

# Daniel G. Aliaga

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## 1. Research Interests

Research is primarily in the area of 3D computer graphics but overlaps with computer vision and visualization while also having strong multi-disciplinary collaborations outside of computer science. Activities are divided into three groups: a) pioneering work in the multi-disciplinary area of inverse modeling and design; b) first-of-its-kind work in codifying information into images and surfaces, and c) compelling work in a visual computing framework including high-quality 3D acquisition methods. Aliaga's inverse modeling and design is particularly focused at digital city planning applications that provide innovative "what-if" design tools enabling urban stake holders from cities worldwide to automatically integrate, process, analyze, and visualize the complex interdependencies between the urban form, function, and the natural environment.

## 2. Academic Appointments

- Visiting Professor at Department of Computer Science in King Abdullah University of Science and Technology (KAUST), Saudi Arabia, July 2018-December 2018.
- Associate Professor of Computer Science, Purdue, West Lafayette, IN, August 2010-present.
- Visiting Researcher at INRIA (French Computer Science/Computer Graphics Research Institute), France, July 2015.
- Visiting Professor at Department of Computer Science, ETH Zurich, July – November 2011.
- Visiting Professor at Chair for Information Architecture, Department of Architecture, ETH Zurich, January – November 2011.
- Assistant Professor of Computer Science, Purdue, West Lafayette, IN, August 2003-2010.
- Research Scientist, Dept. of Computer Science, Princeton, January 2003 - August 2003.
- Ph.D., Computer Science, University of North Carolina at Chapel Hill, May, 1999.  
**Thesis:** "Automatically Reducing and Bounding Geometric Complexity"  
Advisor: Professor Anselmo Lastra
- M.S., Computer Science, University of North Carolina at Chapel Hill, December, 1993.  
**Thesis:** "Virtual and Real Object Collisions in a Merged Environment"  
Advisor: Professor Henry Fuchs
- B.Sc., Computer Science, Magnum Cum Laude, Brown University, May, 1991.  
**Honor's Thesis:** "Transaction-Based Distributed Computer Graphics Systems"  
Advisor: Professor Andries van Dam

### 3. Industrial Positions

- Member of Technical Staff, Image and Video Processing Lab, November 1998-December 2002, Lucent Technologies Bell Laboratories, Murray Hill, NJ.
- Intern, June 1995 – August 1995, Silicon Graphics Inc., Mountain View, CA.
- Software Developer, June 1994 – August 1994, Division Inc, Chapel Hill, NC.
- Intern, June 1992 – August 1992, Siemens Corporate Research Lab, Munich, Germany.
- Intern, June 1991 – August 1991, IBM, Boca Raton, FL.
- Intern, June 1989 – August 1989, IBM, Boca Raton, FL.
- Intern, June 1988 – August 1988, Siemens USA, Boca Raton, FL.
- Intern, June 1987 – August 1987, Siemens USA, Boca Raton, FL.

### 4. Publications

#### Published Journal Articles

1. G. Nishida, A. Bousseau, **D. Aliaga**, Multi-pose Interactive Linkage Design, *Computer Graphics Forum (CGF)*, also *Proc. of Eurographics*, 38:2, 13 pages, 2019.
2. G. Nishida, A. Bousseau, **D. Aliaga**, Procedural Modeling of a Building from a Single Image, *Computer Graphics Forum (CGF)*, also *Eurographics*, 37:2, 15 pages, 2018.
3. A. Mustafa, X. Zhang, G. Nishida, M. Bruwier, B. Dewals, J. Teller, **D. Aliaga**, Procedural Generation of Flood-Sensitive Urban Layouts, *Environment and Planning B: Urban Analytics and City Science*, to appear, 15 pages, 2018.
4. J. Ching, G. Mills, B. Bechtel, L. See, J. Feddema, X. Wang, C. Ren, O. Brousse, A. Martilli, M. Neophytou, P. Mouzourides, I. Stewart, A. Hanna, E. Ng, M. Foley, P. Alexander, **D. Aliaga**, D. Niyogi, A. Shreevastava, P. Bhalachandran, V. Masson, J. Hidalgo, J. Fung, M. Andrade, A. Baklanov, W. Dai, G. Milcinski, M. Demuzere, N. Brunzell, M. Pesaresi, S. Miao, Q. Mu, F. Chen, N. Theeuwes, 2018. WUDAPT: An Urban Weather, Climate, and Environmental Modeling Infrastructure for the Anthropocene, *Bulletin of the American Meteorological Society (BAMS)*, 99(9), 1907–1924.
5. I. Demir, **D. Aliaga**, Guided Proceduralization: Optimizing geometry processing and grammar extraction for architectural models, *Computers & Graphics*, 11 pages, May, 2018.
6. T. Mathew, P. Knob, S. Musse, **D. Aliaga**, Urban Walkability Design using Virtual Population Simulation, *Computer Graphics Forum (CGF)*, 14 pages, 2018.
7. I. Demir, **D. Aliaga**, B. Benes, Near-Convex Decomposition and Layering for Efficient 3D Printing, *Additive Manufacturing*, Vol. 21, May, 2018.
8. M. Bruwier, A. Mustafa, **D. Aliaga**, P. Archambeau, S. Erpicum, G. Nishida, X. Zhang, M. Piroton, J. Teller, B. Dewals, 2018. Influence of urban pattern on inundation flow in floodplains of lowland rivers, *Science of the Total Environment*, Vol. 622–623, 446–458.
9. I. Garcia-Dorado, **D. Aliaga**, P. Bhalachandran, P. Schmid, D. Niyogi, Fast Weather Simulation for Inverse Procedural Design of 3D Urban Models, *ACM Transactions on Graphics (TOG)*, 36(2), #21, 19 pages, 2017.

10. G. Nishida, I. Garcia-Dorado, **D. Aliaga**, B. Benes, A. Bousseau, Interactive Sketching of Urban Procedural Models, *ACM Transactions on Graphics (TOG)*, 35(4), #130, 11 pages, 2016.
11. L. Yang, D. Niyogi, M. Tewari, **D. Aliaga**, F. Chen, F. Tian, G. Ni, Contrasting impacts of urban forms on the future thermal environment: example of Beijing metropolitan area, *Environmental Research Letters (ERL)*, 11(034018), 10 pages, 2016.
12. I. Demir, **D. Aliaga**, B. Benes, Coupled Segmentation and Similarity Detection for Architectural Models, *ACM Transactions on Graphics (TOG)*, 34(4), #104, 11 pages, 2015.
13. C. Montalto, I. Garcia-Dorado, **D. Aliaga**, M. Oliveira, F. Meng, A Total Variation Approach for Customizing Imagery to Improve Visual Acuity, *ACM Transactions on Graphics (TOG)*, 34(3), 15 pages, 2015.
14. G. Nishida, I. Garcia-Dorado, **D. Aliaga**, Example-Driven Procedural Roads, *Computer Graphics Forum (CGF)*, DOI: 10.1111/cgf.12728, 14 pages, 2015.
15. D. Shin, **D. Aliaga**, B. Tuncer, S. Arisona, S. Kim, D. Zund, G. Schmitt, Urban sensing: Using Smartphone for Transportation Mode Classification, *Computers, Environment, and Urban Systems*, Vol. 53, 76-86, 2015.
16. I. Garcia-Dorado, **D. Aliaga**, S. Ukkusuri, Designing Large-Scale Interactive Traffic Animations for Urban Modeling, *Computer Graphics Forum (CGF)*, 33:2, also Eurographics, 10 pages, 2014.
17. I. Garcia-Dorado, I. Demir, **D. Aliaga**, Automatic Urban Modeling using Volumetric Reconstruction with Surface Graph Cuts. *Computers & Graphics*, 37, 896-910, 2013.
18. P. Musialski, P. Wonka, **D. Aliaga**, M. Wimmer, L. van Gool, W. Purgathofer. A Survey of Urban Reconstruction, *Computer Graphics Forum (CGF)*, earlier version in Eurographics 2012 STAR, 28 pages, 2013.
19. **D. Aliaga**, C. Vanegas, M. Lei, D. Niyogi. Visualization-based Decision Tool for Urban Meteorological Modeling, *Environment and Planning B: Planning and Design (EPB)*, 40(2), 271-288, 2013.
20. C. Vanegas, I. Garcia-Dorado, **D. Aliaga**, B. Benes, P. Waddell. Inverse Design of Urban Procedural Models. *ACM Transactions on Graphics (TOG)*, also ACM SIGGRAPH Asia, 11 pages, 2012.
21. **D. Aliaga**, Y. H. Yeung, A. Law, B. Sajadi, A. Majumder. Fast High-Resolution Appearance Editing Using Superimposed Projections, *ACM Transactions on Graphics (TOG)*, 12 pages, 2012.
22. V. Pamplona, M. Oliveira, **D. Aliaga**, R. Raskar. Tailored Displays to Compensate for Visual Aberrations, *ACM Transactions on Graphics (TOG)*, also ACM SIGGRAPH, 12 pages, 2012.
23. **D. Aliaga**. 3D Design and Modeling of Smart Cities from a Computer Graphics Perspective, *ISRN Computer Graphics*, 2012(728913), 19 pages, 2012.
24. C. Vanegas, T. Kelly, B. Weber, J. Halatsch, **D. Aliaga**, P. Mueller. Procedural Generation of Parcels in Urban Modeling, *Computer Graphics Forum (CGF)*, also Eurographics, 31(2): 15 pages, 2012.

25. C. Vanegas, **D. Aliaga**, B. Benes. Automatic Extraction of Manhattan-World Building Masses from 3D Laser Range Scans, *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 12 pages, 2012.
26. A. Law, **D. Aliaga**, B. Sajadi, A. Majumder, Z. Pizlo, “Perceptually-Based Appearance Modification for Compliant Appearance Editing”, *Computer Graphics Forum (CGF)*, 13 pages, 2011.
27. J. Zhang, M. Boutin, **D. Aliaga**, “Pose-Free Structure from Motion Using Depth From Motion Constraints”, *IEEE Transactions on Image Processing (TIP)*, 16 pages, 2011.
28. A. Law, **D. Aliaga**, Single Viewpoint Model Completion of Symmetric Objects for Digital Inspection. *Computer Vision and Image Understanding (CVIU)*, 115(5): 603-610, 2011.
29. **D. Aliaga**, E. Bertino, S. Valtolina, DECHO - A Framework for the Digital Exploration of Cultural Heritage Objects. *ACM Journal on Computing and Cultural Heritage (JOCCH)*, 21 pages, 2011.
30. A. Law, **D. Aliaga**, A. Majumder, Projector Placement Planning for High Quality Visualizations on Real-World Colored Objects. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, also *IEEE Visualization*, 16(6): 10 pages, 2010.
31. O. Stava, B. Beneš, R. Mech, **D. Aliaga**, P. Kristof, Inverse Procedural Modeling by Automatic Generation of L-systems. *Computer Graphics Forum (CGF)*, also *Eurographics*, 29:2, 10 pages, 2010.
32. Y. Xu, **D. Aliaga**. Modeling Repetitive Motions using Structured Light. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 16(4): 676-689, 2010.
33. C. Vanegas, **D. Aliaga**, B. Benes, P. Waddell. Interactive Design of Urban Spaces using Geometrical and Behavioral Modeling. *ACM Transactions on Graphics (TOG)*, also *ACM SIGGRAPH Asia*, 28(5): 10 pages, 2009.
34. **D. Aliaga**, Y. Xu. A Self-Calibrating Method for Photogeometric Acquisition of 3D Objects. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 32(4): 747-754, 2010.
35. **D. Aliaga**, J. Zhang, M. Boutin. A Framework for Pose-Free Modeling of 3D Scenes. *ACM Transactions on Graphics (TOG)*, 29(1): 17 pages, 2009.
36. C. Vanegas, **D. Aliaga**, P. Wonka, P. Müller, P. Waddell, B. Watson. Modeling the Appearance and Behavior of Urban Spaces. *Computer Graphics Forum (CGF)*, also *Eurographics STAR*, 17 pages, 2009.
37. **D. Aliaga**, M. Atallah. Genuinity Signatures: Designing Signatures for Verifying 3D Object Genuinity. *Computer Graphics Forum (CGF)*, also *Eurographics*, 28(2): 437-446, 2009.
38. C. Vanegas, **D. Aliaga**, B. Benes, P. Waddell. Visualization of Simulated Urban Spaces: Inferring Parameterized Generation of Streets, Parcels, and Aerial Imagery. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 15(3): 424-435, 2009.
39. Y. Xu, **D. Aliaga**. An Adaptive Correspondence Algorithm for Modeling Scenes with Strong Inter-reflections. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 15(3): 465-480, 2009.

40. **D. Aliaga**, A. Law, Y. Yeung. Virtual Restoration Stage for Real-World Objects. *ACM Transactions on Graphics (TOG)*, also ACM SIGGRAPH Asia, 27(5): 10 pages, 2008.
41. **D. Aliaga**, C. Vanegas, B. Benes. Interactive Example-based Urban Layout Synthesis. *ACM Transactions on Graphics (TOG)*, also ACM SIGGRAPH Asia, 27(5): 10 pages, 2008.
42. **D. Aliaga**, B. Benes, C. Vanegas, N. Andryscio, “Interactive Reconfiguration of Urban Layouts”, *IEEE Computer Graphics & Applications (CG&A)*, 28(3): 38-47, 2008.
43. **D. Aliaga**, P. Rosen, D. Bekins. Style Grammars for Interactive Visualization of Architecture. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 13(4): 786-797, 2007.
44. **D. Aliaga**, Y. Xu, V. Popescu. Occlusion-Compatible Camera Design for Acquisition of Active Environments. *IEEE Computer Graphics & Applications (CG&A)*, 27(5): 68-78, 2007.
45. **D. Aliaga**, Y. Xu, V. Popescu. Lag Camera: A Moving Multi-camera Array for Scene Acquisition. *Journal of Virtual Reality and Broadcasting*, Special Issue GRAPP, 3(10): 9 pages, 2007.
46. **D. Aliaga**, P. Rosen, V. Popescu, I. Carlbom. Image Warping for Compressing and Spatially Organizing a Dense Collection of Images. *Signal Processing - Image Communications: Special Issue on Still and Dynamic Scenes*, 21(9): 755-769, 2006.
47. V. Popescu, P. Rosen, **D. Aliaga**. Three-Dimensional Display Rendering Acceleration Using Occlusion Camera Reference Images. *IEEE/OSA Journal of Display Technology (JDT)*, 2(3): 274-283, 2006.
48. **D. Aliaga**, I. Carlbom. Finding Yourself: Fiducial Planning for Error-Bounded Pose Estimation of a Panoramic Camera in Large Environments. *IEEE Robotics and Automation (RA): Special Issue on Panoramic Robotics*, 11(4): 53-61, 2004.
49. **D. Aliaga**, T. Funkhouser, D. Yanovsky, I. Carlbom. Sea of Images: a Dense Sampling Approach for Rendering Large Indoor Environments. *IEEE Computer Graphics & Applications (CG&A)*, 23(6): 22-30, 2003.
50. **D. Aliaga**, A. Lastra. Smooth Transitions in Texture-based Simplification. *Computer & Graphics (C&G)*, 22(1): 71-81, 1998.
51. M. Rafferty, **D. Aliaga**, V. Popescu, A. Lastra. Images for Accelerating Architectural Walkthroughs. *IEEE Computer Graphics & Applications (CG&A)*, 18(6): 38-45, 1998.
52. **D. Aliaga**. Virtual Objects in the Real World. *Communications of the ACM (CACM)*, 40(3): 49-54, 1997.

#### Articles in Refereed Conference Proceedings

53. G. Nishida, A. Bousseau, **D. Aliaga**, Multi-pose Interactive Linkage Design, In *Proceedings of Eurographics, also Computer Graphics Forum (CGF)*, 38:2, 13 pages, 2019.
54. A. Mustafa, M. Bruwier, B. Dewals, J. Teller, X. Zhang, **D. Aliaga**, Investigating the Impact of Urban Layout Geometry on Urban Flooding, In *Proceedings of 11<sup>th</sup> Intl. Conference on Advanced Geographics Information Systems, Applications, and Services*, 4 pages, Feb, 2019.

55. G. Nishida, A. Bousseau, **D. Aliaga**, Procedural Modeling of a Building from a Single Image, In *Proceedings of Eurographics, also Computer Graphics Forum (CGF)*, 37:2, 15 pages, 2018.
56. J. Ching, **D. Aliaga**, G. Mills, V. Masson, A. Hanna, 2018. WUDAPT's Next Generation of Urban Canopy Parameters for Advanced Multi-scale Weather, Climate, and Air Quality Models, In *Proceedings on the 17<sup>th</sup> Annual CMAS Conference*, 1-6.
57. P. Waddell, I. Garcia-Dorado, M. Gardner, D. Aliaga, 2018. Architecture for modular microsimulation of real estate markets and transportation, In *Proceedings of 7<sup>th</sup> Symposium on Applied Urban Modeling*, 32 pp.
58. M. Bruwier, A. Mustafa, **D. Aliaga**, S. Erpicum, P. Archambeau, G. Nishida, X. Zhang, M. Piroton, J. Teller, B. Dewals, Influence of urban patterns on flooding, In *Proceedings of 37<sup>th</sup> Int'l Association for Hydro-Environment Engineering and Research (IAHR) World Congress*, 2017.
59. I. Demir, **D. Aliaga**, B. Benes, Proceduralization of Urban Models, In *Proceedings of 25<sup>th</sup> Signal Processing and Communications Applications Conference*, 4 pages, 2017.
60. I. Demir, **D. Aliaga**, B. Benes, Proceduralization for Editing 3D Architectural Models, In *Proceedings of 3D Vision*, 9 pages, 2016.
61. G. Nishida, I. Garcia-Dorado, **D. Aliaga**, B. Benes, A. Bousseau, Interactive Sketching of Urban Procedural Models, In *Proceedings of ACM SIGGRAPH*, also *ACM Transactions on Graphics (TOG)*, 35(4), #130, 11 pages, 2016.
62. M. Fiser, B. Benes, J. A. Garcia Galicia, M. Abdul-Massih, **D. Aliaga**, V. Krs, 2016. Learning geometric graph grammars. In *Proceedings of Spring Conference of Computer Graphics (SCCG)*, 7-15.
63. I. Demir, **D. Aliaga**, B. Benes, Procedural Editing of Building Point Clouds, In *Proceedings of IEEE International Conference on Computer Vision (ICCV)*, 9 pages, 2015.
64. I. Demir, **D. Aliaga**, B. Benes, Coupled Segmentation and Similarity Detection for Architectural Models, In *Proceedings of ACM SIGGRAPH*, also *ACM Transactions on Graphics (TOG)*, 34(4), #104, 11 pages, 2015.
65. I. Demir, **D. Aliaga**, B. Benes, Proceduralization of Buildings at City Scale, In *Proceedings of 3DV (International Conference on 3D Imaging, Modeling, Processing, Visualization & Transmission)*, 8 pages, 2014.
66. I. Garcia-Dorado, **D. Aliaga**, S. Ukkusuri, Designing Large-Scale Interactive Traffic Animations for Urban Modeling, In *Proceedings of Eurographics, also Computer Graphics Forum (CGF)*, 33:2, 10 pages, 2014.
67. B. Vitins, I. Garcia-Dorado, C. Vanegas, **D. Aliaga**, K. Axhausen, Evaluation of Shape Grammar Rules for Urban Transport Network Design, In *Proceedings of Transportation Research Board*, 19 pages, 2013.
68. I. Garcia-Dorado, **D. Aliaga**, Automatic Modeling of Planar-Hinged Buildings. In *Proceedings of Eurographics*, short paper, 4 pages, 2013.

69. C. Vanegas, I. Garcia-Dorado, **D. Aliaga**, B. Benes, P. Waddell. Inverse Design of Urban Procedural Models. In *Proceedings of ACM SIGGRAPH Asia*, also ACM Transactions on Graphics (TOG), 11 pages, 2012.
70. Y. Chao, **D. Aliaga**. Hiding a Second Appearance in a Physical Relief Surface, In *Proceedings of Information Hiding Conference (IH)*, 15 pages, 2012.
71. V. Pamplona, M. Oliveira, **D. Aliaga**, R. Raskar. Tailored Displays to Compensate for Visual Aberrations, In *Proceedings of ACM SIGGRAPH*, also ACM Transactions on Graphics (TOG), 12 pages, 2012.
72. C. Vanegas, T. Kelly, B. Weber, J. Halatsch, **D. Aliaga**, P. Mueller. Procedural Generation of Parcels in Urban Modeling, In *Proceedings of Eurographics (EG)*, also Computer Graphics Forum, 31(2), 15 pages, 2012.
73. P. Musialski, P. Wonka, **D. Aliaga**, M. Wimmer, L. van Gool, W. Purgathofer. A Survey of Urban Reconstruction, In *Proceedings of Eurographics (EG)*, State-of-the-Art-Report, 28 pages, 2012
74. A. Law, **D. Aliaga**. Spatially Augmented Reality for Environmentally-Lit Real-World Objects, In *Proceedings of IEEE Virtual Reality (VR)*, short paper, 4 pages, 2012.
75. B. Benes, M. Abdul, P. Jarvis, **D. Aliaga**, C. Vanegas, Urban Ecosystem Design. In *Proceedings of ACM Symposium on Interactive 3D Graphics (I3D)*, 8 pages, 2011.
76. A. Law, **D. Aliaga**, A. Majumder, Projector Placement Planning for High Quality Visualizations on Real-World Colored Objects. In *Proceedings of IEEE Visualization*, also IEEE Transactions on Visualization and Computer Graphics (TVCG), 16:6, 10 pages, 2010.
77. C. Vanegas, **D. Aliaga**, B. Benes, Building Reconstruction using Manhattan-World Grammars, In *Proceedings of IEEE Computer Vision and Pattern Recognition (CVPR)*, 8 pages, 2010.
78. Y. Xu, **D. Aliaga**, High-Resolution Modeling of Moving and Deforming Objects Using Sparse Geometric and Dense Photometric Measurements, In *Proceedings of IEEE Computer Vision and Pattern Recognition (CVPR)*, 8 pages, 2010.
79. O. Stava, B. Beneš, R. Mech, **D. Aliaga**, P. Kristof, Inverse Procedural Modeling by Automatic Generation of L-systems, In *Proceedings of Eurographics*, also Computer Graphics Forum, 29:2, 10 pages, 2010.
80. C. Vanegas, **D. Aliaga**, B. Benes, P. Waddell. Interactive Design of Urban Spaces using Geometrical and Behavioral Modeling. In *Proceedings of ACM SIGGRAPH Asia*, also ACM Transactions on Graphics, 28:5, 10 pages, 2009 (acceptance: 23%).
81. **D. Aliaga**, M. Atallah. Genuinity Signatures: Designing Signatures for Verifying 3D Object Genuinity. In *Proceedings of Eurographics*, also Computer Graphics Forum 28:2, 437-446, March 2009 (acceptance: 23%).
82. C. Vanegas, **D. Aliaga**, P. Mueller, P. Waddell, B. Watson, P. Wonka. Modeling the Appearance and Behavior of Urban Spaces. In *Proceedings of Eurographics*, also Computer Graphics Forum, State of the Art Report (STAR), 1-17, March 2009 (acceptance: 38%).

83. A. Law, **D. Aliaga**, Y. Yeung, A. McKune, R. McCoy, L. Zimmerman. Projecting Restorations in Real-Time for Real-World Objects. In *Proceedings of Museums and the Web (MW)*, Archives & Museum Informatics, 8 page demonstration paper, March, 2009.
84. **D. Aliaga**, A. Law, Y. Yeung. Virtual Restoration Stage for Real-World Objects. In *Proceedings of ACM SIGGRAPH Asia*, also ACM Transactions on Graphics 27:5, 10 pages, December 2008, (acceptance: 18%).
85. **D. Aliaga**, C. Vanegas, B. Benes. Interactive Example-based Urban Layout Synthesis. In *Proceedings of ACM SIGGRAPH Asia* (also ACM Transactions on Graphics, 27:5), 10 pages, December 2008, (acceptance: 18%).
86. **D. Aliaga**, Y. Xu. Photogeometric Structured Light: A Self-Calibrating and Multi-Viewpoint Framework for Accurate 3D Modeling. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 8 pages, June 2008 (acceptance: 27%).
87. **D. Aliaga**. Digital Inspection: An Interactive Stage of Viewing Surface Details. In *Proceedings of ACM SIGGRAPH Symposium on Interactive 3D Graphics (I3D)*, 53-60, February 2008 (acceptance: 35%).
88. Y. Xu, **D. Aliaga**. Dense Depth and Color Acquisition of Repetitive Motions. In *Proceedings of 3D Digital Imaging and Modeling (3DIM)*, 141-148, August 2007 (acceptance: 30%).
89. Y. Xu, **D. Aliaga**. Robust Pixel Classification for 3D Modeling with Structured Light. In *Proceedings of Graphics Interface (GI)*, 233-240, June 2007 (acceptance: 38%).
90. **D. Aliaga**, J. Zhang, M. Boutin, “Simplifying the Reconstruction of 3D Models using Parameter Elimination”, In *Proceedings of IEEE International Conference on Computer Vision (ICCV)*, Workshop on Visual Representations and Modeling of Large-scale Environments, pp. 1-8, 2007 (acceptance: 30%).
91. Y. Xu, **D. Aliaga**. Efficient Multi-viewpoint Acquisition of 3D Objects Undergoing Repetitive Motions. In *Proceedings of ACM SIGGRAPH Symposium on Interactive 3D Graphics (I3D)*, 113-120, April 2007 (acceptance: 30%).
92. J. Zhang, M. Boutin, **D. Aliaga**. Variable Elimination for 3D from 2D. In *Proceedings of Visual Communication and Image Processing (VCIP)*, 193-200, January 2007.
93. J. Zhang, M. Boutin, **D. Aliaga**. Robust Bundle Adjustment for Structure from Motion. In *IEEE International Conference on Image Processing (ICIP)*, 2185-2188, September 2006 (acceptance: 30%).
94. J. Zhang, **D. Aliaga**, M. Boutin, R. Insley. Angle-Independent Bundle Adjustment Refinement. In *Proceedings of Third Int’l Symposium on 3D Data Processing, Visualization, and Transmission (3DPVT)*, 108-116, April 2006.
95. V. Popescu, **D. Aliaga**. Depth Discontinuity Occlusion Camera. In *Proceedings of ACM SIGGRAPH Symposium on Interactive 3D Graphics (I3D)*, 139-143, April 2006 (acceptance: 35%).
96. **D. Aliaga**, G. Rodriguez-Rivera, D. Xu, “A Collaborative Undergraduate Course for Pen-based Computing using Tablet PCs”, In *Workshop on the Impact of Pen-based Technology on Education (WIPTe)*, 6 pages, April 2006.

97. D. Bekins, S. Yost, M. Garrett, J. Deutsch, W. Htay, D. Xu, **D. Aliaga**. Mixed-Reality Tabletop (MRT): A Low-cost Teleconferencing Framework for Mixed-Reality Applications. In *Proceedings of IEEE Virtual Reality (VR)*, 245-248, March 2006 (acceptance: 29%).
98. **D. Aliaga**, Yi Xu, V. Popescu. Lag Camera: A Moving Multi-Camera Array for Scene Acquisition. In *Proceedings of Int'l Conference on Computer Graphics Theory and Applications (GRAPP)*, 98-107, February 2006 (acceptance: 35%).
99. M. Boutin, J. Zhang, **D. Aliaga**. Improving the Numerical Stability of Structure from Motion by Algebraic Elimination. In *Proceedings of SPIE and IS&T Electronic Imaging*, 178-187, January 2006.
100. D. Bekins, **D. Aliaga**. Build-by-Number: Rearranging the Real World to Visualize Novel Architectural Spaces. In *Proceedings of IEEE Visualization*, 143-150, October 2005 (acceptance: 33%).
101. **D. Aliaga**, I. Carlbom. A Spatial Image Hierarchy for Compression in Image-Based Rendering. In *Proceedings of IEEE International Conference on Image Processing (ICIP)*, 609-612, September 2005 (acceptance: 30%).
102. **D. Aliaga**, D. Yanovsky, T. Funkhouser, I. Carlbom. Interactive Image-Based Rendering using Feature Globalization. In *Proceedings of ACM SIGGRAPH Symposium on Interactive 3D Graphics (I3D)*, 163-170, April, 2003 (acceptance: 26%).
103. **D. Aliaga**, T. Funkhouser, D. Yanovsky, I. Carlbom. Sea of Images. In *Proceedings of IEEE Visualization*, 331-338, October 2002 (acceptance: 34%).
104. J. Cohen, **D. Aliaga**, W. Zhang. Hybrid Simplification: Combining Multi-resolution Polygon and Point Rendering. In *Proceedings of IEEE Visualization*, 140-147, October 2001, (acceptance: 34%).
105. **D. Aliaga**, I. Carlbom. Plenoptic Stitching: A Scalable Method for Reconstructing 3D Interactive Walkthroughs. In *Proceedings of ACM SIGGRAPH*, 443-450, August 2001 (acceptance: 22%).
106. **D. Aliaga**. Accurate Catadioptric Calibration for Real-time Pose Estimation in Room-size Environments. In *Proceedings of IEEE International Conference on Computer Vision (ICCV)*, 127-134, July 2001 (acceptance: 25%).
107. **D. Aliaga**, A. Lastra. Automatic Image Placement to Provide a Guaranteed Frame Rate. In *Proceedings of ACM SIGGRAPH*, 307-316, August 1999 (acceptance: 16%).
108. **D. Aliaga**, J. Cohen, A. Wilson, E. Baker, H. Zhang, C. Erikson, K. Hoff, T. Hudson, W. Stuerzlinger, R. Bastos, M. Whitton, F. Brooks, and D. Manocha. MMR: An Interactive Massive Model Rendering System Using Geometric and Image-Based Acceleration. In *Proceedings of ACM SIGGRAPH Symposium on Interactive 3D Graphics (I3D)*, 199-206, 1999 (acceptance: 25%).
109. V. Popescu, A. Lastra, **D. Aliaga**, M. Oliveira Neto. Efficient Warping for Architectural Walkthroughs using Layered Depth Images. In *Proceedings of IEEE Visualization*, 211-215, October 1998 (acceptance: 39%).

110. M. Rafferty, **D. Aliaga**, A. Lastra. 3D Image Warping in Architectural Walkthroughs. In *Proceedings of IEEE Virtual Reality Annual International Symposium (VRAIS)*, 228-233, March 1998, (acceptance: 30%).
111. **D. Aliaga**, A. Lastra. Architectural Walkthroughs Using Portal Textures. In *Proceedings of IEEE Visualization*, 355-362, October 1997 (acceptance: 26%).
112. **D. Aliaga**. Visualization of Complex Models Using Dynamic Texture-based Simplification. In *Proceedings of IEEE Visualization*, 101-106, October 1996 (acceptance: 38%).
113. **D. Aliaga**. Virtual and Real Objects in a Merged Environment. In *Proceedings of ACM Virtual Reality Software and Technology (VRST)*, 287-298, August 1994 (acceptance: 35%).
114. **D. Aliaga**, M. Schneider-Hufschmidt. Prototyping of Graphing Tools Using Direct GUI Composition. In *Proceedings of Requirements Engineering*, 317-334, April 1993.
115. R. Zeleznik, D. Conner, M. Wloka, **D. Aliaga**, N. Huang, P. Hubbard, B. Knep, H. Kaufman, J. Hughes, A. van Dam. An Object-Oriented Framework for the Integration of Interactive Animation Techniques. In *Proceedings of ACM SIGGRAPH*, 105-111, July 1991 (acceptance: 21%).
116. B. Conner, H. Kaufman, M. Wloka, B. Zeleznik, **D. Aliaga**, W. Draves, P. Hubbard, B. Knep, M. Natkin, P. Strauss, J. Hughes, A. van Dam. Integration of high-level animation controls, simulation methods, and gestural specification. In *Proceedings of First Eurographics Workshop on Animation and Simulation*, September 1990.

#### Refereed Editorials, Posters, and Briefs

117. B. Bechtel, G. Mills, J. Ching, D. Aliaga, and M. Demuzere, WUDAPT: current status and next steps, *EGU General Assembly: Geophysical Research Abstracts*, Vol. 21, 2019.
118. B. Dewals, A. Mustafa, M. Bruwier, J. Teller, X. Zhang, D. Aliaga, Automatic design of flood-resilient urban layouts, *EGU General Assembly: Geophysical Research Abstracts*, Vol. 21, 2019.
119. M. Bruwier, A. Mustafa, **D. Aliaga**, P. Archambeau, S. Erpicum, G. Nishida, X. Zhang, M. Pirotton, J. Teller, B. Dewals, Systematic flood modelling to support flood-proof urban design, *European General Sciences Union (EGU) General Assembly Conf.*, 2017.
120. L. Yang, D. Niyogi, J. Smith, M. Tewari, **D. Aliaga**, F. Chen, F. Tian, G. Ni, Contribution of Urbanization and Future Climate Change to Urban Heat Island: Case Study of a Severe Heat Wave over Beijing, China, Poster at 9th *International Conference on Urban Climate*, July, 2015.
121. **D. Aliaga**, J. Zhang, M. Boutin. 3D Scene Modeling using Pose-free Reconstruction. Technical Sketch in *ACM SIGGRAPH*, August 2007.
122. Y. Xu, **D. Aliaga**. Modeling Repetitive Motions in Real-World 3D Scenes. Technical Sketch in *ACM SIGGRAPH*, August 2007.
123. **D. Aliaga**, Y. Xu, V. Popescu. Lag Camera. *Poster in ACM SIGGRAPH Symposium on Interactive 3D Graphics (I3D)*, 2006.
124. **D. Aliaga**, A. Lastra. Virtual Backdrops. *Technical Sketch in ACM SIGGRAPH*, August 1997.

## Book Chapters and Edited Proceedings/Special Sections

125. Solar Energy at Urban Scale, book chapter "Geometrical Models of a City", lead author Benoit Becker, ISTE Ltd and John Wiley & Sons, Inc, 384 pages, 2012.
126. Digital Urban Modeling and Simulation, book chapter "Integrating Urban Simulation and Visualization", lead author Stefan Arisona, Springer-Verlag, 355 pages, Communications in Computer and Information Science, 2012.
127. Emerging Topics in Computer Vision and its Applications, book chapter "Novel Photogeometric Methods for Capturing Static and Deforming Objects", written together with former student Yi Xu, lead author C.H. Chen, World Scientific Publishing, 508 pages, 2011.
128. Editorial for Special Section on I3D 2010 Selected Papers, Editors: Manuel Oliveira, Daniel Aliaga, IEEE Transactions on Visualization and Computer Graphics, 41 pages, 2011.
129. Proceedings of ACM Symposium on Interactive 3D Graphics 2010, Editors: Daniel Aliaga, Manuel Oliveira, ACM Publication, 184 pages, 2010.

## 5. Patents

1. U.S. Patent No. 9,659,351, **D. Aliaga**, I. Garcia-Dorado, C. Montalto. "Displaying personalized imagery for improving visual acuity", May, 2017.
2. U.S. Patent No. 8,896,660, **D. Aliaga**, I. Carlbom. "Method and apparatus for computing error-bounded position and orientation of panoramic cameras in real-world environments", April 2014.
3. U.S. Patent No. 7,362,969, **D. Aliaga**, I. Carlbom. "Camera Model and Calibration Procedure for Omnidirectional Paraboloidal Catadioptric Cameras", April, 2008.
4. U.S. Patent No. 7,356,164, **D. Aliaga**, T. Funkhouser, I. Carlbom, D. Yanosvky. "Method and Apparatus for Finding Feature Correspondences Between Images Captured in Real-World Environments", April, 2008.
5. U.S. Patent No. 7,313,285, **D. Aliaga**, T. Funkhouser, I. Carlbom, D. Yanosvky. "Method and Apparatus for Compressing and Decompressing Images Captured From Viewpoints Throughout N-Dimensional Space", December, 2007.
6. U.S. Patent No. 7,126,603, **D. Aliaga**, T. Funkhouser, I. Carlbom, D. Yanosvky. "Method and System for Creating Interactive Walkthroughs of Real-World Environments From Set of Densely Captured Images", October 2006.
7. U.S. Patent No. 7,027,049, **D. Aliaga**, I. Carlbom. "Method and System for Reconstructing 3D Interactive Walkthroughs of Real-World Environments" (part 2), April 2006.
8. U.S. Patent No. 6,831,643, **D. Aliaga**, I. Carlbom. "Method and System for Reconstructing 3D Interactive Walkthroughs of Real-World Environments" (part 1), April 2004.

## 6. Business Ventures

1. UrbanSim: technical advisor (2018-present), a startup for using data science, simulation and visualization to learn from the past, inform the present, and shape the future of communities everywhere.

2. Synthicity: technical advisor (2012-2015), a startup to develop novel urban design and planning software, acquired by AutoDesk in 2015.
3. Authentise: technical advisor (2013-present), a startup to develop novel secure 3D printing methodologies; first products released.
4. CPrecisely Inc.: co-founder (2014-present), startup venture to deploy novel image processing technique that corrects images so that they appear in focus to an observer not wearing their prescription eyeglasses.

## **7. Grants and Gifts (Total awarded = \$7,429,000)**

1. NSF OAC, “U-Cube: A Cyberinfrastructure for Unified and Ubiquitous Urban Canopy Parameterization” (status: funded)
  - Duration of Funding: 01/01/2019 – 12/31/2021
  - Total Amount of Award: \$600,000
  - Your Role: PI
2. NSF IIS, “Functional Proceduralization of 3D Geometric Models” (status: funded)
  - Duration of Funding: 08/15/2018 - 07/31/2021
  - Total Amount of Award: \$500,000
  - Your Role: PI
3. IARPA, ”LEGO: Large-scale Environment-modeling with Geometric Optimization” (status: funded)
  - Duration of Funding: 09/15/2017 - 09/14/2021
  - Total Amount of Award: \$621,628
  - Your Role: Co-PI; (above is my portion of grant)
4. NSF I/UCRC, “Phase I: Robots and Sensors for the Human Well-being” (status: funded)
  - Duration of Funding: 09/9/2014 - 08/31/2020
  - Total Amount of Award: \$429,000
  - Your Role: Co-PI
5. NSF IIS, “Collaborative Research: A Heterogeneous Inference Framework for 3D Modeling and Rendering of Sites” (status: ended)
  - Duration of Funding: 08/01/2013 - 07/30/2017
  - Total Amount of Award: \$1,200,000
  - Your Role: Purdue PI (collaborative with Yale; Purdue portion is \$600k)
6. NSF CBET, “STRONG Cities – Simulation Technologies for the Realization of Next Generation Cities” (status: ended)
  - Duration of Funding: 09/15/2012 - 08/31/2017
  - Total Amount of Award: \$552,408
  - Your Role: PI
7. NSF IIS, “Integrating Behavioral, Geometrical and Graphical Modeling to Simulate and Visualize Urban Areas” (status: ended)

- Duration of Funding: 09/01/2010 - 08/31/2014  
 Total Amount of Award: \$900,000  
 Your Role: PI (with Berkeley; Purdue portion is \$450k)
8. NSF CNS, “A Computational Framework for Marking Physical Objects against Counterfeiting and Tampering” (status: ended)  
 Duration of Funding: 09/01/2009 - 08/31/2013  
 Total Amount of Award: \$499,883  
 Your Role: PI
9. MTC, “Urban Simulation and Visualization” (status: ended)  
 Duration of Funding: 01/01/2011 – 08/01/2013  
 Total Amount of Award: \$600,000  
 Your Role: Purdue PI (with Berkeley; Purdue portion is \$285k)
10. NSF INTEROP, “A Community-based Drought Information Network for Multidisciplinary Applications” (status: ended)  
 Duration of Funding: 09/01/2008 - 08/31/2013  
 Total Amount of Award: \$750,000  
 Your Role: Co-PI
11. Google Research Award, “Automatic Modeling of Buildings” (status: funded)  
 Duration of Funding: 02/01/2011 – present  
 Total Amount of Award: \$70,000 (unrestricted gift funds)  
 Your Role: PI
12. NVIDIA Hardware Gift, “Tablet-based Tools for Urban Visualization and Simulation”  
 Duration of Funding: 04/01/2012 – present  
 Total Amount of Award: \$2,000 (given as equipment)  
 Your Role: PI
13. NSF CCF, “3D Scene Digitization - A Novel Invariant Approach for Large-Scale Environment Capture” (status: ended)  
 Duration of Funding: 08/15/2004 - 07/31/2008  
 Total Amount of Award: \$500,000  
 Your Role: PI
14. Adobe Inc., “Vector Pattern Modeling and Editing (Continuance)”  
 Duration of Funding: 08/15/2009 – present  
 Total Amount of Award: \$10,000 (unrestricted gift funds)  
 Your Role: Co-PI
15. Adobe Inc., “Vector Pattern Modeling and Editing”  
 Duration of Funding: 08/01/2008 – present  
 Total Amount of Award: \$45,000 (unrestricted gift funds)

- Your Role: Co-PI
16. PACE/Hewlett-Packard Hardware Grant, “Genuinity Signatures”
 

Duration of Funding: 04/01/2008 – present

Total Amount of Award: \$5,000 (given as equipment)

Your Role: PI
  17. Purdue-IUPUI Research Grant, “Digital Inspection and Virtual Restoration of 3D Objects”
 

Duration of Funding: 02/01/2008 – 05/01/2009

Total Amount of Award: \$50,000 (with IUPUI; Purdue portion is \$35k)

Your Role: PI
  18. NSF REU, “3D Scene Digitization - A Novel Invariant Approach for Large-Scale Environment Capture”
 

Duration of Funding: 08/15/2006 – 07/31/2008

Total Amount of Award: \$6,000

Your Role: PI
  19. Microsoft Research, “Tablet PC-Based Teaching Platform for Portable Mixed-Reality Concept”
 

Duration of Funding: 01/01/2005 – present

Total Amount of Award: \$50,000 (unrestricted gift funds)

Your Role: PI
  20. Microsoft Research, “Immersive Mentoring Using Mixed-Reality Tabletop”
 

Duration of Funding: 01/01/2004 – present

Total Amount of Award: \$40,000 (unrestricted gift funds)

Your Role: PI

**Funding Received for Student Support:**

1. Purdue Research Foundation, “Sketching Static and Dynamic 3D Models”, 1 year graduate student support, August 2017-May 2018.
2. Bilsland Fellowship, “Inverse Procedural Modeling”, 6 months graduate student support, during Fall 2016.
3. Bilsland Fellowship, “Inverse Traffic Modeling”, 6 months graduate student support, during Spring 2015.
4. Purdue Research Foundation, “Semantic-Aware Inverse 3D Modeling of Buildings and Cities”, 1 year graduate student support, August 2012-May 2013.
5. Purdue Special Incentive Research Grant, Computing Research Institute, “Modeling the Appearance and Behavior of Peta-scale Urban Spaces”, 1 year graduate student support, August 2009-July 2010.
6. Purdue Summer Research Grant, “Genuinity Signatures”, 1 summer graduate student support, June-August 2009.
7. Bilsland Fellowship, “Efficient and Robust Image-based Modeling of Dynamic Scenes”, 6 months graduate student support, June 2009-March 2010.

8. Purdue Research Foundation, “Designing Tomorrow’s Cities: Simulation and Creation of Urban Environments”, 1 year graduate student support, August 2008-May 2009.
9. Purdue Research Foundation, “Acquiring Active Environments”, 1 year graduate student support, August 2006-May 2007.

## 8. Professional Engagement

### External

#### *Journal Editor*

- Editorial Board, Computer Graphics Forum, 2013-present
- Editorial Board, Elsevier Graphical Models, 2006-present

#### *Program Committees*

- IEEE Computer Vision and Pattern Recognition, 2019
- IEEE Computer Vision and Pattern Recognition, 2018
- ACM SIGGRAPH Asia, 2017
- Eurographics, 2017
- IEEE Computer Vision and Pattern Recognition, 2017
- ACM SIGGRAPH Asia, 2016
- ACM SIGGRAPH Asia Technical Briefs and Posters, 2016
- European Conference on Computer Vision, 2016
- First International Conference on Urban Physics, 2016
- Eurographics, 2016
- International Workshop on Smart Cities and Urban Analytics, 2015
- ACM SIGGRAPH, 2015
- 3DV (3D Imaging, Modeling, Processing, Visualization & Transmission), 2015
- CEIG (Congreso Espanol de Informatica Grafica), 2015
- ACM SIGGRAPH Asia Technical Briefs and Posters, 2014
- Eurographics, 2014
- IEEE Visualization, 2014
- 3DV (3D Imaging, Modeling, Processing, Visualization & Transmission), 2014
- Latin American Symposium on Computer Graphics, Virtual Reality and Image Processing, 2014
- IEEE Visualization, 2013
- IEEE International Conference on Computer Vision, 2013
- 3DV (3D Imaging, Modeling, Processing, Visualization & Transmission), 2013
- ACM SIGGRAPH Asia Technical Briefs and Posters, 2013
- ICVGIP, 2012
- 3DPVT, 2012
- European Conference on Computer Vision, 2012
- ACM/IEEE International Workshop on Projector-Camera Systems, 2012
- IEEE Computer Vision and Pattern Recognition, 2012
- Int’l Conference on Computing for Geospatial Research & Applications, 2012

- ACM SIGGRAPH Symposium on Interactive 3D Graphics, 2012
- IEEE Visualization, 2011
- IEEE International Conference on Computer Vision, 2011
- IEEE Computer Vision and Pattern Recognition, 2011
- Int'l Conference on Computing for Geospatial Research & Applications, 2011
- ACM SIGGRAPH Symposium on Interactive 3D Graphics, 2011
- ACM/IEEE International Workshop on Projector-Camera Systems, 2010
- Brazilian Symposium on Computer Graphics and Image Processing, 2010
- ECCV Workshop on Reconstruction and Modeling of Large-Scale 3D Virtual Environments, 2010
- Int'l Conference on Computing for Geospatial Research & Applications, 2010
- ACM International Symposium on Mixed and Augmented Reality, 2010
- 3D Digital Imaging and Modeling, 2009
- ACM/IEEE International Workshop on Projector-Camera Systems, 2009
- Brazilian Symposium on Computer Graphics and Image Processing, 2009
- Pacific Graphics, 2008
- ACM SIGGRAPH Symposium on Interactive 3D Graphics, 2008
- Brazilian Symposium on Computer Graphics and Image Processing, 2008
- ACM HyperText, 2008
- IEEE International Conference on Computer Vision, Workshop on Visual Representations and Modeling of Large-scale Environments, 2007
- ACM Int'l Symposium on Mixed and Augmented Reality, 2007
- Pacific Graphics, 2007
- Symposium on Point-based Graphics, 2007
- Brazilian Symposium on Computer Graphics and Image Processing, 2007
- ACM SIGGRAPH Symposium on Interactive 3D Graphics, 2007
- EG/CPCG Int'l Conference on Computer Graphics Theory and Applications, 2007
- Symposium on Point-based Graphics, 2006
- ACM International Symposium on Mixed and Augmented Reality, 2006
- ACM Symposium on Virtual Reality Software and Technology, 2006
- Pacific Graphics, 2006
- ACM SIGGRAPH Symposium on Interactive 3D Graphics, 2006
- EG/CPCG Int'l Conference on Computer Graphics Theory and Applications, 2006
- Brazilian Symposium on Computer Graphics and Image Processing, 2006
- Symposium on Point-based Graphics, 2005
- ACM International Symposium on Mixed and Augmented Reality, 2005
- ACM SIGGRAPH Symposium on Interactive 3D Graphics, 2005
- Symposium on Point-based Graphics, 2004

*Conference Organization and Participation*

- Co-Organizer, DeepGlobe – CVPR, 2018.
- Papers Co-Chair, SIBGRAPI, 2016

- Papers Co-Chair, ACM SIGGRAPH Symposium on Interactive 3D Graphics 2010
- General Co-Chair, ACM SIGGRAPH Symposium on Interactive 3D Graphics 2009
- Student Stipend Chair, ACM SIGGRAPH Symposium on Interactive 3D Graphics 2008

#### *Grant Funding Panels*

- NSF CISE, NRI, IGERT Panels: 2001 - present
- Peru CONCYTEC (Peruvian NSF equivalent): 2014
- QNRF (Qatar National Research Fund); 2011, 2013

#### *Reviewer (above and beyond the program committees/journal editorial boards served on)*

- ACM SIGGRAPH/ACM Transaction on Graphics, ACM SIGGRAPH courses, ACM Computational Geometry
- IEEE Transactions on Visualization and Computer Graphics, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Computer Graphics and Applications, IEEE Visualization, IEEE Transactions on Image Processing, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Transactions on Multimedia Systems
- Elsevier Image Communication, Computer & Graphics
- Eurographics, Eurographics Rendering Workshop
- International Symposium on 3D Data Processing, Visualization and Transmission

### **Department and University**

- College of Science *Faculty Diversity Committee* 2010-2015; *Committee Chair* Fall 2012-May 2014
- Department *Diversity Chair*, Fall 2010, Spring 2012-present.
- Member of the *Graduate Committee*, August 2008-2010, Purdue University.
- Member of the *Graduate Admissions Committee*, August 2005-May 2008, Purdue University.
- Member of *Undergraduate Committee*, August 2005-May 2007, Purdue University.
- Founder of AMIGOS (Association of Minorities in Graphics and Other Sciences): Aliaga is a Hispanic minority who formed this association (<http://www.cs.purdue.edu/amigos>) using initial funds sponsored by IBM Research and to recruit Hispanics, Latinos, and other minorities interested in computer graphics, computer science, and other sciences. During its first year of inception (academic year 2008-2009), exposed computer graphics and summer employment opportunities to undergraduates (in coalition with USB – Undergraduate Student Board), to Latino Scholars (in cooperation with LaFASA – Latino Faculty and Staff Association at Purdue), to high-school students (as part of SACNAS, Society for the Advancement of Chicanos and Native Americans in Science).
- Representative to Purdue Undergraduate Research Day, November 2005.
- Co-planned the “Live Virtual Tour into the Future” computer graphics demonstration during the inauguration of the Lawson Computer Science Building, October 2003, Purdue University.
- College of Science *Grievance Committee*, August 2005-May 2008.
- Faculty Co-Advisor for Ecuadorians at Purdue University, 2016-present.
- Faculty Co-Advisor for Purdue Tango Milonguera Club, August 2005-2014.
- Guest Lecturer for numerous freshman and honor’s level undergraduate courses (2003-present)

## 9. Fellowships and Awards

- Fulbright Scholar Award, 2018-2019
  - Awarded \$65k in funds for attending University of Tokyo during sabbatical; however, funds returned because performing sabbatical elsewhere.
- Discovery Park Faculty Research Fellow (July 2013-June 2014):
  - Received \$10k in funds and \$25k to offset teaching requirements
- Purdue University Diversity Award (2012)
- OECD Fellowship Recipient (2011):

Received 10,000 euros (approximately \$15,000) from Organisation for Economic Co-operation and Development for “Designing and Visualizing Sustainable Interactions between Agriculture and Urban Areas”.
- Invited Member of Upsilon Pi Epsilon, International Honor Society for the Computer and Information Disciplines (2010)
- Purdue University Undergraduate Advising Award (2009)
- Purdue University Engagement Award (2008)

## 10. Invited Talks/Colloquiums (not including conference nor Purdue talks)

1. “STRONG Cities: Simulation Technologies for the Realization of Next Generation Cities”, Colloquium, *King Abdullah University of Science and Technology (KAUST)*, Saudi Arabia, 2018.
2. “Interactively Designing Future Buildings and Cities”, Keynote, *International Workshop on Visual Computing*, Bogota, Colombia, 2018.
3. “Cities of Tomorrow: Visual Computing for Designing and Modeling Urban Ecosystems”, Keynote, *Peruvian Symposium On Computer Graphics And Imaging*, Arequipa, Peru, 2017.
4. “Cities of Tomorrow: Visual Computing for Designing and Modeling Urban Ecosystems”, Invited Speaker, *Universidad de Tecnologia y Ciencias*, Lima, Peru, 2017
5. “Designing and Modeling Cities of Tomorrow”, Invited Speaker, *Bogota ACM SIGGRAPH*, Bogota, Colombia, 2016.
6. “Designing and Modeling Cities of Tomorrow”, Invited Speaker, *SIBGRAPI*, Brasil, Sao Jose, 2016.
7. “Visual Computing for Designing and Modeling Urban Ecosystems”, Invited Talk, *INRIA – Sophia-Antipolis*, France, July 2015.
8. “What You See Is Not (Necessarily) What You Have”, Invited Talk, *INRIA – Sophia-Antipolis*, France, July 2015.
9. “Designing and Modeling Intelligent Cities”, Invited Talk, *Universidad de Ingenieria y Tecnologia*, Lima, Peru, July, 2013.
10. “Cities of Tomorrow: Visual Computing for Sustainable Urban Ecosystems”, Invited Talk, *National Institute of Informatics*, Tokyo, Japan, July 2013.
11. “Cities of Tomorrow: Visual Computing for Sustainable Urban Ecosystems”, Invited Talk, *Networks and Complex Systems at IU Bloomington, Cyberinfrastructure for Network Science Center*, April, 2013.
12. “Appearance Editing: What you see is not what you have”, Invited Talk, *3<sup>rd</sup> Annual SIGGRAPH Chapter Conference*, Bogota, Colombia, October, 2012.

13. "Appearance Editing", Invited Talk, *UMIACS, Univ. of Maryland at College Park*, July 2012.
14. "Cities of Tomorrow: Visual Computing for Designing Sustainable Urban Ecosystems", Keynote, *National Socio-Environmental Synthesis Center (SESYNC) Workshop: Visualization Technologies to Support Research on Human-Environmental Interactions*, July, 2012.
15. "Appearance Editing", Invited Talk, *ETH Computer Science/Disney Research Lab*, Zurich, Switzerland, November, 2011.
16. "Computational Cities: Geometrical Modeling for Urban Design and Simulation", Invited Talk, *Center for Image Analysis, Uppsala University*, Sweden, September, 2011.
17. "Computational Cities: Geometrical Modeling for Urban Design and Simulation", Invited Talk, *Department of Urban Systems Engineering, Technical University of Compiegne*, Compiegne, France, June, 2011.
18. "Computational Cities: Geometrical Modeling for Urban Design and Simulation", Invited Talk, *Qatar Energy and Environment Institute and Qatar Computing Research Institute*, Qatar Foundation, Doha, Qatar, April, 2011.
19. "Computational Cities: Geometrical Modeling for Urban Design and Simulation", Colloquium Talk, *Department of Informatics, University of Zurich*, Zurich, Switzerland, March, 2011.
20. "Designing Smarter Cities by Integrating Urban Behavioral and Geometrical Simulation", Featured Note, *1st International Conference on Computing for Geospatial Research and Applications*, Washington, DC, June, 2010.
21. "Designing and Modeling Intelligent Cities", Invited Talk, *Department of Architecture, Universidad Central del Ecuador*, Quito, Ecuador, June, 2010.
22. "Designing and Modeling Intelligent Cities", Invited Talk, *Department of Engineering, Universidad Politécnica*, Quito, Ecuador, May, 2010.
23. "Designing and Modeling Intelligent Cities", Invited Talk, *Department of Engineering and Informatics, Universidad Católica*, Quito, Ecuador, May, 2010.
24. "Designing and Modeling Intelligent Cities", Invited Talk, *Department of Informatics, Universidad Católica*, Lima, Peru, May, 2010.
25. "Towards Designing and Modeling Smarter Cities", *Invited Talk, NAVTEQ*, Chicago, IL, April, 2010.
26. "Restoring the Past: A Virtual Restoration Stage for Real-world Objects", Invited Talk, *Department of Computer Science, University of Washington*, Seattle, WA, June, 2009.
27. "Modeling the Appearance and Behavior of Urban Spaces", Invited Talk, *Department of Urban Planning and Public Affairs, University of Washington*, Seattle, WA, June, 2009.
28. "Genuinity Signatures: Designing Signatures for Verifying 3D Object Genuinity", Invited Talk, *Department of Computer Science, ETH*, Zurich, Switzerland, March, 2009.
29. "Changing the Past: Virtual Restoration of Real-World Objects", Invited Talk, *Computer Science and Artificial Intelligence Laboratory*, Massachusetts Institute of Technology, Boston, MA, March 2009.
30. "Changing the Past: Virtual Restoration of Real-World Objects", Invited Talk, *School of Engineering and Applied Sciences, Harvard University*, Boston, MA, March, 2009.
31. "AMUSE: Acquiring and Modeling Urban Simulation Environments", *Notre Dame University, Northwest Indiana Computational Grid Meeting*, August, 2005.
32. "Research Problems and Solutions for Content Generation in 3D Gaming", Invited Talk, *Midway Games*, Chicago, IL, March, 2005.

33. “Plenoptic Stitching”, Department of Computer Science, Invited Talk, *University of North Carolina, Chapel Hill*, NC, May, 2001.
34. “Images for Rendering Acceleration”, Invited Talk, *Department of Computer Science, Johns Hopkins University*, Baltimore, MD, March, 2000.
35. “Image-based Rendering for Interactive Walkthroughs”, Invited Talk, *Department of Computer Science, Princeton University*, Princeton, NJ, March, 2000.
36. “Image-based Rendering for Acceleration”, Invited Talk, *Department of Computer Science, University of Virginia*, Charlottesville, VA, November, 1999.

### **SIGGRAPH/Eurographics Course Presentations (peer reviewed)**

37. “Modeling and Remodeling 3D Worlds”, *ACM SIGGRAPH Course*, Co-organizer and presenter, November, 2017.
38. “Inverse Procedural Modeling of 3D Models for Virtual Worlds”, Co-organizer and presenter, *ACM SIGGRAPH Course*, July, 2016.
39. “Modeling 3D Urban Spaces Using Procedural and Simulation-Based Techniques”, Co-organizer and presenter, *ACM SIGGRAPH Course*, August, 2011 (peer reviewed).
40. “Modeling the Appearance and Behavior of Urban Spaces”, Co-organizer and presenter, *Eurographics State of the Art Report*, Munich, Germany, March, 2009 (peer reviewed).
41. “Interactive Walkthroughs of Large Geometric Datasets”, Co-organizer and presenter, *ACM SIGGRAPH Course*, July, 2000 (peer reviewed).
42. “Interactive Walkthroughs of Large Geometric Datasets”, Co-organizer and presenter, *ACM SIGGRAPH Course*, August, 1999 (peer reviewed).

### **Other presentations**

43. “Future City Systems”, Invited Panel Member and Presenter, *Asia-Pacific Conference on Systems Engineering (APCOSE): Green Growth and Systems Engineering*, October, 2011.
44. “3D Urban Modeling and Simulation”, Guest Lecture, *Chair of Information Architecture, ETH*, Zurich, Switzerland, April, 2011.
45. “Computational Cities: Geometrical Modeling for Urban Design and Simulation”, Guest Lecture, *Chair of Computer Aided Architectural Design, ETH*, Zurich, Switzerland, March, 2011.
46. “Future Novel Applications of PROCAM Systems”, Invited Panel Member, *IEEE International Workshop on Projector-Camera Systems*, June, 2009.
47. “3D Scene Modeling using Pose-free Reconstruction”, presenter, *ACM SIGGRAPH Sketch*, August, 2007 (peer reviewed).
48. “Modeling Repetitive Motions in Real-World 3D Scenes”, presenter, *ACM SIGGRAPH Sketch*, August, 2007 (peer reviewed).
49. “Virtual Backdrops”, presenter, *ACM SIGGRAPH Sketch*, August, 1997 (peer reviewed).

## **11. Students**

### **Graduate Students**

#### **Current Advisee’s**

- Tharindu Mathew, Ph.D. student in Computer Science (estimated graduation 2020).
- Christopher May, Ph.D. student in Computer Science (estimated graduation 2021).

- Xiaowei Zhang, Ph.D. student in Computer Science (estimated graduation in 2021).
- Zixun Yu, Ph.D. student in Computer Science (estimated graduation in 2022).

#### **Former Advisee's**

- Gen Nishida (C.S. Ph.D., 2018), “Interactive Sketching Framework for Static and Dynamic 3D Content Creation”, started GM Cruise.
- Ilke Demir (C.S. Ph.D. 2017), “A Generalized Proceduralization Framework for Urban Models with Applications in Procedural Modeling, Synthesis, and Reconstruction“, started at Facebook.
- Ignacio Garcia-Dorado (C.S. Ph.D. 2015), “SMART CITIES: Inverse Design of 3D Urban Models with Traffic and Weather Simulation “, started at Google Research.
- Carlos Vanegas (C.S. Ph.D. 2012) “Modeling the Appearance and Behavior of Urban Spaces“, started at *UC Berkeley* as a Post-doc, then at a startup: *Syntheticity*.
- Yi-Liu Chao, ABD, on leave since 8/2012, Ph.D. Candidate in Computer Science. Dissertation topic: Ensuring the Genuinity of Physical Objects (qual I/II passed).
- Alvin Law, (C.S. Ph.D., 2011), “Compensation Compliant Appearance Editing of Physical Objects with Arbitrary Shape and Color”, started at *Google*.
- Yi Xu, (C.S., Ph.D., 2010): “Capturing Real-World Dynamic Objects Using Temporally-Coded Photography”, started at *GE Research*.
- Abhinav Jain (C.S., M.S., 2006): “Robotic Image Acquisition”, started at *Rockwell Collins*.
- Daniel Bekins (C.S., M.S., 2005): M.S. Thesis “Build-by-Numbers”, started at *Electronic Arts*.
- Scott Yost (C.S., M.S., 2004): “Mixed-Reality Tabletop”, started at *Microsoft Corporation*.

#### **Current and Former Ph.D. Committee Membership**

- Paul Schmid (E.A.S, Ph.D. candidate, estimated graduation: 2018): investigating impacts of land-surface heterogeneity and urban aerosols on thunderstorms.
- Jae Sung Kim (C.E. Ph.D. 2014): completed PhD. Thesis “Automated Triangulation of Video Imagery by Successive Relative Orientation”, Purdue University.
- Jaeyoung Park (E.C.E. Ph.D., 2013): completed Ph.D. thesis “Effect of Contact Location Information on Haptic Shape Perception”, Purdue University.
- Paul Rosen (C.S., Ph.D., 2010): completed Ph.D. thesis “Improved 3-D Scene Sampling By Camera Model Design”, Purdue Univ., started as *Research Assistant Professor at Univ. of Utah*.
- Mihai Mudure (C.S., Ph.D., 2008): completed Ph.D. thesis “Efficient and Versatile 3D Scene Modeling by Sparse-Depth Dense-Viewpoint Acquisition”, Purdue Univ., started at *Google Inc*.
- Huiying Xu (C.S., Ph.D., 2007): completed Ph.D. thesis “Physically-based model of surface and subsurface scattering”, Purdue University, started at *CISCO Systems Inc*.
- David Gotz (C.S., Ph.D., 2005): completed Ph.D. thesis “Scalable and Adaptive Streaming for Non-linear Media”, University of North Carolina at Chapel Hill, started at *IBM T.J. Watson Research Center*.

#### **Undergraduate and High School Students**

- Jacob Dunbar, (C.S. 2018), “Crowd-Controlled User Interface”, Fall 2017.
- Hareesh Gali, (C.S., 2020), “WUDAPT Portal Development”, Fall 2016, Spring 2017.
- Aahash Ranga (C.S. 2018), “WUDAPT Portal Development”, Fall 2016.
- Zheng Qing Li (C.S., 2016), “Interactive Water Simulation using GPUs”, CS490 Spring 2015.

- Stephen Pinceti (C.S., 2015), “Interactive Volumetric Deformation”, CS490 Spring 2015
- Ben Staiger (Jefferson High School senior in 2012-13, now Purdue freshman, still working in research group), “Appearance Editing”, Summer 2013/Fall 2013.
- David Fifer (C.S. 2014), “Interactive Appearance Editing”, CS490 Fall 2012/Spring 2013.
- Chris May (C.S. 2013), “3D Acquisition and Appearance Editing Engine”, CS490 Spring 2013.
- Yeong-Ouk Kim (C.S. 2013), “Levels of Details for Urban Procedural Modeling”, CS490 Summer 2012, CS490 Fall 2012.
- John McCoy Crofts (C.S. 2012), “Educational Games for Learning Percussion Instruments”, CS490 Spring 2012.
- Andy Feldkamp (C.G.T., 2011), “Procedural Building Modeling”, paid research during 2011.
- Tyler Smith (C.S., 2011), Honors, “GPU-based Photometric Stereo with Unknown Lights” and “Image-based Vision Correction”, CS490 Fall 2010/Spring 2011, paid research during Summer 2011.
- Philip Jarvis (C.S., 2011), “Modeling Trees in Large Urban Spaces”, CS490 Fall 2010.
- Aaron Link (C.S., 2010), Honors, “Procedural Modeling for Coherent Urban Spaces”, paid research and CS490.
- Robert Insley (Math/C.S., 2008), Honors, “Angle-Independent Bundle Adjustment Refinement”, CS490.
- Dat Nyugen, Nitin Nalreja, Nimesh Amin (C.S., 2006): “Portable Mixed Reality”, CS490
- Jamie Gennis (Math/C.S., 2005), worked for 1.5 years on 3D Acquisition Methods, paid research and CS490.
- Paul Ardis (Math/C.S., 2005), “Mobile Mixed Reality”, paid research and CS490.
- Jonathan Deutsch (C.S., 2004): “Mixed-Reality Tablettop”, CS490.
- Darin Rajan (C.S., 2005): “Mobile Image Acquisition”, CS490.

### **Research Staff and Paid Visitors**

- Chris May (C.S., 2013): graphics programmer, hired since Summer 2013.
- Luis Paredes, visiting scholar, “Mobile-Platform Appearance Editing”, Summer 2013.

## **12. Teaching**

### **Purdue University (2003 – present)**

Spring 2018

CS251: Data Structures and Algorithms

Fall 2017

CS334: Fundamentals of Computer Graphics

Spring 2017

CS635: Capturing, Modeling, and Rendering 3D Objects

Fall 2016

CS535: Interactive 3D Computer Graphics

Spring 2016

CS251: Data Structures and Algorithms  
Fall 2015  
CS334: Fundamentals of Computer Graphics  
Spring 2015  
CS636: Capturing, Modeling, and Rendering 3D Objects  
Fall 2014  
CS535: Interactive 3D Computer Graphics  
Spring 2014:  
CS434: Advanced Computer Graphics  
Fall 2013  
CS334: Fundamentals of Computer Graphics  
Spring 2013  
CS434: Advanced Computer Graphics  
CS251: Data Structures and Algorithms  
Fall 2012  
CS535: Interactive 3D Computer Graphics  
Spring 2012  
CS334: Fundamentals of Computer Graphics  
Fall 2010  
CS535: Interactive 3D Computer Graphics  
Spring 2010  
CS635: Capturing, Modeling, and Rendering 3D Objects  
CS197/CS497: Honor's Seminar for Freshman and Undergraduate Honors Research Projects  
Fall 2009  
CS530: Introduction to Scientific Visualization  
Spring 2009  
CS635: Capturing, Modeling, and Rendering 3D Objects  
Fall 2008  
CS334: Fundamentals of Computer Graphics  
Spring 2008  
CS334: Fundamentals of Computer Graphics  
Fall 2008  
CS535: Interactive 3D Computer Graphics  
Spring 2007  
CS635: Capturing, Modeling, and Rendering 3D Objects  
Fall 2006  
CS251: Data Structures and Algorithms  
Spring 2006  
CS490G: Teaching and Learning Tools using Tablet PCs

Fall 2005

CS535: Interactive 3D Computer Graphics

Spring 2005

CS490G: Sketching and Mixed-Reality on Tablet PCs

CS497: Undergraduate Honors Research Projects

Fall 2004

CS590G: Capturing, Modeling, Rendering 3D Objects”, CS590G

CS397/CS497: Undergraduate Honors Research Projects

Spring 2004

CS490T: 3D Sketching on Tablet PCs

CS590M: Model Representations for 3D Objects and Environments

Fall 2003

CS590G: Capturing, Modeling, Rendering 3D Objects

### **University of North Carolina (1991-1999)**

August 2000

ACM SIGGRAPH course “Interactive Walkthroughs of Large Datasets”

August 1999

ACM SIGGRAPH course “Interactive Walkthroughs of Large Datasets”

Summer 1997

CS114: Introduction to Programming

### **Brown University (1987-1991)**

Fall 1989

CS011: Introduction to Computer Science, teaching assistant

Spring 1989

CS012: Fundamentals of Computer Science Architecture, teaching assistant

Fall 1988

CS011: Introduction to Computer Science, teaching assistant

## **13. Miscellaneous**

- Lucent Technologies Global Sciences Scholarship Program Lab Coordinator (2002)
- Lucent Technologies Summer Internship Program Lab Coordinator (2000)
- NSF Science and Technology Center Student Conference Organizer (1992-1993)
- Brown University Computer Science Faculty-Student Liaison (1991)
- ACM Programming Competitions Team Member and International Team Leader (1989, 90, 91)

## **14. Personal**

- Hobbies: vintage computers, woodworking, model trains, martial arts, soccer, mountain biking
- Languages: speak English and Spanish fluently, some ability in German