

**David Urnes Johnson**  
452 Escondido Mall, Building 520, Room 220  
Stanford, CA 94305  
(650) 283-7535 • daviduj@stanford.edu

Dear Mr. and Mrs. MacDonald,

My name is David Urnes Johnson, and I am writing to you to express my gratitude for receiving support from the John R. MacDonald Memorial Fellowship. I am now in the final stretch of my PhD in mechanical engineering here at Stanford University, and I am currently writing my thesis and preparing my dissertation defense. With your continued support, I can focus on my research, my writing and plan my future. Thank you for enabling my success and allowing me to pursue my dreams.



My thesis is on carbon fuel cells, an energy conversion technology that has the potential to transform the energy landscape. Our carbon fuel cell scheme uses solid carbonaceous fuels such as coal and biomass directly in a solid oxide fuel cell and provides an efficient conversion of earth-abundant fuels into electricity or hydrogen. In addition to providing an efficient energy conversion, this fuel cell technology automatically separates the resulting carbon dioxide (CO<sub>2</sub>) from the nitrogen in the air. Hence, it can easily be integrated with a CO<sub>2</sub> capture and storage system, which will be a critical tool to limit our carbon emissions and its impact on the climate. Currently, I am running a first-of-its-kind demonstration of an integrated carbon fuel cell capable of simultaneously producing both electricity and hydrogen without power or heat input. I am grateful and appreciative of this opportunity to work on a project that inspires and motivates me, and which I know will certainly make a difference.

Last summer, I participated in Stanford Ignite, a four-week certificate program in innovation and entrepreneurship at the Graduate School of Business here at Stanford. The program exposed me to core business skills such as marketing, strategy and finance, as well as applied skills including design thinking, negotiation and leadership. The program also taught me the key steps required to take a technology like carbon fuel cells and bring it to the market. When I complete my PhD early next year, I plan to join a Stanford PhD alumnus, also from the Professor Reginald Mitchell laboratory, to commercialize SkyCool Systems, a new energy efficiency product for cooling. SkyCool Systems provide cooling by the phenomena called radiative cooling in which sun light is reflected and thermal energy is rejected into outer space. Ultimately, I want to use my knowledge from my PhD and my experience with the SkyCool Systems to commercialize carbon fuel cells.

When my PhD is complete, I look forward to getting outside and enjoying the scenic nature of California. A long-standing goal of mine is to climb the Nose on El Capitan in Yosemite. Remarkably, my goal of climbing a three thousand feet cliff face and completing my PhD have several similarities. Hard work, focus and a step-by-step mentality, all of which is required for success in both endeavors.

Finally, I want to again express my gratitude for your generosity and support through your fellowship. Without your generosity, my life trajectory would not be the same. Thank you.

Sincerely,

*David U Johnson*

David Urnes Johnson