

Yi-King Choi

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Education

- Ph.D. (CS) The University of Hong Kong (2000-2008)
Dissertation: "Collision Detection for Ellipsoids and Other Quadrics"
- M.Phil (CS) The University of Hong Kong (1997-2000)
Dissertation: "Computer Visualization Techniques in Surgical Planning for Pedicle Screw Insertion"
- B.Sc (CS) The University of Hong Kong (1993-1996) with first class honors

Experience

- Research Assistant Professor The University of Hong Kong (2009-present)
Senior Research Associate The University of Hong Kong (2008-2009)

Journal Publications

1. S. He, Y.-K. Choi, Y. Guo and W. Wang, *Spectral Analysis on Medial Axis of 2D Shapes*, **Computer Graphics Forum**, online, 2014.
2. Y. Zhu, F. Sun, Y.-K. Choi, B. Jüttler and W. Wang, *Computing a Compact Spline Representation of the Medial Axis Transform of a 2D Shape*, **Graphical Models**, 76(5): 252–262, 2014.
3. Y.-K. Choi, W. Wang, B. Mourrain, C. Tu, X. Jia and F. Sun, *Continuous Collision Detection for Composite Quadric Models*, **Graphical Models**, 76(5): 566–579, 2014.
4. H. Pan, Y.-K. Choi, Y. Liu, W. Hu, Q. Du, K. Polthier, C. Zhang and W. Wang, *Robust Modeling of Constant Mean Curvature Surfaces*, **ACM Transactions on Graphics (SIGGRAPH 2012)**, 31, 4, Article 85 (July 2012).
5. Z. Chen, Z. Yuan, Y.-K. Choi, L. Liu and W. Wang, *Variational Blue Noise Sampling*, **IEEE Transactions on Visualization and Computer Graphics**, 18(10), 1784–1796, Oct., 2012.
6. J.-W. Chang, Y.-K. Choi, M.-S. Kim and W. Wang, *Computation of the Minimum Distance Between Two Bézier Curves/surfaces*, **Computers and Graphics**, 35(3), 677–684, 2011.
7. F. Sun, Y.-K. Choi, W. Wang, D. Yan, Y. Liu and B. Lévy, *Obtuse Triangle Suppression in Anisotropic Meshes*, **Computer Aided Geometric Design**, 28(9), 537–548, 2011.
8. X. Jia, Y.-K. Choi, B. Mourrain and W. Wang, *An Algebraic Approach To Continuous Collision Detection For Ellipsoids*, **Computer Aided Geometric Design**, 28 (3), 164–176, 2011.

9. Y.-K. Choi, X. Li, F. Rong, W. Wang and S. Cameron, *Determining the Directional Contact Range of Two Convex Polyhedra*, **Computer-Aided Design**, 42(1), 27–35, 2010.
10. Y.-K. Choi, J.-W. Chang, W. Wang, M.-S. Kim and G. Elber, *Continuous Collision Detection for Ellipsoids*, **IEEE Transactions on Visualization and Computer Graphics**, 15(2), 311–325, 2009.
11. L. Lu, Y.-K. Choi, W. Wang and M.-S. Kim, *Variational 3D Shape Segmentation for Bounding Volume Computation*, **Computer Graphics Forum (Eurographics)**, 26(3), 329–338, 2007.
12. Y.-K. Choi, W. Wang, Y. Liu and M.-S. Kim, *Continuous Collision Detection for Elliptic Disks*, **IEEE Transactions on Robotics**, 22(2), 213–224, 2006.
13. W. Wang, Y.-K. Choi, B. Chan, M.-S. Kim and J. Wang, *Efficient Collision Detection for Ellipsoids using Separating Planes*, **Computing**, 72, 235–246, 2004.
14. Y.-K. Choi, D. Yan and W. Wang, *A Folding Index of 2D Curves*, **Computer-Aided Design and Applications**, 1, 741–749, 2004.

Conference Publications

1. G. Jing, Y.-K. Choi, J. Wang and W. Wang, *Gradient Guided Image Interpolation*, in **IEEE International Conference on Image Processing (ICIP)**, 2014.
2. L. Lu, Y.-K. Choi and W. Wang, *Visibility-Based Coverage of Mobile Sensors in Non-convex Domains*, in **Symposium on Voronoi Diagrams in Science and Engineering (ISVD)**, pp. 105–111, 2011.
3. L. Zheng, Y.-K. Choi, X. Liu and W. Wang, *CVT-based Motion Planning in 2D Space Towards Maximal Clearance*, in **IEEE International Conference on Robotics and Automation (ICRA)**, pp. 2281–2287, 2011.
4. Y.-K. Choi, X. Li, F. Rong, W. Wang and S. Cameron, *Determining Directional Contact Range of Two Convex Polyhedra*, in **Proc. of Advances in Geometric Modeling and Processing (GMP)**, pp. 127–142, 2008.
5. D. Albocher, U. Sarel, Y.-K. Choi, G. Elber and W. Wang, *Efficient Continuous Collision Detection for Bounding Boxes under Rational Motion*, in **IEEE Conference on Robotics and Automation (ICRA)**, pp. 3017–3022, 2006.
6. X. Wang, Y.-K. Choi, W.W. Lu and W. Wang, *Rod-like Trabeculae Extraction from Cancellous Bone Microstructure Using Topological Analysis*, in **Ninth International Conference on Computer Aided Design and Computer Graphics (CAD/CG)**, pp. 173–180, 2005.
7. Y.-K. Choi, W. Wang and M.-S. Kim, *Exact Collision Detection of Two Moving Ellipsoids under Rational Motions*, in **IEEE Conference on Robotics and Automation (ICRA)**, vol. 1, pp. 349–354, 2003.
8. Y.-K. Choi, J.C.Y. Leong, W.W. Lu and W. Wang, *VISBONE: 3D Visualization of Bone Mineral Density*, in **Seventh Pacific Conference on Computer Graphics and Applications (Pacific Graphics)**, pp. 138–146, 1999.

Technical Reports

1. Y.-K. Choi, W. Wang, B. Mourrain, C. Tu, X. Jia and F. Sun, *Continuous Collision Detection for Composite Quadric Models*, 2013, **arXiv:1311.7462**.
2. F. Sun, Y.-K. Choi, Y. Yu and W. Wang, *Medial Meshes for Volume Approximation*, 2013, **arXiv:1308.3917**.
3. Y. Zhu, F. Sun, Y.-K. Choi, B. Jüttler and W. Wang, *Spline Approximation to Medial Axis*, 2013, **arXiv:1307.0118**.
4. X. Jia, W. Wang, Y.-K. Choi, B. Mourrain and C. Tu, *Continuous Detection of the Variations of the Intersection Curves of Two Moving Quadrics in 3-Dimensional Projective Space*, **TR-2012-15**, Department of Computer Science, The University of Hong Kong, 2012.
5. F. Sun, Y.-K. Choi, W. Wang, D.-M. Yan, Y. Liu and B. Lévy, *Obtuse Triangle Suppression in Anisotropic Meshes*, **TR-2010-08**, Department of Computer Science, The University of Hong Kong, 2010.
6. Y.-K. Choi, J.-W. Chang, W. Wang, M.-S. Kim and G. Elber, *Real-Time Continuous Collision Detection for Moving Ellipsoids under Affine Deformation*, **TR-2006-02**, Department of Computer Science, The University of Hong Kong, 2006.
7. Y.-K. Choi, X. Li, F. Rong, W. Wang and S. Cameron, *Computing the Minimum Directional Distance between Two Convex Polyhedra*, **TR-2006-01**, Department of Computer Science, The University of Hong Kong, 2006.
8. Y.-K. Choi, W. Wang, Y. Liu and M.-S. Kim, *Continuous Collision Detection for Elliptic Disks*, **TR-2005-03**, Department of Computer Science, The University of Hong Kong, 2005.
9. Y.-K. Choi, X. Li, W. Wang, S. Cameron, *Collision Detection of Convex Polyhedra Based on Duality Transformation*, **TR-2005-01**, Department of Computer Science, The University of Hong Kong, 2005.
10. W. Wang, Y.-K. Choi, B. Chan, M.-S. Kim and J. Wang, *Efficient Collision Detection for Moving Ellipsoids Based on Simple Algebraic Test and Separating Planes*, **TR-2002-16**, Department of Computer Science, The University of Hong Kong, 2002.
11. Y.-K. Choi, W. Wang and M.-S. Kim, *Exact Collision Detection of Two Moving Ellipsoids Under Rational Motions*, **TR-2002-15**, Department of Computer Science, The University of Hong Kong, 2002.

Professional Activities

Organization chair – The 20th Pacific Conference on Computer Graphics and Applications (Pacific Graphics), September 12-14, 2012, Hong Kong, China

Organization chair – Eighth International Symposium on Voronoi Diagrams in Science and Engineering (ISVD), June 28-30, 2011, Qingdao, China

Organization chair – The 4th IEEE Pacific Visualization, March 1-4, 2011, Hong Kong, China

Reviewer – IEEE Transactions on Computer Graphics and Visualization (TVCG) [2011], The Visual Computer [2011]

Research Grants / Fundings

Seed Funding Programme for Basic Research (HKU) – *A capacity-constrained centroidal Voronoi tessellation framework for blue noise point sampling* (HK\$58,000), Principal investigator, 2011

Innovation and Technology Support Programme (HKSAR Government) – *New technology for real time and accurate collision detection in computer games and simulation* (HK\$1,000,000), Deputy project coordinator, 2006

PROCORE France/Hong Kong Joint Research Scheme Travel Grants (HK Research Grants Council and the Consulate General of France) – *Computational algebraic geometry for industrial applications* (HK\$61,750), Co-Investigator, 2006

Multidisciplinary Projects / Software

Project WATERMAN—A Water Quality Forecast and Management System for Hong Kong, which aims to develop an innovative environmental management system for HK with advanced Internet and GIS-based water quality forecast capability, and was awarded HK\$29.8M by the Hong Kong Jockey Club Charities Trust. In collaboration with Civil Engineering, HKU (2008-2011). *Role: project manager and co-ordinator.* (<http://www.waterman.hku.hk/>)

Ellipsoids / Quadrics Collision Detection Toolkit, a software library for collision detection of conics and quadrics primitives (2006-). In collaboration with School of Computer Science and Engineering, Seoul National University. Available in the public domain at <http://sourceforge.net/projects/cdquadrics/>.

VISJET, a software system that provides 3D flow visualization to predict the impact of an effluent discharge into the water environment. In collaboration with Civil Engineering, HKU (2006-2008). Available at <http://www.aoe-water.hku.hk/visjet/visjet.htm>.

VISBONE, a prototyping system on SGI IRIX for 3D visualization of bone for orthopaedic surgical planning and education. In collaboration with Orthopaedic Surgery, HKU (2000).

Awards

Li Ka Shing Prize (2007-2008) – Best PhD theses, The University of Hong Kong.

Best Paper Award in the 5th International Conference, GMP 2008 (held in April 2008, in Hangzhou, China), paper titled “Determining Directional Contact Range of Two Convex Polyhedra” by Y.-K. Choi, X. Li, F. Rong, W. Wang and S. Cameron.

Best Paper Award in the First Korea-China Joint Conference on Geometric and Visual Computing (held in August 2005, in Busan, South Korea), paper titled “An Algebraic Approach to Collision Detection of Ellipses” by Y.-K. Choi, Y. Liu, W. Wang and M.-S. Kim.

Best Tutor Award at the Department of Computer Science, The University of Hong Kong, 2005.

Research Interests

Geometric Computing ★ Computational Topology ★ Visualization ★ Computer Graphics ★ Computational Geometry

Teaching Experience

Instructor – Computer Programming and Applications, Visualization and Visual Analytics

Teaching Assistant – Computer Graphics ★ Advanced Computer Graphics ★ Foundations of Computer Science ★ Engineering Mathematics (1997-2006)

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