



**Olga Ermak
SHAMARDINA**

**Home Country
Russia**

**Degree
PhD in Polymer
Physics**

**Expertise
Computer Engineering**

**Research Focus
Computer Models for
High-Temperature
Proton-Exchange
Membrane Fuel Cells**

**Host University
Centre for Solar
Energy and Hydrogen
Research Baden-
Württemberg,
Germany**

**Fellowship Awarded
2007**

Olga Shamardina was born in Uzhhorod in western Ukraine. She and her two younger sisters spent their childhood in Elektrostal, a town near Moscow, and each summer they visited their grandparents in Uzhhorod or Cherkessk.

Olga is a PhD student at Moscow State University, where her mother graduated. Olga has completed a program at the Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) in Ulm, Germany. She is married to a research associate whose specialization is high-energy physics and GRID-computing.

Her research interests include statistical physics of macromolecules, computer simulations of polymer systems, proton exchange membrane fuel cells, numerical methods, algorithms and hydrogen energetics. She is studying fuel cell theory and creating computer models for high-temperature proton-exchange membrane (PEM) fuel cells.

Fuel cells are increasingly attracting the attention of the scientific community as well of industry and even consumers. This is because fuel cell power generators are considered to be environmental friendly, with only water vapor emissions, and because the efficiency of fuel-cell-driven power plants is higher compared to power plants driven by combustion engines. As well, many fuel-cell systems are almost silent. High-temperature PEM fuel cells have certain advantages over conventional PEM fuel cells, including their tolerance to impurities in hydrogen fuel and unnecessary water management. At the same time, they still have several unsolved engineering problems, including a lack of models for high-temperature PEM fuel cells. Because it is often easier and less expensive to simulate changes in fuel cell parameters, Olga's computer model simulations may help our understanding of the processes occurring at different stages of the fuel cell operation and eventually may help overcome these engineering challenges.

Olga plans to continue teaching at Moscow State University.