Without Borders Arsenic Project Development: Confronting the largest mass poisoning of a population in history by providing clean water in Bangladesh

Chemists Without Borders: Past, Present and Future**Bego Gerber**

Hear the remarkable story of some remarkable people making a remarkable difference. What are the foundations of Chemists Without Borders? Why does it exist? How does it work? Why does it matter? Who is affected? What have we learned? Where do we all fit in? What is possible?



Bego Gerber is Managing Director of Business Development International, a lifestyle marketing company, and is an Executive Associate accredited by the Institute for Independent Business. Dr Gerber's expertise ranges from academic medical research to patented new product development in a no-walls start-up and in Fortune 100 R&D; and from idea processing and information management to entrepreneurial lifestyle marketing and the development of B-Quadrant businesses on the Internet. He also spent many years as a passionate court appointed special advocate for abused and neglected children. Bego was educated at Heriot-Watt University in Scotland,

has Master's and Doctoral degrees from the University of California, Santa Barbara, and was a postdoctoral fellow at the Johns Hopkins University.

Bego is Chairman and Co-Founder of Chemists Without Borders, and focuses on board development, fundraising, public relations and partnerships.

Applying Chemistry to Solve Problems in the Developing World**Ronda Grosse^{*}, Rolande Hodel, Marya Lieberman, Julian Tyson**

Chemists Without Borders is a non-profit organization, comprised primarily of volunteer chemists, with the mission of solving humanitarian problems by mobilizing the resources and expertise of the global chemistry community and its networks. Work to date has involved clean water initiatives, science education in developing countries, and inexpensive tests for analysis of medicines. This presentation will review projects aimed at improving living conditions in South Asia, including measuring heavy metal concentrations in the Bangladesh food supply and renewable energy options for affordable housing in India. Projects in Africa include development of paper analytical devices to provide high quality chemical analysis of pharmaceutical samples and prevent falsified or substandard medications. Recent work in Kenya will be shared. Additionally, AIDSfreeAFRICA has set up a laboratory in Cameroon for drug testing. The status of these initiatives, technical progress, and ongoing opportunities and challenges will be discussed.



Ronda Grosse received her Ph.D. in analytical chemistry from the Ohio State University and her B.S. in chemistry from Bethel University in St. Paul, Minnesota. She has worked as an industrial chemist for 25 years in laboratory and managerial roles at Dow Corning Corporation. Her primary expertise is in molecular spectroscopy, chromatography, and mass spectrometry for materials

characterization. Ronda is an active member of the American Chemical Society. She is an advocate for science education and conducts chemistry demonstrations in local schools, as well as other outreach

activities.

Ronda is on the Board of Directors at Chemists Without Borders. She serves as the organization's liaison with the ACS. Ronda actively supports Chemists Without Borders' projects by providing technical guidance and assisting with grant writing and other communications.

Ronda's international experience includes scientific research in Japan and an affordable housing project in India. She is passionate about improving quality of lives by combining science and service, and exploring sustainable ways that we can collectively create positive change in our global community. Originally from New Castle, Pennsylvania, she resides in Saginaw, Michigan, with her husband and two daughters.

Studying Abroad in Chemistry: An Opportunity for Undergraduate Chemistry Researchers to have an International Impact in Chemical Education

Bakarr Kanu

Developing undergraduate research through service learning is a high impact practice that can greatly influence student engagement and success. In this project, a team of scientists has been working to develop inexpensive microchemistry kits to facilitate Chemistry Education in West Africa. Since 2015, several undergraduate STEM majors have engaged in research with the nonprofit organization, Chemists Without Borders, to enhance chemistry education in Sierra Leone. The ultimate goal has been to provide chemistry laboratory kits to high school and first- year university students' in Sierra Leone by training teachers to use the kits in their classrooms. In addition to standard labs that will help students understand basic chemical concepts, most of the STEM experiments developed for this project will focus on the application of chemistry towards practical knowledge relevant to the lives of ordinary Sierra Leoneans. Currently, we have assembled 15-lab activity kits ready for use in Sierra Leone. To implement this project, we developed a study abroad class at Winston-Salem State University (WSSU) and we expect to offer this class in spring 2019. Students enrolled in this course will have the opportunity to travel to Sierra Leone and conduct a workshop to train teachers who will in turn use the kits in their classrooms. In addition, they will have an opportunity to learn about the politics, history, and culture of Sierra Leone. Upon implementation of this project, we anticipate the kits to service between 200-500 teachers and students, covering approximately 50 schools in Sierra Leone annually. Our hope is that once this project is executed successfully, it will be expanded to other English-speaking countries. We anticipate this service learning research project will attract students from underrepresented groups and influence their engagement in STEM activities at WSSU and the broader community of scientists.



Dr. Kanu received his Ph.D. in Instrumentation and Analytical Chemistry from the University of Manchester, Manchester, United Kingdom in 2003. His Ph.D. work developed a novel sampling device with "active membranes" that reduced sampling time by 60% and increased sensitivity by 25%. His sampling device, interfaced to several separation-typed instruments was used to characterize environmental pollutants. One of his papers, published in the Journal of Environmental Monitoring, January 2007 issue, was selected to appear on the front cover of the journal as a current cutting-edge research development on environmental processes and impact. In 2008, a second paper he published in the Journal of Mass Spectrometry, January 2008 issue, appeared on the front cover of the journal. Dr. Kanu is an expert in



Tripartite Symposium

May 18, 2019

separation-type instrumentation techniques including gas and liquid chromatography, mass spectrometry, capillary electrophoresis, ion mobility mass spectrometry, to name a few. Dr. Kanu currently has over thirty-two peer-reviewed scientific publications in top-rated reputable journals, over fifty presentations and two patents (related to sample introduction interfaces). Dr. Kanu has mentored several undergraduate and graduate students in research and is very interested in developing activities to increase number of minority students enrolled and retained in STEM disciplines. Since joining WSSU, he has mentored over thirty undergraduate students in research and many have presented their results at regional and national conferences. One of Dr. Kanu's mentees won the Best Poster in Chemistry award at the 2016 Annual Biomedical Research Conference for Minority Students (ABRCMS).

His current research is modifying separation-type instrumental techniques to achieve rapid analysis of chemical and biological compounds. He is interested in investigating the fate of compounds like environmental soil-gas and water contaminants, drugs, explosives, chemical warfare agents, total suspended particles, nucleotides, nucleosides, peptides, proteins, forensic, and biological samples in complex matrices. Dr. Kanu has been studying the ingredients from plant sources to identify chemical compounds that may be useful for promoting health and/or fighting diseases. Additionally, he is interested in the chemical synthesis of novel polymers that may be useful in alternate energy and military type applications.

Dr. Kanu is the American Chemical Society Student Chapter Faculty Advisor (WSSU Chapter). His responsibility is to provide guidance and mentorship to the executive members and foster their smooth operation. Since 2012, the organization has volunteered in a number of community events. Dr. Kanu has membership in eight professional organizations and he is the current WSSU representative to National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) Collaborative Institutional. Dr. Kanu has developed curricular materials and pedagogical methods for instrumental analysis, quantitative analysis, and forensic chemistry. He has also developed and implemented guided inquiry projects in the laboratory portions of quantitative and instrumental analysis.

Chemists Without Borders Arsenic Project Development: Confronting the largest mass poisoning of a population in history by providing clean water in Bangladesh

Steven Chambreau

Back in the 1970s, in an attempt to provide hygienic drinking water in Bangladesh, the United Nations International Children's Emergency Fund (UNICEF) and other aid agencies began installing millions of tube wells in Bangladesh villages as an alternative source of drinking water to contaminated surface water supplies. The program, which continued through the 1980s, was an early success. Instances of cholera, microbe-caused diarrhea, and other diseases dropped dramatically. But no one thought to analyze water for trace and ultra-trace impurities, and soon the good news turned bad. By the early 1990s, villagers began breaking out with skin disorders and experiencing fatigue symptoms of arsenicosis from drinking the water. Arsenic poisoning in drinking water in Bangladesh has been identified as one of the world's greatest humanitarian disasters, with the World Health Organization characterizing the situation as "largest mass poisoning of a population in history." Out of 150 million people in Bangladesh, 35-77 million people are at risk from arsenic contamination of water. It is estimated that between 1-5 million children are at risk of death by arsenicosis, or arsenic poisoning, by 2030. Many countries with arsenic-contaminated groundwater

do not face the same catastrophic outcomes as in Bangladesh, in part due to inaction on the part of the Bangladesh government. Clearly there are no simple, easily implemented solutions that would provide “arsenic-free” water in sufficient quantities to meet the requirements of communities in rural Bangladesh for drinking, cooking and irrigation of crops (particularly rice). Chemists Without Borders works to remedy this. The Arsenic Project in Bangladesh will be described from its inception and how the project has



Dr Chambreau demonstrating the Hach arsenic test kit to students at Palmdale High School, Palmdale, CA

evolved into the work that is currently underway today, involving arsenic education, arsenic testing of wells and the development of alternative drinking sources in Bangladesh.

Steve Chambreau is a Co-founder of Chemists Without Borders, and has served the organization previously as Vice President, President and Director. Dr. Chambreau is a Research Scientist in the Propellants Branch at the Air Force Research Laboratory at Edwards Air Force Base, where he studies chemical dynamics. Steve grew up in California, attended school at UC Berkeley (BS 1993), San Diego State University (MS 1997), and UC Riverside (PhD 2002). He spent 2 years working as an NRC Associate at the Air Force Research Laboratory at Hanscom AFB near Boston, and 2 years as a postdoc with Professor Arthur Suits at Wayne State University investigating the H-atom roaming mechanism. Dr. Chambreau’s primary interest in Chemists Without Borders involves water quality issues, and he initiated the Arsenic Project in Bangladesh. In his various roles, Dr. Chambreau assisted Chemists Without Borders development in many ways including development of the mission and vision statements, incorporating the organization and obtaining 501(c)(3) non-profit status, fundraising, project development, and membership management.

Parking

Enter parking lot at the corner of Craft and Fifth Avenues. The AJ Palumbo Center is directly across the street from the parking lot.

