

High Performance Computing facility

Twenty Years of Internet in Puerto Rico
Gauss Research Lab
San Juan - 2009

High Performance Computing facility University of Puerto Rico and GRL Inc. Background for Collaboration

<http://www.hpcf.upr.edu>

- Shared resources for research computing in Puerto Rico
 - Hosts PR-AABRE Bioinformatics Resource Center (BiRC)
 - Hosts Puerto Rico's Internet2 GigaPOP

HPCf and GRL

- Long history of collaboration on technical issues.
 - IPv6
 - Multicast
 - Internet exchange (IX.pr)
- Collaborative Research Projects
- Will collaborate with IX.pr to provide Internet2 service to eligible institutions

Research on Aerospace

Dr. Oscar Moreno, José R. Ortiz Ubarri

- Topic: Double Periodic Arrays with applications
 - Multiple Target radars and sonars.
 - Optical Communications
 - Digital Watermarking
- New DPA Constructions
- DPA with cross-correlation $<$ auto-correlation
- Optimality

Research on Bioinformatics

Dr. Oscar Moreno, Dr. Humberto Ortiz Zuazaga

Topic: Error Correction and clustering microarray data.

- Discretization and error correction of replicate experiments
- Validation of biological relevance
- Extension of procedures to arrays with multiple probes per gene
- Weighted mutual information for comparing multiple microarray experiments

Joint Publications

Refereed Proceedings

- O. Moreno and J. Ortiz-Ubarri. A New Method to Construct Double Periodic Arrays with Optimal Correlation. IEEE Proc Information Theory Workshop, Taormina, Sicily, 2009
- J. Ortiz-Ubarri and O. Moreno. Families of Constructions with Unequal Auto- and Cross-Correlation Constraints. IEEE Proc International Symposium on Information Theory, Seoul, Korea, 2009.
- O. Moreno and J. Ortiz-Ubarri. Double Periodic with Good Correlation for Applications in Watermarking. IEEE Proc 3rd International Workshop in Signal Design and Its Applications in Communications, pages 214-218, Chengdu, China, 2007.
- O. Moreno and J. Ortiz-Ubarri. Double Periodic Arrays with Optimal Correlation for Applications in Watermarking. In Sequences, Subsequences, and Consequences, volume LNCS 4893, pages 82-94, Los Angeles, CA, USA, 2007.

Conferences

- Double periodic sequences in the aerospace industry, Entrepreneurship and Research in the Aerospace Industry, San Juan, Puerto Rico, 2009

Joint Publications

Refereed Proceedings

- Ortiz-Zuazaga, H., Aviño-Diaz, M. A., Laubenbacher, R., Moreno O. Finite fields are better Booleans. Refereed abstract, presented at the Seventh Annual Conference on Computational Molecular Biology (RECOMB 2003), April 10-13, 2003, Germany.
- Humberto Ortiz-Zuazaga, Sandra Peña de Ortiz, Oscar Moreno de Ayala. Error Correction and Clustering Gene Expression Data Using Majority Logic Decoding. Proceedings of The 2007 International Conference on Bioinformatics and Computational Biology (BIOCOMP'07), Las Vegas, Nevada, June 25-28, 2007.
- Humberto Ortiz Zuazaga, Tim Tully, Oscar Moreno. Majority logic decoding for probe-level microarray data. Proceedings of BIOCOMP'08 - The 2008 International Conference on Bioinformatics & Computational Biology, Las Vegas, Nevada, July 13-17, 2008.

Conferences

- Oscar Moreno (UPR-Río Piedras) Maria Alicia Aviño (UPR-Cayey) Dorothy Bollman (UPR-Mayaguez) Humberto Ortiz-Zuazaga (UPR HPCf). The Reverse Engineering Problem in Genetic Networks. Invited talk, presented at the BRIN-PR 1st Annual Symposium: Biotechnology and Modern Medicine, October 11, 2002 San Juan Puerto Rico.

Preprints

- Maria A. Avino-Diaz, Humberto Ortiz, Oscar Moreno. Genetic Sequential Dynamical Systems. <http://arxiv.org/abs/math/0603370v2>

FIN

Internet 2 Infrastructure

- 300 Mbps Connections to UPR-RRP, UPR-RCM, UPR-RUM
- 100-45 Mbps Connections to UPR-CUH, UPR-CUB, UCC, PSM (fractional)
- UPR Core routers, HPCf Core, Arecibo Radio Observatory connected at Gigabit Ethernet.
- Gigabit Ethernet link for Internet2, commodity Internet (200 Mbps I2, 600 Mbps CI)

Computing Resources

- espresso.hpcf.upr.edu
 - 32-bit linux cluster
 - 85 dual 2.4GHz Xeon computing nodes
 - 86 GB distributed RAM memory
 - 10 TB Storage
- gelato.hpcf.upr.edu –
 - SGI altix hybrid cluster
 - 36 Itanium 2 1.4 Ghz
 - 72 GB RAM Shared
 - 10 TB Storage
- cafeina.hpcf.upr.edu
 - SGI Origin 300 Supercomputer
 - 32 600 Mhz MIPS processors
 - 24 GB shared Memory
 - 3TB Storage
- barista.hpcf.upr.edu
 - 64-bit SMP Cluster
 - 216 cores (Opteron/Xeon)
 - 64/32/16 GB RAM
 - 10GB, GB ethernet
 - 4TB Storage