

In remembrance: George Crabtree (1944–2023)

Gentleman–scientist at the forefront of sustainable energy

Scientist, visionary, and gentleman

A stunning loss to the scientific community and to humanity, the news of George Crabtree’s recent demise came as a shock to his numerous colleagues and friends. George was the epitome of an inspirational visionary and an astounding human being, as well as a force for critical and interdisciplinary scientific thought. Remembered by all as approachable, warm, wonderful, kind, curious, fearless, insightful, articulate, inspiring, inclusive, empathetic, intelligent, and impactful, George was the consummate scientist, gentleman, and leader with a deep appreciation for diverse thought, dialogue, and approaches. With so many dimensions to George, we will always remember him as our friend, a thoughtful scholar, a kind soul, and for his smile and laugh. His sudden recent death on January 23, 2023 affected many of us individually and impacted the entire materials research community.

George’s immense contributions to science and clean energy will surpass and outlive our lifetimes. His efforts propelled energy-storage research to the forefront of societal change, which we are living and experiencing now. George masterminded collaborative contributions to the field of batteries, while simultaneously lifting the institutional capabilities of Argonne National Laboratory (ANL), the University of Illinois at Chicago (UIC), and the Materials Research Society (MRS), to advance next-generation scientific thought and leadership. He was indeed a true believer in science and a supporter of the younger generations, always willing to spend time with students, enthusiastically answering their questions,

and why he has an extensive community of supporters.

A tribute to his contributions

Coupled to his leadership, George brought deep scientific insight and limitless curiosity about the world around us and a strong drive to explain, teach, and learn.

George always made everyone around him better. He was an excellent scientist with many awards from basic science to applications. His passions turned to renewable energy and energy storage some decades ago. George helped found and was the director of the US Department of Energy (DOE) Joint Center for Energy Storage Research (JCESR) established in 2012, one of the US’ leading centers for developing the next generation of energy-storage materials. His broad expertise and leadership were reflected by the many government review boards he served on or led.

He had many connections with MRS and was a critical player in developing its increasingly important role in energy materials. George was a pillar, whether serving on *MRS Bulletin* Energy Quarterly, sitting on editorial boards, or as a “go to” resource on energy topics. He presented the foundations of a sustainable future for the *MRS Energy and Sustainability* Journal, asserting that “it’s the materials,” notably, from which other areas must follow. That does not mean that physics and engineering, two disciplines that were part of his formal



training, were forgotten. Instead, he rose to prominence in the area because of his broad knowledge, vision, and ability to articulate the integral role of materials in his many invited talks and roles in advising many organizations including DOE in the Grand Challenges and Basic Research Needs in a number of energy areas.

George joined ANL when he was still in college and loved working there and interacting with the three major universities in the area—Northwestern University, UIC, and The University of Chicago. He started as a lab technician, took night classes when he started his PhD studies, alongside his job at ANL. At the time of his death, he had risen to become one of ANL’s most prominent staff members, Director of JCESR at ANL, Director of UIC’s Energy Initiative, Distinguished Professor of Physics, Electrical, and Mechanical Engineering at UIC, and a member of the US National Academy of Sciences and the American Academy of Arts & Sciences. He also testified before the US Congress on the potential of hydrogen as a means to store (chemical) energy.

“Science is extremely powerful. As a discipline, all published work gets reviewed and verified, and it always moves in a positive direction. This is unusual for most disciplines. Therefore, pay attention to science—it has the ability to change the world for the better.”

—H. Taz, George Crabtree, *MRS Bull.* **44**(6), 509 (2019). <https://doi.org/10.1557/mrs.2019.144>

Much of his early career was devoted to superconductivity, especially why certain materials do and others do not show this property. The focus switched somewhat in late 1986 when high-temperature cuprate superconductors burst on the scene. One of his famous contributions was the experimental evidence for vortex melting in new materials, an issue of critical importance for understanding how they will behave in high magnetic fields and how high current densities can pass. For this he received the Kammerlingh Onnes Prize. Months before his death, after 35 years, science caught up and produced the best evidence yet for an answer to the question that has been with researchers,

electron superexchange.

In addition to superconductivity, George was very well aware of the tremendous potential for energy and sustainability. Global sharing of electrical power, an issue George discussed in the *MRS Bulletin* Energy Quarterly in 2011 (<https://doi.org/10.1557/mrs.2011.214>), could become a reality with superconducting transmission cables. Half a decade later, George co-authored an editorial (<https://doi.org/10.1557/mrs.2016.29>) on energy safety, especially concerning batteries, an area he entered with all his personal energy, enthusiasm, and wisdom when JCESR was created. Even before that, George, with the late Mildred

including George, since 1986, which is “How does superconductivity work in the cuprates?” namely by a special type of

Dresselhaus, wrote an article in *MRS Bulletin*, “The hydrogen fuel alternative” (<https://doi.org/10.1557/mrs2008.84>) to explain and educate about the hydrogen economy, foretelling the immense global interest in this area currently.

The legacy: Collectively aspiring to his vision

George has left an inspiring mark on everyone’s path with his combination of extensive scientific knowledge and propensity for making it accessible and inspirational to everyone. George’s passing is a huge loss to all, and he has left with us an incredible legacy. As our “north star,” our admirable example, and our enduring role model for guiding people and ideas, we must carry the torch for his many impactful contributions to science, society, and humanity.

Contributed by Elizabeth Kócs, David Cahen, and David Ginley



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