John Edwards, Ph.D.

CONTACT
INFORMATION

Department of Computer Science
Utah State University
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RESEARCH

Geometric modeling, simulation, visualization

EDUCATION

Ph.D. Computer Science, The University of Texas, 2013
M.S. Computer Science, Brigham Young University, 2004
B.S. Computer Science, Utah State University, 1998

PROFESSIONAL
EXPERIENCE

Assistant professor, Utah State University, 2018-current
Assistant professor, Idaho State University, 2015-2018
Post-doctoral fellow, Scientific Computing and Imaging Institute, University of Utah, 2013-2015
Visiting scholar, University of Hong Kong, 2012
Assistant instructor (during PhD studies), The University of Texas, 2010-2013
Robotics and visualization research engineer, Autonomous Solutions, Inc., 2008-2009
Research and development engineer, ProLogic, Inc., 2005-2008
Software engineer, Rigaku, Inc., 1999-2005

JOURNAL
PUBLICATIONS

Lloyd Griffel*, Donna Delparte, and John Edwards. A machine learning approach using spectral signatures to detect potato plants infected with Potato Virus Y. *Precision Agriculture.* In press. 2018.

DeWayne Derryberry, Ken Aho, John Edwards, and Teri Peterson. Model selection and regression t-statistics. *The American Statistician.* In press. 2018.

Nathan Morrical* and John Edwards. Parallel quadtree construction on collections of objects. *Computers and Graphics.* 66:162168. 2017.

Boyd Edwards and John Edwards. Periodic nonlinear sliding modes for two uniformly magnetized spheres. *Chaos: An Interdisciplinary Journal of Nonlinear Science.* 27(5):053107, 2017.

Boyd Edwards and John Edwards. Dynamical interactions between two uniformly magnetized spheres. *European Journal of Physics.* 38(1):015205, 2016.

Xin Tong, John Edwards, Chun-Ming Chen, Han-Wei Shen, Christopher Johnson, and Pak Chung Wong. View-dependent streamline deformation and exploration. *IEEE Transactions on Visualization and Computer Graphics.* 22(7):1788-1801, 2016.

John Edwards, Eric Daniel, Valerio Pascucci, Chandrajit Bajaj. Approximating the Generalized Voronoi Diagram of Closely Spaced Objects. *Computer Graphics Forum.* 34(2):299-309, 2015.

John Edwards, Eric Daniel, Justin Kinney, Terrence Sejnowski, Tom Bartol, Daniel Johnston, Kristen Harris, and Chandrajit Bajaj. VolRoverN: Enhancing surface and volumetric reconstruction for realistic dynamical simulation of cellular and subcellular function. *Neuroinformatics.* 12(2):277-289, 2014.

John Edwards and Chandrajit Bajaj. Topologically correct reconstruction of tortuous contour forests. *Computer-Aided Design.* 43(10):1296-1306, 2011.

* Student author

REFEREED CONFERENCE PUBLICATIONS	John Edwards, Erika Fulton, Jonathan Holmes, Joseph Valentin*, David Beard, and Kevin Parker. Separation of syntax and problem solving in Introductory Computer Programming. *IEEE Frontiers in Education.* San Jose, CA. October 2018.

Sidharth Kumar, Duong Hoang, Steve Petruzza, Valerio Pascucci, and John Edwards. Reducing network congestion and synchronization overhead during data aggregation when writing hierarchical data. *IEEE International Conference on High Performance Computing, Data, and Analytics.* Jaipur, India. December 2017. 23% acceptance rate.

Nathan Morrical* and John Edwards. Parallel quadtree construction on collections of objects. *Shape Modeling International.* Berkeley, CA. June 2017. 37% acceptance rate. [†]

John Edwards, Eric Daniel, Valerio Pascucci, Chandrajit Bajaj. Approximating the Generalized Voronoi Diagram of Closely Spaced Objects. *Eurographics.* Zurich, Switzerland. July 2015. 27% acceptance rate. [†]

Sidharth Kumar, John Edwards, Peer-Timo Bremer, Aaron Knoll, Cameron Christensen, Venkatram Vishwanath, Philip Carns, John A. Schmidt, Valerio Pascucci. Efficient I/O and storage of adaptive resolution data. *High Performance Computing, Networking, Storage and Analysis (SC14).* New Orleans, LA. November 2014. 21% acceptance rate.

John Edwards, Wenping Wang, and Chandrajit Bajaj. Surface segmentation for improved remeshing. *Proceedings of the 21st International Meshing Roundtable*, pages 403-418. San Jose, CA. October 2012.

John Edwards and Chandrajit Bajaj. Topologically correct reconstruction of tortuous contour forests. *Proceedings of the ACM Symposium on Solid and Physical Modeling*, pages 51-60. Haifa, Israel. September 2010. 29% acceptance rate.

Joel Alberts, John Edwards, Josh Johnston, and Jeff Ferrin. 3D visualization for improved manipulation and mobility in EOD and combat engineering applications. *Proceedings of SPIE Defense, Security and Sensing.* April 2009.

Josh Johnston, Joel Alberts, Matt Berkemeier, and John Edwards. Manipulator Autonomy for EOD Robots. *26th Army Science Conference.* December 2008.

* Student author
[†] Also listed under Journals section

BOOK CHAPTER	John Edwards, Sidharth Kumar, and Valerio Pascucci. Big data from scientific simulations. In L. Grandinetti, G.R. Joubert, M. Kunze, and V. Pascucci, editors, *Big Data and High Performance Computing*, pages 32–46. IOS Press, Amsterdam, Berlin, Tokyo, Washington, DC, 2015.

GRANTS FUNDED	*Syntax before problem solving: an approach to introductory computer programming education.* PI: J. Edwards. co-PIs: E. Fulton, J. Holmes, D. Beard, K. Parker. Idaho State University Office of Research. $32,564. 2017. Funded.

Implementing Unmanned Aircraft Systems to detect crop viruses using hyperspectral remote sensing and machine learning. PI: D. Delparte. co-PI: J. Edwards. Idaho State Dept. of Agriculture. $161,175. 2017. Funded.

Unified modeling and visualization of avalanche flow paths. PI: J. Edwards with S. Pawlidis (student). STEM Undergraduate Research Initiative, Idaho SBOE. $1,740. 2017. Funded.

ISU CoSE Internal Travel Grant. J. Edwards. $2,000. 2017. Funded.

Improving STEM Education: Engaged Learning in an Introductory Computer Programming Course. PI: J. Edwards. co-PIs: J. Holmes, K. Parker. ISU Teaching Innovation Grant. $4820. 2017. Funded.

STEM Action Center: Computer Programming Workshops in Southeastern Idaho. C. Hill, et al. United Way. $8000. Role: Senior personnel. 2017. Funded.

igniteCS: CS education in Southeastern Idaho high schools. PI: J. Edwards co-PIs: J. Rose, J. Glines, et al. Google igniteCS gift. $5307. 2016. Funded.

NIH BRAIN Initiative Summer Course on interdisciplinary computational neuroscience. J. Edwards. Competitive admission to funded workshop at University of Missouri. 31% acceptance rate. 2016. Funded.

UTexas Professional Development Award for travel to San Jose, CA. J. Edwards. $275. 2012. Funded.

UTexas Professional Development Award for travel to Providence, RI. J. Edwards. $250. 2011. Funded.

UTexas Professional Development Award for travel to Haifa, Israel. J. Edwards. $450. 2010. Funded.

GRANTS PENDING   *Web-Based Simulations for Intermediate Mechanics Education.* PI: J. Edwards. co-PI: S. Shropshire. NSF 17-561. $215,740. 2017. Pending.

GRANTS NOT FUNDED   *In-situ plant virus detection system using advanced remote sensing and machine learning.* PI: D. Delparte. co-PI: J. Edwards. NSF 17-529. $900,140. 2017. Not funded.

Sensor Systems for Decision Support in the Food, Energy and Water Nexus - Testbed in Idaho's Snake River Plain. PI: D. Delparte. co-PIs: C. Baxter, S. Godsey, F. Harris, D. Van Horn J. Rachlow, J. Forbey, J. Edwards. NSF15-517. $5,999,723. 2015. Not funded.

iSEED: UAS to Advance SES Modeling.. PI: J. Johnston. co-PIs: J. Forbey, L. Vierling, J. Eitel, J. Edwards, D. Delparte. NSF EPSCoR Managing Idahos Landscapes for Ecosystem Services (MILES) iSEED. $242,976. 2015. Not funded.

MRI: Acquisition of advanced Unmanned Aircraft Systems (UAS) remote imaging sensors and ground-based spectrometry for understanding structural and phytochemical function of ecosystems.. PI: D. Delparte. co-PIs: J. Edwards, J. Rachlow, J. Forbey. NSF15-504. 2015. Not funded.

Morse Smale Crystals as Meshing Primitives for Lagrangian Simulations. PI: P-T. Bremer. co-PIs: V. Pascucci, J. Edwards, A. Gyulassy. DOE LAB 14-1003. 2013. Not funded.

THESES   (Ph.D.) Analysis-Ready Models of Tortuous, Tightly Packed Geometries, 2013
(M.S.) Live Mesh: An Interactive 3D Image Segmentation Tool, 2004

RESEARCH SOFTWARE   *pgvd* - Parallel Generalized Voronoi Diagram Approximation
https://github.com/edwardsjohnmartin/pgvd.git

3PIO - Powerful and Practical Program IDE Online
`https://github.com/edwardsjohnmartin/3PIO.git`

avalanche - Avalanche simulation software
`https://github.com/edwardsjohnmartin/avalanche.git`

MagPhyx - Magnet simulation software
`http://www2.cose.isu.edu/~edwajohn/MagPhyx`

GVD - Generalized Voronoi Diagram approximation
`http://www2.cose.isu.edu/~edwajohn/research/gvd`

VolRoverN - Neuronal reconstruction and geometric analysis
http://www.cs.utexas.edu/∼bajaj/cvcwp/?page_id=2089

POSTERS

J. Ory, W. Grigg, J. Edwards, J. Holmes, K. Parker. 3PIO: Powerful and Practical Python IDE Online *Idaho Conference on Undergraduate Research.* Boise, ID, July 2017.

W. Grigg, S. Denton, J. Edwards, J. Stover. Hidden associations: visualizing word-to-word connections in Tweets *Idaho Conference on Undergraduate Research.* Boise, ID, July 2017.

J. Valentin, K. Aho, J. Edwards, D. Derryberry, T. Peterson. Improving computational efficiency in identifying parsimonious statistical models *Idaho Conference on Undergraduate Research.* Boise, ID, July 2017.

G. Cochrane, J. Edwards, D. Delparte. LiDAR Odometry and Mapping for Terrain Analysis from Unmanned Aerial Vehicles *Idaho Conference on Undergraduate Research.* Boise, ID, July 2017.

G. Cochrane, M. Sterbentz, J. Edwards. Real-Time LiDAR Terrain Mapping and Analysis *Idaho Conference on Undergraduate Research.* Boise, ID, July 2016.

J. Glines, J. Edwards. Isosurface Extyraction in a Simple C/C++ Library *Idaho Conference on Undergraduate Research.* Boise, ID, July 2016.

N. Vollmer, N. Harrison, J. Edwards. An Adaptive, Parallel Algorithm for Approximating the Generalized Voronoi Diagram *Idaho Conference on Undergraduate Research.* Boise, ID, July 2016.

J. Edwards, C. Johnson. Visualizing white matter tracts in the human brain. *SIAM Conference on Computational Science and Engineering.* Salt Lake City, UT, March 2015.

S. Kumar, B. Summa, C. Christensen, J. Edwards, V. Pascucci. Multi-resolution I/O for Massive Simulations: Enabling Scalable Visualization and Processing. *Predictive Science Academic Alliance Program (PSAAP) TST Meeting.* Palo Alto, CA, May 2014.

J. Edwards, E. Daniel, C. Bajaj, J. Kinney, T. Bartol, T. Sejnowski, K. Harris, D. Johnston. VolumeRoverN: Analysis-ready domain models of neuronal forests. *2nd Annual Austin Translational Neuroscience Symposium.* Austin, TX, October 2012.
⋆ Best poster award

J. Edwards, A. Rand, J. Kinney, K. Harris, C. Bajaj. Analysis-ready meshes of neuronal forests. *1st IEEE Symposium on Biological Data Visualization.* Providence, RI, October 2011.

J. Edwards, A. Gillette, R. K. Bettadapura, A. Rand, C. Rumsey, Q. Zhang, D. Johnston, K. Harris, C. Bajaj. Electrophysiological Models Derived from EM Reconstructions. *The National Academies Keck Futures Initiative Conference on Imaging Science.* November 2010.

A. Gillette, R. K. Bettadapura, F. Chowdury, J. Edwards, A. Gopinath, J. Rivera, B. Subramanian, A. Rand, C. Rumsey, Q. Zhang, D. Johnston, K. Harris, C. Bajaj, T. Bartol, D. Keller, J. Kinney, T. Sejnowski. Spatially Realistic and Reduced Electrophysiology Models Derived From EM Reconstruction. *MPG-HHMI Janelia Farm High-Resolution Circuit Reconstruction Conference.* Berlin, Germany, September 2009.

CONTRIBUTED TALKS

MagPhyx: simulation and visualization of magnet dynamics. *Idaho Academy of Science and Engineering.* Pocatello, ID. April 1, 2016.

Surface segmentation for improved isotropic remeshing. *21st International Meshing Roundtable.* San Jose, CA. Oct 9, 2012.

Topologically correct reconstruction of tortuous contour forests. *14th ACM Symposium on Solid and Physical Modeling.* Haifa, Israel. September 1, 2010.

Advanced techniques for LiDAR visualization and analysis using ArcGIS. *8th International Lidar Mapping Forum.* Denver, CO. February 2008.

INVITED TALKS

At the whiteboard: collaborative data science projects *Utah State University.* Logan, UT. Dec 8, 2017.

The adventure of discovery: geometry, topology and visualization. *Idaho State University.* Pocatello, ID. Oct 17, 2014.

Exploration of high-dimensional scalar functions. *Computational Visualization Center group meeting.* Austin, TX. Nov 13, 2013.

Analysis-ready models of tortuous, tightly packed geometries. *University of Colorado Medical Center.* Denver, CO. Mar 1, 2013.

Analysis-ready models of tortuous, tightly packed geometries. *New Mexico State University.* Las Cruces, NM. Feb 15, 2013.

Analysis-ready models of tortuous, tightly packed geometries. *Scientific Computing and Imaging Institute.* Salt Lake City, UT. Feb 8, 2013.

Cool Geometry Stuff. *Leander High School, Anna Bouboulis Geometry Class.* Leander, TX. Jan 5, 2012.

Surface segmentation for improved isotropic remeshing. *University of Hong Kong graphics group meeting.* Hong Kong. May 30, 2012.

Polyhedron separation. *Computational Visualization Center group meeting.* Austin, TX. Sept 7, 2011.

Analysis-ready 3D reconstructions of complex objects from planar cross-sectional slices. *Computational Visualization Center group meeting.* Austin, TX. Mar 25, 2011.

The connectome: challenges and approaches. *Computational Visualization Center group meeting.* Austin, TX, Oct 27, 2010.

LidarExplorer *Advanced LiDAR Workshop at the GeoTREE Center of the University of Northern Iowa.* August 2007.

CONFERENCES

IEEE Frontiers in Education. San Jose, California. October 3-6, 2018.

ACM Special Interest Group for Computer Science Education (SIGCSE). Baltimore, MD. February 2018.

Shape Modeling International. Berkeley, CA. June 2017.

Idaho EPSCoR Annual Meeting. Coeur d'Alene, ID. October 2016.

Idaho Conference on Undergraduate Research. Boise, ID. July 2016.

Idaho Academy of Science and Engineering. Pocatello, ID. April 2016.

Eurographics. Zurich, Switzerland. July 2015.

High Performance Computing, Networking, Storage and Analysis (SC14). New Orleans, LA. November 2014.

IEEE VIS. Atlanta, GA. October 2013.

21st International Meshing Roundtable. San Jose, CA. October 2012.

Austin Translational Neuroscience Symposium. Austin, TX. October 2012.

IEEE Symposium on Biological Data Visualization. Providence, RI. October 2011.

ACM Symposium on Solid and Physical Modeling. Haifa, Israel. September 2010.

WORKSHOPS

Geometric and Image Data Sciences: Big Data Analysis, Graphics and Visualization. Austin, Texas. September 14, 2018.

NSF NeuroNex 3DEM Workshop. Austin, Texas. July 30-31, 2018.

Developing Empirical Education Research Studies (DEERS). Charlottesville, VA. July 17-19, 2018.

Deep Learning in the Classroom. SIGCSE. February 23, 2018.

Designing Empirical Education Research Studies (DEERS): Creating an Answerable Research Question. SIGCSE. February 21, 2018.

Integrating Cloud Computing into the Computer Science Curriculum. SIGCSE. February 21, 2018.

NSF XSEDE Workshop on data modeling. Boise State University. July 18-20, 2016.

NIH BRAIN Initiative Summer Course on interdisciplinary computational neuroscience. University of Missouri. June 5-17, 2016.

Grant Writers Workshop. Idaho State University. February 29, 2016.

Promotion and Tenure Workshop. Idaho State University. November 18, 2015.

Interactive Cooperative Grant Training. Idaho State University. August 31, 2015.

Advanced LiDAR Workshop. University of Northern Iowa. August 2007.

HONORS

Translational Neuroscience Symposium Best Poster Award, 2012
The University of Texas, Computer Science PhD Fellowship, 2009

Graduation *Magna Cum Laude*, Utah State University, 1998
Member *Phi Kappa Phi* Honor Society, 1998
Wendell Pope Scholarship, Utah State University, 1998
Superior Student Scholarship, Utah State University, 1996-1998

PROFESSIONAL
SERVICE

Program committee

International Conference on Geometric Modeling and Processing (GMP) 2015, 2016, 2017, 2018

Reviewer

ACM Transactions on Mathematical Software

GMP 2015, 2016, 2017, 2018

Computing Surveys

Computer Aided Geometric Design

European Symposium on Algorithms 2014

International Meshing Roundtable 2015

SIGGRAPH Asia 2015

UNIVERSITY
SERVICE

Chair of CS faculty search committee 2017-2018
University Research Council 2016-2018
Health Informatics search committee 2016
Author of CS Masters Degree proposal submitted 2018

EXPERT WITNESS

State of Idaho v. Gabriel L. Moreno and Anthony C. Moreno, 2018
Case Nos. CR-2017-8408-FE and CR-2017-8409-FE, District Court, County of Bannock, Idaho
Nature of Case: Second degree murder.
    Plaintiff alleged malice aforethought in a fistfight resulting in a death. The defendant claimed self-defense. The event was captured on video and posted to Snapchat, which became the primary exhibit. I testified regarding the source and analysis of the video.

Employment-based immigration petition opinion letters, 2018-current
Maystar, LLC
    Review immigration petitions of foreign employees in software engineering positions and provide opinion letters as to the educational requirements for their positions.

COURSES TAUGHT

Data Visualization
Graduate Algorithms
Computer Graphics
Compilers
Operating Systems
Algorithms and Data Structures
Introductory Programming

STUDENTS

Bo Johnson (current)
John Motley (Idaho State University)
Galen Cochrane (Idaho State University)
William Grigg (Idaho State University)
Joseph Valentin (Idaho State University)
Sandro Pawlidis (Idaho State University)
Jacqueline Ory (NIATEC)
Nathan Morrical (PhD student, University of Utah)
Marko Sterbentz (Masters student, University of Southern California)
Jonathan Glines (NVIDIA)
Nicholas Harrison (Clearwater, Inc.)
Zackary Hall (Clearwater, Inc.)

COLLABORATIONS

Computer Science

Kevin Parker (Idaho State University)
Jonathan Holmes (Idaho State University)
Valerio Pascucci (SCI, University of Utah)
Christopher Johnson (SCI, University of Utah)
Chandrajit Bajaj (University of Texas)
Wenping Wang (University of Hong Kong)
Peer-Timo Bremer (Lawrence Livermore National Laboratories)
Attila Gyulassy (SCI)
Brian Summa (SCI, University of Utah)
Josh Johnston (Boise State University)
Parris Egbert (Brigham Young University)

Other disciplines

DeWayne Derryberry (Statistics, Idaho State University)
Teri Peterson (Statistics, Idaho State University)
Ken Aho (Biology, Idaho State University)
Justin Stover (History, Idaho State University)
Steven Shropshire (Physics, Idaho State University)
Boyd Edwards (Physics, Utah State University)
Donna Delparte (Geosciences, Idaho State University)
Andrew Gillette (Mathematics, University of Arizona)
Terrence Sejnowski (Neuroscience, Salk Institute)
Tom Bartol (Neuroscience, Salk Institute)
Kristen Harris (Neuroscience, University of Texas)
Justin Kinney (Neuroscience, Massachussetts Institute of Technology)
Daniel Johnston (Neuroscience, University of Texas)