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## Chiral induced spin selectivity effect in various biomolecular systems

**Suryakant Mishra**

*Los Alamos National Laboratory*

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### Abstract

In this talk, I will discuss chiral-induced spin selectivity (CISS), recent advancements, and their applications across various fields of science. My specific focus will be on the impact of the CISS effect in biomolecular systems and the critical role spin plays in charge transfer within these systems. One such system is multiheme cytochromes, located on the bacterial cell surface, where extracellular electron transfer processes enable microorganisms to gain energy by respiring solid redox-active minerals. Using techniques such as magnetic conductive probe atomic force microscopy, Hall voltage measurements, and spin-dependent electrochemistry of the decaheme cytochromes MtrF and OmcA from the metal-reducing bacterium *Shewanella oneidensis* MR-1, we have observed signatures of spin-selective electron transport through these extracellular conduits.

Finally, I will discuss the implications of understanding how spin-dependent interactions and magnetic fields can control electron transport across biotic–abiotic interfaces in both natural and biotechnological systems.