

# Hye-Chung Kum

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- Research Interests**
1. Social welfare policy and program analysis using KDD (Knowledge discovery in databases) technology on social welfare administrative data.
  2. KDD (Knowledge Discovery in Databases), Data Mining, and Database Systems
  3. Distributed systems and networking.

- Education**
- Ph. D. Computer Science, University of North Carolina, Chapel Hill Aug 1995 – Aug 2004  
MSW School of Social Work Dec 1998  
MS Computer Science May 1997
  - BS Computer Science, Yonsei University, Seoul, Korea Aug 1995
  - EECS 1993-1994, (Exchange Program) University of California, Berkeley Aug 1993 - May 1994

**Research Experience**

Jordan Institute for Families: Dean Duncan (Winter 98 - current)

- Research Assistant Professor (July 2004-current) : School of Social Work, Univ. of North Carolina, Chapel Hill
- <http://ssw.unc.edu/workfirst/research.html>
- Assistance in Assessing Child Welfare Outcomes : Provide support to the North Carolina Division of Social Services (NCDSS) in assessing the outcomes of the child welfare system via developing, managing, and disseminating outcomes information from their administrative data system.
- Management assistance for the Work First program: Developed a dynamic website reporting on the various aspects of the Work First program at the state and county level based on longitudinal files. It was part of an effort to assess the impact of welfare reform at the state and local level. It is driven by monthly updates of summarized data extracted from various administrative data. The primary purpose of the site is to assist in proper administration of the Work First program at the county level through accurate, fast, and comprehensive dissemination of detailed information to county officials on their welfare program. As a by product, much better public information is freely available to anyone interested in the Work First program in North Carolina.
- Evaluation of the North Carolina's Food Stamp Employment and Training Program
- Medicaid Reinstatement: Under a federal mandate, NC DHHS had to identify, reinstate, and reevaluate a certain class of previous Medicaid recipients. After identifying these individuals from the Medicaid administration database, a website was built and maintained for over a year to track the status of these individuals. The website enabled convenient and instant two-way communication between the state and county staff.
- High Performance Bonus Report: Generate information for the federally-mandated quarterly High Performance Bonus Report using the longitudinal datasets. In earlier years, the report tracked the number of individuals that left Work First who were subsequently employed. It tracked individuals over time to determine how many continued to work as well as whether their income increased. Based on the information contained in those reports, NC received an \$8 million bonus. The current HPB report tracks the number of individuals that leave Work First that are subsequently covered by Medicaid.
- Various ad-hoc data analysis (such as status of disabled participants or child only cases on Work First), social work program evaluation, and computer programming using multiple administrative data sets such as Work First, Foodstamps, Medicaid and employment data from NC state.

Ph.D. Dissertation: Wei Wang & Dean Duncan (Fall 98 - Spring 2004)

- ApproxMAP (for APPROXimate Multiple Alignment Pattern mining) : As a versatile exploratory data analysis tool, ApproxMAP uncovers the underlying trend in databases composed of sequence of sets. It is able to organize and compress huge high dimensional sequential databases into something that is viewable by people.
- <http://www.cs.unc.edu/~kum/approxMAP/>

Collaboration Bus: Prasun Dewan (RA in Spring 98)

- Designed and implemented a "real-time" support module for non-multimedia collaborative applications which reduces jitter in multi-user environments.

Decomposition of parallel algorithms using the BSP model: Lars Nyland (Summer 96)

- Studied the various spatial decomposition techniques for parallel algorithms in dynamic molecular simulations using the BSP model.

Distributed WWW Search Using Semantic Routers: John Smith (RA in Spring 96 - Summer 96)

- Designed and implemented a search engine for the Internet that has a scaleable distributed architecture based on DNS technology.

Conditional Data Breakpoints in GDB: Susan Graham & Sung-Bong Yang (Spring 94, Spring 95)

- Implemented the conditional data breakpoint into GDB

OPTICAL: OPTics and Topography Involving the Cornea And Lens: Brian Barsky (Spring 94)

- Designed and implemented visualization tools for OPTICAL.

## Publications

1. Kum, H. C., Chang, J. H., and Wang, W., "Benchmarking the Effectiveness of Sequential Pattern Mining Methods," submitted to *Data & Knowledge Engineering*, forthcoming.
2. Kum, H. C., Chang, J. H., and Wang, W., "Sequential Pattern Mining in Multi-Databases via Multiple Alignment," *Data Mining and Knowledge Discovery*, 12(2-3): pp151-180 (2006)
3. Hye-Chung (Monica) Kum, Susan Paulsen, and Wei Wang. "Comparative Study of Sequential Pattern Mining Models," *Foundations of Data Mining and Knowledge Discovery*. Series: *Studies in Computational Intelligence*, Vol. 6 Lin, T.Y.; Ohsuga, S.; Liau, C.-J.; Hu, X.T.; Tsumoto, S. (Eds.)2005, ISBN:3-540-26257-1
4. H.C. Kum, D. Duncan, K. Flair, and W. Wang. (2004). Successfully Adopting IT for Social Welfare Program Management. *Proc of the 4th National Conf on Digital Government Res.(DGO 2004)*. Seattle, WA, May 2004.
5. Hye-Chung (Monica) Kum, Dean Duncan, and Wei Wang. (2004). Understanding Social Welfare Service Patterns Using Sequential Analysis. *DGO 2004*. Seattle, WA, May 2004.
6. Hye-Chung (Monica) Kum, D. Duncan, K. Flair, and W. Wang. (2004). Adopting IT for Effective Management of Social Welfare Programs. *DGO 2004*. Seattle, WA, May 2004.
7. Hye-Chung (Monica) Kum, J. Pei, W. Wang, and D. Duncan. (2003). ApproxMAP: Approximate Mining of Consensus Sequential Patterns. *Proc. of the 3rd SIAM Intl. Conf. on Data Mining*. SF, May 2003
8. Hye-Chung (Monica) Kum, D. Duncan, K. Flair, and W. Wang. (2003). Social Welfare Program Administration and Evaluation and Policy Analysis Using Knowledge Discovery and Data Mining (KDD) on Administrative Data. *Proc. of the 3rd National Conf. on Digital Government Res.* Boston, MA, May 2003.
9. Hye-Chung (Monica) Kum, D. Duncan, and K. Flair. (2003). Management Assistance for Work First via a Dynamic Website. *Proc. of the 3rd National Conf. on Digital Government Research*. Boston, MA, May 2003.
10. Hye-Chung (Monica) Kum and Prasun Dewan (2000). Supporting Real-Time Collaboration Over Wide Area Networks. *CSCW 2000 Video Program*.
11. D. Duncan, K. Flair, R. Hallberg, H. C. Kum, and S. Marshall. (2000). Bringing it to the Desktop: Assessing Welfare Reform Performance Over the Web. *NAWRS 2000*.
12. D. Duncan, K. Flair, R. Hallberg, H. C. Kum, S. Muller. (2000). Developing a Dynamic Web Site for Public Policy Data using SAS/IntrNet®. *SUGI 2000*.
13. D. Duncan, A. Dyke, M. Dylan, H. C. Kum, and N. S. Park. (2000) Do Welfare Recipients Really Vote With Their Feet: Intrastate Migration and Welfare Reform in North Carolina. *Technical Report*. Nov 2000.
14. L. Nyland, J. Prins, R. H. Yun, J. Hermans, H. C. Kum, & L. Wang (1998). Modeling Dynamic Load Balancing in Molecular Dynamics to Achieve Scalable Parallel Execution. *IRREGULAR*, pp356-365
15. L. Nyland, J. Prins, R. H. Yun, J. Hermans, H. C. Kum, & L. Wang (1997). Achieving Scalable Parallel Molecular Dynamics Using Dynamic Spatial Domain Decomposition Techniques. *Journal of Parallel and Distributed Computing*, V47, pp127-138.

## Previous Work Experience

### DB designer for social services data management

- Developed numerous comprehensive integrated database systems to track various social welfare programs
- Heart-to-Heart Community Center (Seoul, Korea) : Community Center [ May 98 - Aug 98 ]
- Help Age, Korea (Seoul, Korea) : International NGO for the elderly [ May 98 - Aug 98 ]
- Interact (Raleigh, NC, USA) : Domestic Violence Agency [ Feb 96 - Apr 96 ]

### Intern at Bellcore (Redbank, NJ) : June 94 - Jan 95

- Designed and implemented an ATM/SONET network management system prototype

## Teaching Experience

1. Instructor for COMP4 - Power Tools for the Mind: UNC-CH (Summer 2000)
2. TA for numerous undergraduate and graduate Computer science classes.

## Skills

- C, C++, Java, HTML, ASP, ColdFusion, Lisp, Pascal, Turing, Prolog, 80386 assembly, BASIC
- SAS (base SAS, SAS/STAT, SAS/IntrNet, macro programming), SPSS, Access, Foxpro, dBase
- UNIX, LINUX, XENIX, Windows, NT, MS-DOS, Macintosh
- Bilingual in Korean and English.
- Worked in culturally diverse settings and have experience with diverse population.

## Honors & Professional Activities

- Referee for *Data and Knowledge Engineering Journal*
- The UNC-CH Graduate School's Dissertation Competition Fellowship – Royster Fellows
- The UNC-CH Graduate School's Dean's Award
- Licensed social worker in Korea
- ACM SIGKDD (Special Interest Group on KDD)
- ACM SIGMOD (Special Interest Group on Management of Data)
- ARNOVA (The Association for Research on Nonprofit Orgs & Voluntary Action)
- NASW (National Association of Social Workers)