Binek seeks to put new face on physics education

By Tom Hancock
University Communications

Christian Binek would like to make face-to-face interaction between instructor and student a 24/7 proposition for the teaching of complex topics of physics.

Binek, an assistant professor in the Department of Physics and Astronomy, has been awarded a Faculty Early Career Development (CAREER) grant of $500,000 for five years from the National Science Foundation to support his work in spintronics and to create an innovative Web-based resource for students and the public interested in physics research. The grant name is "CAREER: Education and Research on Nanoscale Spintronic Systems and Heterostructures."

CAREER program grants are awarded to early-career faculty who effectively integrate research and education within the context of the mission of their organization.


Binek

Using the Web to extend the classroom isn't a new idea. But rather than the simple posting of notes or PowerPoint presentations, Binek's system would allow students to address questions at any time to an instructor who is represented by a human-like, knowledge "avatar."

Binek hopes that student-to-avatar dialogues could simulate the face-to-face interaction that has been shown to be the most effective way of learning.

CAREER award

This is the final of three stories on CAREER grants awarded to UNL faculty. Others receiving CAREER grants are Aron Dominguez (published Feb. 2) and Kenneth Bloom (Feb. 9). For additional information on CAREER awards, go online to www.nsf.gov.

"The idea is that at some stage we collect all the research done by the department then present it in an animated way through avatars," Binek said.

On the research side of the grant, Binek works in spintronics, with a primary focus on the effects of magnetism.

Spintronics research focuses on using electrons in ways not used today.

Binek and other physicists are now part of a research effort taking place worldwide that is trying to exploit the spin of the electron.

Spintronic devices would act by storing information as a particular spin orientation, that is, up or down. The spins, being attached to mobile electrons, would carry the information along a wire, with the information being read at a terminal.

Although practical applications of actively controlled spin-polarized currents may be years off, one vision is that data storage and processing devices could be brought together in a single device, Binek said.

"This would be a big advantage because the new configuration would speed up everything," he said. This eventually could make today's computers seem like dinosaurs.