Rosana COLLEPARDO-GUEVARA

Home Country
Mexico

Degree
Post-Doctorate in Biomolecular Simulations

Expertise
Theoretical Chemistry

Research Focus
Biomolecular Simulations

Host University
New York University, United States

Fellowship Awarded
2010

Rosana Collepardo-Guevarai was born and grew up in Mexico, where her parents inspired her to succeed academically. In addition to science, she enjoys hiking, creative cooking, independent cinema and reading, particularly feminist literature and books about how the human mind and human behavior are shaped by evolution.

Rosana graduated from the National Autonomous University of Mexico (UNAM) in 2004 with a BSc (honours) in chemistry. During her final undergraduate year she specialized in high-performance supercomputing. The following year she graduated with her MSc in theoretical chemistry from the University of Oxford in the United Kingdom, where in 2009 she also completed her doctorate in physical and theoretical chemistry. At Oxford Rosana was elected president of the Oxford University Mexican Society, a student organization that helps Mexicans adapt to the experience of studying abroad, and for three years she also taught mathematics to undergraduates.

Rosana's post-doctoral research in theoretical chemistry at New York University in the United States involves biomolecular simulations. Her research focuses on refining and applying innovative computational methods and multi-scale models to help understand how the structures and motions of complex biological systems regulate fundamental cellular processes. Using supercomputers to study the factors that drive and alter the compaction of DNA inside human cells, she is attempting to provide atomic views and quantitative information on energetics that cannot be easily revealed from experimental studies.

Genetic material in human cells is organized in a protein/DNA complex called the chromatin fiber. To fit into micrometer-sized cells, these chromatin fibers condense the genetic material by more than five orders of magnitude. Understanding chromatin organization is of one of the most important open biological questions to date, because the state of the chromatin fibers affects DNA's accessibility to the cellular machinery, which in turn regulates transcription. An accurate computational study such as the one Rosana is performing is key to understanding aberrant cellular processes and, in turn, to designing agents that can prevent associated illnesses such as multiple sclerosis, diabetes and cancer.

When she completes her studies Rosana intends to teach and become a researcher at a Mexican public university.