

Kevin A. Huck

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Education

University of Oregon, Eugene, Oregon, 2002–2009

Ph.D. in Computer and Information Science, 2009

Dissertation Title: “Knowledge Support for Parallel Performance Data Mining”

M.S. Computer and Information Science, 2004

University of Cincinnati, Cincinnati, OH, 1990-1995

B.S. Computer Science, 1995

Awards and Honors

Spanish Ministry of Science and Innovation *Juan de la Cierva* Postdoctoral Fellowship, 2009–2011

University of Oregon Computer and Information Science Graduate Research Fellowship, 2002–2009

University of Oregon Computer and Information Science Department Distinguished Service Award, 2008

International Conference on Parallel Processing *Chuan-lin Wu* Best Paper Award, 2005

Upsilon Pi Epsilon Honor Society for the Computing Sciences, 2004–2009

Research Experience

University of Oregon. **2012–present** **Eugene, OR**
Research Associate - Doing research in the areas of data mining, parallel performance analysis, software tool design and software engineering. Particularly interested in the unique problems of intelligent, automated parallel performance analysis, specifically analysis of very large datasets (high processor counts, high event counts, multiple metrics). Also performing research in the areas of introspection for runtime adaptation of high concurrency, task-based runtime systems.

ParaTools, Inc. **2011–2012** **Eugene, OR**
Computer Scientist - Principal Investigator and Research Scientist providing analysis expertise in the area of parallel and distributed scientific computing, and performance evaluation tools. Responsibilities include preparing and executing Small Business Innovation Research (SBIR) proposals to US agencies such as the National Aeronautics and Space Administration and Department of Energy Office of Science.

Barcelona Supercomputing Center **2009–2011** **Barcelona, Spain**
Postdoctoral Research - Developed and applied analysis tools and expertise to improve the performance of scientific software. Designed and implemented automated utilities to improve the user experience. Integrated performance analysis tools into a

manual services for the mortgage industry. Also designed and maintained an web application order-entry interface for customers.

Triple-I Systems, Inc. 1997–2001 Cincinnati, OH
Senior Systems Engineer Consultant and Technical Leader

Worked as a software developer for a small consulting firm. During my tenure, I worked with four different clients:

Led a team of four consultants working on-site, developing an enterprise intranet workflow application and Internet business-to-business web site using Microsoft development tools and third-party workflow software.

Worked as part of a small team developing web applications. The web sites were part of a suite of applications used by high school students to research colleges and plan careers. Helped develop new features within the site, and worked independently to integrate site searching and a student profile section.

Worked on an Internet pilot project at a leading online legal and news research firm, developing a subscription web application intended to replace an existing dial-up service. As a lead member of the research and analysis team, helped to improve performance and stability of the application.

Responsible for developing automated voice response data collection systems. These solutions replaced employee/customer interaction with an automated phone system to perform repetitive information gathering tasks.

International TechneGroup, Inc. 1992–1997 Milford, OH
Software Engineer / Lead Software Engineer

Developed data translators and related tools for computer aided design, manufacturing and engineering. Maintained, enhanced, and ported the translators and related software to multiple UNIX and Windows environments. Developed new applications that were portable across multiple UNIX platforms, Windows NT, Windows 95 and DOS.

Conference and Workshop Activity

ISC High Performance 2021

Tutorials chair.

The Platform for Advanced Scientific Computing (PASC) Conference 2020

Program committee member.

ISC High Performance 2020

Tutorials deputy chair.

IEEE Cluster 2019

Technical program committee member, posters.

International Conference for High Performance Computing, Networking, Storage and Analysis (SC) 2019

Technical program committee member.

International Conference for High Performance Computing, Networking, Storage and Analysis (SC) 2018

Tutorials Vice Chair.

International Conference for High Performance Computing, Networking, Storage and Analysis (SC) 2016 – 2017

Technical program committee member, *Tutorials*.

- 21st International Workshop on High-level Parallel Programming Models and Supportive Environments (HIPS)** 2016
 Technical program committee member.
- International Conference on Computational Science (ICCS)** 2016
 Technical program committee member.
- 2nd Workshop on Visual Performance Analysis (VPA)** 2015
 Technical program committee member.
- Petascale Tools Workshop** 2013 – 2015
 Invited participant, summer workshop.
- International Meeting on High Performance Computing for Computational Science (VECPAR)** 2014
 Web Chair.
- International Conference on Supercomputing (ICS)** 2014
 Program committee member.
- International Conference on Computational Science (ICCS)** 2014
 Program committee member.
- Workshop on Productivity and Performance (PROPER)** 2013
 Program committee member.
- International Conference on Supercomputing (ICS)** 2013
 Web Chair.
- International Conference on Computational Science (ICCS)** 2013
 Program committee member.
- IEEE International Parallel & Distributed Processing Symposium (IPDPS)** 2013
 Program committee member.
- Workshop on High-performance Infrastructure for Scalable Tools (WHIST)** 2012
 Program committee member.
- International Conference for High Performance Computing, Networking, Storage and Analysis (SC11)** 2011
 Technical program committee member, *Technical Papers, Performance*.
- Workshop on High-performance Infrastructure for Scalable Tools (WHIST)** 2011
 Program committee member.
- Center for Scalable Application Development Software (CScADS)** 2008 and 2010
 Invited participant, *Performance Tools for Petascale Computing* summer workshop.
- International Conference on Parallel Processing (ICPP)** 2010
 Program committee member.
- Schloss Dagstuhl – Leibniz-Center for Informatics** 2010
 Invited participant, *Program Development for Extreme-Scale Computing* workshop.
- Parallel Computing (ParCo) Conference** 2009
 Program committee member, session chair.
- Schloss Dagstuhl – Leibniz-Center for Informatics** 2007
 Invited participant, *Code Instrumentation and Modeling for Parallel Performance Analysis* workshop.

University and Community Services

Computing Resource Committee 2005–2006

Student representative to the committee for the academic year. Provided a student perspective of the development and maintenance of the department’s hardware and software computing resources.

GTFF Steward 2003–2006

Computer & Information Science Department representative to the Graduate Teaching Fellows Federation (GTFF) Local 3544. Attended monthly Executive Council meetings to represent the CIS department, discussed GTFF policy, voted on resolutions, and handled grievances.

Graduate Education Committee 2003–2004

Student representative to the committee for the academic year. Helped shape department policy for graduate students and gave student feedback to the faculty.

Friendship Foundation for International Students 2007–2008

Provided housing and support for an international undergraduate student prior to the academic school year.

Publications

1. D. Boehme, K. **Huck**, J. Madsen, and J. Weidendorfer, “The case for a common instrumentation interface for hpc codes,” in *2019 IEEE/ACM International Workshop on Programming and Performance Visualization Tools (ProTools)*, pp. 33–39, Nov 2019.
2. G. Daiß, P. Amini, J. Biddiscombe, P. Diehl, J. Frank, K. **Huck**, H. Kaiser, D. Marcello, D. Pfander, and D. Pflüger, “From piz daint to the stars: simulation of stellar mergers using high-level abstractions,” in *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, pp. 1–37, 2019.
3. B. Wagle, M. A. H. Monil, K. **Huck**, A. D. Malony, A. Serio, and H. Kaiser, “Runtime adaptive task inlining on asynchronous multitasking runtime systems,” in *Proceedings of the 48th International Conference on Parallel Processing, ICPP 2019*, (New York, NY, USA), pp. 76:1–76:10, ACM, 2019.
4. A. D. Malony, S. Ramesh, K. **Huck**, N. Chaimov, and S. Shende, “A plugin architecture for the tau performance system,” in *Proceedings of the 48th International Conference on Parallel Processing, ICPP 2019*, (New York, NY, USA), pp. 90:1–90:11, ACM, 2019.
5. T. Heller, B. A. Lebach, K. A. **Huck**, J. Biddiscombe, P. Grubel, A. E. Koniges, M. Kretz, D. Marcello, D. Pfander, A. Serio, J. Frank, G. C. Clayton, D. Pflüger, D. Eder, and H. Kaiser, “Harnessing billions of tasks for a scalable portable hydrodynamic simulation of the merger of two stars,” *The International Journal of High Performance Computing Applications*, vol. 33, no. 4, pp. 699–715, 2019.
6. S. Klasky, M. Wolf, K. Mehta, K. **Huck**, B. Geveci, S. Phillip, R. Maynard, H. Guo, T. Peterka, K. Moreland, *et al.*, “In situ analysis and visualization of fusion simulations: Lessons learned,” in *High Performance Computing: ISC High Performance 2018 International Workshops, Frankfurt/Main, Germany, June 28, 2018, Revised Selected Papers*, vol. 11203, p. 230, Springer, 2019.
7. R. Tohid, B. Wagle, S. Shirzad, P. Diehl, A. Serio, A. Kheirkhahan, P. Amini, K. Williams, K. Isaacs, K. **Huck**, *et al.*, “Asynchronous execution of python code on task based runtime systems,” *arXiv preprint arXiv:1810.07591*, 2018.

8. J. Y. Choi, C. Chang, J. Dominski, S. Klasky, G. Merlo, E. Suchyta, M. Ainsworth, B. Allen, F. Cappello, M. Churchill, P. Davis, S. Di, G. Eisenhauer, S. Ethier, I. Foster, B. Geveci, H. Guo, K. **Huck**, F. Jenko, M. Kim, J. Kress, S. Ku, Q. Liu, J. Logan, A. Malony, K. Mehta, K. Moreland, T. Munson, M. Parashar, T. Peterka, N. Podhorszki, D. Pugmire, O. Tugluk, R. Wang, B. Whitney, M. Wolf, and C. Wood, "Coupling exascale multiphysics applications: Methods and lessons learned," in *2018 IEEE 14th International Conference on e-Science (e-Science)*, pp. 442–452, Oct 2018.
9. L. Pouchard, K. **Huck**, G. Matyasfalvi, D. Tao, L. Tang, H. V. Dam, and S. Yoo, "Prescriptive provenance for streaming analysis of workflows at scale," in *2018 New York Scientific Data Summit (NYSDDS)*, pp. 1–6, Aug 2018.
10. M. Kim, J. Kress, J. Choi, N. Podhorszki, S. Klasky, M. Wolf, K. Mehta, K. **Huck**, B. Geveci, S. Phillip, R. Maynard, H. Guo, T. Peterka, K. Moreland, C.-S. Chang, J. Dominski, M. Churchill, and D. Pugmire, "In situ analysis and visualization of fusion simulations: Lessons learned," in *High Performance Computing* (R. Yokota, M. Weiland, J. Shalf, and S. Alam, eds.), (Cham), pp. 230–242, Springer International Publishing, 2018.
11. M. A. H. Monil, A. D. Malony, D. Toomey, and K. **Huck**, "Stingray-hpc: A scalable parallel seismic raytracing system," in *2018 26th Euromicro International Conference on Parallel, Distributed and Network-based Processing (PDP)*, pp. 204–213, March 2018.
12. C. Xie, W. Xu, S. Ha, K. A. **Huck**, S. Shende, H. V. Dam, K. K. van Dam, and K. Mueller, "Performance visualization for tau instrumented scientific workflows," in *VISIGRAPP*, 2018.
13. C. Wood, M. Larsen, A. Gimenez, K. **Huck**, C. Harrison, T. Gamblin, and A. Malony, "Projecting performance data over simulation geometry using sosflow and alpine," in *Programming and Performance Visualization Tools*, pp. 201–218, Springer, 2017.
14. P. C. Roth, K. **Huck**, G. Gopalakrishnan, and F. Wolf, "Using deep learning for automated communication pattern characterization: Little steps and big challenges," in *Programming and Performance Visualization Tools*, pp. 265–272, Springer, 2017.
15. J. Logan, J. Y. Choi, M. Wolf, G. Ostrouchov, L. Wan, N. Podhorszki, W. Godoy, S. Klasky, E. Lohrmann, G. Eisenhauer, C. Wood, and K. **Huck**, "Extending skel to support the development and optimization of next generation i/o systems," in *2017 IEEE International Conference on Cluster Computing (CLUSTER)*, pp. 563–571, Sep. 2017.
16. W. Xu, C. Xie, K. **Huck**, H. van Dam, S. Shende, K. K. van Dam, K. Mueller, L. Pouchard, and A. Malik, "Toward performance visualization for tau instrumented exascale scientific workflows," 2017.
17. C. Wood, S. Sane, D. Ellsworth, A. Gimenez, K. **Huck**, T. Gamblin, and A. Malony, "A scalable observation system for introspection and in situ analytics," in *Proceedings of the 5th Workshop on Extreme-Scale Programming Tools*, pp. 42–49, IEEE Press, 2016.
18. M. A. S. Bari, N. Chaimov, A. M. Malik, K. A. **Huck**, B. Chapman, A. D. Malony, and O. Sarood, "ARCS: Adaptive runtime configuration selection for power-constrained OpenMP applications," in *IEEE Cluster*, 2016.
19. A. D. Malony, M. A. H. Monil, C. Rasmusen, K. **Huck**, J. Byrnes, and D. Toomey, "Towards scaling parallel seismic raytracing," in *2016 IEEE Intl Conference on Computational Science and Engineering (CSE) and IEEE Intl Conference on Embedded and*

- Ubiquitous Computing (EUC) and 15th Intl Symposium on Distributed Computing and Applications for Business Engineering (DCABES)*, pp. 225–233, Aug 2016.
20. P. Grubel, H. Kaiser, K. **Huck**, and J. Cook, “Using intrinsic performance counters to assess efficiency in task-based parallel applications,” in *2016 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, pp. 1692–1701, May 2016.
 21. X. Zhang, H. Abbasi, K. **Huck**, and A. D. Malony, “Wowmon: A machine learning-based profiler for self-adaptive instrumentation of scientific workflows,” *Procedia Computer Science*, vol. 80, no. Supplement C, pp. 1507 – 1518, 2016. International Conference on Computational Science 2016, ICCS 2016, 6-8 June 2016, San Diego, California, USA.
 22. K. **Huck**, A. Porterfield, N. Chaimov, H. Kaiser, A. Malony, T. Sterling, and R. Fowler, “An Autonomic Performance Environment for Exascale,” *Supercomputing Frontiers and Innovations*, vol. 2, no. 3, 2015.
 23. A. Koniges, J. A. Candadai, H. Kaiser, K. **Huck**, J. Kemp, T. Heller, M. Anderson, A. Lumsdaine, A. Serio, M. Wolf, *et al.*, “Hpx applications and performance adaptation.,” tech. rep., Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2015.
 24. A. Sarje, S. Song, D. Jacobsen, K. **Huck**, J. Hollingsworth, A. Malony, S. Williams, and L. Oliker, “Parallel performance optimizations on unstructured mesh-based simulations,” *Procedia Computer Science*, vol. 51, no. 0, pp. 2016 – 2025, 2015. International Conference On Computational Science, (ICCS) 2015 Computational Science at the Gates of Nature.
 25. K. A. **Huck**, K. Potter, D. W. Jacobsen, H. Childs, and A. D. Malony, “Linking Performance Data into Scientific Visualization Tools,” in *Proceedings of the First Workshop on Visual Performance Analysis*, pp. 50–57, IEEE Press, 2014.
 26. K. A. **Huck**, A. D. Malony, S. Shende, and D. W. Jacobsen, “Integrated Measurement for Cross-Platform OpenMP Performance Analysis,” in *IWOMP 2014: Using and Improving OpenMP for Devices, Tasks, and More*, pp. 146–160, Springer International Publishing, 2014.
 27. A. D. Malony and K. A. **Huck**, “General Hybrid Parallel Profiling,” in *Parallel, Distributed and Network-Based Processing (PDP), 2014 22nd Euromicro International Conference on*, pp. 204–212, IEEE, 2014.
 28. A. Qawasmeh, A. Malik, B. Chapman, K. **Huck**, and A. Malony, “Open Source Task Profiling by Extending the OpenMP Runtime API,” in *OpenMP in the Era of Low Power Devices and Accelerators*, pp. 186–199, Springer Berlin Heidelberg, 2013.
 29. H. Servat, G. Llort, K. **Huck**, J. Giménez, and J. Labarta, “Framework for a Productive Performance Optimization,” *Parallel Computing*, vol. 39, no. 8, pp. 336–353, 2013.
 30. K. **Huck**, S. Shende, A. Malony, H. Kaiser, A. Porterfield, R. Fowler, and R. Brightwell, “An Early Prototype of an Autonomic Performance Environment for Exascale,” in *Proceedings of the 3rd International Workshop on Runtime and Operating Systems for Supercomputers*, ROSS ’13, (New York, NY, USA), pp. 8:1–8:8, ACM, 2013.
 31. J. Alameda, W. Spear, J. L. Overbey, K. **Huck**, G. R. Watson, and B. Tibbitts, “The eclipse parallel tools platform: toward an integrated development environment for xside resources,” in *Proceedings of the 1st Conference of the Extreme Science and Engineering Discovery Environment: Bridging from the eXtreme to the campus and beyond*, XSEDE ’12, (New York, NY, USA), pp. 48:1–48:8, ACM, 2012.

32. J. Gonzalez, K. **Huck**, J. Gimenez, and J. Labarta, "Automatic refinement of parallel applications structure detection," in *Parallel and Distributed Processing Symposium Workshops & PhD Forum (IPDPSW), 2012 IEEE 26th International*, pp. 1680–1687, IEEE, 2012.
33. A. D. Malony, S. S. Shende, K. A. **Huck**, *et al.*, "Framework application for core edge transport simulation (facets)," tech. rep., ParaTools, Inc., 2012.
34. A. Radenski, B. Norris, P. Balaprakash, D. Buntinas, A. Chan, A. Mametjanov, D. Lowell, C.-C. Ma, B. Norris, P. Balaprakash, *et al.*, "Automatic differentiation," *Proceedings of ParCo2013*, vol. 180, pp. 2115–2123, 2012.
35. H. Servat, G. Llort, J. Giménez, K. **Huck**, and J. Labarta, "Folding: detailed analysis with coarse sampling," in *Tools for High Performance Computing 2011*, pp. 105–118, Springer Berlin Heidelberg, 2012.
36. G. Llort, M. Casas, H. Servat, K. **Huck**, J. Gimenez, and J. Labarta, "Trace spectral analysis toward dynamic levels of detail," in *Parallel and Distributed Systems (ICPADS), 2011 IEEE 17th International Conference on*, pp. 332–339, dec. 2011.
37. M. Casas, H. Servat, K. **Huck**, J. Gimenez, J. Labarta, *et al.*, "Trace spectral analysis toward dynamic levels of detail," in *Parallel and Distributed Systems (ICPADS), 2011 IEEE 17th International Conference on*, pp. 332–339, IEEE, 2011.
38. H. Servat, G. Llort, J. Giménez, K. **Huck**, and J. Labarta, "Unveiling internal evolution of parallel application computation phases," in *40th International Conference on Parallel Processing (ICPP 2011)*, 2011.
39. K. **Huck** and J. Labarta, "Detailed Load Balance Analysis of Large Scale Parallel Applications," in *39th International Conference on Parallel Processing (ICPP 2010)*, pp. 535–544, 2010.
40. A. Morris, A. D. Malony, S. Shende, and K. **Huck**, "Design and implementation of a hybrid parallel performance measurement system," in *39th International Conference on Parallel Processing (ICPP 2010)*, 2010.
41. J. Alameda, J. L. Overbey, G. R. Watson, W. Spear, K. **Huck**, and B. Tibbitts, "The eclipse parallel tools platform," 2010.
42. L. Li, J. P. Kenny, M.-S. Wu, K. **Huck**, A. Gaenko, M. S. Gordon, C. L. Janssen, L. Curfman McInnes, H. Mori, H. M. Netzloff, B. Norris, and T. L. Windus, "Adaptive application composition in quantum chemistry," in *QoSA '09: Proceedings of the 5th International Conference on the Quality of Software Architectures*, (Berlin, Heidelberg), pp. 194–211, Springer-Verlag, 2009.
43. K. A. **Huck**, *Knowledge support for parallel performance data mining*. PhD thesis, University of Oregon, 2009.
44. K. A. **Huck**, A. D. Malony, S. Shende, and A. Morris, "Knowledge Support and Automation for Performance Analysis with PerfExplorer 2.0," *Scientific Programming, special issue on Large-Scale Programming Tools and Environments*, vol. 16, no. 2-3, pp. 123–134, 2008.
45. K. A. **Huck**, O. Hernandez, V. Bui, S. Chandrasekaran, B. Chapman, A. D. Malony, L. C. McInnes, and B. Norris, "Capturing Performance Knowledge for Automated Analysis," in *SC '08: Proceedings of the 2008 ACM/IEEE conference on Supercomputing*, (Piscataway, NJ, USA), pp. 1–10, IEEE Press, 2008.

46. K. A. **Huck**, W. Spear, A. D. Malony, S. Shende, and A. Morris, "Parametric studies in Eclipse with TAU and PerfExplorer," in *Proceedings of Workshop on Productivity and Performance (PROPER 2008) at EuroPar 2008*, vol. 5415, (Las Palmas de Gran Canaria, Spain), pp. 283–294, 2008.
47. A. Malony, S. Shende, A. Morris, S. Biersdorff, W. Spear, K. **Huck**, and A. Nataraj, "Evolution of a Parallel Performance System," in *2nd International Workshop on Tools for High Performance Computing* (M. Resch, R. Keller, V. Himmler, B. Krammer, and A. Schulz, eds.), pp. 169–190, Springer-Verlag, July 2008.
48. V. Bui, B. Norris, K. **Huck**, L. C. McInnes, L. Li, O. Hernandez, and B. Chapman, "A component infrastructure for performance and power modeling of parallel scientific applications," in *CBHPC '08: Proceedings of the 2008 compFrame/HPC-GECO workshop on Component based high performance*, (New York, NY, USA), pp. 1–11, ACM, 2008.
49. K. A. **Huck**, A. D. Malony, S. Shende, and A. Morris, "Scalable, automated performance analysis with TAU and PerfExplorer," in *Parallel Computing (ParCo2007)*, (Aachen, Germany), pp. 1–8, 2007.
50. D. Gunter, K. **Huck**, K. Karavanic, J. May, A. Malony, K. Mohror, S. Moore, A. Morris, S. Shende, V. Taylor, X. Wu, and Y. Zhang, "Performance database technology for SciDAC applications," *Journal of Physics: Conference Series*, vol. 78, June 2007.
51. Y. Zhang, R. Fowler, K. **Huck**, A. Malony, A. Porterfield, D. Reed, S. Shende, V. Taylor, and X. Wu, "US QCD computational performance studies with PERI," *Journal of Physics: Conference Series*, vol. 78, pp. 24–28, June 2007.
52. K. A. **Huck**, A. D. Malony, S. Shende, and A. Morris, "TAUg: Runtime Global Performance Data Access Using MPI," in *Recent Advances in Parallel Virtual Machine and Message Passing Interface (EuroPVM/MPI)*, vol. 4192/2006 of *Lecture Notes in Computer Science*, (Bonn, Germany), pp. 313–321, Springer Berlin / Heidelberg, 2006.
53. L. Li, A. D. Malony, and K. **Huck**, "Model-Based Relative Performance Diagnosis of Wavefront Parallel Computations," in *International Conference on High Performance Computing and Communications (HPCC2006)*, (Munich, Germany), 2006.
54. K. A. **Huck** and A. D. Malony, "PerfExplorer: A Performance Data Mining Framework For Large-Scale Parallel Computing," in *Proceedings of the 2005 ACM/IEEE Conference on Supercomputing, SC '05*, (Washington, DC, USA), pp. 41–, IEEE Computer Society, 2005.
55. P. Worley, J. Candy, L. Carrington, K. **Huck**, T. Kaiser, G. Mahinthakumar, A. Malony, S. Moore, D. Reed, P. Roth, H. Shan, S. Shende, A. Snavely, S. Sreepathi, F. Wolf, and Y. Zhang, "Performance Analysis of Gyro: A Tool Evaluation," *Journal of Physics: Conference Series*, vol. 16, pp. 551–555, 2005.
56. K. Karavanic, J. May, K. Mohror, B. Miller, K. **Huck**, R. Knapp, and B. Pugh, "Integrating database technology with comparison-based parallel performance diagnosis: The PerfTrack performance experiment management tool," in *International Conference for High Performance Computing, Networking, Storage and Analysis (SC'05)*, (Washington, DC, USA), IEEE Computer Society, 2005.
57. K. **Huck**, A. Malony, R. Bell, and A. Morris, "Design and Implementation of a Parallel Performance Data Management Framework," in *Proceedings of the International Conference on Parallel Processing (ICPP2005)*, (Oslo, Norway), pp. 473–482, 2005. (*Chuan-lin Wu Best Paper Award*).