

# Marc Alexa

## Curriculum vitae

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### Education

- 1998 – 2002 **PhD**, *Darmstadt University of Technology*, Germany, *summa cum laude*.  
Advisor Prof. Dr.-Ing. Dr. h.c. Dr. E.h. J.L. Encarnação  
Co-advisor Prof. Dr. Markus Gross, ETH Zürich  
Topic: “Shape Spaces from Morphing”
- 1993 – 1997 **MSc**, *Darmstadt University of Technology*, Germany, *with honors*.

### Experience

- 2021 – **Professor of Mathematics**, *Technical University of Berlin*, Germany, Faculty II – Mathematics and Natural Sciences.  
Courtesy appointment
- 2005 – **Professor of Computer Science, Chair of “Computer Graphics”**, *Technical University of Berlin*, Germany, Faculty IV – EE & CS.  
Associate Professor 2005–2010, Full Professor since 2010
- 2011 – 2012 **Visiting Faculty**, *University of Toronto*, Canada, [DGP](#).
- 2009 – 2010 **Visiting Faculty**, *ETH Zurich*, Switzerland, [CGL](#).
- 2002 – 2005 **Assistant Professor of Computer Science**, *Darmstadt University of Technology*, Germany.  
Leading the efforts in Discrete Geometric Modeling
- 2001 – 2002 **Group leader “3d graphics computing”**, *Darmstadt University of Technology*, Germany, Department of CS.
- 1999,2000,2001 **Guest faculty**, *Rhode Island School of Design*, USA, [ICPNM](#).

### Research visits

- 2011–2012 **Host: Prof. Eugene Fiume**, *University of Toronto & Disney Research Boston*, Canada/USA.  
Various projects within [Disney Research Boston](#) and the DGP lab at UofT
- 2009–2010 **Host: Prof. Markus Gross**, *Disney Research Zurich & ETH Zurich*, Switzerland.  
Various projects within [Disney Research Zurich](#) and the CGL Lab at ETH
- 2009 **Host: Prof. Jessica Hodgins**, *Disney Research Pittsburgh & Carnegie Mellon University*, USA.  
Various projects within [Disney Research Pittsburgh](#) and the Robotics Lab at CMU
- 2007 **Host: Joe Marks (VP Disney Research)**, *Walt Disney Feature Animation, Burbank, CA, USA, USA*.  
Sketch-based geometric modeling
- 2004 **Host: Prof. Peter Schröder**, *California Institute of Technology, Department of Computer Science*, USA.  
Differential Geometry for discrete or noisy surfaces

- 2003 **Hosts: Prof. Daniel Cohen-Or and Prof. David Levin**, *Tel Aviv University, School of Computer Science*, Israel.  
Geometry synthesis using stochastic models
- 2002 **Host: Prof. Greg Turk**, *Georgia Institute of Technology, College of Computing*, USA.  
Hierarchical implicit geometry approximation
- 2000 **Hosts: Prof. Daniel Cohen-Or and Prof. David Levin**, *Tel Aviv University, School of Computer Science*, Israel.  
Geometric modeling with point sets
- 1999 **Hosts: Prof. Daniel Cohen-Or and Prof. David Levin**, *Tel Aviv University, School of Mathematical Sciences*, Israel.  
Geometric morphing
- 1996–1997 **Host: Dr. Ping Fu and Prof. Herbert Edelsbrunner**, *NCSA & University of Illinois at Urbana-Champaign*, USA.  
Algorithms for replication

## Major grants

- 2022– **EMERGE - Geometry Processing as Inference**, *ERC Advanced Grant*.
- 2019– **MATH+**, *German Research Foundation*.  
Several projects as PI in the Emerging Field “Digital Shapes”
- 2016–2018 **M3D**, *Federal Ministry for Economic Affairs and Energy*.
- 2012–2015 **Rethinking Prototyping – novel hybrid concepts for Prototyping**, *Einstein Foundation Berlin*.  
Joint initiative with colleagues from The University of the Arts, Berlin
- 2012 **unrestricted fund**, *Walt Disney Animation Studios*.
- 2010–2015 **XShape: Expressive Shape: Intuitive Creation and Optimization of 3D Geometry**, *European Union – Support for frontier research (ERC starting grant)*.
- 2010 **unrestricted fund**, *Walt Disney Animation Studios*.
- 2010–2012 **GeoMec – Discrete geometric mechanics for applications in VR and AR**, *German Ministry for Education and Science*.  
together with colleagues from throughout Germany
- 2009 **unrestricted fund**, *Walt Disney Animation Studios*.
- 2009–2011 **Localized Image Browsing**, *TU Berlin*.  
Pilot project funded by the Human Centric Communication Cluster (HC3)
- 2006–2010 **Generating animated meshes from examples and sketches**, *German Science Foundation*.
- 2003–2008 **AIM@SHAPE – Advanced and Innovative Modeling of Shapes**, *Network of Excellence, 6th framework program of the European Union*.  
Member of the consortium

## Awards

- 2020 **Best paper award**, *Symposium on Geometry Processing*.
- 2019 **Data set award**, *Symposium on Geometry Processing*.
- 2018 **Fellow**, *Eurographics – European Association for Computer Graphics*.
- 2017 **Best paper award**, *Shape Modeling International*.
- 2014 **Outstanding Technical Contributions Award**, *Eurographics – European Association for Computer Graphics*.

- 2012 **Engineering Sciences Prize of the Academy**, Berlin-Brandenburg Academy of Sciences and Humanities.
- 2009 **Laureate Winner**, Apple Research & Technology Support, Localized Image Browsing.
- 2007 **Best paper award**, International Symposium on Computational Aesthetics.
- 2006 **Best paper award**, Afrigraph 2006.
- 2003 **Heinz Meier-Leibnitz Prize**, German Science Foundation.

## Professional activities

### Editorial service

- 2018–2021 **Editor-in-Chief**, *ACM Transactions on Graphics*.
- 2015–present **Associate Editor**, *Computational Visual Media*, Springer.
  - 2013 **Guest Editor**, *IEEE CG&A*, Computational Aspects of Fabrication.
- 2010–2012 **Associate Editor**, *Graphical Models*, Elsevier.
- 2009–2012 **Associate Editor**, *Computer Graphics Forum*, Blackwell.
- 2008–2012, 2016–**Associate Editor**, *Computer Aided Geometric Design*, Elsevier.
- 2003–present **Associate Editor**, *Foundations & Trends in Computer Graphics and Computer Vision*.
  - 2000 **Guest editor**, *Computers & Graphics*, Pergamon Press, Shape Blending.

### Conferences / Workshops

- 2016 **Co-Chair**, *International Geometry Summit*.
- 2016 **Program Committee Co-Chair**, *Shape Modeling International*.
- 2013 **Technical Papers Committee Chair**, SIGGRAPH.
- 2011, 2012 **Co-Organizer**, *Hybrid Retreat*.
- 2010 **Papers Committee Co-Chair**, *Eurographics/ACM Symposium on Sketch-based Interfaces and Modeling*.
- 2009 **Papers Committee Co-Chair**, *Eurographics/ACM Symposium on Geometry Processing Program Committee*.
- 2008 **General Submission Jury Chair**, SIGGRAPH.
- 2007 **Sketches & Posters Jury Co-Chair**, SIGGRAPH.
- 2007 **Program Committee Co-Chair**, *Pacific Graphics*.
- 2005 **Conference Co-Chair**, *Eurographics Symposium on Point-based Graphics*.
- 2005 **International Program Committee Co-Chair**, *Eurographics 2005*.
- 2005 **Organizer**, *AIM@Shape Summer School on Interactive Shape Modeling*.
- 2004 **Papers Committee Co-Chair**, *Eurographics Symposium on Point-based Graphics*.
- 2004 **Short Papers Committee Co-Chair**, *Eurographics*.
  - Regular program committee member for SIGGRAPH, SIGGRAPH Asia, Eurographics, Pacific Graphics, EG Symposium on Geometry Processing, ACM/EG Symposium on Sketch-based Interfaces and Modeling, ACM Symposium on Interactive 3D Graphics and Games, Shape Modeling International, 3D Data Processing - Visualization and Transmission, Geometric Modeling and Processing

### Associations, other committees (selection)

- 2016–present **Steering Committee**, *Eurographics Symposium on Geometry Processing*.
- 2011–2015 **Board of Directors**, *Hybrid Plattform*.  
The [Hybrid Plattform](#) is a joint initiative to instigate projects between The University of the Arts, Berlin and the Technical University Berlin

- 2009–2015 **Steering committee**, *Faculty of EE & CS, TU Berlin*.
- 2007–2011 **Extended academic senate**, *TU Berlin*.
- 2003–2005 **Steering committee**, *Department of CS at TU Darmstadt*.
- 2003–present **Steering committee for computer graphics of the German Computing Society**, *Gesellschaft für Informatik*.
- 2002–2006 **Executive committee**, *Eurographics*.

## Presentations

### Invited talks (selection)

- 2019 **Key Note**, *ICIG*, Beijing, China.
- 2018 **Key Note**, *Advances in Architectural Geometry*, Gothenburg, Sweden.
- 2016 **Invited Talk**, *6th Annual Technion Computer Engineering Conference*, Haifa, Israel.
- 2015 **Invited Talk**, *Colloque*, *College de France*, Paris, France.
- 2014 **Key Note**, *Symposium 100 years Goethe University Frankfurt*, Frankfurt, Germany.
- 2014 **Invited Talk**, *FMX*, Stuttgart, Germany.
- 2013 **Key Note**, *CGI*, Hannover, Germany.
- 2011 **Key Talk**, *Design Modeling Symposium*, Berlin, Germany.
- 2010 **Key Note**, *SIBGRAPI*, Gramado, Brazil.
- 2010 **Key Note**, *Afrigraph*, Franschoek, South Africa.
- 2009 **Key Note**, *Industry Challenges in Geometric Modeling*, Darmstadt, Germany.
- 2008 **Key Note**, *Pacific Graphics*, Tokyo, Japan.
- 2007 **Key Note**, *WSCG*, Plzen, Czech Republic.
- 2006 **Key Note**, *Sketch-based Interfaces and Modeling*, Vienna, Austria.
- 2006 **Key Note**, *GRAPP*, Setubal, Portugal.
- 2005 **Key Note**, *Symposium on Geometry Processing*, Vienna, Austria.
- 2004 **Invited Talk**, *Mathematical Foundations of Scientific Visualization*, Banff, Canada.
- 2003 **Key Note**, *Workshop in Geometric Modeling, Computing, and Visualization*, Aizu, Japan.
- 2003 **Invited Talk**, *Israel-Korea Bi-National Conference*, Tel Aviv, Israel.
- 2002 **Invited Talk**, *Square USA*, Honolulu, USA.

### Popular media (selection)

- 2013 **Digital Reliefs**, *Science Show at the Night of Sciences*, Berlin.
- 2012 **Strichzeichnungen (lit: sketches)**, *DRadio Kultur*.
- 2012 **Helle Köpfe (lit: bright minds)**, *Frankfurter Allgemeine Sonntagszeitung*.
- 2010 **Leidenschaft für lebendige Bilder (lit: a passion for living images)**, *Der Tagesspiegel*.

## Publications

### Journal publications

- [J69] M. Kohlbrenner, U. Finnendahl, T. Djuren, and M. Alexa, "Gauss stylization: Interactive artistic mesh modeling based on preferred surface normals," *Computer Graphics Forum*, vol. 40, no. 5, pp. 33–43, 2021.
- [J68] A. Bunge, M. Botsch, and M. Alexa, "The diamond laplace for polygonal and polyhedral meshes," *Computer Graphics Forum*, vol. 40, no. 5, pp. 217–230, 2021.

- [J67] J. E. Zhang, A. Jacobson, and M. Alexa, "Fast updates for least-squares rotational alignment," *Computer Graphics Forum*, vol. 40, no. 2, pp. 13–22, 2021.
- [J66] X. Wang, K. Holmqvist, and M. Alexa, "A consensus-based elastic matching algorithm for mapping recall fixations onto encoding fixations in the looking-at-nothing paradigm," *Behavior Research Methods*, vol. 53, no. 5, pp. 2049–2068, 2021.
- [J65] M. Alexa, "Polycover: Shape approximating with discrete surface orientation," *IEEE Computer Graphics and Applications*, vol. 41, no. 3, pp. 85–95, 2021.
- [J64] M. Alexa, "Conforming weighted delaunay triangulations," *ACM Trans. Graph.*, vol. 39, Nov. 2020.
- [J63] X. Wang, A. Ley, S. Koch, J. Hays, K. Holmqvist, and M. Alexa, "Computational discrimination between natural images based on gaze during mental imagery," *Scientific Reports*, vol. 10, no. 1, p. 13035, 2020.
- [J62] M. Alexa, P. Herholz, M. Kohlbrenner, and O. Sorkine-Hornung, "Properties of laplace operators for tetrahedral meshes," *Computer Graphics Forum*, vol. 39, no. 5, pp. 55–68, 2020.
- [J61] J. Jacobs, X. Wang, and M. Alexa, "Keep it simple: Depth-based dynamic adjustment of rendering for head-mounted displays decreases visual comfort," *ACM Trans. Appl. Percept.*, vol. 16, Sept. 2019.
- [J60] P. Herholz and M. Alexa, "Efficient computation of smoothed exponential maps," *Computer Graphics Forum*, vol. 38, no. 6, pp. 79–90, 2019.
- [J59] M. Alexa, "Harmonic triangulations," *ACM Trans. Graph.*, vol. 38, pp. 54:1–54:14, July 2019.
- [J58] J. Etienne, N. Ray, D. Panozzo, S. Hornus, C. C. L. Wang, J. Martínez, S. McMains, M. Alexa, B. Wyvill, and S. Lefebvre, "Curvislicer: Slightly curved slicing for 3-axis printers," *ACM Trans. Graph.*, vol. 38, pp. 81:1–81:11, July 2019.
- [J57] X. Wang, K. Holmqvist, and M. Alexa, "The mean point of vergence is biased under projection," *Journal of Eye Movement Research*, vol. 12, p. 2, 2019.
- [J56] X. Wang, S. Koch, K. Holmqvist, and M. Alexa, "Tracking the gaze on objects in 3d: How do people really look at the bunny?," *ACM Trans. Graph.*, vol. 37, pp. 188:1–188:18, Dec. 2018.
- [J55] P. Herholz and M. Alexa, "Factor once: Reusing cholesky factorizations on sub-meshes," *ACM Trans. Graph.*, vol. 37, pp. 230:1–230:9, Dec. 2018.
- [J54] M. Piovarči, M. Wessely, M. Jagielski, M. Alexa, W. Matusik, and P. Didyk, "Design and analysis of directional front projection screens," *Computers & Graphics*, 2018.
- [J53] P. Herholz, T. A. Davis, and M. Alexa, "Localized solutions of sparse linear systems for geometry processing," *ACM Trans. Graph.*, vol. 36, pp. 183:1–183:8, Nov. 2017.
- [J52] P. Herholz, S. Koch, T. Boubekeur, and M. Alexa, "Unsharp masking geometry improves 3d prints," *Computers & Graphics*, vol. 66, pp. 135 – 142, 2017. Shape Modeling International 2017.
- [J51] P. Herholz, F. Haase, and M. Alexa, "Diffusion diagrams: Voronoi cells and centroids from diffusion," *Computer Graphics Forum*, vol. 36, no. 2, pp. 163–175, 2017.

- [J50] M. Alexa, K. Hildebrand, and S. Lefebvre, "Optimal discrete slicing," *ACM Trans. Graph.*, vol. 36, pp. 12:1–12:16, Jan. 2017.
- [J49] X. Wang, D. Lindlbauer, C. Lessig, M. Maertens, and M. Alexa, "Measuring the visual salience of 3d printed objects," *IEEE Computer Graphics and Applications*, vol. 36, pp. 46–55, July 2016.
- [J48] R. Richter, J. E. Kyprianidis, B. Springborn, and M. Alexa, "Constrained modelling of 3-valent meshes using a hyperbolic deformation metric," *Computer Graphics Forum*, 2016.
- [J47] R. Richter and M. Alexa, "Beam meshes," *Computers & Graphics*, vol. 53, Part A, pp. 28 – 36, 2015. 40 years of Computer Graphics in Darmstadt.
- [J46] P. Herholz, J. E. Kyprianidis, and M. Alexa, "Perfect laplacians for polygon meshes," *Computer Graphics Forum*, vol. 34, no. 5, pp. 211–218, 2015.
- [J45] P. Herholz, W. Matusik, and M. Alexa, "Approximating free-form geometry with height fields for manufacturing," *Computer Graphics Forum*, vol. 34, no. 2, pp. 239–251, 2015.
- [J44] M. Alexa and J. E. Kyprianidis, "Error diffusion on meshes," *Computers & Graphics*, vol. 46, pp. 336 – 344, 2015. Shape Modeling International 2014.
- [J43] R. Richter and M. Alexa, "Mahalanobis centroidal voronoi tessellations," *Computers & Graphics*, vol. 46, pp. 48 – 54, 2015. Shape Modeling International 2014.
- [J42] M. Limper, Y. Jung, J. Behr, and M. Alexa, "The pop buffer: Rapid progressive clustering by geometry quantization," *Computer Graphics Forum*, vol. 32, no. 7, pp. 197–206, 2013.
- [J41] X. Snelgrove, T. Pereira, W. Matusik, and M. Alexa, "Parallax walls: Light fields from occlusion on height fields," *Computers & Graphics*, vol. 37, no. 8, pp. 974 – 982, 2013.
- [J40] K. Hildebrand, B. Bickel, and M. Alexa, "Orthogonal slicing for additive manufacturing," *Computers & Graphics*, vol. 37, no. 6, pp. 669 – 675, 2013. Shape Modeling International (SMI) Conference 2013.
- [J39] T. Gerstner, D. DeCarlo, M. Alexa, A. Finkelstein, Y. Gingold, and A. Nealen, "Pixelated image abstraction with integrated user constraints," *Computers & Graphics*, no. 0, pp. –, 2013.
- [J38] M. Eitz, J. Hays, and M. Alexa, "How do humans sketch objects?," *ACM Trans. Graph.*, vol. 31, pp. 44:1–44:10, July 2012.
- [J37] M. Eitz, R. Richter, T. Boubekeur, K. Hildebrand, and M. Alexa, "Sketch-based shape retrieval," *ACM Trans. Graph.*, vol. 31, pp. 31:1–31:10, July 2012.
- [J36] K. Hildebrand, B. Bickel, and M. Alexa, "crdbrd: Shape fabrication by sliding planar slices," *Comp. Graph. Forum*, vol. 31, pp. 583–592, May 2012.
- [J35] A. Bermanno, I. Baran, M. Alexa, and W. Matusik, "Shadowpix: Multiple images from self shadowing," *Comp. Graph. Forum*, vol. 31, pp. 593–602, May 2012.
- [J34] M. Alexa and W. Matusik, "Irregular pit placement for dithering images by self-occlusion," *Computers & Graphics*, 2012.
- [J33] U. Hahne and M. Alexa, "Exposure fusion for time-of-flight imaging," *Computer Graphics Forum*, vol. 30, no. 7, pp. 1887–1894, 2011.
- [J32] M. Eitz, K. Hildebrand, T. Boubekeur, and M. Alexa, "Sketch-based image retrieval: Benchmark and bag-of-features descriptors," *IEEE Transactions on Visualization and Computer Graphics*, vol. 17, no. 11, pp. 1624–1636, 2011.

- [J31] M. Alexa and M. Wardetzky, "Discrete laplacians on general polygonal meshes," *ACM Trans. Graph.*, vol. 30, pp. 102:1–102:10, August 2011.
- [J30] M. Eitz, R. Richter, K. Hildebrand, T. Boubekeur, and M. Alexa, "Photosketcher: interactive sketch-based image synthesis," *IEEE Computer Graphics and Applications*, vol. 31, pp. 56–66, Nov. 2011.
- [J29] A. C. Öztireli, M. Alexa, and M. Gross, "Spectral sampling of manifolds," *ACM Trans. Graph.*, vol. 29, pp. 168:1–168:8, December 2010.
- [J28] M. Eitz, K. Hildebrand, T. Boubekeur, and M. Alexa, "An evaluation of descriptors for large-scale image retrieval from sketched feature lines," *Computers & Graphics*, vol. 34, no. 5, pp. 482 – 498, 2010.
- [J27] M. Alexa and W. Matusik, "Reliefs as images," *ACM Transactions on Graphics*, vol. 29, no. 4, pp. 1–7, 2010.
- [J26] T. Winkler, J. Drieseberg, M. Alexa, and K. Hormann, "Multi-scale geometry interpolation," *Computer Graphics Forum*, vol. 29, pp. 309–318, May 2010. Proceedings of Eurographics.
- [J25] B. Buchholz, T. Boubekeur, D. DeCarlo, and M. Alexa, "Binary shading using geometry and appearance," *Computer Graphics Forum*, vol. 29, no. 6, pp. 1981–1992, 2010.
- [J24] M. Alexa and A. Adamson, "Interpolatory point set surfaces—convexity and hermite data," *ACM Trans. Graph.*, vol. 28, no. 2, pp. 1–10, 2009.
- [J23] T. Boubekeur and M. Alexa, "Mesh simplification by stochastic sampling and topological clustering," *Comput. Graph.*, vol. 33, pp. 241–249, June 2009.
- [J22] T. Boubekeur and M. Alexa, "Phong tessellation," *ACM Transactions on Graphics*, vol. 27, no. 5, p. 141, 2008.
- [J21] M. Alexa and T. Boubekeur, "Subdivision shading," *ACM Transactions on Graphics*, vol. 27, no. 5, p. 142, 2008.
- [J20] J. Zimmermann, A. Nealen, and M. Alexa, "Suggesting contours," *Computers & Graphics*, vol. 32, no. 5, pp. 486–499, 2008.
- [J19] A. Nealen, T. Igarashi, O. Sorkine, and M. Alexa, "Fibermesh: designing freeform surfaces with 3d curves," *ACM Trans. Graph.*, vol. 26, no. 3, pp. 41–49, 2007.
- [J18] A. Adamson and M. Alexa, "Point-sampled cell complexes," *ACM Transactions on Computer Graphics (SIGGRAPH 2006 Proceedings)*, vol. 25, no. 3, pp. 671–680, 2006.
- [J17] A. Adamson and M. Alexa, "Anisotropic point set surfaces," *Computer Graphics Forum*, vol. 25, no. 4, pp. 717–724, 2006.
- [J16] P. Reuter, J. Behr, and M. Alexa, "An improved adjacency data structure for fast triangle stripping," *ACM Journal of Graphics Tools*, vol. 10, no. 2, pp. 41–50, 2005.
- [J15] Y. Lipman, O. Sorkine, M. Alexa, D. Cohen-Or, D. Levin, C. Rössl, and H.-P. Seidel, "Laplacian framework for interactive mesh editing," *International Journal of Shape Modeling*, vol. 11, no. 1, pp. 43–62, 2005.
- [J14] A. Nealen, O. Sorkine, M. Alexa, and D. Cohen-Or, "A sketch-based interface for detail-preserving mesh editing," *ACM Transactions on Computer Graphics (SIGGRAPH 2005 Proceedings)*, vol. 24, no. 3, pp. 1142–1147, 2005.

- [J13] A. Sharf, M. Alexa, and D. Cohen-Or, "Context-based surface completion," *ACM Transactions on Computer Graphics (SIGGRAPH 2004 Proceedings)*, vol. 23, no. 3, pp. 878–887, 2004.
- [J12] M. Alexa, J. Behr, D. Cohen-Or, S. Fleishman, D. Levin, and C. T. Silva, "Computing and rendering point set surfaces," *IEEE Transactions on Computer Graphics and Visualization*, vol. 9, no. 1, pp. 3–15, 2003.
- [J11] S. Fleishman, D. Cohen-Or, M. Alexa, and C. Silva, "Progressive point set surfaces," *ACM Transactions on Computer Graphics*, vol. 22, no. 4, pp. 997–1011, 2003.
- [J10] M. Alexa, "Differential coordinates for mesh morphing and deformation," *The Visual Computer*, vol. 19, no. 2, pp. 105–114, 2003.
- [J9] Y. Ohtake, A. Belyaev, M. Alexa, G. Turk, and H.-P. Seidel, "Multi-level partition of unity implicits," *ACM Transactions on Computer Graphics (SIGGRAPH 2003 Proceedings)*, vol. 22, no. 3, pp. 463–470, 2003.
- [J8] M. Alexa, T. Klug, and C. Stoll, "Direction fields over point sampled geometry," *Journal of WSCG 2003*, vol. 11, pp. 27–32, February 2003.
- [J7] M. Alexa, "Recent advances in mesh morphing," *Computer Graphics Forum*, vol. 21, no. 2, pp. 173–196, 2002.
- [J6] M. Alexa, "Refinement operators for triangle meshes," *CAGD*, vol. 19, no. 3, pp. 169–172, 2002.
- [J5] M. Alexa, "Linear combination of transformations," *ACM Transactions on Graphics (SIGGRAPH 02 Proceedings)*, vol. 21, no. 3, pp. 380–387, 2002.
- [J4] W. Müller, U. Spierling, M. Alexa, and T. Rieger, "Face-to-face with your assistant. Realization issues of animated user interface agents for home appliances," *Computers & Graphics*, vol. 25, pp. 593–600, August 2001. ISSN 0097-8493.
- [J3] M. Alexa, "Merging polyhedral shapes with scattered features," *The Visual Computer*, vol. 16, no. 1, pp. 26–37, 2000. ISSN 0178-2789.
- [J2] M. Alexa, D. Cohen-Or, and D. Levin, "As-rigid-as-possible shape interpolation," *Proceedings of SIGGRAPH 2000*, pp. 157–164, July 2000. ISBN 1-58113-208-5.
- [J1] M. Alexa and W. Müller, "Representing animations by principal components," *Computer Graphics Forum*, vol. 19, pp. 411–418, August 2000. ISSN 1067-7055.

#### Edited Books & Proceedings, Book Chapters

- [B11] B. Bickel, M. Alexa, J. K. Hodgins, and K. Shea, "Computational aspects of fabrication (dagstuhl seminar 18431)," in *Dagstuhl Reports*, vol. 8, Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, 2019.
- [B10] M. Alexa, B. Bickel, S. McMains, and H. E. Rushmeier, "Computational Aspects of Fabrication (Dagstuhl Seminar 14361)," *Dagstuhl Reports*, vol. 4, no. 8, pp. 126–150, 2015.
- [B9] A. Nealen and M. Alexa, *The Creation and Modification of 3D Models Using Sketches and Curves*, pp. 225–253. Springer, 2011.
- [B8] M. Alexa, M. Kazhdan, and K. Polthier, eds., *Proceedings of the Eurographics/ACM Symposium on Geometry Processing 2009*. Blackwell, 2009.
- [B7] M. Alexa and A. Nealen, "Mesh editing based on discrete laplace and poisson models," in *Advances in Computer Graphics and Computer Vision* (J. Braz, A. Ranchordas, H. Araújo, and J. Jorge, eds.), pp. 3–28, Springer Berlin Heidelberg, 2008.



- [B6] M. Alexa, "Moving least square-based surface representations," in *Point-based Graphics* (M. Gross and H. Pfister, eds.), pp. 109–126, Morgan Kaufmann, 2007.
- [B5] M. Alexa, S. Gortler, and T. Ju, eds., *Proceedings of the Pacific Graphics 2007 Conference*. IEEE Press, 2007.
- [B4] M. Alexa and J. Marks, eds., *Proceedings of the Eurographics 2005 Conference*. Eurographics Association, 2005.
- [B3] M. Pauly, M. Zwicker, M. Alexa, and S. Rusinkiewicz, eds., *Proceedings of the ACM/Eurographics Symposium on Point-based Graphics*, Eurographics Association, 2005.
- [B2] M. Alexa and E. Galin, eds., *Proceedings of the Eurographics 2004 Short Presentations & Interactive Demos*, Eurographics Association, 2004.
- [B1] M. Alexa, M. Gross, H. Pfister, and S. Rusinkiewicz, eds., *Proceedings of Eurographics Symposium on Point-based Graphics*, Eurographics, 2004.
- Peer-reviewed conference proceedings**
- [C67] M. Alexa, "Super-fibonacci spirals: Fast, low-discrepancy sampling of  $SO(3)$ ," in *The IEEE Conference on Computer Vision and Pattern Recognition*, CVPR, IEEE, 2022.
- [C66] S. Koch, Y. Piadyk, M. Worchel, M. Alexa, C. Silva, D. Zorin, and D. Panozzo, "Hardware design and accurate simulation of structured-light scanning for benchmarking of 3d reconstruction algorithms," in *Thirty-fifth Conference on Neural Information Processing Systems Datasets and Benchmarks Track (Round 2)*, 2021.
- [C65] S. Koch, A. Matveev, Z. Jiang, F. Williams, A. Artemov, E. Burnaev, M. Alexa, D. Zorin, and D. Panozzo, "Abc: A big cad model dataset for geometric deep learning," in *The IEEE Conference on Computer Vision and Pattern Recognition*, CVPR, IEEE, 2019.
- [C64] A. Ion, D. Lindlbauer, P. Herholz, M. Alexa, and P. Baudisch, "Understanding metamaterial mechanisms," in *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, CHI '19, (New York, NY, USA), pp. 647:1–647:14, ACM, 2019.
- [C63] X. Wang, A. Ley, S. Koch, D. Lindlbauer, J. Hays, K. Holmqvist, and M. Alexa, "The mental image revealed by gaze tracking," in *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, CHI '19, (New York, NY, USA), pp. 609:1–609:12, ACM, 2019.
- [C62] A. Fender, P. Herholz, M. Alexa, and J. Müller, "Optispace: Automated placement of interactive 3d projection mapping content," in *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, CHI '18, (New York, NY, USA), pp. 269:1–269:11, ACM, 2018.
- [C61] A. Fender, D. Lindlbauer, P. Herholz, M. Alexa, and J. Müller, "Heatspace: Automatic placement of displays by empirical analysis of user behavior," in *Proceedings of the 30th Annual ACM Symposium on User Interface Software and Technology*, UIST '17, (New York, NY, USA), pp. 611–621, ACM, 2017.
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- Workshop publications**
- [W5] J. Tompkin, S. Muff, S. Jakushevskij, J. McCann, J. Kautz, M. Alexa, and W. Matusik, "Interactive light field painting," in *ACM SIGGRAPH 2012 Emerging Technologies*, SIGGRAPH '12, (New York, NY, USA), pp. 12:1–12:1, ACM, 2012.
- [W4] J. Pfeil, K. Hildebrand, C. Gremzow, B. Bickel, and M. Alexa, "Throwable panoramic ball camera," in *SIGGRAPH Asia 2011 Emerging Technologies*, SA '11, (New York, NY, USA), pp. 4:1–4:1, ACM, 2011.

- [W3] M. Alexa, D. Bartz, and J. T. Klosowski, "Approximate visual hulls as bounding volumes for occlusion culling," in *Poster Proceedings of IEEE Visualization*, 2002.
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#### Invited publications

- [I10] M. Alexa, "Technical perspective: Exploring a kingdom by geodesic measures," *Commun. ACM*, vol. 60, pp. 89–89, Oct. 2017.
- [I9] M. Alexa, "A woodworker's easy fix: Technical perspective," *Commun. ACM*, vol. 58, pp. 115–115, Aug. 2015.
- [I8] B. Bickel and M. Alexa, "Computational aspects of fabrication: Modeling, design, and 3d printing," *IEEE Computer Graphics and Applications*, vol. 33, no. 6, pp. 24–25, 2013.
- [I7] M. Alexa, "Synthetic images on real surfaces," *Computational Design Modelling*, pp. 79–88, 2011.
- [I6] M. Alexa, T. Igarashi, A. Nealen, and O. Sorkine, "Fair triangulated surfaces from positional constraints at interactive rates," in *Trends in Mathematical Imaging and Surface Processing*, no. 3/2007 in Oberwolfach Reports, pp. 7–9, Mathematisches Forschungszentrum Oberwolfach, 2007.
- [I5] M. Alexa, "Non-conforming surface representations," in *Proceedings of the Eurographics Symposium on Geometry Processing 2005* (M. Desbrun and H. Pottmann, eds.), pp. 83–84, Eurographics Association, 2005. extended abstract of an invited talk.
- [I4] M. Alexa, "Linear shift-invariant operators for processing surface meshes," in *Proceedings of 2nd International Symposium on 3D Data Processing, Visualization and Transmission*, pp. 76–81, IEEE Press, 2004.
- [I3] M. Alexa, "Shape spaces from morphing," in *The 4th Israel-Korea Bi-ONational Conference on Geometric Modeling and Computer Graphics – Conference Proceedings* (D. Cohen-Or, N. Dyn, G. Elber, and A. Shamir, eds.), pp. 147–152, February 2003.
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- [I1] M. Alexa and D. Cohen-Or, "Editorial — Special issue on shape blending," *Computers and Graphics*, vol. 25, pp. 1–2, Feb. 2001.

#### Patents Granted

- 2015 **Marc Alexa, Wojciech Matusik**, *Embedding images into a surface using occlusion*.  
US Patent Number 8952959
- 2014 **Daniel Wolfertshofer, Marc Alexa, Wojciech Matusik**, *Images from self-occlusion*.  
US Patent Number 866991
- 2013 **Jan Kautz, Olivier Roullier, Bernd Bickel, Marc Alexa, Wojciech Matusik**, *3d printing with custom surface reflection*.  
US Patent Application 14/030,176
- 2013 **Bernd Bickel, Marc Alexa, Jan Kautz, Wojciech Matusik, Fabrizio Pece**, *Physical reproduction of reflectance fields*.  
US Patent Application 13/608,819

## Teaching and supervision

### Courses

- Algorithms and data structures (regular undergraduate lecture course)
- Scientific computing (regular undergraduate lecture course)
- Generative computer graphics (regular graduate lecture course)
- Geometric modeling in computer graphics (regular graduate lecture course)
- Game programming (regular graduate seminar)
- Computational photography (graduate seminar, irregularly joint with the University of the Arts)
- Digital manufacturing (graduate seminar, irregularly joint with the University of the Arts)
- Multitouch displays / interaction (irregular graduate seminar)

### PhDs advised

- 2020 **Exploring perception through the eyes: from eye tracking to visual saliency and mental imagery**, *Xi Wang*.  
External committee members: Gordon Wetzstein, Stanford University; Kenneth Homlqvist, Lund University
- 2019 **Locally Solving Linear Systems for Geometry Processing**, *Philipp Herholz*.  
External committee members: Daniele Panozzo, New York University; Keenan Crane, Carnegie Mellon University
- 2018 **Bridging the Virtual World and the Physical World with Optically Dynamic Interfaces**, *David Lindlbauer*.  
External committee members: Ravin Balakrishnan, University of Toronto; Jörg Müller, University of Bayreuth
- 2014 **Digital Fabrication of Shape: Abstraction, Data Structures and Optimization**, *Kristian Hildebrand*.  
External committee members: Niloy Mitra, UCL; Bernd Bickel, Disney Research Zurich
- 2012 **Human Object Sketches: Datasets, Descriptors, Computational Recognition and 3d Shape Retrieval**, *Mathias Eitz*.  
External committee member: Tamy Boubekeur, ParisTech
- 2012 **Real-time depth imaging**, *Uwe Hahne*.  
External committee member: Andreas Kolb, University of Siegen
- 2011 **Towards Interactive Landscape Visualization**, *Malte Clasen*.  
External committee member: Hans-Christian Hege, Zuse Institute Berlin
- 2007 **Sketch-based Mesh Modeling**, *Andrew Nealen*.  
External committee members: John Hughes, Brown University; Takeo Igarashi, The University of Tokyo
- 2007 **Computing Curves and Surfaces from Points**, *Anders Adamson*.  
External committee member: Markus Gross, ETH Zürich
- 2006 **Geometric Computing in CG and Robotics using Conformal Geometric Algebra**, *Dietmar Hildenbrand*.  
External committee members: Dieter Fellner, TU Darmstadt; Wolfgang Straßer, Universität Tübingen
- 2006 **Steerable Texture Synthesis for Vector Field Visualization**, *Francesca Taponecco*.  
External committee members: Hans-Christian Hege, Zuse Institut Berlin; Bernt Schiele, TU Darmstadt
- 2005 **Avalon: Ein skalierbares Rahmensystem für dynamische Mixed-Reality-Anwendungen**, *Johannes Behr*.  
External committee members: Bernd Fröhlich, Bauhaus Universität Weimar, José L. Encarnação, TU Darmstadt

## Co-advisor for PhDs

- 2020 **3D Shape Fabrication from Flat Material Sheets**, *Katja Wolff*.  
Advisor Olga Sorkine-Hornung, ETH
- 2020 **Multi-scale Point Cloud Analysis**, *Thibault Lejembre*.  
Advisor Loïc Barthe, Université Toulouse - Paul Sabatier
- 2019 **Multi-View Motion Capture based on Model Adaptation**, *Philipp Fichteler*.  
Advisor Peter Eisert, HU Berlin
- 2018 **Computational fabrication of 3D shapes: Enabling makers through novel geometric algorithms**, *Christian Schüller*.  
Advisor Olga Sorkine-Hornung, ETH Zurich
- 2018 **High-Quality Mesh Generation from 3D Scans for Surface Analysis**, *Nico Schertler*.  
Advisor Stefan Gumhold, TU Dresden
- 2018 **Automatic Optimization of 3D Mesh Data for Real-Time Online Presentation**, *Max Limper*.  
Advisor Dieter Fellner, TU Darmstadt
- 2017 **Dynamic and Probabilistic Point-Cloud Processing**, *Reinhold Preiner*.  
Advisor Michael Wimmer, TU Wien
- 2017 **On the Use of MLDS in the Study of Depth and Lightness Perception**, *Guillermo Andrés Aguilar Cornejo*.  
Advisor Marianne Maertens, TU Berlin
- 2016 **Robust Shape Approximation and Mapping between Surfaces**, *Manish Mandad*.  
Advisor Pierre Alliez, INRIA
- 2015 **Computational Interactions for 3D Modeling**, *Emilie Guy*.  
Advisor Tamy Boubekeur, ParisTech
- 2015 **Computer drawing tools for assisting learners, hobbyists and professionals**, *Emmanuel Iarussi*.  
Advisors George Drettakis & Adrien Bousseau, INRIA
- 2014 **Fabrication-Aware Design with Performative Criteria**, *Yuliy Schwartzburg*.  
Advisor Mark Pauly, EPF Lausanne
- 2013 **Shape and Topology from Noisy Triangulated Surfaces in a Multiple View Reconstruction Toolchain**, *Tilman Wekel*.  
Advisor Olaf Hellwich, TU Berlin
- 2012 **Meshless Signal Sampling and Reconstruction on Manifolds**, *Cengiz Öztireli*.  
Advisor Markus Gross, ETH Zurich
- 2012 **Digital Geometry and algorithmic geometry for interactive 3d design**, *Jean-Marc Thiery*.  
Advisor Tamy Boubekeur, ParisTech
- 2010 **Part-based Representation and Editing of 3D Surface Models**, *Ryan Schmidt*.  
Advisor Karan Singh, University of Toronto, Canada
- 2009 **Enhancement of Low Resolution Models for Real Time Large Scale Visualization**, *Like Gobeawan*.  
Advisor Stephen J. Turner, Nanyang Technological University, Singapore
- 2008 **Image transition techniques using projective geometry**, *Tsu Yen Wong*.  
Advisor Peter Kovese, The University of Western Australia
- 2007 **A Linear Framework for Character Skinning**, *Bruce Merry*.  
Advisors Patrick Marais & James Gain, University of Cape Town



- 2007 **An Authoring Framework for Interactive Narrative with Virtual Characters**, *Ido Iurgel*.  
Advisor Josè L. Encarnação, TU Darmstadt
- 2007 **Surface Reconstruction with Radial Basis Functions using Voronoi Vertices as Centers**,  
*Marie Samozino*.  
Advisor Mariette Yvinec, INRIA
- 2007 **Surface Approximation with Elevation Maps in Numerical Weather Prediction**, *Tilo Ochotta*.  
Advisor Dietmar Saupe, Universität Konstanz
- 2006 **Point-based Modeling, Animation and Rendering of Dynamic Objects**, *Bart Adams*.  
Advisor Philip Dutrè, KU Leuven
- 2005 **New Techniques for the Modeling, Processing and Visualization of Surfaces and Volumes**, *Christian Rössl*.  
Advisor Hans-Peter Seidel, MPI Saarbrücken
- 2003 **Reconstruction and Rendering of Implicit Surfaces from Large Unorganized Point Sets**, *Patrick Reuter*.  
Advisor Christophe Schlick, Université Bordeaux I
- Mentoring / Entrepreneurship**
- 2013 **DISDAR**, *company applying machine learning to invoices started by PhD and masters students*.
- 2011 **Panono**, *company started by diploma students*.  
<http://www.panono.com>
- 2009 **Brightside Games**, *game company started by students from game programming class*.  
<http://brightside-games.com>