

Bedrich Benes

June 19, 2023

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Research Interests

Computer graphics, geometric modeling, procedural modeling, generative algorithms, simulation of natural phenomena, digital twins, deep learning, reconstruction, and additive manufacturing.

Education

Ph.D. Computer Science, Czech Technical University in Prague, 1998.

M.S. Computer Science, Czech Technical University in Prague, 1991.

Professional Experience

Jan. 2022 - present
Professor of Department of Computer Science

Aug. 2019 - Dec. 2021
Professor of Department of Computer Science (40%) Purdue University, USA

Apr. 2019 - Dec. 2021
George McNelly Professor of Technology

Dec. 2017 - 2019
Professor of Department of Computer Science (by courtesy) Purdue University, USA

Aug. 2015 - Dec. 2021
Professor of Department of Computer Graphics Technology (60%) Purdue University, USA

Aug. 2010 - Aug. 2015
Associate Professor of Department of Computer Graphics Technology Purdue University, USA

Aug. 2011 - Aug. 2012
Assistant Head of Department of Computer Graphics Technology Purdue University, USA

Aug. 2005 - Aug. 2010

Assistant Professor of Department of Computer Graphics Technology Purdue University, USA

Aug. 2000 - Aug. 2005

Assistant Professor of Department of Computer Science Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Mexico

Jul. 1999 - Jun. 2000

Visiting Professor of Department of Computer Science Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Mexico

Jun. 1998 - Jul. 1999

Assistant Professor of Computer Science Czech Technical University in Prague, Czech Republic

Awards and Honors

2022 Fellow of the European Association for Computer Graphics (Eurographics)

2020 Associate Editor of the Year (Elsevier Computers & Graphics)

2020 Best paper committee Eurographics Symposium on Rendering, “Semi-Procedural Textures Using Point Process Texture Basis Functions”, Honorable mention

2019 George McNelly Professor of Technology (named professorship)

2019 Best paper committee GRAPP “Character Animation in Function Space”, Best paper

2019 ACM, Senior Member

2018 COMPDES, University of San Carlos, Costa Rica, Keynote address,

2017 IEEE, Senior Member

2017 Eurographics 2017, Full papers chair

2017 Best paper committee Eurographics, “Interactive Modeling and Authoring of Climbing Plants”, Honorable mention

2012 Purdue University, Outstanding Award in Discovery

2011 Siggraph Bogota, Keynote address

2011 Purdue University, Faculty Scholar

2011 Purdue University, Outstanding Award in Discovery

2009 Purdue University, Early Faculty Discovery Award

2006 ACM Spring Conference on Computer Graphics, Keynote address

2005 Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM) (Premio Rómulo Garza), Outstanding faculty award in discovery and technical development

2003 Best paper committee of IEEE International Conference Theory and Practice of Computer Graphics, “Modeling Virtual Gardens by Autonomous Procedural Agents”, Best paper, Ken Brodlie award

2003 Campus Ciudad de México of the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Outstanding Faculty in Discovery

2002 Campus Estado de México of the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Outstanding Graduate Advisor

Publications

Journal Articles

1. Mathew, C. D. T., Benes, B., and Aliaga, D. G. (2023). Sketching Vocabulary for Crowd Motion. *Computer Graphics Forum*, 41(8), 119–130.
2. Popescu, V., Magana, A. J., and Benes, B. (2023). Towards Immersive Visualization for Large Lectures: Opportunities, Challenges, and Possible Solutions. In A. Magana and J. Zara (Eds.), *Eurographics 2023 - Education Papers*. The Eurographics Association.
3. Polasek, T., Čadík, M., Keller, Y., and Benes, B. (2023). Vision UFormer: Long-range monocular absolute depth estimation. *Computers & Graphics*, 111, 180–189
4. Gaillard, M., Benes, B., Tross, M. C., and Schnable, J. C. (2023). Multi-view triangulation without correspondences. *Computers and Electronics in Agriculture*, 206, 107688.
5. Niese, T., Pirk, S., Albrecht, M., Benes, B., and Deussen, O. (2022). Procedural Urban Forestry. *ACM Transactions on Graphics*, 41(2).
6. Polasek, T., Hrusa, D., Benes, B., and Cadik, M. (2021). ICTree: Automatic Perceptual Metrics for Tree Models in *ACM Transactions on Graphics*, 40(6)
7. Li, B., Kałużny, J., Klein, J., Michels, D. L., Pałubicki, W., Benes, B., and Pirk, S. (2021). Learning to Reconstruct Botanical Trees from Single Images in *ACM Transactions on Graphics*, 40(6)
8. Liu, Y., Guo, J., Benes, B., Deussen, O., Zhang, X., and Huang, H. (2021). TreePartNet: Neural Decomposition of Point Clouds for 3D Tree Reconstruction in *ACM Transactions on Graphics*, 40(6)
9. Ecomier-Nocca, P., Cordonnier, G., Carrez, P., Moigne, A.-Marie, Memari, P., Benes, B., and Cani, M.-P. (2021). Authoring Consistent Landscapes with Flora and Fauna in *ACM Transactions on Graphics*, 40(4) pp 1-13.
10. Gieseke, L., Asente, P., Mech, R., Benes, B., and Fuchs, M. (2021). A Survey of Control Mechanisms for Creative Pattern Generation in *Computer Graphics Forum*, 40(2)pp 585-609.
11. Kim, H., Dischler, J.-M., Rushmeier, H., and Benes, B. (2021). Edge-based procedural textures in *The Visual Computer*, 37 pp 2595-2606.

12. Wu, F., Gazo, R., Benes, B., and Haviarova, E. (2021). Deep BarkID: a portable tree bark identification system by knowledge distillation in *European Journal of Forest Research*
13. Deva, A., Krs, V., Robison, L., Adorf, C., Benes, B., Glotzer, S. C., and Garcia, E. (2021). Data Driven Analytics of Porous Battery Microstructures in *Energy & Environmental Science*, pp 2485–2493.
14. Wu, F., Gazo, R., Haviarova, E., and Benes, B. (2021). Wood identification based on longitudinal section images by using deep learning in *Wood Science and Technology*, 55 pp 553–563.
15. Kolmanič, S., Strnad, D., Kohek, Š., Benes, B., Hirst, P., and Žalik, B. (2021). An algorithm for automatic dormant tree pruning in *Applied Soft Computing*, 99, 106931.
16. Walsh, Y., Magana, A., Will, H., Yuksel, T., Bryan, L., Berger, E., and Benes, B., (2021) A Learner-Centered Approach for Designing Visuohaptic Simulations for Conceptual Understanding of Truss Structures in *Computer Applications in Engineering Education*, pp 1-22.
17. Lawson, A. P., Mayer, R. E., Adamo-Villani, N., Benes, B., Lei, X., and Cheng, J. (2021). Do Learners Recognize and Relate to the Emotions Displayed By Virtual Instructors? in *International Journal of Artificial Intelligence in Education*, 114, pp 1560–4306.
18. Lawson, A. P., Mayer, R. E., Adamo-Villani, N., Benes, B., Lei, X., and Cheng, J. (2021). Recognizing the emotional state of human and virtual instructors in *Computers in Human Behavior*, 114, 106554.
19. Graciano, A., Rueda, A. J., Pospíšil, A., Bittner, J., and Benes, B. (2021). QuadStack: An Efficient Representation and Direct Rendering of Layered Datasets in *IEEE Transactions on Visualization and Computer Graphics*, 27(9), pp 3733–3744.
20. Guo, J., Jiang, H., Benes, B., Deussen, O., Zhang, X., Lischinski, D., and Huang, H. (2020). Inverse Procedural Modeling of Branching Structures by Inferring L-Systems. in *ACM Transactions on Graphics*, 39(5) pp 1-13.
21. Krs, V., Mech, R., Gaillard, M., Carr, N., and Benes, B. (2020). PICO: Procedural Iterative Constrained Optimizer for Geometric Modeling in *IEEE Transactions on Visualization and Computer Graphics*, 27(10) pp 3968-3981.
22. Guehl, P., Allegre, R., Dischler, J.-M., Benes, B., and Galin, E. (2020). Semi-Procedural Textures Using Point Process Texture Basis Functions in *Computer Graphics Forum*, 39(4), pp 159–171. **Honorable mention from Best Paper Committee**
23. Zhang, X., Shehata, A., Benes, B., and Aliaga, D. (2020). Automatic Deep Inference of Procedural Cities from Global-Scale Spatial Data in *ACM Transactions on Spatial Algorithms and Systems*, 7(2) pp 1-28.
24. Benes, B., Guan, K., Lang, M., Long, S. P., Lynch, J. P., Marshall-Colón, A., Peng, B., Schnable, J., Sweetlove, L. J., and Turk, M. J. (2020). Multiscale computational models can guide experimentation and targeted measurements for crop improvement in *The Plant Journal*, 103(1) pp 21–31.

25. Strnad, D., Štefan Kohek, Benes, B., Kolmanič, S., and Žalik, B. (2020). A framework for multi-objective optimization of virtual tree pruning based on growth simulation in *Expert Systems with Applications*, 162, 113792.
26. Gaillard, M., Miao, C., Schnable, J. C., and Benes, B. (2020). Voxel carving-based 3D reconstruction of sorghum identifies genetic determinants of light interception efficiency in *Plant Direct*, 4(10), e00255.
27. Escobar-Castillejos, D., Noguez, J., Bello, F., Neri, L., Magana, A. J., and Benes, B. (2020). A Review of Training and Guidance Systems in Medical Surgery in *Applied Sciences*, 10(17), 5752.
28. Yoo, I., Fišer, M., Hu, K., and Benes, B. (2020). Character Animation in Function Space in *The Visual Computer*, 37 pp 1432–2315. **Best Paper of GRAPP 2019**
29. Mathew, C. D. T., Benes, B., and Aliaga, D. G. (2020). An output-driven approach to design a swarming model for architectural indoor environments in *Computers & Graphics*, 87, pp 103–110.
30. Gazo, R., Vanek, J., Abdul-Massih, M., and Benes, B. (2020). A fast pith detection for computed tomography scanned hardwood logs in *Computers and Electronics in Agriculture*, 170, 105107.
31. Peytavie, A., Dupont, T., Guérin, E., Cortial, Y., Benes, B., Gain, J., and Galin, E. (2019). Procedural Riverscapes in *Computer Graphics Forum*, 38(7), pp 35–46.
32. Galin, E., Guérin, E., Peytavie, A., Cordonnier, G., Cani, M.-P., Benes, B., Cani, M.-P., and Gain, J., (2019) A review of digital terrain modeling in *Computer Graphics Forum*, 38(2) pp 553-577.
33. Shaik, A. R., Brinkman, D., Sankin, I., Ringhofer, C., Krasikov, D., Kang, H., Benes, B., and Vasileška, D. (2019). PVRD-FASP: A Unified Solver for Modeling Carrier and Defect Transport in Photovoltaic Devices in *IEEE Journal of Photovoltaics*, 9(6) pp 1602–1613.
34. Yuksel, T., Walsh, Y., Magana, A. J., Nova, N., Krs, V., Ngambeki, I., Berger, E. J., and Benes, B. (2019). Visuohaptic experiments: Exploring the effects of visual and haptic feedback on students' learning of friction concepts in *Computer Applications in Engineering Education*, 27(6), 1376–1401.
35. Yeum, C.M., Dyke, S.J., Benes, B., Hacker, T., Ramirez, J., Lund, A., and Pujol, S., (2019) Postevent Reconnaissance Image Documentation Using Automated Classification in *Journal of Performance of Constructed Facilities*, Volume 33(1), pp 3717-3724.
36. Kang, H., and Li, H., Zhang, J., Lu, X., and Benes, B., (2018) FlyCam: Multitouch Gesture Controlled Drone Gimbal Photography in *IEEE Robotics and Automation Letters*, 3(4), pp 3717-3724.
37. Gazo, R., Wells, L., Krs, V., and Benes, B., (2018) Validation of automated hardwood lumber grading system, in *Computers and Electronics in Agriculture*, pp 496–500.

38. Wells, L., Gazo, R., Re, R. D., Krs, V., and Benes, B. (2018). Defect detection performance of automated hardwood lumber grading system, in *Computers and Electronics in Agriculture*, 155, 487–495.
39. Galicia J. A. G., and Benes, B., (2018) Improving Printing Orientation for Fused Deposition Modeling Printers by Analyzing Connected Components, in *Additive Manufacturing*, 22, pp 720-728.
40. Cordonnier, G., Cani, M-P., Benes, B., Braun, J., and Galin, E., (2018) Sculpting Mountains: Interactive Terrain Modeling based on Subsurface Geology, in *IEEE Transactions on Visualization and Computer Graphics*, 24(5), pp 1717 – 1727.
41. Demir, I., Aliaga, D.G., and Benes, B., (2018) Near-Convex Decomposition and Layering for Efficient 3D Printing, in *Additive Manufacturing*, 21, pp 383-395.
42. Cordonnier, G., Ecomier, P., Galin, E., Gain, J., Benes, B., and Cani, M-P., (2018) Interactive Generation of Time-evolving, Snow-Covered Landscapes with Avalanches, in *Computer Graphics Forum*, 37(2), pp 497-509.
43. Hu, K, Yan, D., Bommers, B., Alliez, P., and Benes, B., (2017) Error-Bounded and Feature Preserving Surface Remeshing with Minimal Angle Improvement, in *IEEE Transactions on Visualization and Computer Graphics*, 23(12), pp2560-2573.
44. Guérin, E., Digne, J., Galin, E., Peytavie, A., Wolf, C., Benes, B., and Martinez, B., (2017). Interactive Example-Based Terrain Authoring with Conditional Generative Adversarial Networks, in *ACM Transactions on Graphics*, 36(6), Article 228, 13 pages.
45. Abdul-Massih, M., Yoo, I., and Benes, B., (2017). Motion Style Retargeting to Characters with Different Morphologies, in *Computer Graphics Forum*, 36(6), pp 86-99.
46. Marshall-Colon, A., Long, S. P., Allen, D. K., Allen, G., Beard, D. A., Benes, B., von Caemmerer, S., Christensen, A. J., Cox, D. J., Hart, J. C., Hirst, P. M., Kannan, K., Katz, D. S., Lynch, J. P., Millar, A. J., Panneerselvam, B., Price, N. D., Prusinkiewicz, P., Raila, D., Zhu, X.-G. (2017) Crops In Silico: Generating Virtual Crops Using an Integrative and Multi-scale Modeling Platform, in *Frontiers in Plant Science*, 8, 786.
47. Vojtech Krs, Ersin Yumer, Nathan Carr, Bedrich Benes, and Radomir Mech (2017) Skippy: Single View 3D Curve Interactive Modeling, in *ACM Transactions on Graphics*, 36(4), Article 128, 12 pages.
48. Cordonnier, G., Galin, E., Gain, J., Benes, B., Guerin, E., Peytavie A., and Cani, M.P., (2017) Authoring Landscapes by Combining Ecosystem and Terrain Erosion, in *ACM Transactions on Graphics*, 36(4), pp 134:1-134:12.
49. Cordonnier, G., Cani, M.P., Benes, B., Braun, J., and Galin E., (2017) Sculpting Mountains: Interactive Terrain Modeling based on Subsurface Geology, in *IEEE Transactions on Visualization and Computer Graphics*, 24(5), pp 1756-1769.
50. Pirk, S., Krs, V., Hu, K., Deepak, S.R., Kang, H., Benes, B., Yoshiyasu, Y., and Guibas, L. J. (2017) Understanding and Exploiting Object Interaction Landscapes, in *ACM Transactions on Graphics*, 36(3).

51. Hädrich, T., Benes, B., Deussen, O., and Pirk, S (2017) Interactive Modeling and Authoring of Climbing Plants, in *Computer Graphics Forum*, 36(2), pp 49-61. **Honorable mention from Best Paper Committee**
52. Fišer, M., Ravi, J., Benes, B., Shi, B., and Hirst, P (2017) IMapple: a source-sink developmental model for 'Golden Delicious' apple trees, in *Acta Horticulturae*, 1160, pp51-60.
53. Magana, A., Sanchez, K. L., Shakik, U. A. S., Jones, G. M., Tan, H. Z., Guayaquil, A., and Benes, B., (2017) Exploring Multimedia Principles for Supporting Conceptual Learning of Electricity and Magnetism with Visuohaptic Simulations, in *Computers in Education Journal*, 8(2) pp 8-23.
54. Shaikh, U. A. S., Magana, A. J., Neri, L., Escobar-Castillejos, D., Noguez, J., and Benes, B. (2017). Undergraduate students' conceptual interpretation and perceptions of haptic-enabled learning experiences, in *International Journal of Educational Technology in Higher Education*, 14(1), 15
55. Benes, B., Kasik, D. J., Li, W., and Zhang, H. (2017). Computational Design and Fabrication, in *IEEE Computer Graphics and Applications*, 37(3), 32–33.
56. Nishida, G., Garcia-Dorado, I., Aliaga, D.G., Benes, B., and Bousseau, A., (2016) Interactive Sketching of Urban Procedural Models, in *ACM Transactions on Graphics*, 35(4), Article 130, 11 pages.
57. Zhao, H., Gu, F., Huang, Q., Garcia Galicia, J.A., Chen, Y., Tu, C., Benes, B., Zhang, H., Cohen-Or, D., and Chen, B. (2016) Connected Fermat Spirals for Layered Fabrication, in *ACM Transactions on Graphics*, 35(4), Article 100, 10 pages.
58. Kim, H.; Dorantes, M. J.; Schulze, D. G. and Benes, B. (2016) Computer Graphics Procedural Modeling of Soil Structure, in *Digital Soil Morphometrics*, Springer International Publishing, pp 133-144.
59. Moore, B. A.; Yoo, I.; Tyrrell, L. P.; Benes, B. Fernandez-Juricic, E. (2016) FOVEA: A New Program to Standardize the Measurement of Foveal Pit Morphology, in *PeerJ*, 4, e1785.
60. Abdul-Massih, M., Yoo, I., and Benes, B., (2016). Motion Style Retargeting to Characters with Different Morphologies, in *Computer Graphics Forum*, 36(6), pp86-99.
61. Escobar-Castillejos, D., Noguez, J., Neri, L., Magana, A., and Benes, B., (2016). A Review of Simulators with Haptic Devices for Medical Training, in *Journal of Medical Systems*, 40(4), pp 1-22.
62. Cordonnier, G., Braun, J., Cani, MP., Benes, B., Galin, E., Peytavie, A., and Guerin, E., (2016). Large Scale Terrain Generation from Uplift and Erosion, in *Computer Graphics Forum*, 35(2), pp 165-175.
63. Chen, X., Zhang, H., Lin, J., Hu, R., Lu, L., Huang, Q., Benes, B., Cohen-Or, D., and Chen B., (2015). Dapper: Decompose-and-Pack for 3D Printing, in *ACM Transactions on Graphics*, 34(6), Article 213 12 pages.

64. Grosbellet, F., Peytavie, A., Guerin, E., Galin, E., Merillou, S., and Benes, B., (2015) Environmental Objects for Authoring Procedural Scenes, in *Computer Graphics Forum*, 35(1), pp 296-308.
65. Emilien, A., Vimont, U., Cani, M.P., Poulin, P., and Benes, B., (2015) WorldBrush: Interactive Example-based Synthesis of Procedural Virtual Worlds, in *ACM Transactions on Graphics*, 34(4), Article 106, 11 pages.
66. Demir, I., Aliaga, D. G., and Benes, B., (2015) Coupled Segmentation and Similarity Detection on Architectural Models, in *ACM Transactions on Graphics*, 34(4), Article 104, 11 pages.
67. Skorkovska, V., Kolingerova, I., and Benes, B., (2015) Hydraulic Erosion Modeling on a Triangular Mesh, in *Surface Models for Geosciences Lecture Notes in Geoinformation and Cartography*, pp 237-247.
68. G enevaux, J.D., Galin, E., Peytavie, A., Gu erin, E., Briquet, C., Grosbellet, F., and Benes, B., (2015), Terrain Modeling from Feature Primitives, in *Computer Graphics Forum*, 34(2) pp 198-210.
69. Kratt, J, Spicker, M., Guayaquil, A., Fiser, M., Pirk, S., Deussen, O., Hart, J.C., and Benes, B., (2015) Woodification: User-Controlled Cambial Growth Modeling, in *Computer Graphics Forum*, 34(2), pp 361-372.
70. Yoo, I., Abdul-Massih, M., Ziamtsov, I., Hassan, R., and Benes, B., (2015) Motion Retiming by using Bilateral Time Control Surfaces, in *Computers & Graphics*, 47, pp 59-67.
71. Pirk, S., Niese, T., Hadrich, T., Benes, B., and Deussen O., (2014) Windy Trees: Computing Stress Response for Developmental Tree Models, in *ACM Transactions on Graphics*, 33(6), Article 204.
72. Vanek, J., Garcia, J., and Benes, B., (2014) Clever Support: Efficient Support Structure Generation for Digital Fabrication, in *Computer Graphics Forum*, 33(5), pp 121-133.
73. Vanek, J., Garcia, J., Benes, B., Mech, R., Carr, N., Stava, O., and Miller, G (2014) Pack Merger: A 3D Print Volume Optimizer, in *Computer Graphics Forum*, 33(6), pp 322-332.
74. Zhou, S., Yoo, I., Benes, B., and Chen, G. (2014), A Hybrid Level of Detail Representation for Large-Scale Urban Scenes Rendering, in *the Journal Computer Animation and Virtual Worlds*, 25(3-4), pp 245-255.
75. Popescu, V., Benes, B., Rosen, P., Cui, J., and Wang, L. (2014), A Flexible Pinhole Camera Model for Coherent Non-Uniform Sampling, in *Computer Graphics & Applications*, 34(4), pp 30-41.
76. Stava, O., Pirk, S., Kratt, J., Chen, B., Mech, R., Deussen, O., and Benes, B., (2014) Inverse Procedural Modeling of Trees, in *Computer Graphics Forum*, 33(6), pp 118-131.
77. Benes, B., Aliaga, D. (2014). Foreword to Special Section on Advances in Procedural Modeling, in *Computers & Graphics*, 37(4), pp 2-3.

78. Yoo, I., Vanek, J., Nizotseva, M., Adamo-Villani, N., and Benes, B. (2014). Sketching Human Character Animations by Composing Sequences from Large Motion Database, in *The Visual Computer*, 30(2), pp 212-227.
79. Smelik, R. M., Tutenel, T., Bidarra, R., and Benes, B. (2014) A Survey on Procedural Modelling for Virtual Worlds, in *Computer Graphics Forum*, 33(6), pp 31-50.
80. Genevaux, J-P., Galin, E., Guerin, E., Peytave, A., and Benes, B. (2013). Terrain Generation using Procedural Models based on Hydrology, in *ACM Transactions on Graphics*, 32(4), pp 143:1-143:10.
81. Bojrab, M., Massih M-A., and Benes, B. (2013). Perceptual Importance of Lighting Phenomena in Rendering of Animated Water, in *ACM Transactions on Applied Perceptions*, 10(1), pp 2:1-2:18.
82. Vanegas, C. A., Garcia-Dorado, I., Aliaga, D., Benes, B., and Waddell, P., (2012) Inverse Design of Urban Procedural Models, in *ACM Transactions on Graphics*, 31(6), Article 168, 11 pages
83. Gurney, K., Razlivanov, I., Song, Y., Zhou, Y., Benes, B., and Abdul-Massih, M., (2012) Quantification of fossil fuel CO₂ emissions at the building/street scale for a large US city, in *Environmental Science & Technology*, 46(21), pp 12194–12202.
84. Stava, O., Vanek, J., Benes, B., Carr, N., and Mech, R., (2012). Stress relief: improving structural strength of 3D printable objects, in *ACM Transactions on Graphics*, 31, 4, Article 48, 11 pages.
85. Pirk, S., Stava, O., Kratt, J., Said, M.A., Neubert, B., Mèch, R., Benes, B., and Deussen. O., (2012). Plastic trees: interactive self-adapting botanical tree models, in *ACM Transactions on Graphics*, 31(4), Article 50, 10 pages.
86. Vanegas, C., Aliaga, D., and Benes, B., (2012) Automatic Extraction of Manhattan-World Building Masses from 3D Laser Range Scans, in *IEEE Transactions on Visualization and Computer Graphics*, 18(10), pp 1627-1637.
87. Vanek, J., Benes, B., Herout, A., and Stava, O., (2011) Large-Scale Physics-Based Terrain Editing Using Adaptive Tiles on the GPU, in *IEEE Computer Graphics and Applications*, 31(6), pp35-44.
88. Peytavie, A., Galin, E., Guerin, E., and Benes, B., (2011) Authoring Hierarchical Road Networks, in *Computer Graphics Forum*, 30(7), pp 2021-2030.
89. Liang, Z., Wildeson, I., Colby, R., Ewoldt, R., Zhang, T., Sands, T. D., Stach, E., Benes, B., and Garcia, E., (2011) Built-In Electric Field Minimization in (In,Ga)N Nanoheterostructure, in *NANO Letters*, 11(11), pp 4515–4519.
90. Benes, B., Stava, O., Mech, R., and Miller, G., (2011) Guided Procedural Modeling, in *Computer Graphics Forum*, 30(2), pp 325-334.
91. Vanegas, C., Aliaga, D., Benes, B., Waddell, P., (2009) Interactive Designing and Editing of Urban Spaces using Geometric and Behavioral Modeling, in *ACM Transactions on Graphics*, 28(5) pp 1-10.

92. Stava, O., Benes, B., Mech, R., Aliaga, D., Kristof, P., (2010) Inverse Procedural Modeling by Automatic Generation of L-systems, in *Computer Graphics Forum*, 29(2), pp 665-674.
93. Malkova, M., Parus, J., Kolingerova, I., and Benes, B. (2010) An intuitive Polygon Morphing, in *The Visual Computer*, 26 (3), pp 205-215.
94. Kristof, P., Benes, B., Krivanek, J., and Stava, O. (2009) Hydraulic Erosion Using Smoothed Particle Hydrodynamics, in *Computer Graphics Forum*, 28(2), pp 219-228.
95. Andryscio, N., Gurney, K. R., Benes, B., Corbin, K. (2009) Visual Exploration of the Vulcan CO₂ Data, in *IEEE Computer Graphics & Applications*, 29(1), pp 6-11.
96. Vanegas, C., Aliaga, D. G., Benes, B., and Waddell, P. (2009) Visualization of Simulated Urban Spaces: Inferring Parameterized Generation of Streets, Parcels, and Aerial Imagery, in *IEEE Transactions on Visualization and Computer Graphics*, 15(2), pp 424-435.
97. Aliaga, D. G., Vanegas, C., and Benes, B. (2008) Interactive Example-Based Urban Layout Synthesis, in *ACM Transactions on Graphics*, 27(5), pp 1:106-10:106.
98. Aliaga, D. G., Benes, B., and Vanegas, C. (2008) Interactive Reconfiguration of Urban Layouts, in *IEEE Computer Graphics & Applications*, 28(3), pp 38-47.
99. Hartman, C., and Benes, B. (2006) Autonomous Boids, in *Computer Animation and Virtual Worlds*, 17(3-4), pp 199-206.
100. Benes, B., Tesinsky, V., Hornys, J., and Bhatia, S. K. (2006) Hydraulic Erosion, in *Computer Animation and Virtual Worlds*, 17(2), pp 99-108.
101. Benes, B., Soto, J.M, and Cordoba, A. (2003) Interacting Agents with Memory, in Virtual Ecosystems, in *the Journal of International Conference in Central Europe on Computer Graphics Visualization and Computer Vision (WSCG)*, I (11), pp 49-56.
102. Benes, B., and Forsbach, R. (2002). Visual Simulation of Hydraulic Erosion, in *the Journal of International Conference in Central Europe on Computer Graphics Visualization and Computer Vision (WSCG)*, pp 79-86.
103. Benes, B., and Espinosa E. (2001). Using Particles for 3D Texture Sculpting, in *The Journal of Visualization and Computer Animation*, 12, pp 191-201.

Conference papers

1. Sheng, Y., Zhang, J., Philip, J., Hold-Geoffroy, Y., Sun, X., Zhang, H., Ling, L., and Benes, B. (2023). PixHt-Lab: Pixel Height Based Light Effect Generation for Image Compositing. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*,
2. Firoze, A., Wingren, C., Yeh, R. A., Benes, B., and Aliaga, D. (2023). Tree Instance Segmentation With Temporal Contour Graph. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2193–2202.

3. Yichen, S., Zhang, J., and Benes, B. (2021). SSN: Soft Shadow Network for Image Compositing, in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (Oral Presentation)*, pp 4380–4390.
4. Zhou, X., Chang, P., Cani, M.-P. R., and Benes, B. (2021). Urban Brush: Intuitive and Controllable Urban Layout Editing, in *UIST '21: The 34th Annual ACM Symposium on User Interface Software and Technology* pp 796–814.
5. Paredes, L., Reddy, S. S., Chidambaram, S., Vagholkar, D., Zhang, Y., Benes, B., and Ramani, K. (2021). FabHandWear: An End-to-End Pipeline from Design to Fabrication of Customized Functional Hand Wearables, in *Proc. ACM Interact. Mob. Wearable Ubiquitous Technology*, 5(2).
6. Gaillard, M., Miao, C., Schnable, J., and Benes, B. (2020). Sorghum Segmentation by Skeleton Extraction, in *Computer Vision – ECCV 2020 Workshops*, pp 296–311.
7. Mathew, T., Benes, B., and Aliaga, D. (2020). Interactive Inverse Spatio-Temporal Crowd Motion Design, in *ACM Symposium on Interactive 3D Graphics and Games*, pp 1-9.
8. Zhou, W., Cheng, J., Lei, X., Benes, B., and Adamo, N. (2020). Deep Learning-Based Emotion Recognition from Real-Time Videos, in *Human-Computer Interaction. Multimodal and Natural Interaction*, pp 321–332.
9. Cheng, J., Zhou, W., Lei, X., Adamo, N., and Benes, B. (2020). The Effects of Body Gestures and Gender on Viewer’s Perception of Animated Pedagogical Agent’s Emotions, in *Human-Computer Interaction. Multimodal and Natural Interaction*, pp 169–186.
10. Yoo, I., Fiser, M., Hu, Kaimo, and Benes, B., (2019) Character Animation in Function Space, in *GRAPP 14th International Conference on Computer Graphics Theory and Applications Best Paper of GRAPP 2019*
11. Gaillard, M., Benes, B., Guérin, E., Galin, E., Rohmer, D., and Cani, M.-P., (2019) Dendry: A Procedural Model for Dendritic Patterns, in *ACM Symposium on Interactive 3D Graphics and Games*,
12. Skorkovska, V., Kolingerova, I., and Benes, B., (2018) A Simple and Robust Approach to Computation of Meshes Intersection, in *Proceedings of the 13th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications*, Volume: 1
13. Patil, S., Lee, T., Ramalingam, S., Taguchi, Y., and Benes, B., (2017). Barcode: Global Binary Patterns for Fast Visual Inference, in *Proceedings of the International Conference on 3D Vision (3DV)*, pp 630-639.
14. Demir, I., Aliaga, D. G., and Benes, B. (2017). Proceduralization of urban models, in *25th Signal Processing and Communications Applications Conference*, pp 1–4.
15. Yeum, C. M., Dyke, S. J., Benes, B., Hacker, T., Ramirez, J., Lund, A., and Pujol, S., (2017) Rapid, Automated Post-Event Image Classification and Documentation, in *Proceedings of the 7th AESE International Conference on Experimental Structural Engineering*,

16. Fiër, M., Benes, B., Garcia-Galicia, J., Abdul-Masih, M., Aliaga, D.G., and Krs, V., (2016) Learning Geometric Graph Grammars, in *Proceedings of the 32nd Spring Conference on Computer Graphics*, pp 7-15.
17. Kang, H., Fiser, M., Shi, B., Sheibani, F., Hirst, P., and Benes, B., (2016) IMapple — Functional Structural Model of Apple Trees, in *Proceedings of the IEEE International Conference on Functional-Structural Plant Growth Modeling, Simulation, Visualization and Applications*, pp 90-97.
18. Yeum, C. M., Dyke, S. J., Ramirez, J., and Benes, B. (2016). Big visual data analytics for damage classification in civil engineering, in *Transforming the Future of Infrastructure through Smarter Information: Proceedings of the International Conference on Smart Infrastructure and Construction*, pp 569–574.
19. Demir, I., Aliaga, D. G., and Benes, B. (2016). Proceduralization for editing 3d architectural models, in *Fourth International Conference on 3D Vision*, pp 194–202.
20. Demir, I., Aliaga, D.G., and Benes, B., (2015). Procedural Editing of 3D Building Point Clouds. International Conference on Computer Vision, in *Proceedings of the IEEE International Conference on Computer Vision*, pp 2147-2155.
21. Zhuo, H., Zhou, S., Benes, B., and Whittinghill, D., (2015). User-assisted Inverse Procedural Facade Modeling and Compressed Image Rendering, in *Advances in Visual Computing (ISVC)*, Lecture Notes in Computer Science, vol 9475.
22. Demir, I., Aliaga, D. G., and Benes, B., (2014) Proceduralization at City Scale, in *Proceedings of the 2nd International Conference on 3D Vision*, pp 456-463.
23. Gazo,R., Benes. B. (2013). Computed tomography log scanning: An industrial application, in *Proceedings of ISCHP 2013 – 4th International Scientific Conference on Hardwood Processing*, pp 140-147.
24. Kristof, P., Benes, B., Song, X.C., and Zhao, L. A. (2013) A system for large-scale visualization of streaming Doppler data, in *Proceedings of the IEEE International Conference on Big Data*, pp 33-40.
25. Vanegas, C., Aliaga, D., Benes, B., (2010) Building Reconstruction using Manhattan-World Grammars, in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp 358-365.
26. Andryscio, N., Rosen, P., Popescu, V., Benes, B., and Gurney, K., (2011) Experiences in Disseminating Educational Visualizations, in *Advances in Visual Computing (ISVC)*, Lecture Notes in Computer Science, vol 6939, pp 239-248.
27. Masih, M. A., Benes, B., Zhang, T., Platzer, C., Leavenworth, W., Garcia, R.E., and Zhiwen, L., (2011) Augmenting Heteronanostructure Visualization with Haptic Feedback, in *Advances in Visual Computing (ISVC)*, Lecture Notes in Computer Science, vol 6939, pp 627-636.
28. Benes, B., Masih, M-A., Jarvis, P., Aliaga, D.G., and Vanegas, C., (2011) Urban Ecosystem Design, in *Proceedings of the ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D)*, pp 167-174.

29. Benes, B., Andryscio, N., and Stava, O. (2009) Interactive Modeling of Virtual Ecosystems, in *Proceedings of the Eurographics Workshop on Natural Phenomena*, pp 9-16.
30. Stava, O., Benes, B., Brisbin, M., and Krivanek, J. (2008). Interactive Terrain Modeling Using Hydraulic Erosion, in *Proceedings of the Eurographics/SIGGRAPH Symposium on Computer Animation*, pp 201-210.
31. Sundaram, V., Ru, Y., Benes, B., Zhao, L., Song, X. C., Park, T., Bertoline, G., and Huber, M. (2008) System for Near Real-Time 3D Visualization of NEXRAD Level II Data Using TeraGrid, in *Proceedings of the TeraGrid Conference*, pp 9-13.
32. Benes, B. (2007) Hydraulic Erosion Using Shallow-Water Equation Simulation, in *Proceedings of the Workshop on Virtual Reality Interactions and Physical Simulation*, pp 43-50.
33. Brisbin, M., and Benes, B. (2007) Interval-Based Motion Blending for Grasping, in *Proceedings of the Theory and Practice of Computer Graphics*, Eurographics, pp 201-205.
34. Dorjgotov, E., Benes, B., and Madhavan, K. (2007) An Immersive Granular Material Visualization System with Haptic Feedback, in *Proceedings of the Theory and Practice of Computer Graphics*, Eurographics, pp 107-113.
35. Foldes, D., and Benes, B. (2007) Occlusion-Based Snow Accumulation Simulation, in *Proceedings of the Workshop on Virtual Reality Interactions and Physical Simulation*, Eurographics, pp 35-41.
36. Benes, B., and Tesinsky, V. (2006) Compression Scheme for Volumetric Animations of Running Water, in *Proceedings of the Computational Imaging and Vision*, (32), Springer-Verlag, pp 2063-1068.
37. Kolingerova, I., Marz, P., and Benes, B. (2005) Tensor Product Surfaces as Rewriting Process, in *Proceedings of the 22nd Spring Conference on Computer Graphics*, pp 107-112.
38. Benes, B., Dorjgotov, E., Arns, L., and Bertoline, G. (2006) Granular Material Interactive Manipulation: Touching Sand with Haptic Feedback, in *Proceedings of International Conference in Central Europe on Computer Graphics Visualization and Computer Vision (WSCG)*, pp 295-304.
39. Benes, B., and Arriaga, X. (2005) Table Mountains by Virtual Erosion, in *Proceedings of the Eurographics Workshop on Natural Phenomena*, pp 33-40.
40. Benes, B., Gomez, N. (2005) GI-Collide: Collision Detection with Geometry Images, in *Proceedings of the Spring Conference on Computer Graphics*, pp 95-102.
41. Hernandez, E., and Benes, B. (2005) Robin Hood's Algorithm for Time-Critical Level of Detail, in *Proceedings of Graphicon*
42. Benes, B., and Soto, J. M. (2004) Clustering in Virtual Ecosystems, in *Proceedings of the International Conference in Central Europe on Computer Graphics Visualization and Computer Vision (WSCG) Short Communication Papers*, I (11), pp 10-21.

43. Benes, B., and Roa, T. (2004) Simulating Desert Scenery, in *Proceedings of the International Conference in Central Europe on Computer Graphics Visualization and Computer Vision (WSCG) Short Communication Papers*, I (11), pp 110-119.
44. Zara, J., Benes, B., and Rodarte, R. R. (2004) Virtual Campeche: A web-based Virtual Three Dimensional Tour, in *Proceedings of the IEEE Fifth Mexican International Conference in Computer Science - ENC*, pp 133-140.
45. Benes, B., and Espinosa, E. (2003) Modeling Virtual Ecosystems with Proactive Guidance of Agents, in *Proceedings of the IEEE Computer Animation and Social Agents*, pp 23-35.
46. Benes, B., Soto, J. M, and Cordoba, A. (2003) Modeling Virtual Gardens by Autonomous Procedural Agents, in *Proceedings of the IEEE Theory and Practice of Computer Graphics*, pp 73-85. **Ken Brodli prize for the best paper**
47. Benes, B. (2002) A Stable Modeling of Large Plant Ecosystems, in *Proceedings of the International Conference on Computer Vision and Graphics*, pp 94-101.
48. Benes, B., and Millan, E. (2002) Virtual Climbing Plants Competing for Space, in *Proceedings of the IEEE Symposium on Computer Animation*, pp 33-42.
49. Benes, B., and Forsbach, R. (2001) Parallel Implementation of Terrain Erosion Applied to the Surface of Mars, in *Proceedings of Afrigraph*, pp 53-57.
50. Benes, B. an Forsbach, R. (2001) Layered Data Representation for Visual Simulation of Terrain Erosion, in *Proceedings of the IEEE Spring Conference on Computer Graphics*, pp 80-86.
51. Benes, B. (1998) Skylight Approximation for Simulation of Plant Development, in *Proceedings of the IEEE Conference on Information Visualization*, pp 146-150.
52. Benes, B. (1998) Direct Illumination of Dense Foliage Using Z-buffer, in *Proceedings of the Spring Conference on Computer Graphics*, pp 237-246.
53. Benes, B. (1997) Visual Simulation of Plant Development with Respect to Influence of Light, in *Proceedings of the Computer Animation and Simulation*, Springer-Verlag, pp 125-136.
54. Benes, B. (1997) Fast Estimation of Light in Simulation of Plant Development, in *Proceedings of the International Conference in Central Europe on Computer Graphics Visualization and Computer Vision (WSCG)*, pp 1-10.
55. Marak, I., Benes, B., and Slavik, P. (1997) Terrain Erosion Model Based on Rewriting of Matrices, in *Proceedings of the International Conference in Central Europe on Computer Graphics Visualization and Computer Vision (WSCG)*, pp 341-351.
56. Benes, B., Marak, I., Simek, and Slavik, P. (1997) Hierarchical Erosion of Synthetic Terrains, in *Proceedings of the Spring Conference of Computer Graphics*, pp 93-100.
57. Benes, B. (1996) An Efficient Estimation of Light in Simulation of Plant Development, in *Proceedings of the Computer Animation and Simulation*, Springer-Verlag, pp 153-165.

Refereed Conference Papers in Education

1. Adamo, N., Benes, B., Mayer, R. E., Lei, X., Wang, Z., Meyer, Z., and Lawson, A. (2021). Multimodal Affective Pedagogical Agents for Different Types of Learners, in *Intelligent Human Systems Integration*, pp 218–224 Springer International Publishing.
2. Felkel, P., Magana, A.J., Folta, M., Sears, A.G., and Benes, B., (2018) I3T: Using Interactive Computer Graphics to Teach Geometric Transformations, in *Proceedings of Eurographics Education Papers*
3. Neri, L., Magana, A., Noguez, J., Walsh, Y., Gonzalez-Nucamendi, A., Robledo-Rella, V., and Benes, B., (2018) Visuo-haptic Simulations to Improve Students' Understanding of Friction Concepts, in *Proceedings of the IEEE-ERM 48th Annual Frontiers in Education (FIE)*
4. Walsh, Y., Magana, A. J., Quintana, J. P., Krs, V., Silva Coutinho, G., Berger, E. J., Ngambeki, I., Efendy, E., and Benes, B. (2018). Designing visuohaptic simulations for promoting graphical representations and conceptual understanding of structural analysis, in *Proceedings of the IEEE-ERM 48th Annual Frontiers in Education (FIE)*
5. Yuksel, T., Walsh, Y., Krs, V., Benes, B., Ngambeki, I., Berger, E., and Magana, A., (2017) Exploration of Affordances of Visuo-Haptic Simulations to Learn Concept of Friction, in *Proceedings of the IEEE-ERM 47th Annual Frontiers in Education (FIE)*
6. Neri, L., Escobar-Castillejos, D., Noguez, J., Shaikh, U.A.S., Magana, A.J., and Benes, B. (2015). Improving the learning of physics concepts using haptic devices, in *Proceedings of the 45th Annual Frontiers in Education (FIE)*

Books and Book Chapters

1. Stava, O., and Benes, B., (2010) Connected Component Labeling in CUDA, Chapter in *GPU Computing Gems*
2. Stava, O., Benes, B., and Krivanek, J., (2009) Interactive Erosion Simulation on the Graphical Processing Unit, Chapter in *ShaderX7 advanced rendering techniques*, Charles River Media
3. Žára, J., Benes, B., Sochor, J., Felkel,P., (2004) **Modern Computer Graphics 2nd edition**, Computer Press **an official textbook of computer graphics in Czech and Slovak republic**
4. Žára, J., Benes, B., Felkel,P., (1998) *Modern Computer Graphics*, Computer Press
5. Žára, J., Benes, B., Limpouch, T., Werner, T., (1992) *Computer Graphics - Principles and Algorithms*, Grada 1992

Invited Presentations

2021 Yale University, Generative Methods in Computer Graphics (virtual talk)

2021 Purdue Digital Forestry Initiative, Deep Learning-based Reconstruction of Tree Geometry from Images and Point Clouds (virtual talk)

- 2020 Mexican International Conference on AI, (one day tutorial) Inverse Procedural Modeling in Computer Graphics (virtual talk)
- 2020 University of Nebraska-Lincoln, Modeling Plants in Computer Graphics
- 2019 Shenzhen University, China – A State of the Art in Digital Terrain Modeling
- 2018 Shenzhen University, China – Modeling Plant Life in Computer Graphics
- 2018 Keynote address, COMPDES, University of San Carlos, Costa Rica
- 2018 University of Magdalena Colombia – Geometric Models in Additive Manufacturing
- 2018 Purdue University - Digital Agriculture Forum, Inverse Procedural Modeling
- 2017 Czech Technical University in Prague – Virtual Life of Plants
- 2015 Tecnológico de Monterrey - Inverse Procedural Modeling
- 2014 Indiana Horticultural Congress - Self-Adapting Botanical Tree Models in Comp. Graphics
- 2013 INRIA Grenoble, IMAGINE - Inverse Procedural Modeling
- 2013 Czech Technical University in Prague - Inverse Procedural Modeling
- 2012 University of San Juan Bogota - Complex Cities, Biologically-Based Plants, and Terrain Modeling for Computer Graphics
- 2011 Back to Class - New and Improved: How Computer Graphics Technology is Changing Everyday Life - Purdue President's Council
- 2011 Keynote address, Siggraph Bogota
- 2011 Delft University - Inverse Procedural Modeling
- 2011 The Best of Eurographics at FMX - 16th Conference on Animation, Effects, Games and Interactive Media
- 2011 Department of Computer Science, University of Konstanz Germany
- 2010 Virtual Landscaping, at the International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision
- 2009 Computer Graphics Applications in Forestry Products, at Purdue University, Department of Forestry
- 2007 Hydraulic Erosion in Computer Graphics at Brigham Young University, Department of Computer Science
- 2006 Keynote address, ACM Spring Conference on Computer Graphics
- 2005 Computer Graphics at the V Simposium de Computación
- 2005 Hydraulic Erosion at St. Louis University, Department of Computer Science

2004 Computer Graphics, Segundo Congreso de Ingenieria en Sistemas Computacionales Instituto Tecnológico Superior de Poza Rica, México

2003 Artificial Life and Computer Graphics at Telecomunicaciones Electrónica y Computación, México

2000 Artificial Life and Computer Graphics at Mexican International Conference on Artificial Intelligence, MICAI 2000

1999 Virtual Plants, Charles University Prague, Faculty of Biology, Czech Republic

1995 Modeling of plant development Technical University Delft, Netherlands

Sponsored Research

Productive Online Teamwork Engagement Through Intelligent Mediation

National Science Foundation/OAC, co-PI
\$850,000 (35% of total), 2021-2024

Optimizing 3D Canopy Architecture for Better Crops

Agricultural Genome to Phenome Initiative, PI
\$20,000, 2021-2022

Crops in Silico

Foundation for Food and Agricultural Research, co-PI
\$5,000,000 (8% of total), 2019-2022

Elements: Data: Integrating Human and Machine for Post-Disaster Visual Data Analytics: A Modern Media-Oriented Approach

National Science Foundation/OAC, co-PI
\$597,955 (30% of total), 2019-2022

Functional Proceduralization of 3D Geometric Models

National Science Foundation/CISE/CHS, co-PI
\$499,937 (50% of total), 2018-2022

Multimodal Affective Pedagogical Agents for Different Types of Learners

National Science Foundation/CISE/IIS, co-PI
\$758,823 (total), \$498,823 (Purdue, 50% of Purdue part) 2018-2022

Development of a 3D Printer for Polymer Structure and Polymer Computation - Purdue PolymerMakers

National Science Foundation/CNS/MRI, co-PI
\$1,867,017 (20% of total), 2017-2022

Inverse Procedural Material Modeling for Battery Design

National Science Foundation/CISE/IIS, PI
\$250,000 (total) \$150,000 (Purdue, 50% of Purdue part), 2017-2018

Solution for Predictive Physical Modeling in CDTE and Other Thin-Film PV Technologies

Department of Energy, co-PI

\$325,081 (total), \$160,051 (Purdue, 100% of Purdue part) 2016-2019

CDS&E: Enabling Time-critical Decision-support for Disaster Response and Structural Engineering

National Science Foundation/CMMI, co-PI

\$299,999 (40% of total) 2016-2019

Haptic-Based Learning Experiences as Cognitive Mediators for Conceptual Understanding and Representational Competence in Engineering Education

National Science Foundation/EEC, co-PI

\$325,081 (25% of total), 2016-2019

Enhancing Computer Graphics Education with Many Integrated Core Computing

Intel Inc., PI

\$20,000 (100% of total) unrestricted gift, 2014-2017

Software Analysis for 3D Printing

Siemens, PI

\$55,000 (100% of total), 2014-2015

Optimizations for Additive Manufacturing, Advancing Purdue Research Enterprise

Purdue University, PI

\$34,000 (100% of total), 2014-15

Integrating Spatial Educational Experiences (Isee) - Mapping a New Approach to Teaching and Learning Soil Science

USDA/HECG, co-PI

\$629,619 (6% of total), 2013-2015

Procedural Modeling

Adobe Research, PI

\$150,000 (100% of total), unrestricted gift 2008-2021

Integrating Spatial Education Experience (ISEE) into Crop, Soil, and Environmental Science Curricula

USDA/HECG, co-PI

\$312,607 (5% of total), 2008-2011

Integrating Behavioral, Geometrical and Graphical Modeling to Simulate and Visualize Urban Areas,

National Science Foundation/CISE/IIS, co-PI

\$990,000 (total), \$449,818 (Purdue, 50% of Purdue part), 2010-2013

Urban Simulation Visualization

Metropolitan Transportation Commission, co-PI

\$285,000 (50% of total), 2010-2013

A Global High-Resolution Fossil Fuel CO₂ Inventory Built from assimilation of in Situ and Remotely-Sensed Datasets to Advance Satellite Greenhouse Gas Detection Support Systems

NASA, co-PI

\$997,440 (20% of total), 2007-2011

Service

Journal Editorial Boards

2022-present Editor-in-Chief of Graphical Models (Elsevier)

2020-2022 The Coaching and Resource Network Mentor (Purdue University)

Jan. 2018-Dec. 2021 Editor-in-Chief of Computer Graphics Forum (Wiley)

2021-2023 Associate Editor of Transactions on Games (IEEE)

2018-present Associate Editor of in Silico Plants (Oxford Academic)

2014-2017 Associate Editor of Computer Graphics Forum (Blackwell)

2012-present Associate Editor of Computers & Graphics (Elsevier)

2012-2016 Associate Editor of Computer Animation and Virtual Worlds (Wiley)

2016 Associate Editor of Computer Graphics Applications,
Special Issue on Computational Design and Fabrication Meet Computer Graphics (IEEE)

2012 Associate Editor of Computers & Graphics,
Special Issue on Procedural Modeling (Elsevier)

Conference Chair

2017 Eurographics, full papers chair

Program Committees

2019 International Conference on Geometric Modeling and Processing, PC member

2017 VisiGrapp, PC member

2015-present Symposium on Geometry Processing, PC member

2015 Siggraph Asia, PC member

2014, 17-21 Workshop on Procedural Content Generation in Games, PC member

2013, 14, 17, 21 Siggraph, PC member

2012, 13 Extreme Science and Engineering Discovery Environment (XSEDE), PC member

2012-present Computer Graphics International (CGI), PC member

2007, 10, 12-17 Eurographics, PC member

2007 Eurographics Animation Theater, PC member

2006-2010 Eurographics Workshop on Natural Phenomena, PC member

2005 Central European Multimedia and Virtual Reality Conference, PC member

2004-2013 Workshop in VR Interactions and Physical Simulations, PC member

Journal Reviewing

2017-present Journal of Microscopy

2016-present Digital Applications in Archaeology and Cultural Heritage

2016-present Plos One

2015-present Shape Modeling International

2015-present Computer Aided Design

2015 ACM Cultural Heritage

2015-present Additive Manufacturing

2012-present IEEE Transactions on Visualization and Computer Graphics

2011 ACM Journal of Computing and Cultural Heritage

2011 International Journal of Computational Fluid Dynamics

2010-present IEEE Computer Graphics & Applications

2009 Journal of Plant Physiology

2008 Journal of Virtual Reality and Broadcasting

2009-present Journal of Pattern Recognition

2009-present Journal of Computer Graphics and Virtual Worlds

2005-present ACM Transactions on Graphics

2005-present Computer Graphics Forum

2007-present Computer Graphics and Visualization

2002-2003 ACM SIGGRAPH Course

Proposal Reviewing

Natural Sciences and Engineering Research Council of Canada
King Abdullah University of Science and Technology
National Science Foundation
National Institutes of Health
Consejo Nacional de Ciencia y Tecnología (Mexico)
Czech Ministry of Education (Czech Rep)

Outreach

2020-2021 Graduate Chair (Purdue Computer Science)
2020-2021 Head of the search for HCI (Purdue Polytechnic)
2018-present Promotion and Tenure Committee (Purdue Polytechnic)
2017-2019 Research Integrity Committee (Purdue Provost)
2017-2018 Graduate Chair (Purdue Computer Graphics Technology)
2015-2017 Graduate Council (Purdue University)
2015-2017 Executive Committee Computational Interdisciplinary Graduate Programs (Purdue University)
2014-2016 Academic Senate (Purdue College of Technology)
2014-present Grade Appeal Committee (Purdue Polytechnic)
2013-2014 Search and Screen committee (Purdue C&IT)
2012-2013 Head of the search for Associate Dean of Research (Purdue College of Technology)
2011-2012 Graduate chair (Purdue Computer Graphics Technology)
2011-2013 Grievance committee (Purdue College of Technology)
2011-2012 Assistant head of department (Purdue Computer Graphics Technology)
2010-2013 Grievance committee (Purdue Computer Graphics Technology)
2005-2007 Curriculum committee (Purdue Computer Graphics Technology)
2005-2018 Search and Screen committee (Purdue Computer Graphics Technology)

Professional societies

IEEE, Senior member

ACM, Senior member

Eurographics, member

Teaching and Students

Course Development

Artificial Intelligence for Computer Graphics (CGT 581-AI4CG), Graduate Course, 2021

Advanced Computer Graphics (CS 434), Graduate course, 2021

Generative Methods in Computer Graphics (CS 590-CGS), Graduate Course, 2020

Foundations of Computer Graphics Technology (CGT 101), Undergraduate Course, 2019

Parallel graphics and simulation (CGT 581-I), Graduate course, 2017

Geometric modeling (CGT 581-G), Graduate course, 2014, 2015, 2018

Graphics processing unit computing (CGT 620), Graduate course, 2010, 2011, 2013, 2014, 2017, 2020

Applied perceptualization (CGT 581-8), Graduate course, 2010, 2011, 2016

Introduction to computer graphics Programming (CGT 215), Undergraduate course, 2006, 2008-21

Computer graphics programming (CGT 520), Graduate course, 2006, 2007, 2008, 2009, 2010, 2012, 2016

Advanced computer graphics programming (CGT 521), Graduate course, 2008, 2009, 2010, 2013

Digital lighting and rendering (CGT 340), Undergraduate course, 2005, 2006-2x, 2007-2x, 2008-2x, 2009, 2012

The development of graphics in technology (CGT 511), 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012

Programming in OpenGL (ITESM, Mexico), 2002, 2003, 2004

Realistic Image Synthesis (ITESM, Mexico), 2002, 2003

Teaching

(S-spring, F-fall, CS - Computer Science at Purdue, CGT-Comp. Graphics Technology at Purdue, ITESM-Tec de Monterrey México)

Artificial Intelligence for Computer Graphics (CGT 581-AI4CG), Graduate Course, CGT
F21 (20 Students)

Advanced Computer Graphics (CS 434), Graduate Course, CS
S21 (11 Students)

Generative Methods in Computer Graphics (CS 590-CGS), Graduate Course, CS
S20 (15 Students)

Foundations of Computer Graphics Technology (CGT 101), Undergraduate course, CGT
F19 (149 students)

Geometric modeling (CGT 581-G), Graduate course, CGT
S18 (12 students), F15 (10 students), F14 (6 students)

Parallel Graphics and Simulation (CGT 581-I), Graduate course, CGT
S17 (6 students)

Advanced Computer Graphics Programming (CGT 521), Graduate course, CGT
F12 (9 students), S12 (8 students), S10 (13 students, S09 (16 students), F06 (12 students)

Computer Graphics Programming (CGT 520), Graduate course, CGT
F16 (14 students), F11 (8 students), F10 (8 students), F09 (8 students), S08 (12 students), S07
(10 students)

The development of graphics in technology (CGT 511), Graduate course, CGT
F12 (22 students), F11 (16 students), F10 (20 students), F09 (23 students), F08 (15 students),
F07 (7 students), F06 (11 students)

Graphics processing unit computing (CGT 620), Graduate course, CGT
F20 (10 students), F14 (5 students), S13 (6 students), F11 (11 students), S11 (5 students), S10
(9 students)

Applied Perceptualization (CGT 581-8), Graduate course, CGT
S16 (10 students), S11 (14 students)

Introduction to Computer Graphics Programming (CGT 215), Undergraduate course, CGT
F20 (81 students), S19 (40 students), F19 (149 students), F18 (150 students), S18 (35 students),
F17 (60 students), S16 (32 students), F15 (53 students), S15 (29 students), S06 (14 students)

Digital Lighting and Rendering (CGT 340), Undergraduate course, CGT
S13 (17 students), S09 (23 students), F08 (27 students), S08 (25 students), F07 (34 students),
S07 (27 students), F06 (14 students), S06 (18 students), F05 (30 students)

Programming in OpenGL, Graduate course, ITESM
F04 (17 students), S04 (9 students), F02 (22 students), S02 (9 students)

Real Time Computer Graphics, Graduate course, ITESM
F03 (16 students)

Realistic Image Synthesis, Graduate course, ITESM
F03 (6 students)

Data Structures, Undergraduate course, ITESM
F03 (30 students), F02 (20 students), S02 (25 students)

Current Graduate Students

Mathieu Gaillard (Purdue CS), PhD student

Jae Joong Lee (Purdue CS), PhD student

Bosheng Li (Purdue CS), PhD student

Yichen Sheng (Purdue CS), PhD student

Xiaochen Zhou (Purdue CS), PhD student

Zhiquan Wang (Purdue Polytechnic), PhD student

Sandeep Malatesh Nadig (CGT), MS student

Ian Andrew Ostermann (CGT), MS student

Graduated Students

Ondrej Stava

Degree: (Polytechnic) PhD, Jul 2012

Research project: Inverse procedural modeling of trees

Currently at: Google, Inc.

Juraj Vanek

Degree: (Polytechnic) PhD, Apr 2014

Research project: 3D Model Optimization for 3D Printing

Currently at: Arevo Labs, Inc.

Michel Abdul

Degree: (Polytechnic) PhD, Jul 2014

Research project: Motion Style Retargeting

Currently at: Square Enix, Inc.

Innfarn Yoo

Degree: (Polytechnic) PhD, Jul 2015

Research project: Motion Pipeline: Searching, Editing, Representation, and Synthesis.

Currently at: Nvidia, Inc.

Jorge Garcia

Degree: (Polytechnic) PhD, Jul 2017

Research project: 3D Printing Speed Optimization by Minimizing Void Paths

Currently at: Nvidia, Inc.

Hansoo Kim

Degree: (Polytechnic) PhD, Dec 2017

Research project: Edge-based inverse procedural texture synthesis

Currently at: Google, Inc.

Vojtech Krs

Degree: (Polytechnic) PhD, May 2019

Currently at: Adobe Research

Hao Kang

Degree: (Polytechnic) PhD, May 2019

Currently at: Wormplex AI Research

Suren Deepak Rajasekaran

Degree: (Polytechnic) PhD, May 2019

Currently at Sony Research

Served on PhD committees of 23 PhD students (CTU Prague, Delft University, Inria, King Abdullah University of Science and Technology, Purdue CS, Purdue Mechanical Eng., and Purdue Materials Eng.)

Graduated 54 MS students with thesis.

Served on MS committees of 51 MS students with thesis.