

## DAVID EDWARD BREEN

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### EDUCATION

Ph.D.: Computer and Systems Engineering August 1993  
Rensselaer Polytechnic Institute, Troy, NY  
Dissertation: A Particle-Based Model for Simulating the Draping Behavior of Woven Cloth

M.S.: Computer and Systems Engineering August 1985  
Rensselaer Polytechnic Institute, Troy, NY  
Thesis: Creation and Smooth-Shading of Steiner Patch Tessellations

B.A.: Physics May 1982  
Colgate University, Hamilton, NY

### EMPLOYMENT HISTORY

**Associate Professor** 9/09-Present  
Department of Computer Science, College of Computing and Informatics

**Assistant Professor** 9/03-8/09  
Department of Computer Science, College of Engineering  
Drexel University, Philadelphia, PA

- Member of the leadership team of the Drexel Center for Functional Fabrics, which is part of Advanced Functional Fabrics of America, a national Manufacturing Innovation Institute.
- Principle investigator (PI) for four NSF-funded research projects. The current project is entitled “A Design Framework for Programmable Manufacturing of Customized Knitted Materials.
- Co-principle investigator (co-PI) for NSF-funded research projects “The Informatics of Making” and “3D Content-based Data Management System”, education projects “Math Images I & II”, as well as for the Phase 2 renewal of the Center for Visual and Decision Informatics.
- Co-PI for numerous projects within the US Army-funded Applied Communication and Information Networking Program.
- Conducting research in CAD technologies for smart textiles, biomedical image informatics, bio-inspired self-organization and level set morphing.
- Teaching computer graphics and programming classes.

**Deputy and Site Director**, Center for Visual and Decision Informatics 9/14-7/15  
College of Computing and Informatics, Drexel University, Philadelphia, PA

- Responsibilities include research and operations administration, and industry sponsor relations.

**Visiting Research Scientist**, Biological Physics Department 8/10-4/11, Summers 2012-15  
Max Planck Institute for the Physics of Complex Systems, Dresden, Germany

- Conducted research in 3D model reconstruction and spatial data analysis from microscopy images.

**Senior Research Scientist**, Center for Advanced Computing Research 8/02-8/03  
California Institute of Technology, Pasadena, CA

- Responsible for overseeing the activities of the Center's visualization group.
- Conducted research in Level Set models for graphics, and parallel, large-data visualization.

**Assistant Director**, Computer Graphics Laboratory, Department of Computer Science 5/96-7/02  
California Institute of Technology, Pasadena, CA

- Responsible for administrative and fund-raising activities, and supervision of research grants.
- Principle investigator (PI) for two NSF-funded research projects "Multiresolution Visualization Tools for Interactive Analysis of Large-Scale N-Dimensional Datasets" and "Interactive Level Set Modeling for Visualization of Biological Volume Datasets".
- Co-PI for NSF-funded equipment grant "Development of the Distributed Teravoxel Data System: Acquisition, Networking, Archiving, Analysis and Visualization".
- Caltech Site Coordinator - NSF Science and Technology Center for Graphics and Visualization.
- Conducted research in deformable models for graphics and segmentation, geometric modeling, scientific visualization and parallel graphics systems.
- Supervised undergraduate research projects.

**Member of Research Staff**, User Interaction & Visualization Group 1/94-4/96  
European Computer-Industry Research Centre, Munich, Germany

- Member of a research group that developed augmented reality technologies and applications.
- Personally involved with development of calibration and modeling technologies, and a vision-based camera tracking application.
- Co-PI for two European Union-funded research projects "Collaborative Integrated Communications for Construction", and "Training and Mobility of Researchers – Platform for Animation and Virtual Reality".
- Responsible for overseeing development of "Mechanical Repair" augmented reality application.

**Research Engineer**, Visual Technologies Program, Rensselaer Design Research Center  
Rensselaer Polytechnic Institute, Troy, NY 6/85-12/93

- Co-led the Visual Technologies Program.
- Organized and supervised undergraduate, M.S. and Ph.D. research projects.
- Personally conducted research in physics-based modeling, object-oriented computer animation and geometric modeling.
- Responsible for communications and interactions with industrial sponsors.

**Visiting Research Engineer**, Computer Animation Group 8/87-7/88  
Fraunhofer Institute for Computer Graphics, Darmstadt, Germany

- Supervised students and personally conducted research in the area of object-oriented computer animation and computer graphics.

**Graduate Research Assistant**, Center for Interactive Computer Graphics 6/82-5/85  
Rensselaer Polytechnic Institute, Troy, NY

- Conducted research in computer animation and geometric modeling.

**Summer Intern**, Thomas J. Watson Research Center Summer 1984  
IBM, Yorktown Heights, NY

- Developed communication software for an IBM PC-5080 interface.

**Summer Intern**, Superconducting R&D Facility, ISAbelle Project,  
Brookhaven National Laboratory, Upton, NY

Summer 1981

- Developed software to collect and analyze data from superconductor monitoring equipment.

## **AWARDS**

Best Graduate Computation and Bio-Modeling Project, “3D Reconstruction and Visualization of the Developing *Drosophila* Wing Imaginal Disc at Cellular Resolution,” L. Bai, T. Widmann, F. Jülicher, C. Dahmann and D.E. Breen, Drexel Research Day, April 2012.

Honorable Mention Award for Imaging E-posters, “Predicting Lymph Node Metastasis Status Via Image Analysis of Primary Breast Tumor Histology” (with B. Hu, M.A. Reza, A. Milutinovic, R. Polikar, and F.U. Garcia) Pathology Informatics Conference, October 2011.

VX Corporation Idea Award for work related to a next-generation, unified data representation for digital product design, analysis and manufacture (with K. Swanson and K. Brakke) June 2009.

NSF CAREER Award, Morphogenetic Primitives: Self-Organizing Geometry Based on Morphogenesis and Evolutionary Computing, March 2009.

IEEE Computer Society Certificate of Appreciation for co-organizing the 2001 Symposium on Parallel and Large-Data Visualization and Graphics, October 2004.

Best Undergraduate Basic/Applied Science Project, “Stochastic Microgeometry for Displacement Mapping,” C.A. Schroeder, D.E. Breen, C. Cera and W.C. Regli, Drexel Research Day, May 2004.

The Literati Club Award for Best Paper of 1996 in the *International Journal of Clothing Science and Technology* (with D. House and R. DeVaul).

Best R & D Image, “Cloth Drape - Real & Virtual” (with D. House and K. Reuter), Eurographics Conference, Oslo, September 1994.

Awarded Garden State Graduate Fellowship, 1982.

## **RESEARCH SUPPORT**

Phase II Renewal: Center for Visual and Decision Informatics, National Science Foundation, \$499,930, 2017-2022, PI: X. Hu, role: co-PI.

RET in Engineering and Computer Science Site for Machine Learning to Enhance Human-Centered Computing, National Science Foundation, \$ 599,979, 2017-2020, PI: J. Popyack, role: co-I.

The Mechanisms of Visual and Decision Processes in Cancer Histopathology Interpretation, Commonwealth Universal Research Enhancement (CURE) Program, \$75,000, 2017-2018, PI: M. Zarella, role: co-I.

A System for 3D Content-based Data Management, National Science Foundation, \$199,997, 2016-2018, PI: A. Shokoufandeh, role: co-PI.

An N-Point Statistics Framework for Predicting Tissue Traits in Biomedical Images, Center for Visual and Decision Informatics, \$51,990, 2016-2017, PI: D. Breen.

I/UCRC Phase 1 Renewal: Center for Visual and Decision Informatics, National Science Foundation, \$55,000, 2016-2017, PI: X. Hu, role: co-I.

A Design Framework for Programmable Manufacturing of Customized Knitted Materials, National Science Foundation, \$549,730, 2015-2018, PI: D. Breen.

The Informatics of Making, National Science Foundation, \$235,040, 2014-2017, PI: V. Shapiro, role: co-PI.

Optical Coherence Tomography of the Periprostatic Urethra to Guide Treatment of Prostate Cancer, Drexel University College of Medicine, \$75,000, 2014-2015, PI: M. Zarella, role: co-PI.

Software Tools for 3D Reconstruction of the Drosophila Wing Imaginal Disc, Max Planck Institute Visiting Scientist Fellowship, \$4,500, Summer 2014.

RET in Engineering and Computer Science Site for Machine Learning, Big Data and Computer Science Principles, National Science Foundation, \$499,989, 2013-2016, PI: J. Popyack, role: co-I.

Tools for Segmenting Biological Confocal Microscopy Images, Max Planck Institute Visiting Scientist Fellowship, \$8,000, Summer 2013.

Tumor Characterization in Breast Carcinoma Using Computerized Image Analysis, Commonwealth Universal Research Enhancement (CURE) Program, \$90,988, 2013-2014, PI: F. Garcia, role: co-PI.

Reconstruction of Epithelial Tissue at Cellular Resolution, Max Planck Institute Visiting Scientist Fellowship, \$4,800, Summer 2012.

Computational Models for the Investigation of Cell-Based Phenomena, Max Planck Institute Visiting Scientist Fellowship, \$43,900, 2010-2011.

Math Images II, National Science Foundation, \$531,539, 2010-2015, PI: E. Klotz, role: co-PI.

CAREER: Morphogenetic Primitives: Self-Organizing Geometry Based on Morphogenesis and Evolutionary Computing, National Science Foundation, \$436,141, 2009-2015, PI: D. Breen.

Planning Grant: I/UCRC Center for Visual Decision Informatics, NSF, \$10,000, 2009-2011, PI: X. Hu, role: co-PI.

Cognitive Networking, U.S. Army CECOM, \$400,000, 2009-2011, PI: S. Weber, role: co-PI.

Multidimensional Shape/Color Distributions as a Computational Biomarker for Cancer Pathology, Commonwealth of Pennsylvania Tobacco Formula Funds, \$101,073, 2009-2010, PI: D. Breen.

Analytic Methods for MANET Design Technology, U.S. Army CECOM, \$400,000, 2008-2009, PI: S. Weber, role: co-PI.

Math Images, National Science Foundation, \$128,673, 2008-2009, PI: E. Klotz, role: co-PI.

Interactive, Freeform Editing of Large-Scale, Multiresolution Level Set Models, National Science Foundation, \$324,994, 2007-2011, PI: D. Breen.

Modeling and Simulation in Support of Communications, U.S. Army CECOM, \$600,000, 2007-2008, PI: S. Weber, role: co-PI.

Modeling and Simulation in Support of COMPOSER, U.S. Army CECOM, \$2,195,000, 2005-2008, PI: M. Kam, role: co-PI.

Visual Behavior Prediction, U.S. Army MEDCOM, \$175,000, 2006-2007, PI: F. Garcia, role: co-PI.

Automated Shape Composition Via Genetic Programming, National Science Foundation, \$75,000, 2006-2007, PI: D. Breen.

Predictive Syndromic Surveillance Systems, U.S. Army MEDCOM, \$346,157, 2005-2006, PI: F. Garcia, role: co-PI.

Modeling and Simulation of On-the-Move Networks, U.S. Army CECOM, \$1,086,703, 2004-2005, PI: H. Sethu, role: co-PI.

Contour-based Neuro-anatomical Surface Reconstruction: Application to Bioinformatics, Drexel University Synergy Grant, \$15,000, 2004-2005, PI: D. Breen.

Interactive Level-Set Modeling for Visualization of Biological Volume Datasets, National Science Foundation, \$265,000, 2000-2005, PI: D. Breen.

Development of the Distributed Teravoxel Data System: Acquisition, Networking, Archiving, Analysis and Visualization, National Science Foundation, \$1,399,089, 2000-2005, PI: P. Dimotakis, role: co-PI.

Multiresolution Visualization Tools for Interactive Analysis of Large-Scale N-Dimensional Datasets, National Science Foundation, \$1.2M, 1999-2003, PI: D. Breen.

Training and Mobility of Researchers – Platform for Animation and Virtual Reality, European Commission, \$2.0M, 1996-1999, PI: P. Willis, role: co-PI.

Collaborative Integrated Communications for Construction, European Commission, \$5.6M, 1995-1998, PI: D. Leever, role: co-PI.

Automated Handling of Garments (Modeling Component), Defense Logistics Agency, \$125,000, 1990, PI: D. House, role: co-I.

## **PATENTS**

K. Museth and D. Breen, *Level Set Surface Editing Operators*, US Patent # 7,542,036, 2009.

M. Gavrilu, J. Carranza, D. Breen and A. Barr, *Method for Deriving Mesh Surface Representation from Volume Representation*, US Patent # 6,828,966 B1, 2004.

## **BOOKS**

D. Breen, and M. Lin (eds.), *ACM SIGGRAPH/Eurographics Symposium on Computer Animation Proceedings*, 2003.

D. Breen, A. Heirich and A. Koning (eds.), *2001 Symposium on Parallel and Large-Data Visualization Proceedings*, ACM SIGGRAPH, 2001.

D.H. House and D.E. Breen (eds.), *Cloth Modeling and Animation*, AK Peters, Natick, MA, 2000.

## BOOK CHAPTERS

L. Bai and D. Breen, "Chemotaxis-Inspired Cellular Primitives for Self-Organizing Shape Formation," R. Doursat, H. Sayama, O. Michel (eds.), *Morphogenetic Engineering: Toward Programmable Complex Systems*, Springer, Berlin, Chapter 9, pp. 209-237, 2012.

D. Breen, R. Whitaker, K. Museth and L. Zhukov, "Level Set Segmentation of Biological Volume Datasets," J. Suri (ed.), *Handbook of Medical Image Analysis, Volume I: Segmentation Part A*, Kluwer, New York, Chapter 8, pp. 415-478, 2005.

K. Museth, R.T. Whitaker, and D.E. Breen, "Editing Geometric Models," S. Osher and N. Paragios (eds.), *Geometric Level Set Methods in Imaging, Vision and Graphics*, Springer, New York, Chapter 23, pp. 441-460, 2003.

R.T. Whitaker, D.E. Breen, K. Museth and N. Soni, "Segmentation of Biological Volume Datasets Using a Level-Set Framework," K. Mueller, A. Kaufman (eds.), *Volume Graphics 2001*, Springer, Vienna, pp. 249-263, 2001.

D.E. Breen, S. Mauch and R.T. Whitaker, "3D Scan Conversion of CSG Models into Distance, Closest-Point and Colour Volumes," M. Chen, A.E. Kaufman, R. Yagel (eds.), *Volume Graphics*, Springer, London, Chapter 8, pp. 135-158, 2000.

D.E. Breen, "A Survey of Cloth Modeling Methods," D.H. House and D.E. Breen (eds.), *Cloth Modeling and Animation*, AK Peters, Natick, MA, Chapter 2, pp. 19-53, 2000.

D.H. House and D.E. Breen, "Particle Representation of Woven Fabrics," D.H. House and D.E. Breen (eds.), *Cloth Modeling and Animation*, AK Peters, Natick, MA, Chapter 3, pp. 55-78, 2000.

## JOURNAL PUBLICATIONS

M.D. Zarella, F.U. Garcia and D.E. Breen, "An Alternative Reference Space for H&E Color Normalization," *PLoS ONE*, Vol. 12, No. 3, p. e0174489, 2017.

D. Liu, D. Christie, B. Shakibajahromi, C. Knittel, N. Castaneda, D. Breen, G. Dion and A. Kontsos, "On the Role of Material Architecture in the Mechanical Behavior of Knitted Textiles," *International Journal of Solids and Structures*, Vol. 109, pp. 101-111, 2017.

M.D. Zarella, D.E. Breen, M.A. Reza, A. Milutinovic and F.U. Garcia, "Lymph Node Metastasis Status in Breast Carcinoma Can Be Predicted via Image Analysis of Tumor Histology," *Analytical and Quantitative Cytology and Histology*, Vol. 37, No. 5, pp. 273-285, 2015.

M.D. Zarella, D.E. Breen, A. Plagov and F.U. Garcia, "An Optimized Color Transformation for the Analysis of Digital Images of Hematoxylin & Eosin Stained Slides," *Journal of Pathology Informatics*, Vol. 6, No. 1, pp. 33, 2015.

- M.A. Reza, S.D. Mhatre, J.C. Morrison, S. Utreja, A.J. Saunders, D.E. Breen and D.R. Marena, "Automated Analysis of Courtship Suppression Learning and Memory in *Drosophila Melanogaster*," *Fly*, Vol. 7, No. 2, pp. 105-111, 2013.
- L. Bai, M. Eyiurekli, P.I. Lelkes and D.E. Breen, "Self-Organized Sorting of Heterotypic Agents Via a Chemotaxis Paradigm," *Science of Computer Programming*, Vol. 78, No. 5, pp. 594-611, 2013.
- A. Fridman, S. Weber, C. Graff, D.E. Breen, K. Dandekar and M. Kam, "OMAN: A Mobile Ad Hoc Network Design System," *IEEE Transactions on Mobile Computing*, Vol. 11, No. 7, pp. 1179 - 1191, 2012.
- M. Eyiurekli and D. Breen, "Interactive Free-Form Level-Set Surface-Editing Operators," *Computers & Graphics*, Vol. 34, No. 5, pp. 621-638, 2010.
- M. Eyiurekli and D. Breen, "Localized Editing of Catmull-Rom Splines," *Computer-Aided Design and Applications*, Vol. 6, No. 3, pp. 307-316, 2009.
- K.W. Swanson, K.A. Brakke and D. Breen, "Physics-based Surface Modeling using Quasi-Static Liquids," *Computer-Aided Design and Applications*, Vol. 6, No. 6, pp. 759-768, 2009.
- L. Bai and D. Breen, "Calculating Center of Mass in an Unbounded 2D Environment," *Journal of Graphics Tools*, Vol. 13, No. 4, pp. 53-60, 2008.
- S. Petushi, J. Marker, J. Zhang, W. Zhu, D. Breen, C. Chen, X. Lin and F. Garcia, "A Visual Analytics System for Breast Tumor Evaluation," *Analytical and Quantitative Cytology and Histology*, Vol. 30, No. 5, pp. 279-290, October 2008.
- M. Eyiurekli, P. Manley, P. Lelkes and D. Breen, "A Computational Model of Chemotaxis-based Cell Aggregation," *BioSystems*, Vol. 93, No. 3, pp. 226-239, September 2008.
- I. Braude, J. Marker, K. Museth, J. Nissanov and D.E. Breen, "Contour-Based Surface Reconstruction using MPU Implicit Models," *Graphical Models*, Vol. 69, No. 2, pp. 139-157, March 2007.
- K. Museth, D.E. Breen, R.T. Whitaker, S. Mauch and D. Johnson, "Algorithms for Interactive Editing of Level Set Models," *Computer Graphics Forum*, Vol. 24, No. 4, pp. 821-841, December 2005.
- L. Zhukov, K. Museth, D.E. Breen, R.T. Whitaker and A.H. Barr, "Level Set Segmentation and Modeling of DT-MRI Brain Data," *Journal of Electronic Imaging*, Vol. 12, No. 1, pp. 125-133, January 2003.
- K. Museth, D.E. Breen, R.T. Whitaker and A.H. Barr, "Level Set Surface Editing Operators," *ACM Transactions on Graphics (Proc. SIGGRAPH 2002)*, Vol. 21, No. 3, pp. 330-338, July 2002.
- M. Aono, D.E. Breen and M.J. Wozny, "Modeling Methods for the Design of 3D Broadcloth Composite Parts," *Computer-Aided Design*, Vol. 33, No. 13, pp. 989-1007, November 2001.
- D.E. Breen, S. Mauch, R.T. Whitaker and J. Mao, "3D Metamorphosis Between Different Types of Geometric Models," *Computer Graphics Forum (Proc. Eurographics 2001)*, Vol. 20, No. 3, pp. 36-48, September 2001.

- D.E. Breen and R.T. Whitaker, "A Level-Set Approach for the Metamorphosis of Solid Models," *IEEE Transactions on Visualization and Computer Graphics*, Vol. 7, No. 2, pp. 173-192, April-June 2001.
- D.E. Breen, "Cost Minimization for Animated Geometric Models in Computer Graphics," *Journal of Visualization and Computer Animation*, Vol. 8, No. 4, pp. 201-220, 1997.
- G.J. Klinker, K.H. Ahlers, D.E. Breen, P.-Y. Chevalier, C. Crampton, D.S. Greer, D. Koller, A. Kramer, E. Rose, M. Tuceryan and R.T. Whitaker, "Confluence of Computer Vision and Interactive Graphics for Augmented Reality," *Presence: Teleoperations and Virtual Environments*, Vol. 6, No. 4, pp. 433-451, August 1997.
- D.E. Breen, "Computer Graphics in Textiles and Apparel Modeling," guest editor introduction, *IEEE Computer Graphics and Applications*, Vol. 16, No. 5, pp. 26-27, September 1996.
- M. Aono, P. Denti, D.E. Breen and M.J. Wozny, "Fitting a Woven Cloth Model to a Curved Surface: Dart Insertion," *IEEE Computer Graphics and Applications*, Vol. 16, No. 5, pp. 60-70, September 1996.
- D.E. Breen, R.T. Whitaker, E. Rose and M. Tuceryan, "Interactive Occlusion and Automatic Object Placement for Augmented Reality," *Computer Graphics Forum* (Proc. Eurographics '96), Vol. 15, No. 3, pp. 11-22, August 1996.
- D.H. House, R.W. DeVaul and D.E. Breen, "Towards Simulating Cloth Dynamics Using Interacting Particles," *International Journal of Clothing Science and Technology*, Vol. 8, No. 3, pp. 75-94, 1996. (Awarded Best Paper of the Year)
- M. Tuceryan, D.S. Greer, R.T. Whitaker, D.E. Breen, C. Crampton, E. Rose and K.H. Ahlers, "Calibration Requirements and Procedures for a Monitor-Based Augmented Reality System," *IEEE Transactions on Visualization and Computer Graphics*, Vol. 1, No. 3, pp. 255-273, September 1995.
- K.H. Ahlers, A. Kramer, D.E. Breen, P.-Y. Chevalier, C. Crampton, E. Rose, M. Tuceryan, R.T. Whitaker and D.S. Greer, "Distributed Augmented Reality for Collaborative Design Applications," *Computer Graphics Forum* (Proc. Eurographics '95), Vol. 14, No. 3, pp. 3-14, August 1995.
- R.T. Whitaker, C. Crampton, D.E. Breen, M. Tuceryan and E. Rose, "Object Calibration for Augmented Reality," *Computer Graphics Forum* (Proc. Eurographics '95), Vol. 14, No. 3, pp. 15-27, August 1995.
- D.E. Breen, D.H. House and M.J. Wozny, "A Particle-Based Model for Simulating the Draping Behavior of Woven Cloth," *Textile Research Journal*, Vol. 64, No. 11, pp. 663-685, November 1994.
- M. Aono, D.E. Breen and M.J. Wozny, "Fitting a Woven Cloth Model to a Curved Surface: Mapping Algorithms," *Computer-Aided Design*, Vol. 26, No. 4, pp. 278-292, April 1994.
- D.E. Breen, D.H. House and P.H. Getto, "A Physically-Based Particle Model of Woven Cloth," *The Visual Computer*, Vol. 8, No. 5-6, pp. 264-277, June 1992.
- P.H. Getto and D.E. Breen, "An Object-Oriented Architecture for a Computer Animation System," *The Visual Computer*, Vol. 6, No. 2, pp. 79-92, March 1990.



## REFEREED CONFERENCE PUBLICATIONS

M.D. Zarella, F.U. Garcia and D.E. Breen, "A Template Matching Model for Nuclear Segmentation in Digital Images of H&E Stained Slides," *9th International Conference on Bioinformatics and Biomedical Technology Proceedings* (Lisbon, Portugal, May 2017) pp. 98-102.

L. Bai, R. Gilmore and D.E. Breen, "Predicting Spatial Self-Organization with Statistical Moments," *Spatial Computing Workshop of the AAMAS Conference Proceedings* (Paris, France, May 2014) Article 2.

L. Bai, T. Widmann, F. Jülicher, C. Dahmann and D.E. Breen, "3D Surface Reconstruction and Visualization of the Drosophila Wing Imaginal Disc at Cellular Resolution," *SPIE-IS&T Conference on Electronic Imaging Proceedings*, (Burlingame, CA, February 2013) Volume 8654, Article 86540D.

D. Breen, T. Widmann, L. Bai, F. Jülicher and C. Dahmann, "Epithelial Cell Reconstruction and Visualization of the Developing Drosophila Wing Imaginal Disc," *IEEE Symposium on Biological Data Visualization Proceedings* (Seattle, WA, October 2012) pp. 77 – 84.

M.A. Reza, J. Marker, S. Mhatre, A. Saunders, D. Marena and D. Breen, "Video Analysis Algorithms for Automated Categorization of Fly Behaviors," *International Symposium on Visual Computing Proceedings, Part II, LNCS 7432* (Rethymon, Greece, July 2012) pp. 229 – 241.

M. Eyiurekli and D. Breen, "Data Structures for Interactive High Resolution Level-Set Surface Editing," *Graphics Interface Proceedings* (St. Johns, NL, Canada, May 2011) pp. 95-102.

M. Eyiurekli, L. Bai, P. Lelkes and D. Breen, "Chemotaxis-based Sorting of Self-Organizing Heterotypic Agents," *25th ACM Symposium on Applied Computing Proceedings* (Sierre, Switzerland, March 2010) pp. 1315-1322.

J.L. Bradshaw, P.L. Gurian and D.E. Breen, "ENVision: Visualizing Water Quality from Geographically Distributed Wells," *11th LASTED International Conference on Computer Graphics and Imaging Proceedings* (Innsbruck, Austria, February 2010) paper 679-100.

M. Eyiurekli, C. Grimm and D. Breen, "Editing Level-Set Models with Sketched Curves," *6th Eurographics/ACM Symposium on Sketch-Based Interfaces and Modeling Proceedings* (New Orleans, LA, August 2009) pp. 45-52.

K. Swanson, K. Brakke and D. Breen, "Temporal Computational Objects: A Process for Dynamic Surface Generation," *4th International Symposium on Visual Computing Proceedings Part II* (Las Vegas, NV, December 2008) pp. 959-969.

L. Bai, M. Eyiurekli and D. Breen, "An Emergent System for Self-Aligning and Self-Organizing Shape Primitives," *2nd IEEE International Conference on Self-Adaptive and Self-Organizing Systems Proceedings* (Venice, Italy, October 2008) pp. 445-454.

J.Z. Zhang, S. Petushi, W.C. Regli, F.U. Garcia and D.E. Breen, "A Study of Shape Distributions for Estimating Histologic Grade," *30th Annual International Conference of the IEEE Engineering in Medicine and Biology Society Proceedings* (Vancouver, BC, Canada, August 2008) pp. 1200-1205.

L. Bai, M. Eyiurekli and D. Breen, "Automated Shape Composition Based on Cell Biology and Distributed Genetic Programming," *Genetic and Evolutionary Computation Conference Proceedings* (Atlanta, GA, July 2008) pp. 1179-1186.

- D. Hennessey, D. Brooks, A. Fridman and D. Breen, "A Simplification Algorithm for Visualizing the Structure of Complex Graphs," *12th International Conference on Information Visualisation Proceedings* (London, UK, July 2008) pp. 619-629.
- L. Bai, M. Eyiurekli and D. Breen, "Self-Organizing Primitives for Automated Shape Composition," *International Conference on Shape Modeling and Applications Proceedings* (Stony Brook, NY, June 2008) pp. 147-154.
- J. Beltowska, K. Museth and D. Breen, "Investigations of Tensor Voting Modeling," *16th International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision Communications Proceedings* (Pilsen, Czech Republic, February 2008) pp. 55 - 62.
- A. Fridman, D. Hennessey, D. Breen, S. Weber and M. Kam, "Visualization of Resource Allocation in Large-Scale Mobile Ad Hoc Networks," *3rd International Symposium on Visual Computing Proceedings* (Lake Tahoe, NV, November 2007) pp. 554-563.
- M. Eyiurekli, P. Lelkes and D. Breen, "Simulation of Chemotaxis-Based Sorting of Heterotypic Cell Populations," *IEEE / NIH BISTI Life Science Systems & Applications Workshop Proceedings* (Bethesda, MD, November 2007) pp. 47-50.
- M. Eyiurekli, P. Lelkes and D. Breen, "A Computational System for Investigating Chemotaxis-Based Cell Aggregation," *9th European Conference on Artificial Life Proceedings* (Lisbon, Portugal, September 2007) pp. 1034-1049.
- J. Marker, I. Braude, K. Museth and D. Breen, "Contour-based Surface Reconstruction Using Implicit Curve Fitting, and Distance Field Filtering and Interpolation," *International Workshop on Volume Graphics Proceedings* (Boston, MA, July 2006) pp. 95-102.
- O. Nilsson, D. Breen and K. Museth, "Surface Reconstruction Via Contour Metamorphosis: An Eulerian Approach With Lagrangian Particle Tracking," *IEEE Visualization 2005 Proceedings* (Minneapolis, MN, October 2005) pp. 407-414.
- C. Schroeder, D. Breen, C. Cera and W. Regli, "Stochastic Microgeometry for Displacement Mapping," *International Conference on Shape Modeling and Applications Proceedings* (Cambridge, MA, June 2005) pp. 164-173.
- K. Museth, D. Breen, L. Zhukov and R. Whitaker, "Level Set Segmentation From Multiple Non-uniform Volume Datasets," *IEEE Visualization 2002 Proceedings* (Boston, MA, October 2002) pp. 179-186.
- M. Gavrilu, J. Carranza, D. Breen and A. Barr, "Fast Extraction of Adaptive Multiresolution Meshes with Guaranteed Properties from Volumetric Data," *IEEE Visualization 2001 Proceedings* (San Diego, CA, October 2001) pp. 295-302.
- S. Lombeyda, L. Moll, M. Shand, D. Breen and A. Heirich, "Scalable Interactive Ray-casting of Volumes Using Off-the-shelf Components," *2001 Symposium on Parallel and Large-Data Visualization and Graphics Proceedings* (San Diego, CA, October 2001) pp. 115-121.

- R.T. Whitaker, D.E. Breen, K. Museth and N. Soni, "A Framework for Level Set Segmentation of Volume Datasets," *International Workshop on Volume Graphics Proceedings* (Stony Brook, NY, June 2001) pp. 159-168.
- Z. Wood, M. Desbrun, P. Schröder and D. Breen, "Semi-Regular Mesh Extraction From Volumes," *IEEE Visualization 2000 Proceedings* (Salt Lake City, UT, October 2000) pp. 275-282.
- D.E. Breen and S. Mauch, "Generating Shaded Offset Surfaces with Distance, Closest-Point and Color Volumes," *International Workshop on Volume Graphics Proceedings* (Swansea, UK, March 1999) pp. 307-320.
- D.E. Breen, S. Mauch and R.T. Whitaker, "3D Scan Conversion of CSG Models into Distance Volumes," *1998 Symposium on Volume Visualization Proceedings* (RTP, NC, October 1998) pp. 7-14.
- R.T. Whitaker and D.E. Breen, "Level-Set Models for the Deformation of Solid Objects," *3rd International Workshop on Implicit Surfaces Proceedings* (Seattle, WA, June 1998) pp. 19-35.
- D. Koller, G. Klinker, E. Rose, D.E. Breen, R.T. Whitaker and M. Tuceryan, "Real-Time Vision-Based Camera Tracking for Augmented Reality Applications," *ACM Symposium on Virtual Reality Software and Technology (VRST '97) Proceedings* (Lausanne, Switzerland, September 1997) pp. 87-94.
- D. Koller, G. Klinker, E. Rose, D.E. Breen, R.T. Whitaker and M. Tuceryan, "Automated Camera Calibration and 3D Egomotion Estimation for Augmented Reality Applications," *7th International Conference on Computer Analysis of Images and Patterns (CAIP '97) Proceedings* (Kiel, Germany, September 1997) pp. 109-206.
- E. Rose, D.E. Breen, K.H. Ahlers, C. Crampton, M. Tuceryan, R.T. Whitaker and D.S. Greer, "Annotating Real-World Objects Using Augmented Reality," *Computer Graphics: Developments in Virtual Environments (CG International '95 Conference Proceedings)*, eds. R.A. Earnshaw and J.A. Vince (Academic Press, London, June 1995) pp. 357-370.
- D.E. Breen, D.H. House and M.J. Wozny, "Predicting the Drape of Woven Cloth Using Interacting Particles," *SIGGRAPH '94 Conference Proceedings* (Orlando, FL, July 1994) pp. 365-372.
- M. Aono, D.E. Breen and M.J. Wozny, "A Computer-Aided Broadcloth Composite Layout Design System," *Geometric Modeling for Product Realization (IFIP Conference on Geometric Modeling Proceedings)*, eds. P.R. Wilson, M.J. Wozny and M.J. Pratt (North-Holland, Amsterdam, September 1992) pp. 223-250.
- D.H. House, D.E. Breen and P.H. Getto, "On the Dynamic Simulation of Physically-Based Particle-System Models," *Third Eurographics Workshop on Animation and Simulation Proceedings* (Cambridge, UK, September 1992).
- D.E. Breen, "Constructive Cubes: CSG Evaluation For Display Using 3-D Scalar Data Sets," *Eurographics '91 Proceedings* (Vienna, Austria, September 1991) pp. 127-142.
- J.V. Miller, D.E. Breen, W.E. Lorensen, R.M. O'Bara and M.J. Wozny, "Geometrically Deformed Models: A Method for Extracting Closed Geometric Models from Volume Data," *SIGGRAPH '91 Conference Proceedings* (Las Vegas, NV, July 1991) pp. 217-226.

D.E. Breen, D.H. House and P.H. Getto, "A Particle-Based Computational Model of Cloth Draping Behavior," *Scientific Visualization of Physical Phenomena (CG International '91 Proceedings)*, ed. N.M. Patrikalakis (Springer-Verlag, Tokyo, June 1991) pp. 113-134.

J.V. Miller, D.E. Breen and M.J. Wozny, "Extracting Geometric Models Through Constraint Minimization," *IEEE Visualization '90 Proceedings* (San Francisco, October 1990) pp. 74-82.

D.E. Breen, P.H. Getto and A.A. Apodaca, "Object-Oriented Programming in a Conventional Programming Environment," *13th Annual International Computer Software and Applications Conference Proceedings* (Orlando, FL, September, 1989) pp. 334-343.

D.E. Breen and V. Kühn, "Message-Based Object-Oriented Interaction Modeling," *Eurographics '89 Proceedings* (Hamburg, FRG, September 1989) pp. 489-503.

D.E. Breen, "Choreographing Goal-Oriented Motion Using Cost Functions," *State-of-the-art in Computer Animation (Computer Animation '89 Conference Proceedings)*, eds. N. Magnenat-Thalmann and D. Thalmann (Springer-Verlag, Tokyo, June 1989) pp. 141-151.

D.E. Breen and M.J. Wozny, "Message-Based Choreography for Computer Animation," *State-of-the-art in Computer Animation (Computer Animation '89 Conference Proceedings)*, eds. N. Magnenat-Thalmann and D. Thalmann (Springer-Verlag, Tokyo, June 1989) pp. 69-82.

D.E. Breen, P.H. Getto and A.A. Apodaca, "An Object-Oriented Programming Methodology for a Conventional Programming Environment," *Second IEE/BCS Software Engineering Conference Proceedings* (Liverpool, UK, July 1988) pp. 65-72.

D.E. Breen, P.H. Getto, A.A. Apodaca, D.G. Schmidt and B.D. Sarachan, "The Clockworks: An Object-Oriented Computer Animation System," *Eurographics '87 Proceedings* (Amsterdam, August 1987) pp. 275-282.

D.E. Breen, "Creation and Smooth-Shading of Steiner Patch Tessellations," *1986 Fall Joint Computer Conference Proceedings* (Dallas, TX, November 1986) pp. 931-940.

## **ABSTRACT-REFEREED AND TUTORIAL PUBLICATIONS**

M.D. Zarella, D.E. Breen, A. Plagov and F.U. Garcia, "An Optimized Color Space for the Analysis of Digital Images of H&E Slides," *Laboratory Investigation*, Vol. 95, p. 403A, February 2015.

M.D. Zarella, B. Greenfield, J. Yan, D.E. Breen and F.U. Garcia, "Breast Cancer Subtype Classification from Computational Histological Image Analysis," *Laboratory Investigation*, Vol. 94, p. 404A, February 2014.

D.E. Breen, T. Widmann, L. Bai, L. Sui, F. Jülicher and C. Dahmann, "3D Reconstruction and Visualization of the Drosophila Wing Imaginal Disc at Cellular Resolution," Poster Abstract, Visualizing Biological Data Conference (Heidelberg, Germany, March 2014).

M. Zarella, M.A. Reza, D. Breen, Y. Gong and F. Garcia, "Lymph Node Metastasis Status in Primary Breast Carcinoma Can Be Predicted Via Image Analysis of Tumor Histology," *Laboratory Investigation*, Vol. 93, p. 383A, February 2013.

- D.E. Breen, T. Widmann, L. Bai, F. Jülicher and C. Dahmann, "3D Reconstruction and Visualization of the Drosophila Wing Imaginal Disc at Cellular Resolution," Poster Abstract, EMBO Conference on Morphogenesis and Dynamics of Multicellular Systems (Heidelberg, Germany, September 2012).
- L. Bai, T. Widmann, F. Jülicher, C. Dahmann and D.E. Breen, "3D Reconstruction and Visualization of the Developing Drosophila Wing Imaginal Disc at Cellular Resolution," Poster Abstract, IEEE Symposium on Biological Data Visualization (Providence, RI, October 2011).
- D.E. Breen, B. Hu, M.A. Reza, A. Milutinovic, R. Polikar and F.U. Garcia, "Predicting Lymph Node Metastasis Status Via Image Analysis of Primary Breast Tumor Histology," Poster Abstract, Pathology Informatics Conference (Pittsburgh, PA, October 2011).
- S. Petushi, J. Zhang, A. Milutinovic, D.E. Breen and F.U. Garcia, "Image-Based Histologic Grade Estimation Using Stochastic Geometry Analysis," *Medical Imaging 2011: Computer-Aided Diagnosis*, SPIE Proceedings, Vol. 7963, paper 79633E, March 2011.
- D. Breen and L. Bai, "A Genetic Programming Framework for the Simulation and Design of Self-assembling, Chemotaxis-driven Cell Aggregates," Poster Abstract, International Workshop on Bio-Design Automation (Anaheim, CA, June 2010).
- A. Milutinovic, M.A. Reza, D. Breen and F. Garcia, "Multidimensional Shape and Color Distributions as a Computational Biomarker for Cancer Pathology," *Laboratory Investigation*, Vol. 90, p. 435A, February 2010.
- J. Bradshaw, P.L. Gurian, A. Kumar and D. Breen, "Spatial Trends Shed Light on Arsenic Concentrations," *Opflow*, Vol. 36, No. 1, pp. 18-21, January 2010.
- J. Bradshaw, P. Gurian, A. Kumar and D. Breen, "Spatial Trends in Groundwater Arsenic Concentrations," *AWWA Annual Conference and Exhibition Proceedings* (San Diego, CA, June 2009).
- S. Petushi, J. Zhang, D. Breen and F. Garcia, "Histologic Grade Estimation Using Stochastic Geometry Shape Distributions in Breast Carcinoma," *Laboratory Investigation*, Vol. 88, p. 369A, January 2008.
- D.E. Breen, (ed.), *Level Set Applications for Visualization*, Notes for IEEE Visualization 2007 Course #4 (Sacramento, CA, October 2007).
- D.E. Breen, (ed.), *Level Set Methods for Visualization*, Notes for IEEE Visualization 2006 Course #4 (Baltimore, MD, October 2006).
- D.E. Breen, (ed.), *Level Set and PDE Methods for Visualization*, Notes for IEEE Visualization 2005 Course #6 (Minneapolis, MN, October 2005).
- D.E. Breen, (ed.), *Level Set and PDE Methods for Computer Graphics*, Notes for SIGGRAPH 2004 Course #27 (Los Angeles, CA, August 2004).
- D.E. Breen, (ed.), *Level Set and PDE Methods for Computer Graphics*, Notes for SIGGRAPH 2002 Course #10 (San Antonio, TX, July 2002).

L. Zhukov, J. Bao, I. Guskov, J. Wood and D. Breen, "Dynamic Deformable Models for MRI Heart Segmentation," *SPIE Medical Imaging 2002 Proceedings* (San Diego, CA, February 2002) pp. 989-1007.

L. Zhukov, K. Museth, D. Breen and R. Whitaker, "3D Modeling and Segmentation of Diffusion Weighted MRI Data," *SPIE Medical Imaging 2001 Proceedings* (San Diego, CA, February 2001) pp. 401-412.

K.H. Ahlers, D.E. Breen, C. Crampton, E. Rose, M. Tuceryan, R.T. Whitaker and D.S. Greer, "An Augmented Vision System for Industrial Applications," *Telem manipulator and Telepresence Technologies*, SPIE Proceedings, Vol. 2351, pp. 345-359, October 1994.

D.E. Breen, "Applying Particle Systems to the Modeling of Cloth Drape," *ACM SIGGRAPH '92 Course Notes #16 - Particle System Modeling, Animation, and Physically-Based Techniques* (Chicago, July 1992).

D.H. House and D.E. Breen, "Particles: A Naturally Parallel Approach to Modeling," *3rd Symposium on the Frontiers of Massively Parallel Computation Proceedings* (College Park, MD, October 1990) pp. 150-153.

D.H. House and D.E. Breen, "Particles As Modeling Primitives For Surgical Simulation," *11th Annual International IEEE Engineering in Medicine & Biology Conference Proceedings* (Seattle, WA, November 1989) pp. 831-832.

D.E. Breen and P.H. Getto, "Object-Oriented Visualization Tools," *Electronic Imaging '89 East Conference Proceedings* (Boston, MA, October 1989) pp. 541-545.

D.E. Breen, A.A. Apodaca and P.H. Getto, "The Clockworks: An Implementation of an Object-Oriented Computer Animation System in a Conventional Programming Environment," *ACM SIGGRAPH '87 Course Notes #14 - Object-Oriented Geometric Modeling and Rendering* (Anaheim, CA, July 1987).

## **TEACHING EXPERIENCE**

Instructor, "Interactive Computer Graphics," Drexel CS Course (Philadelphia, PA, Fall 2005/Winter 2007-2010, 2016-2017/Spring 2013, 2015).

Instructor, "Computer Graphics," Drexel CS Course (Philadelphia, PA, Fall 2006-2009, 2011, 2014-2016/Winter 2004-2006, 2012, 2015/Spring 2004-2005, 2007-2010, 2012, 2014).

Instructor, "Advanced Rendering Techniques," Drexel CS Course (Philadelphia, PA, Fall 2003-2004/Spring 2006-2009, 2012, 2016).

Instructor, "Multimedia Programming," Drexel CS Course (Philadelphia, PA, Winter 2015).

Instructor, "Computer Programming I," Drexel CS Course (Philadelphia, PA, Spring 2010, Fall 2012-2013, Winter 2013-2014).

Instructor, "Advanced Programming Techniques," Drexel CS Course (Philadelphia, PA, Fall 2012-2013).

Instructor, "Computer Programming II," Drexel CS Course (Philadelphia, PA, Spring 2013).

Instructor, “Computer Programming I-II,” Drexel CS Course (Philadelphia, PA, Winter 2012).

Instructor, “Graphical User Interfaces,” Drexel CS Course (Philadelphia, PA, Winter 2009).

Instructor, “Level Set Applications for Visualization,” IEEE Visualization 2007 Course #4 (Sacramento, CA, October 2007).

Instructor, “Level Set Methods for Visualization,” IEEE Visualization 2006 Course #4 (Baltimore, MD, October 2006).

Instructor, “Level Set and PDE Methods for Computer Graphics,” SIGGRAPH 2004 Course #27 (Los Angeles, August 2004).

Instructor, “Clothing Simulation and Animation,” SIGGRAPH 2003 Course #29 (San Diego, CA, July 2003).

Instructor, “Level Set and PDE Methods for Computer Graphics,” SIGGRAPH 2002 Course #10 (San Antonio, TX, July 2002).

Instructor, “Computer Graphics,” RPI ECSE Course (Troy, NY, Fall 1992).

Instructor, “Particle System Modeling, Animation, and Physically Based Techniques,” SIGGRAPH ‘92 Course #16 (Chicago, July 1992).

Instructor, “Object-oriented Computer Animation,” 2-day seminar, Zentrum für Graphische Datenverarbeitung (Darmstadt, FRG, November 1987).

## **GRADUATE STUDENT SUPERVISION**

Rafael Campos, *Feature-Based 3D Level Set Morphing*, M.S., Drexel University, Philadelphia, PA, 2016

Linge Bai, *Chemotaxis-based Spatial Self-Organization Algorithms*, Ph.D., Drexel University, Philadelphia, PA, 2014

Manolya E. McCormick, *Interactive Freeform Editing Techniques for Large-Scale, Multiresolution Level Set Models*, Ph.D., Drexel University, Philadelphia, PA, 2012

Md. Alimoor Reza, *Automated Categorization of Drosophila Learning and Memory Behaviors using Video Analysis*, M.S., Drexel University, Philadelphia, PA, 2011

Daniel Hennessey, *Algorithms for the Visualization and Simulation of Mobile Ad Hoc and Cognitive Networks*, M.S., Drexel University, Philadelphia, PA, 2009

Linge Bai, *Self-Organizing Primitives for Automated 2D Shape Composition*, M.S., Drexel University, Philadelphia, PA, 2008

Jasper Zhang, *An Approach to Analyzing Histology Segmentations Using Shape Distributions*, M.S., Drexel University, Philadelphia, PA, 2008

Manolya Eyiurekli, *A Computational Model of Chemotaxis-based Cell Aggregation*, M.S., Drexel University, Philadelphia, PA, 2006

Ilya Braude, *Smooth 3D Surface Reconstruction from Contours of Biological Data with MPU Implicits*, M.S., Drexel University, Philadelphia, PA, 2005

Sean Mauch, "A Fast Marching Method for Computing Closest Points," California Institute of Technology, Pasadena, CA, 1997

Masaki Aono, *Computer-Aided Geometric Design for Forming Woven Cloth Composites*, Ph.D., Rensselaer Polytechnic Institute, Troy, NY, 1994

James Miller, *On GDM's: Geometrically Deformed Models for the Extraction of Closed Shapes from Volume Data*, M.S., Rensselaer Polytechnic Institute, Troy, NY, 1990

David Tonnesen, *A Window Based Object-Oriented User Interface for The Clockworks*, M.S., Rensselaer Polytechnic Institute, Troy, NY, 1989

Jay Hersh, *Tools for Particle Based Geometric Modeling*, M.Eng., Rensselaer Polytechnic Institute, Troy, NY, 1988

Volker Kühn, *Message-Based Object-Oriented Interaction Modeling*, Diplom, Technische Hochschule, Darmstadt, Germany, 1988

Brion Sarachan, *A User Interface for Interactive Computer Animation Scripting*, M.Eng., Rensselaer Polytechnic Institute, Troy, NY, 1986

Moh-Fung Shen, *Interactive 3-D Surface Design - BBSRF*, M.S., Rensselaer Polytechnic Institute, Troy, NY, 1986

## **THESIS COMMITTEE MEMBERSHIP**

Jae Hoon Kim, *Classifying Human Driving Behavior via Deep Neural Networks*, M.S., Computer Science, Drexel University, 2017

Stephen Lombardi, *Radiometric Scene Decomposition: Estimating Complex Reflectance and Natural Illumination from Images*, Ph.D., Computer Science, Drexel University, 2015

James Worcester, *Task Partitioning for Distributed Assembly*, Ph.D., Mechanical Engineering and Mechanics, Drexel University, 2015

Zhongchuan Zhang, *3D Pedestrian Tracking and Virtual Reconstruction of Ceramic Vessels Using Geometric and Color Cues*, Ph.D., Electrical and Computer Engineering, Drexel University, 2014

Geoffrey Oxholm, *Reconstructing Geometry from Its Latent Structures*, Ph.D., Computer Science, Drexel University, 2014

Arezou Azar, *Speckle Detection in Ultrasonic Images Using Unsupervised Clustering Techniques*, Ph.D., Biomedical Engineering, Drexel University, 2014



Paul Snyder, *Modeling and Engineering Self-Organization in Complex Software Systems*, Ph.D., Computer Science, Drexel University, 2013

Nathaniel Lapinski, *Art Directing Visual Complexity through Smart Textures*, M.S., Digital Media, Drexel University, 2013

Bo Song, *An Automated Wound Identification System Based on Segmentation and Artificial Neural Networks*, M.S., Biomedical Engineering, Drexel University, 2012

Jingjie Teng, *Microbial Risk Assessment Modeling for Exposure to Land-Applied Class B Biosolids*, Ph.D., Civil, Architectural and Environmental Engineering, Drexel University, 2012

Brian Bunch Christensen, *Efficient Algorithms for Controllable Fluid Simulations and High-Resolution Level Set Deformations*, Computer Science, Ph.D., Aarhus (Denmark) University, 2010

Alex Fridman, *Optimization of Cross-Layer Resource Allocation in Mobile Ad Hoc Networks*, M.S., Computer Science, Drexel University, 2009

David Richardson, *Efficient Programming Techniques for the SACLIB Computer Algebra Library*, Ph.D., Computer Science, Drexel University, 2009

Xin Li, *Shape Mapping Framework for Graphics and Visual Computing*, Ph.D., Computer Science, Stony Brook (NY) University, 2008

Anders Brodersen, *Flexible Methods for Geometric Texturing - From Terrain Visualization to Geometric Texture Mapping*, Ph.D., Computer Science, Aarhus (Denmark) University, 2007

Cheuk Yiu Ip, *Automatic Classification of CAD Models*, M.S., Computer Science, Drexel University, Philadelphia, PA, 2005

Christopher Cera, *Secure and Conceptual Collaborative Computer-Aided Design*, M.S., Computer Science, Drexel University, Philadelphia, PA, 2004

Ying Yang, *Cloth Modeling and Animation Using Viscoelastic Surfaces*, Ph.D., Computer Science, Federal Institute of Technology (EPFL), Lausanne, Switzerland, 1994

## **UNDERGRADUATE DESIGN TEAM SUPERVISION**

- Seismograph Method of Sound Generation, 2013
- Temporal Computational Objects: Physics-Based Modeller, 2010
- Therawii, 2009
- Improving Handicap Accessibility on Campus, 2008
- L.I.S.T.E.N., 2007
- Tank Tournament, 2006

## **UNDERGRADUATE STUDENT RESEARCH SUPERVISION**

At Drexel, Caltech and RPI I have worked with approximately 40 undergraduate students. Their research projects included polygonal surface texture mapping, device communication interface, generating tubes from splines, interactive modeling interface, Steiner patch approximation methods, surface of revolution, computer animation, 3D geometric warping, calculating the shortest distance

to a polygonal surface, geodesic distance isolines on an isosurface, 3D model morphing, multiresolution mesh extraction, level set segmentation of volume datasets, 3D procedural texture mapping, deformable meshes for segmentation, stochastic geometry models, visualization of ad-hoc mobile networks, contour-based surface reconstruction, visualization of water pollution/resources, analysis of biomedical images/videos and interactive web-based instructional material for mathematics.

## **HIGH SCHOOL STUDENT/TEACHER MENTORING**

Kelly McCarthy (teacher, Our Lady of Lourdes Regional School, Coal, PA) – Histology Image Analysis for Diagnosing Breast Cancer, Summer 2013

Caner Tarlabasi (student, Robert College of Istanbul) – 3D Surface Reconstruction via Distance Field Interpolation, Summer 2007

David Grunberg (student, Illinois Mathematics and Science Academy) – Contour-based Surface Reconstruction Using MPU Implicit Models, Summer 2005

Christopher Earle (student, Monrovia (CA) High School) – Interactive Computer Graphics Programming, Summer 2003

## **BOARD MEMBERSHIP**

Member, Technical Advisory Board, Primal Space Systems Inc., 2014-present

## **PROFESSIONAL SOCIETIES**

ACM SIGGRAPH, IEEE Computer Society, Fiber Society

## **PROFESSIONAL ACTIVITIES - PUBLICATIONS**

Guest editor for the September 1996 *IEEE Computer Graphics and Applications* special issue on Computer Graphics in Textiles and Apparel Modeling.

## **PROFESSIONAL ACTIVITIES - CONFERENCES**

- Program Co-Chair – International Conference on Computational Biology and Bioinformatics, 2017
- Session Chair – Fiber Society Technical Conference, Modeling and Simulation of Textiles and Processes Session, 2017
- Program Co-Chair – International Conference on Bioinformatics and Biomedical Technology, 2017
- Program Committee Member – Genetic and Evolutionary Computation Conference, 2012-2017
- Program Committee Member – European Conference on Artificial Life, 2015, 2017
- Program Committee Member – IEEE International Conference on Bioinformatics & Biomedicine, 2009, 2012-2016
- Program Committee Member – Conference on the Synthesis and Simulation of Living Systems (ALIFE), 2015-2016
- Session Chair – Fiber Society Technical Conference, Knit Modeling Session, 2016

- Program Committee Member – International Shape Modeling and Applications Conference, 2005-2010, 2012-2015
- Local Organization Chair – IEEE International Conference on Self-adaptive and Self-organizing Systems, 2013
- Program Committee Member – Digital Pathology Special Session, SPIE Medical Imaging Conference, 2013
- Program Committee Member – Computer Graphics International Conference, 2005, 2010-2012
- Program Committee Member – IEEE Visualization Conference, 2002-2004, 2006-2008, 2011-2012
- Program Committee Member – ACS/IEEE International Conference on Computer Systems and Applications (Bioinformatics and Biomedical Computing Track), 2011
- General Submissions Juror – SIGGRAPH Conference, 2010
- Program Committee Member – Symposium on Geometry Processing, 2009-2010
- Program Committee Member – Eurographics Workshop on Visual Computing for Biology and Medicine, 2010
- Program Committee Member – IEEE/EG International Symposium on Volume Graphics, 2008, 2010
- Program Committee Member – International Symposium on Visual Computing, 2009
- Program Committee Member – Spring Conference on Computer Graphics, 2006-2009
- Program Committee Member – Eurographics/IEEE VGTC Symposium on Visualization, 2007-2008
- Program Committee Member – ACM SIGGRAPH/EG Symposium on Computer Animation, 2002-2007
- Organizer – IEEE Visualization 2007 tutorial “Level Set Applications for Visualization”, Sacramento, CA, October 2007
- Program Committee Member – International Workshop on Microscopic Image Analysis with Applications in Biology, 2007
- Organizer – IEEE Visualization 2006 tutorial “Level Set Methods for Visualization”, Baltimore, MD, October 2006
- Organizer – IEEE Visualization 2005 tutorial “Level Set and PDE Methods for Visualization”, Minneapolis, MN, October 2005
- Organizer - SIGGRAPH 2004 tutorial “Level Set and PDE Methods for Computer Graphics”, Los Angeles, CA, August 2004
- Program Committee Member - Eurographics Conference, 2004
- Program Committee Member – Pacific Graphics Conference, 2004
- Program Committee Member - IASTED Computer Graphics and Imaging Conference, 2000-2004
- Program Co-chair - SIGGRAPH/EG Symposium on Computer Animation, 2003
- Co-organizer - SIGGRAPH 2003 tutorial “Clothing Simulation and Animation”, San Diego, CA, July 2003
- Program Committee Member - IEEE Symposium on Parallel and Large-Data Visualization and Graphics, 2003
- Co-organizer - SIGGRAPH 2002 tutorial “Level Set and PDE Methods for Computer Graphics”, San Antonio, TX, July 2002
- Program Committee Member - Immersive Projection Technology Symposium, 2002
- Program Committee Member - Eurographics Workshop on Parallel Graphics and Visualization, 2002
- Co-chair - IEEE Symposium on Parallel and Large-Data Visualization and Graphics, 2001
- Conference Committee Member - IEEE Visualization 2001 Conference
- Program Committee Member - Eurographics Workshop on Virtual Environments, 1998-2001

- Program Committee Member - International Symposium on Computer Graphics, Image Processing and Vision, 1998
- Organizer and Chair - SIGGRAPH '97 panel "Can We Get There From Here? : Current Challenges in Cloth Design, Modeling and Animation", Los Angeles, CA, August 1997

## **PROFESSIONAL ACTIVITIES – PROPOSAL REVIEWING**

NSF CISE Directorate, 2001, 2008, 2009, 2011, 2016, 2017  
 NSF Office of International Science and Engineering, 2009  
 Louisiana Board of Regents' Research Competitiveness, 2008  
 NSF Engineering Directorate, 2003 - 2005

## **UNIVERSITY SERVICE ACTIVITIES**

- Chair of Drexel College of Computing & Informatics bylaws committee, 2015-present
- Member of Drexel Computer Science Department Program Alignment and Review (PAR) committee, 2015-Present
- Member of Drexel Computer Science Department tenure review committee, 2012, 2016
- Member of Drexel Senate Committee on Research and Scholarly Activity, 2015-2016  
 - Chair, Graduate Students and Programs Sub-Committee
- Member of Drexel Shima Seiki Haute Technology Laboratory advisory board, 2015-2016
- Member of Drexel Information Science Department 3<sup>rd</sup> year review committee, 2016
- Member of Drexel Computer Science Department graduate studies committee, 2003-2004, 2008-2015
- Member of Drexel Information Science PhD review committee, 2013-2015
- Member of Drexel Information Science department head search committee, 2015
- Member of Drexel College of Media Arts and Design faculty search committee, 2015
- Member of Drexel Computer Science Department faculty search committee, 2004-2005, 2013-2014
- Westphal Creativity Fund reviewer, 2013-2014
- Chair of Drexel Computer Science Department PhD admissions committee, 2012-2013
- Member of Drexel Civil, Architectural and Environmental Engineering Department tenure review committee, 2012
- Chair of Drexel Computer Science Department faculty search committee, 2011-2012
- Member of Drexel Computer Science Department promotion review committee, 2010
- Member of Drexel Computer Science Department 3<sup>rd</sup> year review committee, 2010
- Member of Drexel College of Media Arts and Design tenure review committee, 2009
- Coordinator of Drexel Computer Science Department Colloquium Series, 2005-2009
- Member of Drexel College of Engineering junior faculty advisory committee, 2006-2008
- Member of Drexel Entertainment Industry Studies Institute advisory committee, 2004-2005
- Member of Drexel Neural and Cognitive Technologies Institute planning committee, 2004-2005
- Member of Drexel Entertainment Industry Studies Institute director search committee, 2004
- Member of Caltech Computer Science Department PhD admissions committee, 1997-1999

## **PRESENTATIONS**

"Predictive Modeling and Optimization for the Design of Customized Knitted Materials"  
 - Techtextil North America Conference, Chicago, IL, June 2017

“An Optimized Yarn Geometric Model for Knitted Material Simulation”

- Fiber Society Conference, Aachen, Germany, May 2017

“3D Reconstruction and Visualization of the Developing Drosophila Wing Imaginal Disc at Cellular Resolution”

- 9th International Conference on Bioinformatics and Biomedical Technology (Invited Talk), Lisbon, Portugal, May 2017
- Poster, Visualizing Biological Data Conference, Heidelberg, Germany, March 2014
- SPIE-IS&T Conference on Electronic Imaging, Burlingame, CA, February 2013
- IEEE Symposium on Biological Data Visualization, Seattle, WA, October 2012
- Poster, EMBO Conference on Morphogenesis and Dynamics of Multicellular Systems, Heidelberg, Germany, September 2012
- Poster, IEEE Symposium on Biological Data Visualization, Providence, RI, October 2011

“Segmentation of Cell Nuclei in H&E Images Based on Image Statistics”

- 9th International Conference on Bioinformatics and Biomedical Technology, Lisbon, Portugal, May 2017
- Poster, 2nd Digital Pathology Congress: USA, Philadelphia, PA, July 2016

“Biomedical Image Informatics”

- University of Lisbon, Portugal, May 2017

Panelist, Design and Manufacturing Panel

- Greater Philadelphia Smart Fabrics Conference, Philadelphia, PA, May 2017

“Design Framework for the Manufacturing of Customized Knitted Materials”

- NSF Cybermanufacturing Workshop, Berkeley, CA, June 2016
- DARPA Transformative Design Meeting, Arlington, VA, May 2016
- NCSA Private Sector Partner Meeting, Urbana, IL, May 2016
- DARPA Design for Advanced Materials Meeting, Arlington, VA, September 2015

“Geometric Biomedical Computing”

- Korea-America Student Conference, Philadelphia, PA, July 2015
- Rutgers University, Camden, NJ, October 2012
- Max Planck Institute of Molecular Cell Biology and Genetic, Dresden, Germany, March 2011

“Predicting/Directing Spatial Self-Organization with Statistical Moments”

- International Workshop on Guided Self-Organization, Freiburg, Germany, December 2014
- Spatial Computing Workshop of the AAMAS Conference, Paris, France, May 2014

“Level Set Models for Computer Graphics”

- University of Pennsylvania, Philadelphia, PA, November 2003, November 2014
- Stevens Institute of Technology, Hoboken, NJ, May 2004
- Princeton University, Princeton, NJ, November 2003
- University of Pennsylvania, Philadelphia, PA, November 2003
- International Workshop on Geometric Modeling, Computing, and Visualization (Invited Talk) Aizu, Japan, July 2003
- Dartmouth College, Hanover, NH, April 2002
- Rutgers University, Piscataway, NJ, April 2002
- University of Maryland, College Park, MD, March 2002
- Lehigh University, Bethlehem, PA, February 2002

- University of Maryland, Baltimore, MD, February 2002
- Pennsylvania State University, State College, PA, January 2002
- Implicit Surfaces Workshop, Seattle, WA, June 1998

“Video Analysis Algorithms for Automated Categorization of Fly Behaviors”

- International Symposium on Visual Computing, Rethymnon, Greece, July 2012

“Self-Organizing Primitives for Automated Shape Composition”

- Rowan University, Glassboro, NJ, October 2011
- Aarhus University, Aarhus, Denmark, May 2010
- 2nd International Conference on Self-Adaptive and Self-Organizing Systems, Venice, Italy, October 2008
- Rensselaer Polytechnic Institute, Troy, NY, September 2008
- SIGGRAPH 2008 Conference, Los Angeles, CA, August 2008
- Stony Brook University, Stony Brook, NY, June 2008

“Predicting Lymph Node Metastasis Status Via Image Analysis of Primary Breast Tumor Histology”

- Poster, Pathology Informatics Conference, Pittsburgh, PA, October 2011  
(Honorable Mention Award)

“Shape Distributions for Histologic Grade Estimation”

- Poster, SPIE Medical Imaging Conference, Orlando, FL, February 2011
- Washington University, St. Louis, MO, April 2008
- Histopathology Image Analysis Workshop, Philadelphia, PA, August 2007

“A Genetic Programming Framework for the Simulation and Design of Self-assembling, Chemotaxis-driven Cell Aggregates”

- Poster, International Workshop on Statistical Physics and Biology of Collective Motion, Dresden, Germany, November 2010
- Poster, International Workshop on Bio-Design Automation, Anaheim, CA, June 2010

“Interactive Free-form Level-Set Surface-Editing Operators”

- Technical University of Dresden (Germany), October 2010

“A Computational Model of Chemotaxis-based Cell Aggregation”

- Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, September 2010

“ENVision: Visualizing Water Quality from Geographically Distributed Wells”

- 11th IASTED International Conference on Computer Graphics and Imaging, Innsbruck, Austria, February 2010

“Visualization of Resource Allocation in Large-Scale Mobile Ad Hoc Networks”

- 3rd International Symposium on Visual Computing, Lake Tahoe, NV, November 2007

“Simulation of Chemotaxis-Based Sorting of Heterotypic Cell Populations,”

- IEEE / NIH BISTI Life Science Systems & Applications Workshop, Bethesda, MD, October 2007

“Level Set Segmentation of Biological Volume Datasets”

- IEEE Visualization 2007 Course #4 - Level Set Applications for Visualization, Sacramento, CA, October 2007
- IEEE Visualization 2006 Course #4 - Level Set Methods for Visualization, Baltimore, MD, October 2006
- University of Pennsylvania, Philadelphia, PA, May 2005
- Rutgers University, Piscataway, NJ, November 2004
- SIGGRAPH 2004 Course #27 - Level Set and PDE Methods for Computer Graphics, Los Angeles, CA, August 2004
- Volume Graphics Workshop, Stony Brook, NY, June 2001

“A Level Set Approach for the Metamorphosis of Solid Models”

- IEEE Visualization 2007 Course #4 - Level Set Applications for Visualization, Sacramento, CA, October 2007
- SIGGRAPH 2002 Course #10 - Level Set and PDE Methods for Computer Graphics, San Antonio, TX, July 2002
- Eurographics 2001 Conference, Manchester, UK, September 2001
- SIGGRAPH '99 Conference, Technical Sketches session, Los Angeles, August 1999

“Contour-Based Surface Reconstruction using Implicit Curve Fitting, and Distance Field Filtering and Interpolation”

- Aarhus (Denmark) University, June 2007
- Volume Graphics Workshop, Boston, MA, July 2006

“Volumetric Contour-Based Surface Reconstruction”

- University of Maryland, College Park, MD, March 2007
- Siemens Corporate Research, Princeton, NJ, January 2007

“Surface Reconstruction Via Contour Metamorphosis”

- IEEE Visualization 2006 Course #4 - Level Set Methods for Visualization, Baltimore, MD, October 2006

“Level Set Models for Geometric Biomedical Computing”

- University of Delaware, Newark, DE, May 2006

“The Evolution of Cloth Modeling and Animation”

- SIGGRAPH 2003 Course #29 - Clothing Simulation and Animation, San Diego, CA, July 2003
- NSF Science and Technology Center for Graphics and Visualization, November 2000
- 7<sup>th</sup> IFIP Workshop on Geometric Modeling (Keynote Talk), Parma, Italy, October 2000.

“Level Set Surface Editing Operators”

- Drexel University, Philadelphia, PA, January 2003
- University of Utah, Salt Lake City, UT, September 2002

“Cluster-based Parallel Visualization at Caltech”

- HP/DOE ASC Views Meeting (Invited Talk), Santa Fe, NM, December 2002

“3D Scan Conversion of CSG Models into Distance Volumes”

- SIGGRAPH 2002 Course #10 - Level Set and PDE Methods for Computer Graphics, San Antonio, TX, July 2002
- Volume Graphics Workshop, Swansea, UK, March 1999

- IEEE Symposium on Volume Visualization, RTP, NC, October 1998
- “Predicting the Draping Behavior of Woven Cloth Using Interacting Particles”
- University of Utah, Salt Lake City, UT, April 2002
  - Lehigh University, Bethlehem, PA, February 2002
  - NSF Science and Technology Center for Graphics and Visualization, October 1996
  - SIGGRAPH '94 Conference, Orlando, July 1994
  - Fiber Society Technical Conference, Ithaca, NY, October 1993
- “Current Challenges in Particle-Based Cloth Modeling”
- SIGGRAPH '97 Conference, Panels session, Los Angeles, August 1997
- “Interactive Occlusion and Automatic Object Placement for Augmented Reality”
- Eurographics '96 Conference, Poitiers, France, August 1996
  - SIGGRAPH '95 Conference, Technical Sketches session, Los Angeles, August 1995
- “Augmented Reality: Bringing Computers into the Real World”
- Science and Technology Lecture Series, Bavaria-USA 50 Year Partnership Celebration (Invited Talk), Munich, November 1995
  - SPIE Electronic Imaging East Conference, Boston, October 1994
- “A Computational Particle-Based Model of Cloth Draping Behavior”
- Fourth IFIP Workshop on Geometric Modeling in Computer-Aided Design, Rensselaerville, NY, September 1992
  - Eurographics Workshop on Animation and Simulation, Cambridge, UK, September 1992.
  - SIGGRAPH '92 Course #16 - Particle System Modeling, Animation, and Physically-Based Techniques, Chicago, July 1992
  - Fiber Society Technical Conference, New Orleans, December 1991
  - Williams College, Williamstown, MA, April 1991
- “Constructive Cubes: CSG Evaluation For Display Using 3-D Scalar Data Sets”
- Eurographics Conference, Vienna, Austria, September 1991
- “The Clockworks: An Object-Oriented Computer Animation System”
- Electronic Imaging '89 East Conference, Boston, October 1989
  - Wilhelm Pieck University, Rostock, GDR, September 1989
  - Zentrum für Graphische Datenverarbeitung, Darmstadt, FRG, November 1987
  - Eurographics '87 Conference, Amsterdam, August 1987
- “Message-Based Choreography for Computer Animation”
- Eurographics Conference, Hamburg, FRG, September 1989
  - Computer Animation '89 Conference, Geneva, June 1989
  - Zentrum für Graphische Datenverarbeitung, Darmstadt, FRG, May 1988
- “Object-Oriented Programming in a Conventional Programming Environment”
- 13th Annual International Computer Software and Applications Conference, Orlando, FL, September 1989
  - Second IEE/BCS Software Engineering Conference, Liverpool, UK, July 1988
- “Choreographing Goal-Oriented Motion Using Cost Functions”
- INESC, Lisbon, Portugal, July 1989



- Computer Animation '89 Conference, Geneva, June 1989

“Creation and Smooth-Shading of Steiner Patch Tessellations,”  
- Fall Joint Computer Conference, Dallas, TX, November 1986

## **COMPUTER-GENERATED IMAGES**

List available upon request (23 items).

## **COMPUTER-GENERATED ANIMATION**

List available upon request (5 items).

## **REVIEWING TECHNICAL PAPERS**

*ACM Transactions on Graphics*

*ACM Transactions on Modeling and Computer Simulation*

*IEEE Transactions on Visualization and Computer Graphics*

*IEEE Computer Graphics and Applications*

*IEEE Signal Processing Letters*

*Graphical Models and Image Understanding*

*Computer-Aided Design*

*Computer-Aided Geometric Design*

*Computer Graphics Forum*

*Computers & Graphics*

*Journal of Visualization and Computer Animation*

*Computer Animation and Virtual Worlds*

*The Visual Computer*

*International Journal of Shape Modeling*

*Mathematical Biosciences*

*Mathematical and Computer Modeling*

*Algorithmica*

*Engineering with Computers*

*Textile Research Journal*

*Journal of the Textile Institute*

*The Computer Journal*

IEEE Press

Cambridge University Press

Springer Verlag

SIGGRAPH Conference

SIGGRAPH Asia Conference

IEEE Visualization Conference

Eurographics - IEEE VGTC Symposium on Visualization

IEEE Pacific Visualization Symposium

Graphics Interface Conference

Computer Animation Conference

Computer Graphics International Conference

Eurographics Conference

IFIP International Conference on Computer Graphics

International Conference on Shape Modeling and Applications

ACM Symposium on Interactive 3D Graphics

ACM Symposium on Solid Modeling and Applications

Symposium on Geometry Processing

International Workshop on Volume Graphics  
International CAD Conference  
International Symposium on Parallel and Distributed Processing