Leaders in Energy Sustainability

DALHOUSIE UNIVERSITY

BIOGRAPHICAL SKETCH

KATHERINE AYERS, PH.D.

Nel Hydrogen | Connecticut, United States

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For those interested in the development of hydrogen-based technologies, the name Dr. Katherine Ayers will frequently be seen on panel discussions, advisory boards, literature reviews, and recent hydrogen-based research reports in North America and abroad. Dr. Katherine Ayers is the Vice-President of Research and Development at NEL Hydrogen US, one of the global leaders in water electrolyzer and hydrogen fueling technologies and innovations. In charge of executing NEL's technology roadmap, Dr. Ayers is responsible for a wide range of business and scientific tasks, including networking with collaborators, outreach for funding opportunities, field support, ensuring production line continuity, and staying up to date on root cause analysis and the newest innovations in the field, as well as providing roadmap support. This diverse and interdisciplinary role offers the ability to work on different types of projects throughout the year. It offers some perks, where she enjoys the frequent expert panel discussions and interaction with government agencies, as well as challenges, such as determining the source of potential failure mechanisms observed in the field from short-term and long-term cell operation. These frequent advisory boards and panels have led to her being involved with numerous government-funded institutes, such as the Joint Center for Artificial Photosynthesis and the Center for Molecular Electrochemistry and the Chemical Transformations Initiative, as well as receiving the 2012 R&D Award from the DOE Hydrogen Production Team, for Outstanding Contributions to Hydrogen Production by PEM Electrolysis, and an American Chemical Society Women Chemists Committee 2014 Rising Stars Award.

Dr. Ayers path to NEL Hydrogen US began at UC San Diego, where she obtained her BSc. In Chemistry/Chemical Physics. Her interest in electrochemical processes led her to pursue a PhD in Chemistry on a NSF Graduate Fellowship at the California Institute of Technology under the supervision of Dr. Nathan S. Lewis, where she studied fundamental electrochemical processes at semiconductor-liquid interfaces. This graduate research work not only fueled her interest and technical abilities in electrochemistry, but also helped her develop the ability to critically think about scientific problems. Rather than pursue an academic position after graduate studies, Dr. Ayers was interested in developing more tangible products and began her career in industry at the Energizer Battery company. Here, she oversaw battery failure diagnostics, strategic materials direction and provided insight into production issues. The biggest difference she noticed in the transition from academia to industry was the change from a supervisor-led targeted research program to an open-ended, less structured research environment. Resources were dedicated to developing protocols to perform failure analysis for repetitive problems that arose, as well as achieving company-set milestones such as

improving output, implementing a new process, or qualifying new materials. Coupled with her experiences from graduate studies, the job at Energizer helped develop hands-on experience with overcoming the different challenges associated with managing research projects and achieving company milestones.

Now at NEL, Dr. Ayers enjoys the benefits of working for a smaller company that is ramping up. Unlike a larger company such as Energizer, a smaller company such as NEL can shift company objectives and milestones much easier, whereby the company can be more agile, adaptable, and diversified. This can allow easier and faster implementation of novel designs or materials into systems, as well as always be at the forefront of new hydrogen-based technologies. Dr. Ayers anticipates that the field of clean hydrogen production will rapidly grow over the next five years, where everyone in the industry is hiring and expanding even amongst the current economy climate in 2022. Key areas that she noted that are of interest in the field are developing research and development divisions as well as cell engineering resources. The current electrolyzer community requires specialized companies to make specific cell components, whereby it is a vast interdisciplinary and collaborative effort to design and implement electrolyzer cell stacks. As electrolyzer production scales up, the coordination between partners and ensuring production quality control will become vitally important for rapid and cost-effective deployment. These developments will present new opportunities and challenges that Dr. Ayers is excited to tackle and solve as the implementation of hydrogen-based technologies grows.