

Alex Sandberg, Ph.D. | *Chemical Research & Development Engineer*

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Diversified, quality-driven chemical engineer with demonstrated excellence in R&D of fuel cells and alternative energies. Earned reputation for unwavering work ethic, ability to thrive in demanding situations, and talent for ensuring quality despite time constraints and competing priorities. Personable cross-cultural communicator with teaching and team leadership experience. Notable skills working with hydrogen and direct methanol fuel cells, and using fabrication techniques for PEM fuel cell MEAs.

Fuel Cell R&D Techniques & Skills

<i>Surface/Microstructure Characterization</i>	SEM FE-TEM XRD HR-TGA EDAX Hg Porosimetry N ₂ Adsorption
<i>Catalyst Characterization</i>	CV LSV EIS RDE Chronoamperometry
<i>Data Analysis</i>	ICP-OES N ₂ Adsorption BET
<i>Electrochemical Measuring</i>	Impedance Spectroscopy Linear Sweep Cyclic Voltammetry
<i>Software Applications</i>	MS Office Suite VBA Mathematica LabVIEW

Professional Experience ~ Research & Design

Doctoral Researcher/Associate | **The University of Manchester** | Manchester, UK 2007 – 2011

Worked in the School of Chemical Engineering and Analytical Sciences. Completed electrochemical characterization, materials surface characterization, and optimized platinum deposition. Synthesized porous carbon substrates using diatomaceous earth and kaolinite clay as sacrificial templates.

Utilized MEA fabrication and assembly techniques to evaluate material and record, analyze, and present polarization and durability data. Developed technical reports and trade journal articles, and presented research at conferences and seminars.

- Boosted power output of novel membrane electrode assemblies by 30% over the standard catalyst.
- Developed a novel catalyst structure for use in fuel cell catalysis.
- Independently conceived, developed, and implemented comprehensive doctoral research plan within three years, honing skills in prioritization and time management.
- Mentored and supervised six graduate students in their individual research.

Lab Technician/Intern | **University of Massachusetts** | Amherst, MA 2006 – 2007

In the University's Laboratory for Laser Energetics, performed materials characterization based on FT-IR, HPLC, and UV-Vis, as well as synthesis and purification of near-infrared dyes for application in night vision optical technologies. Frequently leveraged separation and characterization techniques.

- Worked on projects contracted by the U.S. Army and the Department of Defense.
- Synthesized and characterized nickel dithiolene and azobenzene dyes.

Vanderbilt Research Intern | **University of Massachusetts** | Amherst, MA Summer 2005

Selected to the Chemical Engineering Department's annual program and challenged to examine sodium borohydride as a possible hydrogen storage medium for vehicular fuel cell use. Researched delivery and control methods of reagents and product gas in vehicular fuel cells. Prepared and presented results.

- Determined flow rates and total volume of hydrogen obtained using NaBH₄ and HCl.
- Designed basic process schematic for in-situ borohydride reaction (delivery methods for both sodium borohydride and hydrochloric acid).

Professional Experience ~ Teaching

Graduate Teaching Assistant | The University of Manchester | Manchester, UK 2008 – 2010

Within the School of Chemical Engineering and Analytical Sciences, assisted with undergraduate and graduate courses in Momentum, Heat & Mass Transfer, Solid-Fluid Systems, Thermodynamics, and Process Fluid Dynamics, teaching groups of up to 150 students. Tutored students and graded coursework.

Teaching Assistant | University of Massachusetts | Amherst, MA Spring 2007

Contributed to classes including Fundamentals of Computing (a programming course in Microsoft Excel and Visual Basic). Graded all assignments and tracked records of student grades.

Professional Experience ~ Technology & Leadership

Event Support Technician | University of Massachusetts | Amherst, MA 2004 – 2007

Set up, tested, and operated audio-visual equipment for on-campus student and professional events. Hired with no knowledge in the field and quickly learned all skills on the job. Promoted to supervisor in 2006 and worked with clients to determine equipment and labor needs, and managed student workers.

Education & Accolades

Ph.D., Chemical Engineering | The University of Manchester | Manchester, UK 2011

- Thesis: "Synthesis and Characterization of Porous Carbon Substrates for PEM Fuel Cell Catalysis"
- Earned Scholarship for Energy Engineering, Rigg-NAFUM (North American Foundation for the University of Manchester) Award (2007).

B.S., Chemical Engineering | University of Massachusetts | Amherst, MA 2007

- Senior Design Project (Fall 2006): Designed an industrial drying process for a thin-film polymer, taking into account temperature and LEL constraints. Earned Richard R. Davis Prize in Design.
- Received the Cynthia M. Sanders Scholarship for Women in Engineering (2006), National Merit Scholarship (2003), as well as Rush Rhees and Meliora Grants (2003).

Professional Affiliations

Society of Chemical Industry (SCI) | American Institute of Chemical Engineers (AIChE)