

Kelvin Sung

Professor
Computing and Software System
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Research Interests Applied Pedagogy, Approaches to teaching Computer Science concepts, especially in the context of game development; Computer Graphics; All aspects of image generation, especially in visibility determination, and algorithms concerning temporal anti-aliasing; Computer Hardware and Architecture; Visualization; Virtual Reality.

Teaching Interests Computer Graphics at graduate and undergraduate levels; Computer Games Development; Operating Systems; Digital Logic; Computer Hardware and Microprocessor Design; Undergraduate introductory courses.

Education PhD in Computer Science, University of Illinois at Urbana-Champaign (1992)
MS in Computer Science, University of Illinois at Urbana-Champaign (1990)
BS in Electrical Engineering, University of Wisconsin at Madison (1986)

Experience

2009 – now
1999 – 2008

Professor with Tenure
Associate Professor with Tenure
Computing and Software Systems
University of Washington, Bothell

1998 – 1999
1995 – 1998

Software Architect
Senior Software Engineer
Alias|Wavefront, Toronto, Canada

- One of the chief designers of the Maya Renderer. Alias|Wavefront was awarded the *Academy Award for Scientific and Technical Achievement* in 2002 for the development of the Maya image generation system.
- Co-Developed a patented motion blur algorithm for the entire rendering product line.

1992-1995

Lecturer (Assistant Professor)
Department of Information Systems and Computer Science
National University of Singapore

Summer 1993

Visiting Researcher
Institute of Information Science
Academia Sinica, Taiwan

1987-1992

Research Assistant
Department of Computer Science
University of Illinois at Urbana-Champaign

1986-1987

Teaching Assistant
Department of Information Systems and Computer Science
National University of Singapore

Grants

- "Infrastructure for Sensor Support on Mobile Gaming Platforms," *Microsoft Higher Ed Faculty Programs*, \$8,800, 2010.
- Robin Angotti (PI), Thomas Bellamy (co-PI), "Math 2.0: Teaching Math in a Technical World," *Washington State Higher Education Coordinating Board, Educators for the 21st Century Project*, \$660,220, 2009-2012
 - *Participate as key personnel in leading the design and development of custom game-themed applications for teaching high school math.*
- "A Traditional Game-Themed CS1 Class," *Microsoft Research*, Award Number: 16531, \$130,000, 2008-2010.
- "XNA Based Game-Themed Programming Assignments for CS1/2," *Microsoft Research, Computer Gaming Curriculum in Computer Science*, Award Number: 15871, \$80,000, 2006-2008 [*Success rate: 6 of 71 (~8.5%)*].
 - Results from this project were selected to be specially featured in a Microsoft External Research Case Study, "*Transforming Computer Science in the Gaming Age*," July 2008.
- "Essential Concepts for Building Interactive Computer Graphics Applications," *CCLI-EMD, NSF, DUE-0442420*, \$60,500, 2005 – 2007 [*Success rate: 122 of 742 (~16.4%)*].

Internal Grants

- "Transfer Success from Serious Games Development to Secure Support from Local Industry Partner," *Teaching & Scholarship Enhancement Projects, University of Washington, Bothell*, \$13,700, June 2010 – June 2011.
- "Coursework infrastructure development for Supporting Proposals to the NSF," *Worthington Scholar Award, University of Washington, Bothell*, \$10,000, June 2004 – June 2006.
- "Assessment and Refinement of Programming-Base Problem-Solving Course for non-Technical Students," *Worthington Technology Award, University of Washington, Bothell*, \$10,000, June 2004 – June 2006.
- "The Computing and Software Systems Center for Integrated Teaching, Learning and Scholarship," *Worthington Technology Award, University of Washington Bothell*, \$11,380, June 2002 – June 2003 (with M. Fukuda, C. Jackels, and M. Stiber).
- "Instructional Infrastructure Development and Student Research Initiatives Based on Recent Research Efforts", *Worthington Distinguished Professor Award, University of Washington, Bothell*, \$3,500, June 2001.

Infrastructure Awards:

- "Interdisciplinary Center for Multimedia Research," *University of Washington*, \$40,000, May 2000 – May 2003 (M. Berg co-P.I.).
- "Distributed Systems Research Laboratory," *Office of Research, University of Washington*, \$20,000, May 2000 – May 2001 (M. Berg co-P.I.).
- "Computing and Software Systems Research Laboratory start up fund," *University of Washington, Bothell*, \$20,000, September 1999 – September 2000.
- "Office Equipment Grant," *University of Washington, Bothell*, \$7000, September 1999.

Traveling and Conference Registration Awards

- Faculty Fellow, Teaching and Learning Center Diversity Enhancement Project, UW Bothell, 2006-2007 (\$1000 summer stipend).
- Conference Traveling Fund, *Teaching and Learning Center, University of Washington, Bothell*, 2003-2010 (\$800-\$1000 each year).
- Research Circle, *University of Washington, Bothell*, September 2002-2004, 2006-2008 (\$300 stipend each year).
- Institute for Teaching Excellence support, *University of Washington*, Summer 2002 (\$1500 stipend).

Projects Funded by The Associated Students of the University of Washington, Bothell (ASUWB):

- "Support for Computer Animation Course for Non-CSS Major Students," *ASUWB Student Technology Fee Fund*, \$6,000, June 2004.
- "Invited Speakers Series: Behind the scenes in making of contemporary video games," *ASUWB Service and Activities Fee Fund*, \$3,700, June 2004.
- "A Course in Computer Graphics based on Pre-College mathematics for non-CSS students," *ASUWB Student Technology Fee Fund*, \$19,090, February 2004.
- "Invited Speakers Series: Computer Graphics In Special Effects," *ASUWB Service and Activities Fee Fund*, \$3,000, June 2003.

Other Grants (Received while at the National University of Singapore)

- "Interactive Infra-Structure Previewing System," *National University of Singapore*, Grant No: RP 940641, 1994-1996, S\$89,875 (~US\$50,000) (T. Tan P.I.).
- "3D Graphics Library for Windows," (E. Koh co-P.I.), *Singapore National Computer Board*, Grant No: GR6324, 1994-1995, S\$14,000 (~US\$7,500).
- "Custom Hardware for Parallel Ray Tracer," *National University of Singapore*, Grant No: RP930616, 1993-1995, S\$78,000 (~US\$45,000).

Hardware Donations

- Telsa C1060 Computing Processor Board (NVIDIA CUDA Board), *NVIDIA*, 2010 (with M. Stiber).
- Zune Development Units, *Microsoft XNA Team*, 2009.
- Xbox 360 Development Units, *Microsoft*, 2006.

Software Donations

- Jupiter System SDK License, *Touchdown Entertainment (was LithTech Inc.)*, 2003-2004.
- Maya Unlimited (4 Seats), *Alias/Wavefront*, \$156,671, 1999-2006.

Book

- K. Sung, P. Shirley, and S. Baer, "*Essentials of Interactive Computer Graphics: Concepts and Implementation*," A.K. Peters, December 2008.

Book Chapters

- K. Sung, "Building Interactive Graphics Applications," (PP. 467-515), in P. Shirley and S. Marschner "*Fundamentals of Computer Graphics*," 3rd edition, A. K. Peters, 2009 (*revised from 2nd edition*).
- K. Sung, "Building Interactive Graphics Applications," (PP. 401-449), in P. Shirley "*Fundamentals of Computer Graphics*," 2nd edition, A. K. Peters, August 2005.
- K. Sung, and P. Shirley, "Ray Tracing with the BSP Tree," *Graphics Gems III*, PP. 271-274, David Kirk, Editor, Academic Press, San Diego, CA, August, 1992.

Patents

- Pearce, and K. Sung, "Analytic motion blur coverage in the generation of computer graphics imagery," *US Patent Number: 6,211,882*, April 3, 2001.
- Pearce, and K. Sung, "Analytic motion blur coverage in the generation of computer graphics imagery," *US Patent Number: 5,809,219*, September 15, 1998.
 - *The implementation of this patent can be found in all Alias/Wavefront image generation systems. Images generated based on this patent can be found in movies like "Independence Day", or "Wing Commander."*

Refereed Publications

1. Peter Drake, and Kelvin Sung, "Teaching Introductory Programming with Popular Board Games," *to appear in SIGCSE 2011*, March 2011 [Acceptance rate: 107 of 315 (~ 34%)].
2. K. Sung, C. Hillyard, R. Angotti, M. Panitz, D. Goldstein, J. Nordlinger, "Game-Themed Programming Assignment Modules: A Pathway for Gradual Integration of Gaming Context into Existing Introductory Programming Courses," Accepted for publication, *IEEE Transactions on Education*, July, 2010.
3. M. Panitz, K. Sung, R. Reed-Rosenberg, "Game Programming in CS0: A Scaffolded Approach," *The Journal of Computing Sciences in Colleges*, Vol. 26, No. 1, PP. 126-132, October 2010 (Proceedings of the Twelfth Annual CCSC-NW Conference).
4. R. Angotti, C. Hillyard, M. Panitz, K. Sung, K. Marino, "Game-Themed Instructional Modules: A Video Case Study," *Proceedings of the Fifth International Conference on the Foundations of Digital Games* (Monterey CA, USA) *FDG '10*, PP. 9-16, June 2010 [Acceptance rate: 32 of 94 (~ 34%)].
5. C. Hillyard, R. Angotti, M. Panitz, K. Sung, J. Nordlinger, D. Goldstein, "Game-Themed Programming Assignments for Faculty: A Case Study," *Proceedings of the 41st SIGCSE Technical Symposium on Computer Science Education* (Milwaukee, WI, USA) *SIGCSE '10*, PP. 270-274, March 2010 [Acceptance rate: 103 of 303 (~34%)].
6. K. Sung, "Computer Games and Traditional Computer Science Courses," *Communications of the ACM*, Vol. 52, No. 12, PP. 74-78, December 2009 (invited paper, peer reviewed).
7. P. Shirley, K. Sung, E. Brunvand, A. Davis, S. Parker, S. Boulos, "Fast Ray Tracing and The Potential Effects on Graphics and Gaming Courses," *Computer & Graphics*, Vol. 32, Issue 2, PP. 260-267, April 2008 (invited full-length paper based on *ACM SIGGRAPH 2007 Educator's Program* conference paper).
8. K. Sung, M. Panitz, R. Rosenberg, R. Anderson, "CS1/2 Game-Themed Programming Assignments for Faculty," *Journal of Game Development*, Vol. 3, Issue 2, March 2008, PP. 27-47, (invited full-length paper based on *SIGCSE 2008* conference paper).
9. K. Sung, M. Panitz, S. Wallace, R. Anderson, J. Nordlinger, "Game-Themed Programming Assignments: The Faculty Perspective," *Proceedings of the 39th SIGCSE Technical Symposium on Computer Science Education* (Portland, OR, USA, March 12-15, 2008) *SIGCSE '08*, PP. 300-304 [Acceptance rate: 100 of 324 (~31%)].
10. K. Sung, M. Panitz, R. Rosenberg, R. Anderson, "Assessing Game-Themed Programming Assignments for CS1/2 Courses," *Proceedings of the Third International Conference on Game Development in Computer Science Education (GDCSE'08)*, Feb 2008 [Acceptance rate: 15 of 60 (25%)].
11. P. Shirley, K. Sung, E. Brunvand, A. Davis, S. Parker, S. Boulos, "Rethinking Graphics and Gaming Courses Because of Fast Ray Tracing," *SIGGRAPH 2007 Educator's Program Conference CD/DVD-ROM*, August 2007.
12. K. Sung, P. Shirley, R. Reed-Rosenberg, "Experiencing Aspects of Games Programming in an Introductory Computer Graphics Course," *SIGCSE Bulletin*, Vol. 39, Issue 1, March, 2007, PP. 249-253, (Proceedings of the 38th *SIGCSE Technical Symposium on Computer Science Education*, *SIGCSE 07*) [Acceptance rate: 108 of 316 (~34%)].
13. K. Sung, A. Leong, and R. Reed-Rosenberg, "A Programming Course for Business MIS Students," *ASEE/IEEE Frontiers In Education 35th Annual Conference, Conference Proceedings (Conference CD)*, October 2005.
14. K. Sung, and P. Shirley, "Algorithm Analysis for Returning Adult Students," *The Journal of Computing Sciences in Colleges*, Vol. 20, No. 2, PP. 62-72, December 2004 (Proceedings of the Sixth Annual CCSC-NW Conference).
15. K. Sung, and P. Shirley, "A Top-Down Approach to Teaching Introductory Computer Graphics," *Computer & Graphics*, Vol. 28, Issue 3, PP. 383-391, June 2004 (invited full-length paper based on *ACM SIGGRAPH 2003 Educator's Program* conference paper).
16. K. Sung, and P. Shirley, "A Top-Down Approach to Teaching Introductory Computer Graphics," *ACM SIGGRAPH 2003: Educator's Program from the 30th annual conference on Computer graphics and interactive techniques*, PP. 1-4, New York, NY, USA 2003. *ACM Press*. (also, *Conference CD/DVD-ROM Disc*) July 2003.
17. K. Sung, A. Pearce, and C. Wang "Spatial-Temporal Antialiasing," *IEEE Transactions on Visualization and Computer Graphics*, Vol. 8, No.2, PP. 144-153, April-June 2002.
18. C. Wang, and K. Sung, "Multi-Stage N-rooks Sampling Method," *Journal of Graphics Tools*, Vol. 4, No. 1, PP. 39-47, 1999.

19. K. Sung, J. Craighead, C. Wang, S. Bakshi, A. Pearce, and A. Woo, "Design and Implementation of the Maya Renderer," *Proceedings of Pacific Graphics '98*, PP. 150-159, 1998 (*invited paper, peer reviewed*).
20. J. Loh, K. Sung, A. Ananda, and E. Koh, "Client-Server Based Ray-tracer using ASTRA - an Asynchronous RPC Mechanism," *The Journal of Computer Communications*, Vol. 19, PP. 445-455, 1996.
21. K. Sung, J. Loh, and A. Ananda, "Ray Tracing in a Distributed Environment," *Computer & Graphics*, Vol. 20, No. 1, PP. 41-49, 1996.
22. K. Sung, and W. Kubitz, "Tracing Rays with the Area Sampling Machine," *The Visual Computer*, Vol. 11, No. 9, PP. 477-496, November 1995.
23. K. Lam, K. Sung, and L. Hui, "A Cardinalized Binary Representation for Exponentiation," *The Journal of Computers and Mathematics with Applications*, Volume 30, Number 8, PP. 33-39, 1995.
24. A. Fang, K. Sung, and P. Heng, "Interactive Surface Rendering for Medical Visualization," *Graphics Interface '95*, PP. 65-74, May 1995.
25. K. Sung, "The Area Sampling Machine," *The Third Eurographics Workshop on Rendering*, PP. 147-160, May, 1992.
26. K. Sung, "Area Sampling Buffer: Tracing Rays with Z-Buffer Hardware," *Computer Graphics Forum*, Vol. 11, No. 3, PP. 299-310, September 1992, (*Proceedings of the Eurographics '92 Conference*).
27. K. Sung, "A DDA Octree Traversal Algorithm for Ray Tracing," *Eurographics '91*, PP. 73-85, September 2-6, 1991.
28. P. Shirley, K. Sung, and W. Brown, "A Ray Tracing Framework for Global Illumination Systems," *Graphics Interface '91*, PP. 117-128, June 3-7, 1991.
29. K. Sung, G. Rogers, and W. Kubitz, "A Critical Evaluation of PEX," *IEEE Computer Graphics and Applications*, Vol. 10, No. 6, PP. 65-75, November 1990.
30. G. Rogers, K. Sung, and W. Kubitz, "Combining Graphics and Windowing Standards in the XGKS System," *Computer Graphics Forum*, Vol. 9, PP. 229-237, 1990.

Peer Reviewed Tutorials/Workshops/Panels/Game Demos/Posters

1. Victor Larios, Kelvin Sung, "Open Source and Freeware Tools for 3D Game Development Courses," *workshop to be offered at SIGCSE 2011*, March 2011 [*Acceptance rate: 35 of 78 (45%)*].
2. M. Panitz, K. Sung, J. Nordlinger, "Develop Game-Themed Examples for CS1/2 without background in Graphics or Games," Workshop offered at *ACM SIGCSE '10 Conference*, March 2010 [*Acceptance rate: 39 of 86 (45%)*].
3. A. Amlag, S. Krolkowski, B. McMahon, S. McPherson, K. Phillips, and K. Sung, "Sammy goes to UWB – A Game for UWB Admissions Office," Poster, *Serious Games Winter School 2010*, Puerto Vallarta, Mexico, February 12-14, 2010.
4. K. Sung, "Alphabet Hero – A Game for Programming Binary Search Tree," Game DemoFes, *The Fourth International Conference on the Foundations of Digital Games (ICFDG 2009)*, Orlando, Florida, April 2009.
5. M. Lewis, S. Leutenegger, M. Panitz, and K. Sung (Organizer/Moderator), and S. Wallace, "Introductory Programming Courses and Computer Games," Panel presentation, *ACM SIGCSE '09 Conference Proceedings*, March 2009, PP. 204-205 [*Acceptance rate: 11 of 20 (55%)*].
6. G. Orr, K. Sung, B. Wilson, and D. Wolff (Organizer/Moderator), "The Content And Role of The Computer Graphics Course in Small Liberal Arts Colleges," Panel presentation, *CCSC-NW 2008 Conference*, October, 2008.
7. M. Panitz, and K. Sung, "Incrementally Incorporating Video Games Into Instruction Using XNA Game-Themed Assignments," Tutorial offered at the *CCSC-NW 2008 Conference*, October, 2008.
8. K. Sung, M. Panitz, and R. Anderson, "Program Development with Graphical User Interface," *The Journal of Computing Sciences in College*, Vol. 23, No. 2, PP. 49-50, Tutorial offered at the Ninth Annual CCSC-NW Workshop, October, 2007.
9. K. Sung, and M. Panitz, "Developing Applications on the Xbox 360 Console," *The Journal of Computing Sciences in College*, Vol. 23, No. 2, PP. 71-72, Tutorial offered at the Ninth Annual CCSC-NW Workshop, October, 2007.
10. E. Angel, S. Cunningham, P. Shirley, and K. Sung (Organizer/Moderator), "Teaching Computer Graphics without Raster-Level Algorithm," *SICCSE Bulletin*, Vol. 38, Issue 1, March, 2006, PP. 266-267 (Panel Presentation, *Proceedings of the 37th SIGCSE Technical Symposium on Computer Science Education, SIGCSE 06*).

11. K. Sung, "Working with the Maya Renderer: The Technical Details," Tutorial offered at the Pacific Graphics '98 Conference, 1998.

Invited Workshops and Presentations

- "Game-Themed CS Education: Empowering the Faculty," and "Video Game Design Workshop," Invited 2-day visit, *Department of Computer Science, Iowa State University*, Ames, Iowa, November 2010.
- "Video Game Design Workshop," Invited two-day Workshop, Invited 2-day workshop, *Faculty of Physics, Universidad Autonoma de Nuevo Leon (UANL)*, Monterrey, Mexico, October 2010.
- *Collaborating Across Silos to Create Interdisciplinary Game Design and Development Curriculum*, Organized by Digital Media Program, East Tennessee State University, Sponsored by NSF (CPATH Grant CCF 0722261), Johnson City, TN, September 17-18, 2010 [*Application reviewed, invited participant and panelist*].
- *Math/Science Partnership Program Summer Institute 2010*, As part of the Math2.0 Project, Supported by *Washington State Higher Education Coordinating Board, Educators for the 21st Century Project*, Wenatchee, WA, August 11-12, Omak, WA, August 17-19, 2010 [*Invited Workshop Technology Consultant*].
- *Games in Engineering and Computer Science (GECS) Workshop*, served as a panelist on *Games in Computer Science panel*, Organized by Texas A&M University, Sponsored by NSF (CCLI Grant No. 0938176), Arlington VA, June 3-4, 2010 [*Application reviewed, invited participant and panelist*].
- "Game-Themed CS Education: Empowering the Faculty," Invited Presentation, *Penn State University Educational Gaming Initiative Exploration Meeting with Microsoft Representative*, Microsoft Executive Briefing Center, Redmond, Washington, May 27, 2010.
- *Northwest Distributed Computer Science Department (NWDCSD) Spring and Summer Workshops*, Organized jointly by Washington State University Vancouver, Willamette University, and Gonzaga University, Sponsored by NSF (CPATH Grant No. 0829651), Vancouver, WA, May 15 and August 14, 2010 [*Invited Workshop Participant*].
- "Developing Game-Themed Applications With XNA," Invited 3-day workshop, *Serious Games Winter School 2010*, Puerto Vallarta, Mexico, February 12-14, 2010 [*Sponsored by Information Systems Department, University of Guadalajara*].
- "Breaking into the Game Industry the Educated Way," Invited Panelist, *PAX / The Penny Arcade Expo!*, Seattle, Washington, September 4th 2009.
 - <http://www.youtube.com/watch?v=5jo3qCzbsag>
- "Developing Game-Themed Applications for Teaching Introductory Programming Courses," Invited two-day Workshop, *Beijing University of Technology*, Beijing, China, July 2009.
- "XNA Game-Themed Applications for Teaching Introductory Programming Courses," Invited Pre-Conference Workshop, *The Fourth International Conference on the Foundations of Digital Games (ICFDG 2009)*, Orlando, Florida, April 2009.
- "XNA Game-Themed Applications for Teaching Introductory Programming Courses," Invited full-day Workshop, *Microsoft Research*, Redmond, Washington, April 2009.
- "Game-Themed CS Education: Empowering the Faculty," Invited Presentation, *Microsoft External Research Symposium*, March 30-31, 2009, Redmond, Washington.
 - Lecture: <http://research.microsoft.com/en-us/um/redmond/events/ersymposium2009/16940/lecture.htm>
 - Poster: http://research.microsoft.com/en-us/events/ersymposium2009/themed_cs_edu-empowering_faculty.pdf
- "XNA Game-Themed Applications for Teaching Introductory Programming Courses," Invited 3-day Workshop, *Microsoft Mexico and Digital Arts University*, Guadalajara, Mexico, February 2009.
- "Top-Down Approach to Teaching Computer Graphics and Game Development," Invited Presentation, *Institute of Technology Seminar*, University of Washington, Tacoma, Washington, January 2009.
- "Programming 2D games without games or graphics background," Invited Workshop, *Multimedia Development Corporation*, Cyberjaya, Selangor, Malaysia, July 2008.
- "Developing Game-Themed Applications with XNA Game Studio," Invited full-day Workshop, *Microsoft Research*, Redmond, Washington, April 2008.

- "Developing Applications for the Xbox 360 Console," Invited Talk, *Computer Science Department, Brigham Young University*, March 2008.
- "Developing Programming Assignments on the Xbox 360 Console," Invited full-day Workshop, *SIGCSE 2008*, March 2008.
- "Developing Game-Themed Programming Assignments," Invited Talk, *GDCSE'08 Conference*, February 2008, *MSR Computer Gaming Resource Kit V4*.
- "Gaming-Themed Programming Assignments for CS1/2 Courses," Microsoft Research, *Faculty Summit 2007*, Redmond, Washington, July 2007.
- "Integrating Computer Gaming into Computer Graphics Courses," Microsoft Research Asia, *Gaming and Graphics Workshop*, Beijing, China, May 2007.
- "Integrating Computer Gaming into Computer Graphics Courses," Computer Science Department, *Shandong University*, Jinan, China, May 2007.
- "Learning Computer Graphics Programming Through Examples," NSF CCLI Showcase, *SIGCSE 2007*, March 2007.
- "Design and Implementation of the Maya Renderer," Invited Speaker, *Pacific Graphics '98*, Singapore, October 1998.
- "Advanced Computer Graphics: Topics in Rendering," Invited one week short course given in Chinese (Mandarin), Institute of Information Science, Academia Sinica, Taiwan, July 1993.

Featured in Public Publications

- "Transforming Computer Science in the Gaming Age," Case Study, Microsoft External Research, http://research.microsoft.com/en-us/collaboration/papers/usc_uwb_rit.pdf, August, 2008.
- "Game on: Professor brings Xbox 360 into the classroom," by Hannah Hickey, UWeek – The University of Washington faculty and staff newspaper, <http://uwnews.org/uweek/article.aspx?id=32871>, Vol 24, No. 27, May, 2007.
- "UW Bothell professor uses Xbox to teach students," by Victoria Lee, The Daily News (University of Washington campus wide student daily newspaper), <http://www.thedaily.washington.edu/article/2007/5/22/uwBothellProfessorUsesXboxToTeachStudents>, May, 2007.

Courses Taught

- At CSS, UWB (1999-now): **CSS105**: Interdisciplinary Information Technology; **CSS 305**: Interdisciplinary Information Technology; **CSS 341**: Fundamentals of Programming Theory and Applications; **CSS 430**: Operating Systems; **CSS 443**: Advanced Programming Methodologies; **CSS 450**: 2D Computer Graphics; **CSS 451**: 3D Computer Graphics; **CSSAP 443**: Advanced Programming Methodologies II; **CSSIE 450**: The Graphical Display of Information; **CSSIE 490B**: 3D Computer Graphics; **CSS 490**: Introduction to Game Programming.
- At National University of Singapore (1992 – 1995): Computer Graphics: Topics in Rendering (Graduate level); Introduction to Computer Graphics (Final year); Computer Organization (Final year).

Independent Student Research Projects Supervisions

Independent Research Projects Supervised:

- 2010: John Therrell – Web services on Mobile Devices (Fall).
 Ryan Hoaglan – Gaming with Sensors on Mobile Devices (Summer).
 Kimberly Walker – Java/OpenGL platform for Game-Themed application development (Summer).
 Sean Keating – Automation and GUI Interface support for TI Calculator data transfer.
 Daniel Girodat, Andrew Ogier, Charlie Skinner, Nathaniel Williams – Understanding 3D Game Engine via Game Development (Summer).
 Ryan Hoaglan, Sidney Maxwell, Dmitry Ryzhkov, Kimberly Walker – Serious Game on Mobile Devices (Summer).
 Tom Baron – Automatic Sprite Animation Generation from Photographs (Spring, Summer).

- Katherine Phillips, Shane Krolikowski – OpenGL ES 2.0 Shader Library and Mobile Devices (Spring).
 Aaron Amlag, Shane Krolikowski, Bryan McMahon, Scott McPherson, Katherine Phillips – The Game Across Multiple Environment (GAME) Project: A Game for UWB Admissions Office (Winter).
- 2009: Conrad Young – Physics based games and gameplay (Fall).
 Matthew Kaplan, Filiz Kurban, Soufi Souaiaia, Conrad Young, Darrell Westerinen, – Game for Autistic Children (Spring).
 Jeffery Hutchins – 2D Games Engine based on XNA Framework (Spring).
 Clifton Dobrich – 3D Animation via Maya API (Winter).
 Jae Joong Kim – Interactive Game Design with Eye Tracking Device (Winter).
- 2008: Christopher Ross – Java language binding for UWBGL (Fall).
 Neil Erdman – Integration of XNA Framework lighting effects into UWBGL (Summer).
 Howard Yuen – Building GUI based interactive applications on the Xbox 360 console (Winter).
 Glenn Plant – Gesture Based User Interaction (Winter).
 Ryan McMillan – Infrared Cameras in Graphics Applications (Winter).
- 2007: Matthew Allen – Semi-Automatic Color Reduction Tools for Artists (Fall).
 Robert Stone – Porting UWB_GL to XNA framework (Summer, Fall).
 Peter Yiap – GUI Menu System for NXA on the Xbox 360 platform (Summer, Fall).
 Elvir Bahtijaralic – Viewport and Camera wrappers for XNA (Spring).
- 2006: William Frankhouser – User Manual for UWB GL (Winter).
- 2005: Jordan Philips – Interactive Slicing of Mesh Objects (Spring).
 Andrew Belousek – API Analysis of Massively Multiplayer Online Role Playing Game (Winter).
 Philips Jordan – Designing/Developing API independent 3D Graphics Library (Winter).
 Kevin Gott – Adapting First Person Role Playing Game Engine for General Game Genres (Winter).
- 2004: Sean Brogan – Multi-Tier web-application development (Fall).
 Chris Traina – DirectShow and Multimedia (Summer).
 James Howbert – Visualization of Molecular Structures with Maya API (Summer).
 Christopher D’Annunzio – Games Engine Analysis and Development (Spring).
 Jack Nichols – Interactive Slicing of Arbitrary Mesh Objects (Spring).
 Adam Smith – Design of Graphics Library Interactive Applications (Spring).
 Wilson Kam – Application Automation with Scripting Languages (Winter).
- 2003: Peter Christensen - Real-time hardware assisted soft-shadow generation (Summer 2003 – Fall 2004).
 Kyoko Nakahashi – Virtual driving in the real world (Fall).
 Charles Watson – Performance Monitoring in CORBA Application Architecture (Summer).
 Aida Sakkal – Interactive Audio for Games Development (Summer). *The poster describing this work won the 1st price at the CCSC-NW 2003 Annual Conference Student poster competition.*
 Lawrence Sanchez – Virtual Surgeon on Tablet PC (Summer).
 Igor Bodi – Java Based Network Chess Game Development (Spring).
 John Young – Resource Management Support for Games Development (Spring).
 Eric Byrd – API Support for Network Games Development (Spring).
 John Carlson – Game development for GameBoy platform (Winter).
 Ian Chan – Maya based human modeling (Winter 2003).
 Axel Koch – Game pad controller user interface for 3D interactive walkthrough (Winter 2003).
- 2002: Saikat Kanjilal – Image processing with Intel WebCam (Fall).
 Jason Pursell – OpenGL development with C# (Summer).
 Kazuko Hass – Simulating Group and Crowd Behavior with Maya (Spring).
 Chris Veal – Java toolkit for 3D interactive walkthrough (Winter).
 Brain Warren – Joystick user interface for 3D interactive walkthrough (Winter).
- 2001: Daniel MacDonald – 3D modeling and rendering systems development (Spring /Summer).
 Tung Tran – Distributed system development based on Java RMI (Winter 2001 – Winter 2002).
 Michael Mager – Distributed system development based on CORBA (Fall 2000 – Spring 2001).
 Steve Baer – Instrumentation for distributed system performance (Spring 2001 – Fall 2002).
 Derek Gerstmann – Navigation in video system project (Spring 2001).
 Jennifer Beers – High Quality Image Generation (Summer 2001).
 Paul Volosen – Working with Media in the Microsoft Windows Environment (Spring 2001).

- Gabriel Holmes – User interface Support for 3D navigation system (Summer 2001).
 2000: Calvin Atkin – User interface support for 3D navigation system (Fall 2000 – Spring 2001).
 Morgan Eason – 3D modeling based on Maya unlimited (Fall 2000).

CSS Internship Projects Supervised:

- 2010: Boua Lor (Pandamonium Games, Fall), Shane Krolikowski (Pandamonium Games, Fall), John Therrell (Apple, Summer/Fall), Bryan McMahon (Griptonite Games, Summer), Jesse Bergslien (Vertafore Inc, Summer), Katherine Kuttler (Griptonite Games, Summer), Samuel Cook (HP, Summer), Ronald Cook (Predictive Solutions, Summer), Sam Frazier (Zetec Inc, Spring/Summer), Thomas Baron (CSS UWB, Summer), Joseph Chouinard (Zombie Studios, Summer), Jayson Kostelyk (with P. Littig, S&T/CSS UWB, Spring/Summer), Joshua Bell (Halycon Games, Spring/Summer), Soufi Souaiaia (with P. Littig, S&T/CSS UWB, Spring), Ethan Crawford (with M. Stiber, CSS UWB, Spring), Sean McCallum (with M. Stiber, CSS UWB, Spring), Mikhail Elbert (Engineering Simulation and Animation Lab, Winter), Nathan Bowhay (Engineering Simulation and Animation Lab, Winter), Aaron Amlag (CSS, UWB, Winter).
- 2009: Conrad Young (CSS, UWB, Fall), Thomas McShane (Vertafore Inc, Summer), Young Wouk Youn (University of Washington Autism Center, Spring), Jeffery Hutchins (CSS UWB, Spring), James McCool (Durham Geo Slope Indicator, Spring), Christopher Eng (FuelCell Games, Spring), Jae Joong Kim (University of Washington Autism Center, Winter).
- 2008: Neil Erdman (Robert McNeel & Associate, Fall), John Ellenberger (Expedia, Summer), Peter Ung (Boeing, Summer), Jin Jun (GalleryPlayer Inc, Spring), Ryan McMillan (HandheldGames, Spring), Brent Nakamoto (HandheldGames, Winter).
- 2007: Matthew Allen (CSS, UWB, Fall), Robert Stone (Amaze Entertainment, Fall), Peter Yiap (Big Fish Games, Fall), Ethan Verrall (Digini Inc, Summer) Alex Badian (RealNetwork Inc, Summer), Brain Kohlwaies (Illumigen Biosciences Inc., Winter/Spring), Elvir Bahtijaragic (RealNetwork Inc., Spring), Nathan Schelin (Planet Technologies, Spring).
- 2006: Alex Yatskov (Griptonite, Winter)
- 2005: James Gray (Children’s Hospital and Regional Medical Center, Seattle, Spring), Brad Hallisey (Griptonite, Spring), Tyler Marlatt (Resolute Inc., Spring), Jordan Phillips (CSS, UWB, Spring).
- 2004: Kevin Gott (CSS, UWB, Fall), Gordon Watanabe (Microsoft, Fall), Lewis Kostiew (CSS, UWB, Fall), Christopher D’Annunzio (Microsoft, Summer), Adam Smith (HandheldGames, Spring), Jack Nichols (Hunt Interactive Inc., Spring), Mark Pottorf (CrankyPants Games, Winter), Wilson Kam (CSS, UWB, Winter).
- 2003: Jason Pursell (Magtronic Inc, Winter), Ian Chen (CSS, UWB, Spring), Aida Sakkal (CSS, UWB, Summer), Lawrence Sanchez (CSS, UWB, Summer), Dan Weber (Green Button Technologies Inc., Summer), Terasak Roeksbutr (HIT Lab, UWS, Summer), Benjamin Steenbock (CSS, UWB, Fall), John Carlson (HandheldGames, Fall), Jin Park (HIT Lab, UWS, Fall).
- 2002: Derek Gerstmann (Industrial Light and Magic, Spring), Morgan Eason (Rainfalls Studios, Summer), Daniel MacDonald (Rainfalls Studios, Summer), Kyoko Nakahashi (Core Mobility, Summer), Christopher Veal (AT&T Wireless, Summer), Gabriel Holmes (Electronic Arts, Summer), Steve Baer (Adrenium [Amaze Entertainment], Summer), Kazuko Hass (Escape Factory, Summer).
- 2001: Holmes Ge (InfoCom, Summer), Jared Merkley (United Parcel Services, Summer), Jonathan Eytinge (CSS, UWB, Fall).
- 2000: Revin Guillen (Agilent Technologies Inc., Summer), Brady Houck (Humongous Entertainment, Fall).

University of Washington-wide Committees

- Appointed Member (by UWB Chancellor), University of Washington Academic Technology Advisory Committee (2003-2005, 2006-2008).
- Member, UWB Chancellor Search Committee (2005, 2006).
- Member, UWB Chancellor Review Committee (2005).
- Member, UWB Vice Chancellor for Academic Affairs Search Committee (2003).
- UWB, CSS Coordinator, UW Combined Fund Drive (2001-2002).

University of Washington, Bothell (UWB) Campus-wide Committees

- Co-Chair, UWB Director of Quantitative Skills Center Search Committee (2009).
- Co-Chair, UWB Director of Teaching and Learning Center Search Committee (2009).
- Member, UWB Director of Quantitative Skills Center Search Committee (2010).
- Member, UWB Education Program Tenure Committee (2010).
- Member, UWB Interactive Media Technology Degree Task Force (2009-2010).
- Member, UWB Electrical Engineering Faculty Search Committee (2009).
- Member, UWB Digital Entertainment & Interactive Media Degree Exploration Committee (2008-2009).
- Member, UWB Electrical Engineering Degree Committee (2008).
- Member, UWB Director of Information Systems Search Committee (2007).
- Member, UWB Technology Policy Advisory Group (2003-2005).
- Member, Worthington Scholar Award Selection Committee, UW Bothell (2003).
- Member, Advisory Board, UW Bothell Teaching and Learning Center (2002-2005).
- Member, CSS Director Search Committee (2002-2004).
- Member, UWB Vice-Chancellor Search Committee (2000, 2003).
- Member, Planning and Search Committee for Quantitative Skills Center (2000).

UWB General Faculty Organization (GFO) Committees

- Elected to UWB GFO Campus Council on Promotion, Tenure and Faculty Affairs (2009-2011).
- Co-Chair, UWB GFO Instructional and Research Support Committee (2008-2010).
- Elected to UWB GFO Executive Council (1999-2002, 2008-2010).
- Elected to UWB GFO Faculty Council on Tenure and Promotion (1999, 2002-2005).
- Member, UWB GFO Student Relations Committee (2006).
- Member, UWB GFO Faculty Affairs Committee (2002).

Computing and Software Systems (CSS) Committees

- Chair, CSS Infrastructure Committee (2009-)
- Chair, CSS Undergraduate Admissions Committee (2008-2010).
- Chair, CSS Strategic Initiatives Committee: External Curriculum (2008-2009).
- Chair, CSS Curriculum Committee (2004, 2006-2008, 2010-).
- Chair, CSS Faculty Search Committee (2000, 2001).
- Chair, CSS Promotion and Tenure Committee (2000).
- Chair, Ad. Hoc. Committee on Master Degree Planning (1999).
- Chair, CSS Personnel Committee (2002-2005)
- Elected Chair, CSS Personnel Committee (2009-2010).
- Elected Member, CSS Personnel Committee (2008).
- Member, CSS Undergraduate Admissions Committee (2010-).
- Member, CSS Graduate Admission Committee (2010-).
- Member, CSS Faculty Search Committee (1999, 2009, 2010).
- Member, CSS Undergraduate Curriculum Committee (2003, 2009).
- Member, CSS Infrastructure Committee (2002, 2003, 2008-2009).
- Member, CSS Academic Appeals Committee (2007, 2008).
- Member, CSS Strategic Initiatives Committee (2004, 2006-2008).
- Member, CSS Personnel Committee (2000-2001, 2006).
- Member, CSS Promotion and Tenure Committee (2006).
- Member, CSS Master Program Committee (2000-2002).

General UWB Services

- Invited Panelist, "*Working with Undergraduate Research Students*," UW Bothell/Tacoma New Faculty Research Boot Camp, September, 2010.
- Invited Panelist, "*Reflections on Being an F-1 Student*," Association of Washington International Student Affairs (AWISA) meeting, February, 2010.
- Invited Faculty Panelist, UW Bothell Admissions Office Orientation for International Students, January, 2010.

- Participated in UW Bothell Neighborhood Open House, October 2009.
- Participated in and contributed to the content of the UWB Viewbook and Virtual Tour project (2008).
- Invited Speaker, UWB College Awareness Day, 2008.
- Invited Speaker, UWB Freshmen Fair, 2006, 2007, 2008.
- Faculty Advisor, UWB Student Technology Fee Fund Committee (2005).

Committee Membership Prior to UWB

- Organizing Chair, Rendering Summit II, Research and Development Division, Alias|Wavefront, Toronto Canada, May 1999.
- *Committee members while at National University of Singapore (1992-1995):* Elected junior faculty representative to the department executive committee; member of curriculum planning and, new building planning committees.

Other Presentations and Public lectures

- Presented papers/panels at: Graphics Interface 1991, 1995; Eurographics 1991, 1992; Eurographics Rendering Workshop 1992; Pacific Graphics 1998; SIGGRAPH Educator's Program 2003; CCSC-NW 2004, 2007, 2008; FIE Conference 2005; SIGCSE 2006, 2007, 2008, 2009, 2010; GDCSE 2008; PAX 2009; CPATH GECS Workshop 2010, CPATH ETSU Workshop 2010.
- "Overview of Game-Themed Introductory Programming Project," Invited Presentation, The second annual UWB-CSS State of Computing Education Summit with Regional Community Colleges, November 2009.
- "Computing and Software Systems Program at University of Washington, Bothell," Invited talk, Engineering Department, Everett Community College, October 2009, November 2010.
- "Who I am and What I do: Why you might care?" Invited presentation as outstanding Alumni, Nan Hua Primary School, Singapore, July 2008.
- "Research and Teaching at the Computing and Software Systems Program, University of Washington, Bothell," Invited talk, Business Information Technology Program, Cascadia Community College, March 2003.
- "Technical Details of the Maya Renderer," Invited Talk, Alias|Wavefront Users' Group Meeting, Bellevue, Washington, September 2002.
- Presentations on the technical details of the Maya Renderer to Alias|Wavefront customers at customer sites, 1998.
- Other Invited Talks: Stanford University; IBM T.J. Watson Research Center; University of Illinois at Urbana-Champaign; Indiana University at Bloomington; Simon Fraser University; Academia Sinica, Taiwan; The Chinese University of Hong Kong; National University of Singapore; Alias|Wavefront, Toronto; Square Soft, Hawaii; University of Washington, Bothell; Microsoft Research, Redmond; Shandong University, China; Brigham Young University; University of Washington, Tacoma.

Reviewer for

- National Sciences and Engineering Research Council of Canada (2009); National Science Foundation DUE CCLI proposal review panelist (2005, 2007); National Research Foundation, Singapore (2007); Canada Foundation for Innovation (2003), Hong Kong Research Council (1996-2000).
- IEEE Transactions on Education; Computers & Graphics; Eurographics Education Program; Eurographics State-of-the-Art Reports (STAR) Programme; Communications of the ACM; International Journal of Image and Graphics (IGIJ); ACM SIGGRAPH Asia; ACM SIGGRAPH Conference; Graphics Interface; EUROGRAPHICS; IEEE Computer Graphics & Applications; Visual Computer; IEEE Software; A.K. Peters Publishing, Prentice Hall Publishing; CG Educational Materials Source (CGEMS).
- External Examiner for PhD Candidates, School of Computing, National University of Singapore.
- External Reviewer for Promotion and Tenure Cases (Faculty members from Computer Science and Interactive Multimedia Programs) Institutions within the US, 2008, 2010.

Honors

- Nominated for University of Washington Bothell Distinguished Teacher Award, 2001, 2004, 2009.
- The Richard C. & Lois M. Worthington Excellence in Technology Award, University of Washington, Bothell, 2004.
- The Richard C. & Lois M. Worthington Distinguished Scholar Award, University of Washington, Bothell, 2004.

- Worthington Distinguished Professor Award, University of Washington Bothell, June 2001.
- Frederick Emmons Terman Teacher, School of Engineering, Stanford University, May 1999.
- Silicon Graphics Inc. Invention Incentive Awards (1996, 1998).
- Selected as first customer intern from Research and Development, Alias|Wavefront, February 1998.
- The University of Illinois Fellowship (1991-1992).
- The Berganthal Scholarship (University of Wisconsin, 1985)
- Elected member of Sigma Xi, PHI KAPPA PHI, TAU BETA PI, and ETA KAPPA NU.

Other Professional Activities

- Session Chair, SIGCSE 2010.
- Member, Education Program Committee, Eurographics 2010.
- International Program Committee, Serious Games Winter School 2010.
- Invited Faculty Moderator, UW Bothell Research Symposium, North Creek Event Center, UW Bothell, October 2009.
- Invited Faculty Fellow, Teaching and Learning Center Diversity Enhancement Project, UW Bothell, 2006-2007.
- Participated in the Discovery Faculty Cohort, Center for University Studies and Programs, UW Bothell, 2006.
- Participated in Computer Graphics Education (CGE) 2004 Workshop.
- Research Poster Presentation, UW Bothell Campus Retreat (2003).
- Invited participant, Teaching and Learning Network, Washington State Board for Community and Technical Colleges, Spring 2003 Retreat.
- Selected participant, Fourth Annual Institute for Teaching Excellence (ITE), Teaching Academy, University of Washington (June 2002).
- Faculty Fellowship, University of Washington, Summer 1999.

Other Publications

- K. Sung, and P. Shirley, "Teaching Computer Graphics Programming To Non-Traditional Returning Adult Students," Extended Abstract, *Eurographics/ACM SIGGRAPH Workshop on Computer Graphics Education 2004*, June 2004.
- Andrew Pearce and Kelvin Sung, "Maya Software Rendering: A Technical Overview," *Alias/Wavefront, Content Library, AP-M-MFA-02*, March 1998.
- Anthony Fang, Kelvin Sung, and Heng Pheng Ann, "Interactive Surface Rendering for Medical Visualization," *Technical Report, DISCS, NUS*, July 1994.
- Kelvin Sung, Jason Loh, and A. L. Ananda, "Ray Tracing in a Distributed Environment," *Technical Report (TRA4/94), DISCS, NUS*, April 1994.
- Kelvin Sung, "The Area Sampling Machine," PhD Thesis, *Department of Computer Science, University of Illinois at Urbana-Champaign*, October 1992.
- Kelvin Sung, "Tracing Rays with the Area Sampling Buffer," Technical Report, *Department of Computer Science, University of Illinois, UIUCDCS-R-91-1715 or UILU-ENG-91-1762*, November, 1991.
- Kelvin Sung, "UIPEX - A 3D Graphics Extension to the X Window System," Master's Thesis, *Department of Computer Science, University of Illinois at Urbana-Champaign, UIUCDCS-R-90-1584*, May 1990.
- Kelvin Sung, "UIPEX: Device Independent PEX Server Design Documentation," Technical Report, *Graphics Workstation Research Group, Department of Computer Science, University of Illinois, GWRG-90-5*, April, 1990.
- Kelvin Sung and William Brown, "UIPEX: Modeling Extension C Language Binding," Technical Report, *Graphics Workstation Research Group, Department of Computer Science, University of Illinois, GWRG-90-2*, April, 1990.

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