

Liangjun Zhang

CONTACT INFORMATION

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RESEARCH INTERESTS EDUCATION

Robot motion planning; Computer Graphics; Computational Geometry; CAD/CAM.

University of North Carolina, Chapel Hill, USA

Ph.D. candidate, Computer Science Department, **Aug 2005 - present**
Dissertation Topic: Efficient Motion Planning using Generalized Penetration Depth Computation
Advisor: Prof. Dinesh Manocha
M.S. Computer Science Department, Dec, 2007

Zhejiang University, Hangzhou, China

M.S. College of Computer Science, **Sep 2000 - Mar 2003**
B.S. College of Computer Science, GPA: 3.79/4.00, Top 5% **Sep 1996 - Jul 2000**

RESEARCH EXPERIENCE

Research Assistant, UNC-Chapel Hill

May 2005 - Present

- Design algorithms for a geometric proximity query - generalized penetration depth computation;
- Develop efficient algorithms to improve the performance of sample-based motion planning for narrow passage problems and CAD part disassembly applications;
- Work for constrained motion interpolation for collision avoidance;
- Develop efficient and practical algorithms for complete motion planning.

Research Assistant, Zhejiang University

Mar 2001 - Mar 2003

Worked for 3D Meshes Digital Watermarking and 3D web-based collaborative CAD design.

PUBLICATIONS

Refereed Journal Papers

[4] **Liangjun Zhang**, Young J. Kim, Dinesh Manocha, *Efficient Distance Computation in Configuration Space*, Computer Aided Geometric Design (CAGD special issue on SPM 07), 2008, in press

[3] **Liangjun Zhang**, Xin Huang, Young J. Kim, Dinesh Manocha, *D-Plan: Efficient Collision-Free Path Computation for Part Removal and Disassembly*, Journal of Computer-Aided Design and Applications, 2008; International CAD Conference (CAD'08), **Best Paper Award**, to appear

[2] **Liangjun Zhang**, Young J. Kim, Gokul Varadhan, Dinesh Manocha, *Generalized Penetration Depth Computation*, Computer-Aided Design (CAD special issue on SPM 06), Volume 39, Issue 8, August 2007, Pages 625-638

[1] Avneesh Sud, **Liangjun Zhang**, Mark Foskey, Dinesh Manocha, *Homotopy Preserving Approximate Voronoi Diagram of 3D*, Computer Graphics Forum special issue, in press

Refereed Conference Papers

- [10] **Liangjun Zhang**, Dinesh Manocha, *An Efficient Retraction-based RRT Planner*, IEEE International Conference on Robotics and Automation (ICRA), 2008, to appear
- [9] **Liangjun Zhang**, Young J. Kim, Dinesh Manocha, *A Hybrid Approach for Complete Motion Planning*, IEEE/RSJ International Conference On Intelligent Robots and Systems (IROS), 2007, 7-14
- [8] **Liangjun Zhang**, Young J. Kim, Dinesh Manocha, *A Simple and Fast Algorithm for Generalized Penetration Depth Computation*, Robotics: Science and Systems Conference (RSS), 2007
- [7] **Liangjun Zhang**, Young J. Kim, Dinesh Manocha, *C-DIST: Efficient Distance Computation for Rigid and Articulated Models in Configuration Space*, ACM Solid and Physical Modeling Symposium (SPM07), 2007, To appear
- [6] **Liangjun Zhang**, Young J. Kim, Dinesh Manocha, *A Simple Path Non-Existence Algorithm Using C-obstacle Query*, International Workshop on the Algorithmic Foundations of Robotics (WAFR), 2006 (16 pages)
- [5] Gokul Varadhan, Shankar Krishnan, **Liangjun Zhang**, Dinesh Manocha, *Reliable Implicit Surface Polygonization using Visibility Mapping*, Eurographics Symposium on Geometry Processing (SGP), 2006 (11 pages)
- [4] Young J. Kim, **Liangjun Zhang**, Ming C. Lin, Dinesh Manocha, *Fast Penetration Depth Computation and its Applications*, Nicographics 2006 (invited paper)
- [3] **Liangjun Zhang**, Young J. Kim, Gokul Varadhan, Dinesh Manocha, *Generalized Penetration Depth Computation*, ACM Solid and Physical Modeling Symposium (SPM06), 2006, 173-184
- [2] Xianfeng Gu, Song Zhang, **Liangjun Zhang**, Peisen S. Huang, Ralph Martin, and Shing-Tung Yau, *Holoimages*, ACM Solid and Physical Modeling Symposium (SPM06), 2006, 129-138
- [1] **Liangjun Zhang**, Young J. Kim, Gokul Varadhan, Dinesh Manocha, *Fast C-obstacle Query Computation for Motion Planning*, IEEE International Conference on Robotics and Automation (ICRA 2006), 2006, 3035-3040

Submitted Conference Papers

- [1] **Liangjun Zhang**, Dinesh Manocha, *Motion Interpolation with Distance Constraints*, UNC-CS Technical Report 002, 2008

Submitted Journal Papers

- [1] **Liangjun Zhang**, Young J. Kim, Dinesh Manocha, *Efficient Cell Labelling and Path Non-existence Computation using C-obstacle Query*, The International Journal of Robotics Research (special issue on WAFR06), 2007

EXTERNAL
PRESENTATIONS

- [8] 05/2008: *Contact Space Proximity and Planning Computations*, ICRA 2008 Workshop on Contact Models for Manipulation and Locomotion, Pasadena, CA
- [7] 05/2008: *An Efficient Retraction-based RRT Planner*, ICRA 2008, Pasadena, CA
- [6] 11/2007: *Generalized Penetration Depth Computation and Applications to Robot Motion Planning*, Tenth SIAM Conference on Geometric Design & Computing, San Antonio, TX
- [5] 10/2007: *A Hybrid Approach for Complete Motion Planning*, IROS07, San Diego, CA
- [4] 06/2007: *A Fast and Practical Algorithm for Generalized Penetration Depth Computation*, RSS07, Atlanta, GA
- [3] 06/2007: *C-DIST: Efficient Distance Computation for Rigid and Articulated Models in Configu-*

ration Space, SPM06, Beijing, China

[2] 07/2006: *A Simple Path Non-Existence Algorithm Using C-obstacle Query*, WAFR06, New York City, NY

[1] 05/2006: *Fast C-obstacle Query Computation for Motion Planning*, ICRA06, Orlando, FL

WORKING
EXPERIENCE

Architecture Engineer, S3 Graphics Ltd., Shanghai, China **Apr 2003 - Jan 2004**

Worked on the software-level modeling for DirectX™ 9.0 compatible graphics chip (GPU);
Profiled the performance of *Texture Mapping* unit.

System Designer and Programmer, Hangzhou, China **Nov 2000 - Mar 2003**

CIMS Lab at Zhejiang University and Save&Safe High Tech Ltd.

Worked as a team on an *Interior Design Software* - E-CAD. Duties included system design, AutoCAD™ data format support, 3D modeler by ACIS™.

TEACHING
EXPERIENCE

Teaching Assistant, University of Florida, Gainesville, USA **Aug 2004 - Mar 2005**

COT4501: Numerical Analysis - a computational approach.

SELECTED COURSES

Computer Graphics, Robot Motion Planning, Algorithm Analysis, Formal Languages and Computation Theory, Software Engineering, Physically-Based Modeling, Computational Geometry, and Robotics.

AWARDS

Best Paper Award, International CAD Conference,	Jun 2008
WAFR 2006 Student Travel Grant,	Jul 2006
NSF DMI Student Travel Grant,	Jul 2006
Excellent Undergraduate of Zhejiang Province, top 5%,	2000
Honor program - Zhejiang University Advanced Class of Engineering Education,	1997-2000
Huawei scholarship,	1999
Zhengtai scholarship,	1998
Excellent Student Prizes of Zhejiang University for consecutive 6 years,	1996-2002

REVIEW

Conferences: ICRA06, ICRA07, ICRA08, IROS08
Journal: CAGD, RAS Magazine, IEEE Transactions on Robotics

REFERENCES

Available upon request