

Sang Won Bae

Curriculum Vitae

Contact

Research Assistant Professor
Geometric Computing Lab.
Department of Computer Science and Engineering
POSTECH
San 31, Hyoja-dong, Nam-gu
Pohang, Gyeongbuk
790-784, Republic of Korea
Phone: +82-54-279-1479
swbae@postech.ac.kr
<http://www.postech.ac.kr/~swbae>

Research Interests

Theoretical computer science, discrete and computational geometry, algorithm design and analysis, graph theory
Voronoi diagrams, shortest paths, geometric networks, geometric optimization, discrete geometry

Education

Ph.D., Computer Science, February 2008
Korea Advanced Institute of Science and Technology
Daejeon, Korea
Thesis: *Proximity and Location Problems on Transportation Networks*
Advisor: Prof. Kyung-Yong Chwa
GPA: 3.98/4.3
M.S., Computer Science, February 2004
Korea Advanced Institute of Science and Technology
Daejeon, Korea
Thesis: *Voronoi Diagrams with Transportation on the Euclidean Plane*
Advisor: Prof. Kyung-Yong Chwa
GPA: 3.99/4.3
B.S., Computer Science, August 2002
Korea Advanced Institute of Science and Technology
Daejeon, Korea
Magna Cum Laude
Minors: *Mathematics*

Academic and Professional Experience

3/2009–current Research Assistant Professor
Department of Computer Science and Engineering, POSTECH,
Pohang, Korea
3/2008–2/2009 Postdoctoral Researcher
Division of Computer Science, Korea Advanced Institute of Science and Technology,
Daejeon, Korea
9/2009 Visiting Researcher (*worked with Prof. Takeshi Tokuyama and Dr. Jinhee Chun*)
Graduate School of Information Sciences, Tohoku University
Sendai, Japan

- 6/2009 Visiting Researcher (*worked with Prof. Christian Knauer*)
Institute of Computer Science, Freie Universität Berlin
Berlin, Germany
- 5/2009 Visiting Researcher (*worked with Prof. Naoki Kato*)
Department of Architecture and Architectural Systems, Kyoto University
Kyoto, Japan
- 1/2009 Visiting Researcher (*worked with Assoc. Prof. Yoshio Okamoto*)
Graduate School of Information Science and Engineering, Tokyo Institute of Technology
Tokyo, Japan
- 7/2008 Visiting Researcher (*worked with Prof. Tetsuo Asano*)
School of Information Science, Japan Advanced Institute of Science and Technology
Nomi, Ishikawa, Japan
- 4/2008 Visiting Researcher (*worked with Prof. Siu-Wing Cheng*)
Department of Computer Science and Engineering, HKUST
Hong Kong
- 4/2008 Visiting Researcher (*worked with Prof. Takeshi Tokuyama and Dr. Jinhee Chun*)
Graduate School of Information Sciences, Tohoku University
Sendai, Japan
- 12/2007 Visiting Researcher (*worked with Prof. Tetsuo Asano*)
School of Information Science, Japan Advanced Institute of Science and Technology
Nomi, Ishikawa, Japan
- 3/2007 Visiting Researcher (*worked with Dr. Xavier Goaoc*)
INRIA Lorraine - Loria
Villers-lès-Nancy cedex, FRANCE
- 9/2002–12/2005 Teaching Assistants
Division of Computer Science, Korea Advanced Institute of Science and Technology
Daejeon, Korea
CS202, Problem Solving, *undergraduate course*
CS500, Algorithm Design and Analysis, *graduate course*
- 2002–2008 Organizing Staffs
ACM International Collegiate Programming Contest (ICPC) Asia Regional – Seoul
Seoul, Korea
- 7/2000–8/2000 Intern
IDIS Research Center, IDIS (*a digital-based security solution company*)
Daejeon, Korea

Honors and Awards

- February 2008 *Silver Prize*, Samsung Humantech Thesis Award, Samsung Electronics Co.
- February 2008 *Outstanding PhD Thesis Award*, KAIST
- February 2004 *Outstanding MS Thesis Award*, KAIST
- 1998 – 2007 *KAIST National Fellowship*, KAIST

Professional Activities

- 2009 Referee, *Computational Geometry: Theory and Applications*, journal (SCIE)
Referee, *International Journal of Computational Geometry and Applications*, journal (SCIE)
Referee, *Journal of Computational Geometry*, journal
Referee, *ACM Annual Symposium on Computational Geometry*
Referee, *International Symposium on Algorithms and Computations*
Referee, *Frontiers of Algorithmics Workshop*
Referee, *Workshop on Algorithms and Computations*

2008	Referee, <i>International Journal of Computational Geometry and Applications</i> , journal (SCIE) Referee, <i>Journal of Korea Information Science Society</i> , a domestic journal Referee, <i>ACM Annual Symposium on Computational Geometry</i> Referee, <i>International Symposium on Algorithms and Computations</i> Referee, <i>European Symposium on Algorithms</i> Referee, <i>Frontiers of Algorithmics Workshop</i>
Before 2008	Subreferee, <i>Computational Geometry: Theory and Applications</i> , journal (SCIE) Subreferee, <i>International Journal of Computational Geometry and Applications</i> (SCIE) Referee, <i>International Symposium on Algorithms and Computation</i> Referee, <i>International Conference on Algorithmic Aspects in Information and Management</i> Referee, <i>International Computing and Combinatorics Conference</i>
Membership	Member, <i>Korea Information Science and Society</i> , 2009 Student Member, <i>Association for Computer Machinery</i> , 2007 Student Member, <i>Korea Information Science and Society</i> , 2004–2007

Publications

Journal Articles

- [1] Sang Won Bae and Kyung-Yong Chwa. Voronoi diagrams for a transportation network on the Euclidean plane. *International Journal of Computational Geometry and Applications*, 16(2–3):117–144, 2006. On invitation, a special issue for ISAAC 2004.
- [2] Hee-Kap Ahn, Sang Won Bae, and Otfried Cheong. A new geometric proof on shortest paths of bounded curvature. *Journal of KISS: Computer Systems and Theory*, 34(3–4):132–137, 2007. (in Korean).
- [3] Hee-Kap Ahn, Sang Won Bae, Otfried Cheong, and Joachim Gudmundsson. Aperture-angle and Hausdorff-approximation of convex figures. *Discrete & Computational Geometry*, 40:414–429, 2008. Available by doi:10.1007/s00454-007-9039-5.
- [4] Hee-Kap Ahn, Helmut Alt, Tetsuo Asano, Sang Won Bae, Peter Brass, Otfried Cheong, Christian Knauer, Hyeon-Suk Na, Chan-Su Shin, and Alexander Wolff. Constructing optimal highways. *International Journal of Foundations of Computer Science*, 20(1):3–23, 2009. On invitation, a special issue for CATS 2007.
- [5] Esther M. Arkin, Sang Won Bae, Alon Efrat, Kazuya Okamoto, Joseph S.B. Mitchell, and Valentine Polishchuk. Geometric stable roommates. *Information Processing Letters*, 109(4):219–224, 2009. Available by doi:10.1016/j.ipl.2008.10.003.
- [6] Sang Won Bae, Jae-Hoon Kim, and Kyung-Yong Chwa. Optimal construction of the city Voronoi diagram. *International Journal of Computational Geometry and Applications*, 19(2):95–117, 2009. On invitation, a special issue for ISAAC 2006.
- [7] Hee-Kap Ahn, Sang Won Bae, Siu-Wing Cheng, and Kyung-Yong Chwa. Casting an object with a core. *Algorithmica*, 54(1):72–88, 2009. Available by doi:10.1007/s00453-007-9120-8.
- [8] Sang Won Bae, Chunseok Lee, Hee-Kap Ahn, Sunghee Choi, and Kyung-Yong Chwa. Computing minimum-area rectilinear convex hull and L-shape. *Computational Geometry: Theory and Applications*, 42(9):903–912, 2009.
- [9] Sang-Sub Kim, Sang Won Bae, and Hee-Kap Ahn. Covering a point set by two disjoint rectangles. *International Journal of Computational Geometry and Applications*, Accepted for publication. On invitation, a special issue for ISAAC 2008.
- [10] Sang Won Bae, Chunseok Lee, and Sunghee Choi. On exact solutions to the Euclidean bottleneck Steiner tree problem. *Information Processing Letters*, Submitted.
- [11] Jaehwan Ma, Sang Won Bae, and Sunghee Choi. Medial axis point approximation using nearest neighbors. *The Visual Computer*, Submitted.

- [12] Hee-Kap Ahn, Sang Won Bae, Erik D. Demaine, Martin L. Demaine, Sang-Sub Kim, Matias Korman, Iris Reinbacher, and Wanbin Son. Covering points by disjoint boxes with outliers. *Computational Geotry: Theory and Applications*, Submitted.
- [13] Sang Won Bae and Yoshio Okamoto. Querying two boundary points for shortest paths in a polygonal domain. *Computational Geotry: Theory and Applications*, Submitted.

Refereed Conference Papers

- [1] Sang Won Bae and Kyung-Yong Chwa. Voronoi diagrams with a transportation network on the Euclidean plane. In *Proc. 15th Annu. Internat. Sympos. Algo. Comput. (ISAAC)*, volume 3341 of *LNCS*, pages 101–122, 2004.
- [2] Changbum Park, Sang Won Bae, Jong Bhak, and Sunghye Choi. Watertight boundary detection of domain-domain interface surfaces. In *Proc. 2nd Internat. Sympos. Voronoi Diagrams in Science and Engineering (ISVD)*, pages 257–268, 2005.
- [3] Sang Won Bae and Kyung-Yong Chwa. Shortest paths and Voronoi diagrams with transportation networks under general distances. In *Proc. 16th Annu. Internat. Sympos. Algo. Comput. (ISAAC)*, volume 3827 of *LNCS*, pages 1007–1018, 2005.
- [4] Hee-Kap Ahn, Sang Won Bae, Siu-Wing Cheng, and Kyung-Yong Chwa. Casting an object with a core. In *Proc. 16th Annu. Internat. Sympos. Algo. Comput. (ISAAC)*, volume 3827 of *LNCS*, pages 40–49, 2005.
- [5] Sang Won Bae, Jae-Hoon Kim, and Kyung-Yong Chwa. Optimal construction of the city Voronoi diagram. In *Proc. 17th Annu. Internat. Sympos. Algo. Comput. (ISAAC)*, volume 4288 of *LNCS*, pages 182–192, 2006.
- [6] Hee-Kap Ahn, Helmut Alt, Tetsuo Asano, Sang Won Bae, Peter Brass, Otfried Cheong, Christian Knauer, Hyeon-Suk Na, Chan-Su Shin, and Alexander Wolff. Constructing optimal highways. In *Proc. Thirteenth Computing: The Australasian Theory Symposium (CATS)*, volume 65 of *CRPIT*, pages 7–14, 2007.
- [7] Hee-Kap Ahn, Sang Won Bae, Otfried Cheong, and Joachim Gudmundsson. Aperture-angle and hausdorff-approximation of convex figures. In *Proc. 23rd ACM Annu. Sympos. Comput. Geom. (SoCG)*, pages 37–45, 2007.
- [8] Sang Won Bae, Chunseok Lee, Hee-Kap Ahn, Sunghye Choi, and Kyung-Yong Chwa. Maintaining extremal points and its applications to deciding optimal orientations. In *Proc. 18th Annu. Internat. Sympos. Algo. Comput. (ISAAC)*, volume 4835 of *LNCS*, pages 788–799, 2007.
- [9] Hee-Kap Ahn and Sang Won Bae. Covering a point set by two disjoint rectangles. In *Proc. 19th Annu. Internat. Sympos. Algo. Comput. (ISAAC)*, volume 5369 of *LNCS*, pages 728–739, 2008.
- [10] Sang Won Bae, Matias Korman, and Takeshi Tokuyama. All farthest neighbors in the presence of highways and obstacles. In *Proc. 3rd Annu. Workshop Algo. and Comput. (WALCOM)*, volume 5431 of *LNCS*, pages 71–82, 2009.
- [11] Sang Won Bae, Chunseok Lee, and Sunghye Choi. On exact solutions to the Euclidean bottleneck Steiner tree problem. In *Proc. 3rd Annu. Workshop Algo. and Comput. (WALCOM)*, volume 5431 of *LNCS*, pages 105–116, 2009.
- [12] Sang Won Bae and Kyung-Yong Chwa. The geodesic farthest-site Voronoi diagram in a polygonal domain with holes. In *Proc. 25th ACM Annu. Sympos. Comput. Geom. (SoCG)*, pages 198–207, 2009.
- [13] Hee-Kap Ahn, Sang Won Bae, Sang-Sub Kim, Matias Korman, Iris Reinbacher, and Wanbin Son. Square and rectangle covering with outliers. In *Proc. 3rd Frontiers of Algorithmics Workshop (FAW)*, 2009.
- [14] Hee-Kap Ahn, Sang Won Bae, and Iris Reinbacher. Optimal empty pseudo-triangles in a point set. In *Proc. 21st Canadian Conf. Comput. Geom. (CCCG)*, pages 5–8, 2009.

- [15] Sang Won Bae, Sunghye Choi, Chunseok Lee, and Shin-ichi Tanigawa. Exact algorithms for the bottleneck Steiner tree problem. In *Proc. 20th Annu. Internat. Sympos. Algo. Comput. (ISAAC)*, volume 5878 of *LNCS*, pages 24–33, 2009.
- [16] Sang Won Bae and Yoshio Okamoto. Querying two boundary points for shortest paths in a polygonal domain. In *Proc. 20th Annu. Internat. Sympos. Algo. Comput. (ISAAC)*, volume 5878 of *LNCS*, pages 1054–1063, 2009.

Other Publications (Domestic Conferences/Presentations in Non-refereed Workshops)

- Sang Won Bae and Kyung-Yong Chwa. Voronoi diagrams with a transportation network. In *Proc. 2004 Spring Korea Information Science and Society (KISS)*, volume A, pages 949–951, 2004.
- Sang Won Bae and Kyung-Yong Chwa. Shortest paths on the L_1 plane with a transportation network. In *Proc. 2004 Fall Korea Information Science and Society (KISS)*, volume I, pages 724–726, 2004.
- Yong-Hee Park, Sang Won Bae, Hee-Kap Ahn, and Kyung-Yong Chwa. Casting an object with a core. In *Proc. 2004 Spring Korea Information Science and Society (KISS)*, volume I, pages 706–708, 2004.
- Hee-Kap Ahn, Sang Won Bae, and Otfried Cheong. A new geometric proof on shortest paths of bounded curvature. In *Proc. 2005 Fall Korea Information Science and Society (KISS)*, volume A, pages 958–960, 2005.
- Sang Won Bae, Jae-Hoon Kim, and Kyung-Yong Chwa. L_1 shortest paths with isothetic roads. In *Proc. 8th KOREA-JAPAN Joint Workshop on Algorithms and Computation (WAAC)*, pages 18–26, 2005. Available as Technical Report CS-TR-2005-218 of KAIST.
- Sang Won Bae, Jae-Hoon Kim, and Kyung-Yong Chwa. Improved algorithm for constructing Euclidean city Voronoi diagrams. In *Proc. 2006 Fall Korea Information Science and Society (KISS)*, volume A, pages 505–510, 2006.
- Sang Won Bae, Jae-Hoon Kim, and Kyung-Yong Chwa. Optimal construction of the city Voronoi diagram. In *Proc. 9th KOREA-JAPAN Joint Workshop on Algorithms and Computation (WAAC)*, pages 111–118, 2006.
- Sang Won Bae, Chunseok Lee, Hee-Kap Ahn, Sunghye Choi, and Kyung-Yong Chwa. Maintaining extremal points and its applications to deciding optimal orientations. In *Proc. 10th KOREA-JAPAN Joint Workshop on Algorithms and Computation (WAAC)*, pages 64–71, 2007.
- Sang Won Bae and Kyung-Yong Chwa. Farthest city Voronoi diagram. In *The First AAAC Annual Meeting (AAAC08)*, 2008.
- Hee-Kap Ahn and Sang Won Bae. Optimal disjoint two-box covering of points. In *The First AAAC Annual Meeting (AAAC08)*, 2008.
- Sang Won Bae and Chunseok Lee. On exact computation of Euclidean bottleneck Steiner trees. In *Proc. 11th KOREA-JAPAN Joint Workshop on Algorithms and Computation (WAAC)*, pages 107–114, 2008.
- Sang Won Bae and Matias Korman. All farthest neighbors under the city metric. In *Proc. 11th KOREA-JAPAN Joint Workshop on Algorithms and Computation (WAAC)*, pages 150–157, 2008.
- Sang Won Bae and Kyung-Yong Chwa. Farthest Voronoi diagrams in the presence of obstacles. In *Proc. 11th KOREA-JAPAN Joint Workshop on Algorithms and Computation (WAAC)*, pages 158–165, 2008.
- Hee-Kap Ahn, Sang Won Bae, Sang-Sub Kim, Matias Korman, Iris Reinbacher, and Wanbin Son. Square and rectangle covering with outliers. In *Proc. 25th European Workshop on Computational Geometry (EuroCG)*, 2009.
- Yoonho Hwang, Sang Won Bae, and Hee-Kap Ahn. Covering two point sets with two disjoint unit squares. In *Proc. 2009 Korea Computer Congress (KCC)*, volume A, pages 362–366, 2009. (in Korean).

Sang Won Bae, Iris Reinbacher, and Hee-Kap Ahn. Optimal empty pseudo-triangle in a point set. In *Proc. 2009 Korea Computer Congress (KCC)*, volume A, pages 367–370, 2009. (in Korean).

Sang Won Bae, Chunseok Lee, and Sunghee Choi. An exact algorithm for the Euclidean bottleneck Steiner tree problem. In *Proc. 2009 Korea Computer Congress (KCC)*, volume A, pages 371–376, 2009. (in Korean).

Hee-Kap Ahn, Sang Won Bae, and Iris Reinbacher. Optimal empty pseudo-triangles in a point set. In *Proc. 12th KOREA-JAPAN Joint Workshop on Algorithms and Computation (WAAC)*, pages 45–51, 2009.

Sang Won Bae and Yoshio Okamoto. Querying two boundary points for shortest paths in a polygonal domain. In *Proc. 12th KOREA-JAPAN Joint Workshop on Algorithms and Computation (WAAC)*, pages 52–60, 2009.

Sang Won Bae, Matias Korman, and Yoshio Okamoto. On the geodesic diameter in polygonal domains. In *Proc. Japan Conference on Computational Geometry and Graphs (JCCGG)*, 2009.

Skills

Programming Languages

C, C++, Java, MATLAB, ML, PROLOG, LISP

Spoken Languages

Korean(*native*), English, Japanese(*JLPT Level 2*)

October 20, 2009