

# Powering Sustainable Energy Sources



Carlo Segre  
Duchossois Professor of Physics

## CURRENT RESEARCH

Using x-rays to learn how the structure of materials affects their properties

Imagine driving from Boston to D.C. and using only a single charge for your car. This would effectively double the current mile range possible for the best electric cars. Dr. Carlo Segre of the Illinois Institute of Technology researches how the structure of materials affect their properties. Using x-rays, it is possible to precisely measure the important characteristic lengths between atoms which describe the local structure of a cluster of atoms and how it affects the material properties. In short, x-rays allow researchers to understand how to improve and design new materials capable of superconductivity, magnetism, catalysis, and energy storage. Dr. Segre's current work on battery materials may lead to the development of a new format for storing electrochemical energy in a way that gives superior performance for electric vehicles of the future. This will therefore improve our chances of reducing the use of fossil fuels for transportation, creating renewable sources of energy, and enabling more efficient uses of nonrenewable energy.

As the Director of Illinois Tech's Center for Synchrotron Research and the Materials Research Collaborative Access Team (MRCAT), Dr. Segre manages the operation of an experimental facility for materials research that leads the nation. His team has access to one of the premiere x-ray sources in the world which makes it possible to approach difficult problems that are intractable using other methods. In addition, Dr. Segre not only researches science but also provides collaborative support to a large quantity of outside users. Therefore, he and his team are able to share the fantastic equipment they use each day with the greater community of university researchers, students, and...

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## AFFILIATION



Illinois Institute of Technology

## EDUCATION

- Ph.D. in Physics 1981, University of California, San Diego
- B.S. in Physics 1976, University of Illinois Urbana-Champaign
- B.S. in Chemistry 1976, University of Illinois Urbana-Champaign

## AWARDS

- Fellow, American Association for the Advancement of Science, 2013
- Fellow of the International Centre for Diffraction Data, 2006
- IIT Sigma Xi Research Award, Senior Faculty Division, 2014

## RESEARCH AREAS

Clean Energy, Technology, Materials Science / Physics, Space

## FUNDING REQUEST

Your contributions will support the continued research of Dr. Carlo Segre as he uses x-rays to understand the structure of molecules that affect their properties. Your donations of \$200K would ensure enough lab time for experiments within the MRCAT project. Additional donations of \$150K will support faculty stipends, graduate student support, and lecture series. Your donation will continue to guarantee new formats for storing electrochemical energy sources.