

DONALD FRANCESCHETTI

- My overall purpose in requesting a PDA for the Fall semester was to position myself for an increase in research productivity by developing my abilities in cognitive science and neural modeling while reviving activity in areas in which I had been successful previously, namely the mathematical modeling of charge motion in condensed matter.

In the area of cognitive science and neural modeling I was able to devote appreciable time to the continuing study of physics tutoring being conducted in the Institute for Intelligent Systems. This led to my being coauthor of two oral presentations that will occur at the 24th Annual Meeting of the Cognitive Science conference [1,2]. Growing from this work are two studies being conducted at the moment, one involving the analysis of transcripts of over 100 hours of physics tutoring sessions and the other an experimental study of students' descriptors of time instants and durations. These are being conducted with the aid of doctoral students in Instructional Design and in Psychology. In a more analytical mode I was able to bring an undergraduate computational physics project, using phase diagrams to describe the different behaviors of a single idealized nerve cell to the point where I could present it at a local scientific conference [3] with a bit of expansion this work should be publishable in a journal such as **Physica**. I also was able to have a short commentary accepted for publication on some modeling issues [4] that actually are of some importance in work I intend to continue.

In the modeling of charge motion, I have acquired new software for impedance analysis and I am now applying it to data on reference electrodes recorded by M. Ciobanu, a doctoral student in the chemistry department. I have additional software on order that will provide a capability of modeling charge distributions in nanoparticles of ionic conductors. This is an area where my previous academic theoretical work is now of greater practical interest due to the emergence of nanotechnology.

I am grateful for the opportunity afforded by the PDA and feel that I have put the time to good use, but I do not feel that presentations are a substitute for contributions to the primary literature. I intend to submit at least three papers to refereed journals based on my PDA efforts before the calendar year is out.

1. Implementing Latent Semantic Analysis in Learning Environments with Conversational Agents and Tutorial Dialog, A. C. Graesser, X. Hu, B. A. Olde, M. Ventura, A. Olney, M. Lowerse, D. R. Franceschetti and N. Person, accepted for oral presentation at the Twenty-Fourth Annual Conference of the Cognitive Science Society, Washington, D.C., July 2002

2. The Right Stuff: Do You Need to Sanitize Your Corpus when Using Latent Semantic Analysis? B. A. Olde, D. R. Franceschetti, A. Karnavat, A. C. Graesser, and the Tutoring Research Group, accepted for oral presentation at the Twenty-Fourth Annual Conference of the Cognitive Science Society, Washington, D.C., July 2002

3. Weight Space Phase Diagram for Simple Neurons Implementing Symmetrical Cellular Automata Rules, D. R. Franceschetti and W. Brad Robinson, MAESC 2000 Conference, Memphis, TN, May 10, 2002
4. Biorobotic Simulations Might Offer Some Advantages over Purely Computational Ones, D. R. Franceschetti, Behavioral and Brain Sciences (submitted)