UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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The Dynamic Research Enterprise for Multidisciplinary Engineering Sciences
ZJU-UIUC Joint Research Center

ZHEJIANG UNIVERSITY

Center for Infrastructure Resilience in Cities as Livable Environments
CIRCLE

CIRCLE
Distinguished Lecture Series

Dr. Lilia A. Abron

Convergence of Engineering, Science, and Sociology for Equitable Solutions to Environmental Problems

ABSTRACT: Environmental engineers combine environmental science methods, engineering principles, and sociological theories/paradigms to prevent, control, and mitigate hazards and to implement public policy initiatives that impact public health and the environment. This convergence of disciplines, thoughts, and practices requires environmental engineers to practice holistic thinking — incorporating engineering, science, medicine, and sociology in the practice of the profession. Thus, environmental engineers have learned to be collaborative by reaching out to other disciplines for support, advice, and guidance. They have become curious individuals that talk to others, ask questions, listen, and observe the situation – first to identify the right problem and subsequently to find a solution to the environmental problem that is transformative, sustainable, technically appropriate, financially viable, and acceptable to and by the community it (directly) impacts.

The COVID-19 pandemic disproportionately impacted developing countries worldwide and minority and poor communities in the U.S. The CDC reports that race and ethnicity are risk markers for other underlying conditions that affect health, including socioeconomic status, access to health care, and exposure to the virus based on one's occupation, e.g., frontline, essential and critical infrastructure workers – a metaphor for low-wage workers who are mostly women and people of color. The COVID-19 death toll was unusually high among essential workers and their families. Environmental engineers should have been at the forefront of educating, communicating and visibly demonstrating to the public and this at-risk population the need for the intentional use of a variety of preventive measures that are economical, effective, and easy to obtain and implement. These measures – such as proper sanitation, frequent handwashing with soap (especially after contact with the ill), covering the mouth when coughing, and maintaining proper (social) distance – are proven measures that stop the spread of infectious diseases while curative measures become available, if and as needed. Undeterred, environmental engineers quickly pivoted to identifying ways of tracking the virus in the air and water; based on that information, they developed technologies and practices to mitigate its impacts in the built environment. This lecture discusses examples of solutions to environmental problems worldwide, where "convergence and human engineering" identified the right problem of the human environment to solve and project beneficiaries were paramount to the decision-making process.

BIO: Dr. Lilia A. Abron, P.E., BCEE is the CEO/President and Founder of PEER Consultants, P.C. (PEER). She is the first African-American woman in the nation to earn a Ph.D. in Chemical Engineering and the first African-American to start an engineering consulting firm focused on environmental issues and concerns relating to the physical and human environments. To help advance the condition of the impoverished sector worldwide using sustainability measures, Lilia also founded PEER Africa Western Cape, CC in 1995. Dr. Abron holds a B.S. degree in Chemistry from Lemoyne College in Memphis, TN, with Distinction; an M.S. degree in Environmental and Sanitary Engineering from Washington University in St. Louis; and, in 1972, Dr. Abron obtained her Ph.D. in Chemical Engineering from the University of Iowa. Professionally, she has been bestowed the highest honor - Distinguished Member, Class of 2021 - of the American Society of Civil Engineers (ASCE). Dr. Abron is an elected member of the prestigious National Academy of Engineering (NAE), the American Academy of Arts & Sciences, Tau Beta Pi, DC Alpha Chapter as an Eminent Engineer, and she is a History Maker®. As of January 2021, she became President of The American Academy of Environmental Engineers and Scientists (AAEES). Her civic and social responsibility activities range from being an invited member of the International Women's Forum; inducted member of Delta Sigma Theta, a social services sorority; serving on several college of engineering advisory boards; and, she is a member of the Board of Trustees at LeMoyne-Owen College, her undergraduate alma mater.

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Dr. Lilia A. Abron

融合工程、科学和社会学以寻求环境问题的公平解决方案

摘要：环境工程师将环境科学的专业方法、工程学原理和社会学理论及范式相结合来预防、控制和减轻环境危害，并实施改善公共健康和环境的公共政策举措。这种学科、思想和实践的融合要求环境工程师实践整体思维——将工程、科学、医学和社会学融入专业实践中。因此，环境工程师善于通过向其他学科寻求支持、建议和指导以进行协作。他们是具有好奇心的人，会通过与他人交谈、提问、倾听和观察情况来首先识别出正确的问题，然后为其找出能够（直接）对所在社区产生影响的变革性的、可持续的、技术上合适、财务上可行且为社区接受的环境问题解决方案。COVID-19 传染病流行对全球发展中国家以及美国的少数族裔和贫困社区造成了不成比例的影响。美国疾病控制与预防中心报告说，种族和族裔是影响健康的其他潜在条件的风险标志。这些潜在条件包括社会经济地位、获得医疗保健的机会和职业相关的接触病毒的可能性，例如前线、重要和关键基础设施工人—这主要包括低收入女性和有色人种。COVID-19 造成的死亡人数在基层工作人员及其家人中异常高。环境工程师应该站在教育、沟通和向公众以及这些高危人群展示各种经济、有效、易于获得和实施的预防措施的最前沿。这些措施—例如正确的消毒、经常用肥皂洗手（特别是在与病人接触后）、咳嗽时捂住嘴，以及保持适当的（社交）距离—都是行之有效的措施，可以阻止传染病的传播。勇敢的环境工程师们迅速发展了追踪空气和水中病毒的方法；根据这些信息，他们开发了新的技术并进行实践，以减轻病毒对人工环境的影响。本讲座讨论了全球环境问题解决方案案例。其中，“融合与人类工程”确定出人类环境中需要解决的正确问题；项目受益者对决策过程的参与至关重要。

简介：Lilia A. Abron 博士，注册工程师，是 PEER Consultants, P.C. (PEER) 公司的创始人、总裁兼首席执行官。她是第一位在美国获得化学工程博士学位的非州裔美国女性，并且是第一位在美国创建自然与人类环境领域工程咨询公司的非裔美国人。为了通过采用可持续发展的方式帮助改善全球存在的贫困状况，Lilia还在1995 年创立了 PEER Africa West Cape, C.C.公司。PEER 是一家拥有 43 年历史的提供全方位服务的环境与土木工程咨询公司。该公司 战略性地将总部设立于华盛顿伦比亚特区，并在马里兰州巴尔的摩、马萨诸塞州伯灵顿和佛罗里达州克利尔沃特设有办事处，自1978年以来便为全美国的客户提供服务。公司专注于为其客户具有挑战性的环境问题提供变革性、适当的和可持续的解决方案。在过去的 43 年中，作为一家屡获殊荣的公司，PEER Consultants 的平均年收入已增长到 年均1500 万美元，总计成功完成了 1600 多份合同。公司已将办事处扩展到南非，并在国际上提供设计–建造一体化可持续解决方案，同时在美国全国水与污水处理工程、环境工程和可持续性领域的变革性问题中保持领先地位。Abron 博士以优异成绩获得田纳西州孟菲斯 Lemoyne 学院的化学学士学位，圣路易斯华盛顿大学环境与卫生工程硕士学位，并于 1972 年在爱荷华大学获得了化学工程博士学位。在专业领域，她被授予2021年度美国土木工程师学会 (ASCE)杰出会员这一学会最高荣誉。 Abron 博士是美国国家工程院 (NAE)院士、美国艺术与科学学院院士、Tau Beta Pi DC Alpha 分会的杰出工程师，并且获颁“历史缔造者®”荣誉。她于 2021 年 1 月开始担任美国环境工程师与科学家学会 (AAEES) 主席。在社会活动方面，她是国际妇女大会的受邀成员、社会服务联谊会 Delta Sigma Theta 的入选会员、多个工程学院顾问委员成员，并且是母校 LeMoyne–Owen College 的董事会成员。

CIRCLE：宜居城市基础设施韧性中心是伊利诺伊大学厄巴纳–香槟分校 (UIUC) 格兰杰工程学院和浙江大学 (ZJU) 建立的三个联合研究中心之一。 CIRCLE 杰出讲座系列旨在为教师和学生提供与该领域国际知名专家会面和互动的机会。

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