## High Performance Database Research Center

**Director:** Dr. Naphtali Rishe  
**Affiliated Universities:** (AFFILIATES)

### Directory Information

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<td>I/C Director:</td>
<td>Dr. Naphtali Rishe Director</td>
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| I/C Address:           | Florida International University  
11200 SW 8th ST, ECS 243 |
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| 33199                  |                              |
| I/C Telephone:         | 305-348-1706                 |
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| Affiliated Universities: | (AFFILIATES)                |

### Mission and Areas of Focus

**Mission Statement:**
The High Performance Database Research Center (HPDRC) conducts research on database management systems and various applications, leading to the development of new types of database systems and the refinement of existing database systems. The HPDRC, a research division of the Florida International University School of Computer Science, has a strong commitment to training graduate and undergraduate students and preparing them for their future roles as scholars and specialists employed by industry.

**Key Terms:**  
- Databases  
- Information Systems  
- Remote Sensing  
- GIS  
- (KEY5)  
- (KEY6)
EXECUTIVE SUMMARY

1. Activities - Prior Year
   a. Scholarly activities (e.g., forums or conferences that support faculty research, teaching, and service interests)

During the Summer 1999 semester, HPDRC collaborated with FIU's College of Education to hold two five-day intensive in-service training workshops entitled "Databases for School, Life and Space" for teachers. The workshops were organized as part of the College of Education's commitment to developing workshops for math, science, and technology middle school and high school teachers in the Miami-Dade County Public School System. The main objective of these workshops was to impact the pipeline for potential computer science students by creating awareness among teachers about the FIU School of Computer Science and the HPDRC. The participants were lead through an intensive training sessions on Microsoft Access. Access was chosen because, as a database program, it provides the basic foundation needed for teachers to begin to understand how databases are used in the HPDRC. Furthermore, by teaching teachers how to use databases, it is hoped that they will show their students how to use databases. The increase of knowledge related to databases is another way this program is attempting to "prime the pump" and create database and computer applications awareness throughout the FIU local feeder pattern. Workshop participants visited the HPDRC for one afternoon of each workshop. Dr. Naphtali Rishe welcomed the participants, explained how the HPDRC has been involved in the advancement of database technology, and provided an overview of ongoing HPDRC projects, including the Everglades Research Project and TerraFly. Debra Davis, a computer science graduate student performing research at HPDRC, provided a presentation on TerraFly. She demonstrated the program and explained how database technology is being used for similar applications. She described how teachers could use the technology and provided teachers with the CD version of the program, then answered questions about database technology and TerraFly.

We have continued to develop an outreach program that will ultimately consist of both visits to FIU and a traveling 'show' that includes a presentation geared to the appropriate audience at schools. The presentation is followed by a hands-on demonstration of interesting database projects to which the students can relate, such as advanced 'virtual reality' demonstrations and the like. One aspect of this show is viewing a South Florida Landsat image through which it is possible to 'fly' by updating the image in real-time from the semantic database in which the Landsat data is stored. During the Summer 1999 semester, FIU's College of Education and the HPDRC worked closely to develop a half-day seminar, the first of its kind for FIU, for minority students interested in computer applications. Seventy students attending Miami Central High School (Miami-Dade County's magnet school for computer science) were invited to FIU for this "Day of Databases." The students were welcomed and provided with practical information by FIU staff members from the College of Education, the Office of Admissions, the School of
Computer Science, and the HPDRC. Staff members from the FIU Office of Admissions spoke to the students and provided campus tours. Admissions staff members engaged the students in an information-packed orientation session during which catalogues were handed out and many of the students' questions were answered. More than 30 students submitted cards requesting more information about FIU. After the tour, Dr. William Kraynek, Associate Director for the School of Computer Science, promoted the possibilities and benefits of studying at the School of Computer Science. Several students expressed an interest in studying computer science and asked questions ranging from the amount of math required for computer science students to the differences between computer engineering and computer science. After Dr. Kraynek's presentation, Dr. Maxim Chekmasov (HPDRC's Acting Manager), spoke about various uses for databases and the research being conducted at HPDRC. Debra Davis, a computer science graduate student performing research at HPDRC, then conducted a presentation on TerraFly, demonstrating how it uses database information to create visual images of geography. The HPDRC session ended with the introduction of four teenaged HPDRC student researchers. Several of these students began working with the HPDRC while they were in high school. The students discussed the projects they are working on and encouraged the participants to pursue their dreams of attending college.

FIU's High Performance Database Center hosted seven students from the Miami-Dade Public Schools under the school system's Advanced Academic Internship Program (AAIP) during the 1998-1999 school year as well as seven additional students during the 1999-2000 school year. These students worked alongside researchers at HPDRC and contributed to the research and development goals of the Center. After serving as an intern, Roy Duque de Estrada graduated from Hialeah-Miami Lakes High and has enrolled as a freshman at FIU. He is presently volunteering at HPDRC to stay involved in cutting-edge computer science research; we hope to hire him to a paying position in the near future. The involvement of these students provides us a pipeline of researchers from high school through the PhD.

b. Published research, faculty productions or other media by primary authors giving credit to the institute/center for its support

HPDRC faculty and students combined to publish 13 papers during the period of July 1999 through June 2000. Additionally, Nirva Morisseau-Leroy and Gerald Momplaisir, who each received their MS degrees while at HPDRC, collaborated to publish a book: *Oracle8i SQLj Programming*, Osborne McGraw Hill, 557 pp. Ms. Morisseau-Leroy will be publishing another book in the coming year.

c. External funding sources resulting of the prior year’s activities, or non-funded outreach

HPDRC was awarded a three year $2.04M (including matching) extension of its NASA Institutional Research Award, High Performance Database Management with Application to Earth Science. Additionally, HPDRC was awarded $100K to continue its development of information management tools and databases for the Everglades National Park.
HPDRC was also awarded $100K by an industrial concern to pursue research on better ways to extract and store WWW data.

d. Any form of public recognition by the mass media

none

e. Integration of faculty into center activities

Dr. Shu-Ching Chen, a newly hired Assistant Professor of Computer Science is now affiliated with HPDRC and has collaborated on a number of publications with HPDRC students and faculty. Drs. Rishe, Sun, Ege, and Prabakar continue in their roles with HPDRC.

2. Activities - Coming Year

a. Proposed research and scholarly activities

We plan to continue our outreach program to the Miami-Dade County Public Schools in collaboration with FIU’s College of Education.

b. Teaching and training activities

FIU’s High Performance Database Research Center has established an Affinity Group laboratory. The Affinity Groups are made up of faculty members, postdoctoral associates, graduate and undergraduate students, and high school students. Each group is focusing on deepening research in computer science. Groups established to date include the following: Semantic Database Engine Group - devoted to designing and developing semantic database technology; Applications Group - devoted to investigating spatial data technology and applications and GIS; Heterogeneous Database Group - devoted to deepening research in distributed heterogeneous databases; and Semantic-Relational Systems Group - devoted to making the semantic database technology available to all database users. The grouping of students at different stages of their academic careers enables training of students by direct contact with others further along in their studies, post docs, and faculty members. Students who have gained research experience are able to assume leadership roles and gain valuable experience by helping to train new research students. The Affinity Group laboratory provides the students with a dedicated space to meet, study, and to perform their research.

c. Service and outreach – internal (e.g., with departments, colleges, or other university units) or external networking (e.g., with other universities, community colleges, public schools, public-private partnerships)

HPDRC has hosted students from Miami-Dade County Public School’s Advanced Academic Internship Program each of the past two years. One of these students has matriculated to FIU and is volunteering at HPDRC. We plan to continue to host students and hope to recruit some more of them.
HPDRC is collaborating with researchers from FIU’s International Hurricane Center, GIS Laboratory, Department of Physics, and Department of Geology. We plan to continue and expand these collaborations.

HPDRC is collaborating with NOAA’s National Hurricane Center and is presently working with researchers from the University of Miami’s RSMAS, NOAA’s AOML, and Spaceport Florida to create a collaboration that will focus on applying remotely sensed data and information management to environmental problems.

d. Opportunities for students (e.g., assistantships, service learning); or financial goals (e.g., levels of external funding, potential contracts)

HPDRC will continue to provide opportunities for undergraduate, graduate, and post doctoral students to pursue research and development activities on the cutting edge of information management.

e. Integration of faculty into center activities

HPDRC will continue its present faculty relations and will seek to recruit new SCS faculty into its research programs.