

## Message From the Chairman

The goal of this newsletter is to keep in touch with you. I will do this by periodically describing our events and activities. I will also appreciate hearing from you.

I became Chairman of the Computer Science Department last year, after 23 years at Bell Laboratories, home of some of the most prominent innovations in computer science, such as UNIX, C, and C++ programming languages. As Vice President of Communications Systems Research at Bell Labs, I worked with many of their fine researchers to build a strong computer science research community in several disciplines. NJIT's computer science program has developed with 30 years of experience into one of the finest in the country. Currently, there are over 700 students enrolled in our Bachelor's program and 600 in our Master's and PhD programs. The faculty of NJIT's Computer Science Department teach courses and have research interests ranging from algorithms and programming languages to data mining, bioinformatics and Web technologies. Computer scientists work on complex problems spanning many disciplines. We in the NJIT Computer Science faculty are teachers; we are researchers who develop novel solutions and new applications; we are engineers who build computer systems; we are managers who are responsible for the deployment and use of computing systems. The goal of the department is to provide the students with a strong background in computer science and to come up with innovations.

Narain Gehani  
Professor and Chair, CS Department

## CS Department Hosts High School Programming Contest

The Computer Science Department held its first annual NJIT High School Programming Contest on April 3, 2004. Thirty New Jersey high schools participated in this exciting event, with each school having one team of up to 3 juniors. During the 3-hour competition, each team was given 8 problems to solve using either C++ or Java.

The schools that came out on top in the competition were:

First: Millburn High School, Millburn, NJ,  
Second: Middletown High School South, Middletown, NJ,  
Third: Livingston High School, Livingston, NJ,  
Fourth: Middlesex County Academy, Middletown, NJ.

The contest organizers were Profs. Joseph Leung, Marvin Nakayama and Michael Baltrush, and

the judges were Profs. Alexandros Gerbessiotis, Barry Cohen, Artur Czumaj, and Wojciech Rytter. Prof. Jim Geller supervised a team of undergraduates who developed a web-based system for submitting programs during the contest.

The success of the competition has led us to make it an annual event. The planning for the next competition, scheduled for Feb. 25, 2005, has already started. The team will be led by Professors Geller, Gehani, and Baltrush and will also include Andy Hrechak, Kathy James, and Sarah Vandermark.

## Seminars

### **CS Distinguished Seminar Series**

The CS department started a Distinguished Seminar Series this year. Our first distinguished speaker was Dennis Shasha of New York University. He presented an exciting talk, entitled “Upstart Puzzles!” Professor Shasha, whose research interests include biological pattern discovery and databases, is also the puzzles editor of the Scientific American.

### **Weekly seminar**

We regularly hold seminars every week for our students and faculty

### **Graduate Student Seminar**

Once a year we now have a graduate seminar day where all our PhD students present their research.

## For Our Students

### **Innovation in Teaching – Programming Competition**

Barry Cohen and Artur Czumaj introduce a programming competition in the CS introductory programming course, CIS 113. Barry's enthusiastic report:

“We can pinpoint precisely the moment of conception of the Top Gun Programming Competition. Late on the evening of April 3, the judging of the NJIT high school programming contest was coming to a close. We were pleasantly high from contact with the 30+ teams of students. It occurred to us that the very successful framework developed for the high school competition could also be deployed to good effect in our introductory computer science course. The time from conception to birth was short: the CIS 113 Top Gun Programming Competition was held on April 14. Eligibility was by invitation only. We invited the top students in CIS 113, as determined by performance on the midterms, to participate. Thirteen students took part. The top three finishers were awarded Certificate of Achievement and all those who performed well were given an A for the course and excused from the final.

We foresee making this a regular feature of CIS 113. This may include the presentation of challenge problems throughout the semester, encouraging students to train hard to improve their chances of being invited to compete and their chances of winning.

Based on immediate feedback, the Top Gun competition provided an exciting experience for the participants. We are looking forward to its future iterations giving encouragement, recognition and tangible rewards for excellent performance, and strengthening a culture of achievement in the CS program at NJIT.”

## Java

We have started the process of transitioning from C++ to Java as the primary programming language. We will be offering Java as the primary programming language for our courses starting Fall 2004.

## Graduate Student Association

The CS Department encouraged and supported the formation of the CS Graduate Students Association, DeepCS. The founding officers of our new graduate student club are: Rahul Jain, Viswanath Neelavalli, Suresh Solaimuthu, and Achir Karla.

For more information, visit:

<http://web.njit.edu/~deepcs>

## Faculty News

This year we had two new additions to our faculty:

- Narain Gehani, Professor and Chair, PhD 1975, Computer Science, Cornell University. Research Expertise: Web technologies, Communications Software, and Databases.

Dr. Gehani comes to us with 23 years of industrial experience at Bell Labs/Lucent, with his latest position as Vice President, Communications Software Research. Dr. Gehani has written several books, including the recent *Bell Labs: Life in the Crown Jewel* that tells fascinating stories about Bell Labs and its "radical cultural change" from a great research lab to ...

- Qun (Marc) Ma, Assistant Professor, PhD 2003, Computer Science, University of Notre Dame. Research Interests: Computational Biology, Bioinformatics, and Software Engineering.

We will have two new colleagues joining the CS department next Fall as Assistant Professors:

- Cristian Borcea, PhD in Computer Science, 2004, Rutgers University.  
Research Interests: Pervasive Computing, Distributed Systems, Networking, and Operating Systems.
- Usman Roshan, PhD in Computer Science, 2004, University of Texas at Austin.  
Research Interests: Computational Biology and Bioinformatics.

We have a new Undergraduate Academic Advisor:

Sara Vandermark. She was previously an Advisor at The Art Institute of New York City.

## What is the Faculty Doing Besides Teaching?

### Grants

- Artur Czumaj and Wojciech Rytter, “ITR: Efficient Algorithms with Implicit Input Data,” Current year award \$50,000 (Estimated total award \$150,000), Start Sep. 2003.
- Alex Gerbessiotis (with S. Zivras from ECE and researchers from Drexel University) received a grant from Department of Energy for the collaborative project entitled “PowerGrid - A computation engine for large-scale electric networks.” (NJIT's expertise is in computational aspects and Drexel's in power-engineering.) The grant is for one year (starting Sep. 2003) and the NJIT share of it approximately \$900,000.
- Joseph Leung, “Collaborative Research: Scheduling Multiple Product Types on Parallel Resources,” June 2003 to May 2006, \$239,895.
- Frank Shih and Alex Gerbessiotis (with collaborators from Physics) have a \$1 million grant from National Science Foundation for the research project entitled “ITR: Innovative Information Technology for Space Weather Research,” for a period of 4 years, starting Sep. 2003.

### Best Paper Award

Alexander Thomasian (with Chunqi Han, his PhD student), “Performance of two disk failure tolerant disk arrays,” *International Symp. on Performance Evaluation of Computer and Telecommunication Systems* (SPECTS’04), Montreal, Canada, July 2003.

### Keynote Speech

Dr. Thomasian gave a keynote speech at SPECTS’04 on “Storage Systems and Their Performance Analysis.”

### Journal Editors

- Yehoshua Perl and James Geller served as Guest Editors for a Special Issue of the journal *Biomedical Informatics* on the Unified Medical Language System (UMLS), Vol. 36, No. 6, Dec. 2003. The title of the special issue is “Research on structural issues of the UMLS -- past, present, and future.”
- Frank Shih was invited to serve as an Associate Editor for *International Journal of Pattern Recognition and Artificial Intelligence*.

## Book Series Editor

Professor Jason Wang is now the Executive Editor of the World Scientific Book series on Science, Engineering, and Biology Informatics.

## Research Recognition

David Nassimi is listed by ISI as one of the 250 most-cited researchers worldwide in Computer Science:

<http://www.ISIHighlyCited.com>

## Other News

### CS Teaching Award Nominations

The Computer Science Department has nominated the following faculty members for excellence in teaching awards:

Undergraduate Lower Division:	David Nassimi
Undergraduate Upper Division:	Alexander Gerbessiotis
Graduate Teaching:	Dimitri Theodoratos
Distance Learning:	Jason Wang
Outstanding Professional Development:	Marvin Nakayama

### Computational Biology Program in CS

The CS department now offers an interdisciplinary MS degree program in Computational Biology. The current CS faculty with expertise/research interests in Computational Biology and Bioinformatics are: Barry Cohen, Marc Ma, Jason Wang. Usman Roshan will join this group starting Fall 2004.

### New PhD Graduates in Computer Science

The following graduate students will receive their PhD this year:

1. Katherine G. Herbert, “New Techniques for Improving Biological Data Quality Through Information Integration.” Advisor: Jason T. L. Wang. (Katherine has accepted an offer from Montclair State as tenure-track assistant professor.)
2. Chunqi Han, “Studies of disk arrays tolerating two disk failures and a proposal for

a heterogeneous disk array”, Advisor: Alex Thomasian.

3. Yue Li, “Efficient Similarity Search in High-Dimensional Data Space.”  
Advisor: Alexander Thomasian.
4. Jingxuan Liu, “On WDM Burst-Switched Long Haul and Metropolitan Area Networks.”  
Advisors: Nirwan Ansari, ECE, and Teunis Ott.
5. Huiyuan Shan, “An Approximate Search Engine for Structure.”  
Advisor: Jason T. L. Wang.
6. Li Zhang, “Enriching and Designing Metaschemas for the UMLS Semantic Network.”  
Advisors: James Geller and Yehoshua Perl.

## Recent Journal Publications

- Alex Gerbessiotis, “Trinomial-tree based parallel option price valuations,”  
*Parallel Algorithms and Applications*, Vol. 18, No. 3, pp. 181-196, Dec. 2003.
- Alex Gerbessiotis, “Architecture independent parallel binomial tree option price valuations,”  
*Parallel Computing journal*, Vol. 30, No. 2, pp. 303-318, 2004.
- Alex Gerbessiotis (with C. J. Siniolakis), “Probabilistic Integer Sorting,” *Information Processing Letters*, Vol. 90, No. 4, pp. 187-193, 2004.
- Marc Q. Ma (with C. J. Izaguirre), “Targeted mollified Impulse -- a multiscale stochastic integrator for long molecular dynamics simulations,” *SIAM Multiscale Model. Simul.*, Vol. 2, No. 1, pp. 1-21, 2003.
- Marc Q. Ma (with T. Matthey, T. Cickovski, S. Hampton, A. Ko, M. Nyerges, T. Raeder, T. Slabach and J. Izaguirre), “PROTOMOL, an object-oriented framework for prototyping novel applications of molecular dynamics,” *ACM Transactions on Mathematical Software (TOMS)*, Vol. 30, No. 3, 2004, to appear.
- Frank Shih (with Yi-Ta Wu, his PhD student), “The efficient algorithms for achieving Euclidean distance transformation,” *IEEE Transactions on Image Processing*, to appear.
- Li Zhang, Yehoshua Perl, Michael Halper, and James Geller, “Designing metaschemas for the UMLS enriched semantic network,” *Biomedical Informatics*, special issue on UMLS, Dec. 2003.
- Jim J. Cimino, Hua Min, and Yehoshua Perl, “Consistency across the hierarchies of the UMLS Semantic Network and Metathesaurus,” *Biomedical Informatics*, special issue on UMLS, Dec. 2003.

- J. Calvin and J. Y-T. Leung, “Average case analysis of a greedy algorithm for 0/1 knapsack,” *Operations Research Letters*, Vol. 31, pp. 202-210, 2003.
- J. Yang and J. Y-T. Leung, “The ordered open-end bin packing problem,” *Operations Research*, Vol. 51, pp. 759-770, 2003.
- J. Y-T. Leung and M. L. Pinedo, “Minimizing total completion time on parallel machines with deadline constraint,” *SIAM Journal on Computing*, Vol. 32, pp. 1370-1388, 2003.
- J. Y-T. Leung and M. L. Pinedo, “A note on the scheduling of parallel machines subject to breakdown and repair,” *Naval Research Logistics*, Vol. 51, pp. 60-72, 2004.
- L. Georgadis, C. Nikolaou, and A. Thomasian, “A fair workload scheduling policy for heterogeneous systems,” *Journal of Parallel and Distributed Computing*, April 2004.
- A. Czumaj, F. Ergun, L. Fortnow, A. Magen, I. Newman, R. Rubinfeld, and C. Sohler, “Sublinear-time Approximation of Euclidean Minimum Spanning Tree,” *SIAM Journal on Computing*, accepted for publication.
- A. Czumaj and H. Zhao, “Fault-Tolerant Geometric Spanners,” *Discrete and Computational Geometry*, accepted for publication. Reprint from *19<sup>th</sup> ACM Symposium on Computational Geometry (SoCG'03)*.
- A. Czumaj and B. Voeking, “Tight Bounds for Worst-Case Equilibria,” *Journal of Algorithms*, Accepted for publication. Reprint from *13th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA'02)*.
- A. Czumaj and C. Sohler, “Testing Hypergraph Coloring,” *Theoretical Computer Science*, accepted for publication. Reprint from *28th International Colloquium on Automata, Languages and Programming (ICALP'01)*.

## Conference Publications

- A. Czumaj and A. Ronen, “On the Expected Payment of Mechanisms for Task Allocation,” *Proc. of the 23rd Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC'04)*, St. John's, Newfoundland, Canada, July 2004, to appear.
- G. Cormode, A. Czumaj, and S. M. Muthukrishnan, “How to Increase the Acceptance Ratios of Top Conferences?” *Proc. of the 3rd International Conference on Fun with Algorithms (FUN 2004)*, Isola d'Elba, Tuscany, Italy, May 2004, to appear.
- A. Czumaj and C. Sohler, “Sublinear-Time Approximation for Clustering via Random Sampling,” *Proc. of the 31st International Colloquium on Automata, Languages and Programming (ICALP'04)*, Turku, Finland, July 2004, to appear.

- A. Czumaj and C. Sohler, “Estimating the Weight of Metric Minimum Spanning Trees in Sublinear-time,” *Proc. of the 36th ACM Symposium on Theory of Computing (STOC’04)*, Chicago, IL, June 2004, to appear.
- A. Czumaj, M. Grigni, P. Sissokho, and H. Zhao, “Approximation Schemes for Minimum 2-edge-connected and Biconnected Subgraphs in Planar Graphs,” *Proc. of the 15th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA’04)*, New Orleans, LA, pp. 489-498, Jan. 2004.
- R. Beier, A. Czumaj, P. Krysta, and B. Vvcking, “Computing Equilibria for Congestion Games with (Im)perfect Information,” *Proc. of the 15th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA’04)*, New Orleans, LA, pp. 739-748, Jan. 2004.
- C. Ng, J. Y-T. Leung and G. H. Young, “Heuristics for generalized task system,” *Proc. of the 2003 International Conference on Parallel and Distributed Processing Techniques and Applications*, Vol. 3, pp. 1447-1453, 2003.
- J. Y-T. Leung, H. Li and M. L. Pinedo, “Order scheduling models with application in practice,” *Proc. of the 1st Multidisciplinary International Conference on Scheduling: Theory and Applications*, pp. 2-10, 2003.
- J. Y-T. Leung and H. Zhao, “Minimizing mean flow time on master-slave machines,” *Proc. of the 2004 International Conference on Parallel and Distributed Processing Techniques and Applications*, 2004, to appear.
- Alexander Thomaian, Junilda Spirollari, Chang Liu, Chunqi Han, and Gang Fu, “Mirrored disk scheduling,” *Proc. Int’l Symp. on Performance Evaluation of Computer and Telecommunication Systems*, Montreal, Canada, July 2003, 5 pages.
- Gang Fu, Alexander Thomasian, Chunqi Han, and Spencer W. Ng, “Rebuild strategies for redundant disk arrays,” *Proc. NASA/IEEE Conf. on Mass Storage Systems and Technologies*, College Park, MD, April 2004, 4 pages.

## Books and Book-Chapters

Joseph Y. T. Leung (editor), *Handbook of Scheduling: Algorithms, Models, and Performance Analysis*, Chapman & Hall/CRC, 2004 (52 chapters). Several chapters of this book are authored by our faculty:

- Chapter 1, Joseph Leung, “Introduction and Notation.”
- Chapter 2, Joseph Leung, “A Tutorial on Complexity.”
- Chapter 3, Joseph Leung, “Some Basic Scheduling Algorithms.”
- Chapter 34, Joseph Leung, “Minimizing Total Weighted Error for Imprecise Computation Tasks and Related Problems.”
- Chapter 41, Alex Thomasian, “Scheduling in Secondary Storage Systems.”

- Chapter 42, Artur Czumaj, “Selfish Routing in the Internet.”

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