

## Vitae: Paul S. Wang (王士弘)

Paul S. Wang  
Department of Computer Science  
Kent State University

Email: [pwang@cs.kent.edu](mailto:pwang@cs.kent.edu)  
Web: [www.cs.kent.edu/~pwang](http://www.cs.kent.edu/~pwang)

### Professional Preparation

Ph.D., August 1971, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA  
B.S., June 1966, Taiwan National Chung-Hsing University, Taiwan, ROC

### Positions

1992-present: IT Consultant ([sofpower.com](http://sofpower.com))  
April 2000-2021: President, [webtong.com](http://webtong.com)  
June 2012: Professor Emeritus, Kent State U. Kent, Ohio  
1981-2012: Professor of Computer Science, Kent State U. Kent, Ohio  
1986-2011: Director of Research, ICM, Kent State U. Kent, Ohio  
1977-81: Associate Professor, Kent State U. Kent, Ohio  
1970-77: Research Member of Laboratory for Computer Science, MIT, Cambridge, Massachusetts  
1974-77: Assistant Professor, MIT; 1972-74 Instructor, MIT, Cambridge, Massachusetts

### Professional Activities

Computational Thinking blog, since March 2017

Invited keynote speech, “計算思維的重要性和推廣”, 第四届计算思维和大学计算机课程教学改革研讨会, Dalian, China, July 29, 2015.

Academic tour Lanzhou University and HFUT in China, August 2012.

Author and Editor of National STEM Distributed Learning *Expert Voices* Blog on *Web-Based Mathematics Education* (WME), [expertvoices.nsdsl.org/wme/](http://expertvoices.nsdsl.org/wme/), April 2010–2012.

Colloquium speaker *An Overview of WME*, Department of Computer Science, Akron University, March 4, 2010.

Colloquium speaker *An Overview of WME*, Department of Computer Science, Kent State University, Fall 2009.

Invited keynote speaker, East Cost Computer Algebra Day, Shepherd University, Shepherdstown, West Virginia, Saturday, May 10, 2008.

*WME Tutorial Workshop* by P. Wang and the WME Team Shepherd University, Shepherdstown, West Virginia, May 9, 2008.

Improvements and new implementation for **MathPASS**, a Web-based drill-and-practice system for remedial mathematics, by P. Wang, Su Wei and Dean Zeller in cooperation with the Department of Mathematical Sciences, started Spring 2008.

External Examiner, Ph.D. Committee, University of Western Ontario, London, Ontario, Canada, August 2007.

Member *Ohio Mathematics and Science Coalition* (OMSC), since 2006.

*WME Tutorial Workshop* by P. Wang and X. Lai at the 4th International Conference on Web-based Learning (ICWL 2005), Hong Kong SAR, China, July 31, 2005.

Program committee, International Symposium on Symbolic and Algebraic Computation, Beijing China, July 2005.

Invited keynote speaker, East Cost Computer Algebra Day, Ashland University, March 12, 2005.

Editor, *Journal of Symbolic Computation*, July 2003–February 2008.

Establishment of the *Web Design and Programming Minor*, a joint undergraduate program between Computer Science and Visual Communication Design, at Kent State University, August 2003.

Presentation on *Internet Accessible Mathematical Computation and Web-based Mathematics Education*, Atna 10th Anniversary Conference, ICM, Kent State University (5/31/2003).

Member, University Patent and Copyright Board, Kent State University (2003-07).

Organizer, Internet Accessible Mathematical Computation (IAMC) Workshop, 1999, 2001, 2002, 2003, 2005.

Recipient, Graduates' Applause Certificate, University Teaching Council, Kent State University, Oct. 2002.

Finalist, Distinguished Scholar Award, Kent State U., 2002.

Ohio Governor's Award for U. Faculty Entrepreneurship, 2001.

"Internet Accessible Mathematical Computation: a progress report," *The Future of Mathematical Communication: 1999* (FMC99), MSRI, UC Berkeley, California, Dec. 1-5, 1999.

Plenary address, "Internet Accessible Mathematical Computation," 3rd Asian Symposium on Computer Mathematics, Lanzhou U., Lanzhou, P. R. China, August 6, 1998.

Main organizer 1999, 2001, and 2002 Workshops on *Internet Accessible Mathematical Computation*.

Four-week consulting assignment to Beijing, Lanzhou, and Xian the People's Republic of China, sponsored by the United Nations Development Program, Jul-Aug, 1998.

## Grants

International Joint Research with Dr. Su Wei at Lanzhou University, China on *E-TextBook for Geometry on Mobile Devices*, start date November 2011, Amt: \$5000 (allocated to the US side).

Kent State University Foundation curriculum development grant, *Web Programming I and II for CS majors*, Summer 2011, Amt: \$2500.

Kent State University Teaching Council (UTC) curriculum development grant (with Prof. Marino of JMC), *Web Programming for Multimedia Journalism*, Summer 2010, Amt: \$6400.

National Science Foundation (NSF), Grant No. CCR-0201772, Internet Accessible Mathematical Computation (IAMC) and Web-based Mathematics Education (WME), Amt: \$255,000, Date: August 1, 2002 through July 31, 2008

National Science Foundation (NSF) Supplement to grant CCR 021772, IAMC 2005 Conference, Beijing China. Amt: \$6,000, August 1, 2005.

NSF REU (jointly with Professor Weidong Liao, Shepherd University, West Virginia) *Web-based Mathematics Education*, Amt: \$6,000.00, 06/1/2005 to 05/30 2006.

OBR Research Challenge, (jointly with Prof. Mikusa of the School of Education), *Web-based Mathematics Education*, Amt: \$50,304, Jan. 2004 to Jan. 2005.

National Science Foundation (NSF) Supplement to grant CCR 021772 (Internet Accessible Mathematical Computation). Amt: \$4,800, August 1, 2003.

NSF Grant No. CCR-9721343, Amt: \$177,778, Title: Parallel/Distributed Symbolic Computation, Date: July 1998 to July 2003

NSF Grant No. CCR-9721343, supplement 001, Title: Mathematical Computation Protocols for Internet Accessible Mathematical Computation, Amt: \$11,279

NSF Grant No. CCR-9721343, software capitalization supplement 002, Title: OOP Design and Java Implementation of MP, Amt: \$26,660

NSF Grant CCR-0115611, Title: *Conference Support: Workshop on Internet Accessible Mathematical Computation*, 7/22/2001, Amt: \$4,200, Date: August 15, 2001 - July 31, 2002

Kent State U. Teaching Council, Summer Curriculum Development Grant, Title: *Interdisciplinary Curriculum Development in Web Design and Programming*, Amt: \$3,250, Date: Summer 2001

NSF Grant No. CCR-9721343, Title: 1999 Workshop on Internet Accessible Mathematical Computation, Amt: \$4,200, Date: June 1, 1999 to May 31, 2000

NSF Grant No. INT-9722919, Title: Symbolic Computation Algorithms and Systems for Polynomial Computations, Amt: \$27,450, Date: Jan. 1998 to January 31, 2003.

NSF Grant No. CCR-9503650, Title: Efficient Algorithms and System Interface for Scientific Computation, Amt: \$105,000, Date: Sept. 1995 to Aug. 1997.

NSF Supplement to Grant No. CCR-9423696, Title: Common Lisp Interface to PVM, Amt: \$12,040, Date: May 1, 1995.

NSF Grant No. CCR-9423696, Title: SymbolicNet - An Internet Information Service for the Symbolic Computation Research Community, Amt: \$23,354 Date: May 1, 1995 - April 30, 1996.

NSF Grant No. CCR-9201800, Title: High-Performance and System Integration for Symbolic and Numeric Computation, Amt: \$42,000/per year, Date: January 1, 1993 - Dec. 31, 1995.

## Publications

### BOOKS:

1. *Mastering Modern Linux*, second edition of *Mastering Linux*, Chapman & Hall, CRC Press, Florida, USA, ISBN: 978-0-8153-8098-6, June 2018, 384 pages.
2. *大学计算机教程——从计算到计算思维*, (with 李廉), 高等教育出版社, Beijing, China, ISBN 978-7-04-045239-6, September, 2016, 250 pages.
3. *From Computing to Computational Thinking*, Chapman & Hall, CRC Press, Florida, USA, ISBN—10: 1482217651, October 5, 2015, 288 pages.
4. *Dynamic Web Programming and HTML5*, Chapman & Hall, CRC Press, Florida, USA, ISBN 978-1-4398-7182-9, 11-2012, 544 pages.
5. *Mastering Linux*, Chapman & Hall, CRC Press, Florida, USA, ISBN 978-1-4398068-6-9, 09-2010, 439 page.
6. *Java with Object-Oriented and Generic Programming*, E-book published by softpower.com, ISBN 978-1-4276-3452-8, 09-2008
7. *Web Design and Programming*, (with Sanda Katila) Brooks/Cole, 10-2003
8. *Java with Object-Oriented Programming*, Brooks/Cole, 07-2002
9. *Standard C++ with Object-Oriented Programming*, Brooks/Cole, 07-2000
10. *Java with OOP and Web Applications*, Brooks/Cole, 09-1998
11. *An Introduction to UNIX with X and the Internet*, PWS, 07-1996
12. *C++ with Object-oriented Programming*, PWS, 01-1994
13. *An Introduction to ANSI C on UNIX*, Wadsworth, 09-1991
14. *An Introduction to Berkeley UNIX*, Wadsworth, 02-1988

### ARTICLES:

“Factoring Multivariate Polynomials Over the Integers” (with Linda Preiss Rothschild) *Mathematics of Computation*, v.29, no. 131 p. 935-950 (1975)

- “Factoring Multivariate Polynomials Over Algebraic Number Fields” *Mathematics of Computation*, v.30, no. 134 p. 324-336 (1976)
- “An Improved Multivariate Polynomial Factoring Algorithm” *Mathematics of Computation*, v.32, no. 144 p. 1215-1231 (1978)
- “MathPASS: A Remedial Mathematics System with Automated Answer Checking” (with Su Wei and Lian Li), *CICM (Conferences on Intelligent Computer Mathematics)* Paris, France, July 5-10 2010, pp. 45-50.
- “DMAS: A Web-based Distributed Mathematics Assessment System” (with Saleh Al-shomrani) *International Conference on Learning 2008*, University of Illinois at Chicago, USA, June 3-6, 2008
- “WME: a Web-based Mathematics Education System for Teaching and Learning.” (with M. Mikusa, S. Al-shomrani, X. Lai, X. Zou, D. Zeller) *ICME 11 —TSG 22 Theme 3 the 11th International Congress on Mathematical Education*, Monterrey, Mexico, July 6 - 13, 2008.
- “An On-line MathML Editing Tool for Web Applications.” (with Wei Su and Lian Li) *Proceedings, 2nd International Multi-Symposiums on Computer and Computational Sciences*, 2007, pp. 458-464.
- “GeoSVG: A Web-based Interactive Plane Geometry System for Mathematics Education.” (with Xun Lai) *Proceedings, the 2nd IASTED International Conference on EDUCATION AND TECHNOLOGY (ICET)*, July 17-19, 2006, pp. 5-10.
- “Design and Implementation of an Assessment Database for Mathematics Education.” (with Saleh Al-shomrani) *Proceedings, the 2nd IASTED International Conference on EDUCATION AND TECHNOLOGY (ICET)*, July 17-19, 2006, pp. 173-179.
- “MEML: Supporting Structured, Interoperable and Dynamic Web-based Mathematics Education.” (with Xiao Zou) *Proceedings, the 2nd IASTED International Conference on EDUCATION AND TECHNOLOGY (ICET)*, July 17-19, 2006, pp. 113-120.
- “An Approach for Interoperable and Customizable Web-based Mathematics Education.” (with David Chiu) *Proceedings, The Fifth IASTED International Conference on Web-based Education*, January 23-25, 2006 Puerto Vallarta, Mexico, pp. 80-87.
- “Lesson Page Structure and Customization in WME.” (with Wei Su and Lian Li) *IAMC 2005 Workshop*, Chinese Academy of Sciences, July 24 2005, Beijing, China.
- “An SVG Based Tool for Plane Geometry and Mathematics Education,” (with Xun Lai) *IAMC 2005 Workshop*, Chinese Academy of Sciences, July 24 2005, Beijing, China.
- “Building DMAD: A Distributed Mathematics Assessment Database for WME,” (with Saleh Al-shomrani) *Proceedings, IEEE SoutheastCon*, Fort Lauderdale, Florida, April 2005, pp. 630-635.
- “Features and Advantages of WME: A Web-based Mathematics Education System,” (with M. Mikusa, S. Al-shomrani, D. Chiu, X. Lai, and X. Zou) *Proceedings, IEEE SoutheastCon*, Fort Lauderdale, Florida, April 2005, pp. 621-629.

- “Web-based Mathematics Education Pilot Project,” (with Michael Mikusa, David Chiu, Xun Lai, and Xiao Zou) Proc., Conference on Information Technology in Education, Elizabethtown College Elizabethtown, PA, Sept. 18, 2004, pp. 132-138.
- “Web-based Mathematics Education: MeML Design and Implementation,” (with Yi Zhou and Xiao Zou) Proc., IEEE/ITCC’2004, Las Vegas, Nevada, April 5-7 2004, pp. 169-175.
- “The Internet Accessible Mathematical Computation Framework,” (with S. Gray, N. Kajler, D. Lin, W. Liao, X. Zou) Science in China Ser. F Information Sciences 2004 Vol. 47 No.1 75-88.
- “WME: Towards a Web for Mathematics Education,” (with N. Kajler, Y. Zhou, and X. Zou) Proc., ISSAC’2003, ACM Press, August 2003, pp. 258-265.
- “Secure Internet Accessible Mathematical Computation Framework,” (with D. Lin and Z. Song) Proc., International Congress of Math. Software, World Scientific, August 2002, Beijing, China, pp. 501-502.
- “Local and Remote User Interface for ELIMINO through OMEI,” (with Y. Wu, W. Liao, and D. Lin) Proc., Int. Congress of Math. Software, World Scientific, Aug. 2002, Beijing, China, pp. 411-420.
- “Initial Design of A Web-Based Mathematics Education Framework,” (with N. Kajler, Y. Zhou, and X. Zou) IAMC 2002 Workshop, July 7, 2002 Lille, France.
- “Mathematics over the Internet/Web: A Protocol-based Approach,” (with Q. Guo and W. Liao) Proc., International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA’02), June 2002, pp. 2190-2196.
- “OMEI: An Open Mathematical Engine Interface,” (with W. Liao and D. Lin) In *Computer Mathematics*, Proc. of ASCM’2001, the 5th Asian Symposium on Computer Math., Sept 26-28, 2001, Matsuyama, Japan, World Scientific Press, (Lecture Notes Series on Computing, Vol. 9), pp. 82-91.
- “IAMC Architecture and Prototyping: A Progress Report,” (with S. Gray, N. Kajler, D. Lin, W. Liao, and X. Zou) Proc., ISSAC’2001, U. of Western Ontario, London, Ontario, Canada, July 22-25, 2001, pp. 337-344.
- “Another Attempt for Parallel Computation of Characteristic Sets,” (with I. Ajwa and D. Lin) Proc., the 4th Asian Symposium on Computer Math. (ASCM’2000), Chiang Mai, Thailand, Dec. 17-21, 2000, pp. 63-70.
- “Dragonfly: A Java-based IAMC Client Prototype,” (with Weidong Liao) Proc. the 4th Asian Symposium on Computer Math. (ASCM’2000), Chiang Mai, Thailand, Dec. 17-21, 2000, pp. 281-290.
- “Building IAMC: A Layered Approach,” (with Weidong Liao) Proc., International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA’00), June 26-29, 2000, Csrea Press, pp. 1509-1516.

- “Design and Protocol for Internet Accessible Mathematical Computation,” Proc., ISSAC’99, Simon Fraser U., Vancouver, BC, Canada, July 28-31, 1999, ACM Press, pp. 291-298.
- “Parallel Implementations of the Characteristic Sets Method,” (with Iyad A. Ajwa) Proc., 1999 International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA’99) June 28 - July 1, 1999, Monte Carlo Resort, Las Vegas, Nevada.
- “The MP Encoding for Distributed Mathematical Computations: An Object-oriented Design and Implementation,” (with Simon Gray and Linlin Tong), Proc., 1999 International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA’99) June 28 - July 1, 1999, Monte Carlo Resort, Las Vegas, Nevada, pp. 2084-2090.
- “IAMC: Internet Accessible Mathematical Computation,” Proc., 3rd Asian Symposium on Computer Math. (ASCM’98), Lanzhou U., Lanzhou, P. R. China, August 6, 1998, pp. 1-13.
- “Design and Implementation of MP, a Protocol for Efficient Exchange of Mathematical Expressions” (with S. Gray and N. Kajler) *Journal of Symbolic Computation*, Vol. 25, No. 2, Academic Press, Feb. 1998, pp. 213-238
- “PvmJobs: A Generic Parallel Jobs Library for PVM” (with Hong H. Ong and Iyad A. Ajwa), Proc. of IEEE National Aerospace and Electronics Conference (NAECON ’97), pp. 165-172, Dayton, OH, July 14-18, 1997.
- “Applying Parallel/Distributed Computing to Advanced Algebraic Computations” (with Iyad A. Ajwa), Proc. of IEEE National Aerospace and Electronics Conference (NAECON ’97), pp. 156-164, Dayton, OH, July 14-18, 1997.
- “Tools for Parallel/Distributed Mathematical Computation,” Proc., PASCO ’97 (July 20-22) Maui, HI, pp. 188-195.
- “Parallel Characteristic Sets Methods Using PVM” (with Iyad A. Ajwa), Cluster Computing Conference (CCC’97), March 9-11, 1997, Emory University, Atlanta, GA, USA  
<http://www.mathcs.emory.edu/ccc97/1997>.
- “A Generic Parallel Jobs library for PVM” (with Hong Ong and Iyad Ajwa), Cluster Computing Conference (CCC’97) March 9-11, 1997 Emory University, Atlanta, GA, USA  
<http://www.mathcs.emory.edu/ccc97/1997>.
- “Using PVM to Speedup Groebner Bases Computation” (with Iyad A. Ajwa), Proc., Eighth IASTED International Conference on Parallel and Distributed Computing and Systems, Oct. 16-19, 1996, Chicago, IL, USA, pp. 457-461.
- “Pluggability Issues in the Multi Protocol” (with Simon Gray and Norbert Kajler), Proc., DISCO’96, Karlsruhe, Germany, Sept. 18-20, 1996.
- “Tools to Aid PVM Users,” the Fourth U.S. PVM Users’ Group Meeting,  
<http://www.cic-8.lanl.gov/pvmug96>, Santa Fe, NM, Feb. 25-27, 1996.
- “Parallel Polynomial Operations on SMPs: An Overview,” *Journal of Symbolic Computation - Special issue on parallel symbolic computation*, Volume 21 Issue 4-6, April/May/June 1996 pp. 397 - 410 Academic Press, Inc. Duluth, MN, USA.

## Patents, Copyrights, and Software Systems Developed

MathEdit, Geometry Editor, DMAS (Distributed Mathematics Education Assessment System), and others related to WME (Web-based Mathematics Education, [wme.cs.kent.edu/index.html](http://wme.cs.kent.edu/index.html))

Website: *Interactive Demos of Mathematical Computations*, selected by *Internet Scout* in *National Science Digital Library Report for Math, Engineering, and Technology* 10-2002

Create and maintain the NSF sponsored [SymbolicNet.org](http://SymbolicNet.org) 1994–.

MP, a Mathematical data encoding and transmission protocol.

PVM-ET, a set of PVM (Parallel Virtual Machine) enhancement tools including compilation, task distribution, management, and interfaces to Common Lisp, MAXIMA, and SACLIB.

MathML Presentation and Content Code Generation Demo package, Mar. 1999.

## Students

Ph.D. SUPERVISED:

**Samer Khasawneh (Summer 2012)**, *A Web-based Lessons Authoring System for Mathematics Education (MLAS)*

**Su Wei (Fall 2010, Lanzhou University)**, *Research on Web-based Inputting and Accessibility of Mathematical Expressions*, as adviser from Kent State under a research collaboration with Dr. Lian Li of Lanzhou University, People's Republic of China

**Xun Lai (2010)**, *GeometryEditor: A Web-based System for Authoring, Sharing and Support of Plane Geometry Manipulatives for Mathematics Education*

**Saleh Al-shomrani (2008)**, *A Web-based Distributed and Interoperable Tool for Sharing Mathematical Assessments and Supervising Online Tests*

**Weidong Liao (2003)**, *IAMC Framework: Design and Prototyping*

**Simon Gray (1998)**, *MP: A Protocol for the Efficient Exchange of Mathematical Data*

**Iyad A. Ajwa (1998)**, *Parallel Algorithms and Implementations for the Grobner Bases Algorithm and the Characteristic Sets Method*

**Olaf Bachmann (1996)**, *Chains of Recurrences*

**Yaser Doleh (1995)**, *The Design and Implementation of a System Independent User Interface for an Integrated Scientific Computing Environment*

**Mohamed Rayes (1995)**, *Parallel Algorithms and Implementations for Sparse Multivariate GCD*

**Ken Weber (1994)**, *Parallel Integer GCD Algorithms and Their Application to Polynomial GCD*

**Naveen Sharma (1992)**, *User-directed Generation of Sequential and Parallel Codes for Finite Element Analysis*

**Vilmar Trivisan (1991)**, *Univariate Polynomial Factorization*

**Hui Tan (1986)**, *FINGER: A Finite Element Code Generator*

M.S. STUDENTS SUPERVISED:

Maja Anderson, Ashish Bhargava, Dan Bennett, David Chrin, David Chiu, Yaser Doleh, Adnan Es-haque, Barbara Gates, Robert Hall, Chia-Kai Hsu, Chao-Jen Hsu, Chokchai Leangsuksun, Sam Lin, Carl Powell, Mohamed Rayes, Naveen Sharma, Cora Stackelberg, Trevor Tan, Linlin Tong, Vilmar



Trevisan, Sanjiva Weerawarana, Carl Williams, David Wu, Douglas Young, Pei Young, Rick Zhang.

### **Industrial and Synergistic Activities**

Founder and president, **Webtong Inc** ([webtong.com](http://webtong.com)), a Web development company

Sofpower™, [sofpower.com](http://sofpower.com) IT consulting

*Web Design and Programming* ugrad minor development, together with Austin Melton (CS), Sanda Katila and Charles Walker (VCD/Art) 1997–.

NSF funded Research Opportunity Award (ROA) to support Prof. S. Gray of Ashland U. 1998-99