



Jennifer A. Doudna

University of California, Berkeley
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Jennifer Doudna studies the "secrets of RNA" and among other achievements, she co-created the revolutionary RNA-guided CRISPR-Cas genome engineering technology. Raised in Hawaii, she received her Ph.D. from Harvard University and did postdoctoral research at the University of Colorado. Doudna is a professor of molecular and cell biology and chemistry at UC Berkeley, where she holds the Li Ka Shing Chancellor's Chair in Biomedical and Health Sciences, senior investigator at Gladstone Institutes, investigator at the Howard Hughes Medical Institute, and the Executive Director of the Innovative Genomics Institute. She has received numerous awards including the FNIH Lurie Prize, the Paul Janssen Award for Biomedical Research, the Breakthrough Prize in Life Sciences, the Gairdner Award, the Nakasone Award, the Tang Prize, the Heineken Prize, the L'Oreal-UNESCO International Prize for Women in Science, the Japan Prize, and the Kavli Prize in Nanoscience. She is an elected member of the National Academy of Sciences, National Academy of Inventors, National Academy of Medicine and the American Academy of Arts and Sciences, and is a Foreign Member of the Royal Society.

Introduction: The Chemistry of Genome Editing and Imaging

We are in the midst of a revolution in our ability to query and alter genetic material. Basic research uncovered CRISPR-Cas9 and related enzymes as tools for genome editing, paving the way for both fundamental and applied research and applications. Our first session will examine genome editing enzymes and the chemistry behind targeted genome manipulation.

As all of life is based upon the building blocks of DNA, the applications of this technology are profound and far-reaching, including research in microbes, plants, insects and mammals. Our second session will focus on translational work that is adapting and developing genome editing platforms for use in the clinic, in fields, and in labs around the world.

Understanding genome function and evolution requires determining chromosome spatio-temporal organization. Innovations in imaging are yielding new insights into the where and when of CRISPR-Cas enzyme binding and cleavage of DNA within the complex 3D structures inside the nucleus, the focus of our third session.

Finally, the fourth session is about future directions of genome engineering, including innovations such as base editing that make direct chemical changes to DNA sequences without DNA cleavage. The chemistry of genome editing and imaging will provide a foundation for future discovery and technology development in this exciting field.