

Joshua R. New

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Education

THE UNIVERSITY OF TENNESSEE, KNOXVILLE 2004-2009 Knoxville, TN
Ph.D., Computer Science with specialization in Graphics and Visualization
Thesis: “*Visual Analytics for Relationships in Scientific Data*”
GPA: 3.9/4.0; Ph.D. Adviser: Dr. Jian Huang

JACKSONVILLE STATE UNIVERSITY 2001-2004 Jacksonville, AL
M.S., Computer Systems and Software Design with specializations in Human-Computer
Interaction, Machine Learning, Automation, Graphics, and Robotics
Thesis: “*An Advanced User Interface for Pattern Recognition in Medical Imagery:
Interactive Learning, Contextual Zooming, and Gesture Recognition*”
GPA: 4.0/4.0; Outstanding MCIS Graduate Award; M.S. Adviser: Dr. Mario Aguilar

JACKSONVILLE STATE UNIVERSITY 1997-2001 Jacksonville, AL
B.S., Computer Science & Mathematics with Physics minor; GPA: 3.5/4.0

Experience

RESEARCH AND DEVELOPMENT STAFF
Oak Ridge National Laboratory 2009-Present Oak Ridge, TN

- Funding - led an average of 8 funded projects per year totaling over \$2 million per year with submission of 12 per year over the past 5 years; 59 deliverables completed last year
- Publications - average co-authorship of 10.2 publications per year with 90.4% acceptance rate over the past 5 years; h-index and i10-index (5 years) is 7
- Sub-program manager responsible for securing funding and ensuring timely delivery of all software-related projects including but not limited to: websites, web services, software tools, simulations, supercomputing, artificial intelligence, and data mining applications.
- Application of advanced computer science techniques including: a suite of machine learning algorithms on supercomputers for robust prediction from sensor data, simulations ensembles on world’s fastest supercomputer (Titan) for data mining of 270+TB of data, and autotuning methodologies for automated calibration of simulation model inputs to match sensor data.
- Primary contributor to the DOE Roof Savings Calculator (RSC); a web-based, industry-consensus energy audit tool for residential and commercial buildings using DOE-2.1E simulations integrated with AtticSim for modeling advanced roof and attic systems.
- Developing visual analytics tools to assist information gathering and knowledge discovery through demonstration home dashboards, linked parallel coordinate plots, and data mining for millions of simulations and capable of running on 35+ megapixel powerwall displays.
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GRADUATE RESEARCH ASSISTANT

The University of Tennessee, Knoxville 2005-2009 Knoxville, TN

- Developed SeeShader, a glut-based framework for easily implementing General Purpose computation on Graphical Processing Units (GPGPU) applications
- Developed SeeBrain, an application which leverages OpenGL's shading language for performing many computations on the GPU. This allows mapping of quantitative hypotheses for volumetric, multivariate datasets directly to the graphics pipeline. The demonstrated results have involved diffusion-tensor MRI (DT-MRI) and the computation of tensor-based features from neural fiber streamline extraction for the purposes of real-time, query-based visualization.

RESEARCH INTERN

Oak Ridge National Laboratory Summer 2008 Oak Ridge, TN

- Extended SeeGraph to meet the visual analytics needs of the ORNL systems genetics group leader in performing complex analysis and trait mapping of microarray data across mouse genomes including automatic karyotyping.
- Part of Computational Sciences Initiative project to leverage supercomputers for model generation routines to predict variables based on 100 years of data and a comprehensive visualization framework for all model results. Tasks included parallel k-means clustering for ecoregion classification, visualization using GIS tools, experimentation with parallel coordinates for directing the analysis process, and maintenance/administration of parallel R-servers for model fitting.

RESEARCH INTERN

Oak Ridge National Laboratory Summer 2007 Oak Ridge, TN

- Extended SeeGraph using general graph algorithms and statistical techniques and applied these techniques to bioinformatics data. Worked hand in hand with domain scientists to increase the usability of the program and position it for web deployment in combination with other pre-existing, web-based tools.

GENERAL TOOLS INTERN

Vital Images, Inc. Summer 2006 Minnetonka, MN

- Part of the general tools team responsible for enhancing usability of Vitrea, a workstation product used by radiologists worldwide to inspect and diagnose 3D medical imagery. Changes made for tools including 3D angiography, vessel probe and measurements, brain perfusion, cardiac, colonography, and lung analysis.
- Primarily tasked with disambiguating click-and-drag for tool mode versus rotation mode. Developed several bypass modes including one-shot, tool over rotation, temporal threshold, and click-drag-click. Several layouts were created which load the active mode from an XML file on a per-tool basis; usability testing of these layouts was conducted. Integrated 5-button mouse support into Qt and Vitrea, used for switching modes and more advanced interaction.

RESEARCH INTERN

Oak Ridge National Laboratory Summer 2005 Oak Ridge, TN

- Part of the ORNL/UTK collaboration for the Computational Sciences Initiative. Security clearance granted for the "Large Scale Cluster-Driven Visualization of SciDAC Datasets" project to develop a suite of new visualization tools for high volume simulation datasets that can be used by visualization practitioners and application scientists alike on arbitrarily-sized clusters driving any tiled display.
- Developed SeeGraph, a 3D spring-embedded layout and graph visualization package which allows interactive viewing, selection, and manipulation of several graph-theoretic constructs and neural network filtering. This system has been applied and showcased for visualization of phenotype correlation of RI mice by ORNL biologists.

GRADUATE TEACHING ASSISTANT

The University of Tennessee, Knoxville 2004-2005 Knoxville, TN

- Developed, provided, organized, and graded course material for UTK's graduate level CS552 - Software Engineering under the guidance of Dr. Stacy Prowell. This course covered the intricacies of the incremental development model from the requirements document to maintenance of the final product. The support work for this course involved developing grading rubrics for exam material, review and guidance of deliverables for the semester-long project, and lectured 10+ times in the professor's absence.

GRADUATE RESEARCH ASSISTANT

Jacksonville State University 2001-2004 Jacksonville, AL

- Awarded a competitive research assistantship with Dr. Aguilar's Knowledge Systems Laboratory three years running. Primary languages used were C, VC6, C++.NET, and Matlab. Toolkits used include the Visualization ToolKit (VTK), Intel Image Processing Libraries (IPL), Open-source Computer Vision library (OpenCV), system-independent GUI-building toolkit (Qt), Open-source Graphics Library (OpenGL), and others.
- Development of a machine vision system completed for use in [gesture recognition](#). This system has been applied to real-time processing of live camera feed for allowing the direct manipulation of a 3D virtual object via spatial and temporal hand gestures.
- Developed a medical system, known as [Med-LIFE](#), to visualize MRI data. This system allows the fusion of multiple image modalities into colored images, creation of intelligent agents for robust segmentation of diseases in MRIs through interactive training, contextual zoom of medical imagery, and intuitive exploration including 3D techniques.

COMPUTER SPECIALIST

Ft. McClellan 1997-2001 Anniston, AL

- Primary contributor to the creation, update, and finalization of the "Automated Installation Property System" inventory tracking software used by the Transition Force to close the military post. This system was responsible for the successful transfer of 11,200,000 tons of material in 215 separate shipments amounting to a total value of approximately \$104,314,000. This system was also installed and customized for use by the Department of Justice (now Department of Homeland Security), Wastren Inc., and the Joint Powers Authority.
- Expert knowledge and application in Microsoft Access database capabilities with Visual Basic.
- Network administrator, responsible for maintaining proper operation and communication of all computers in the personal property section.
- Software/hardware troubleshooter, responsible for up-to-date operation and functionality of all computers.

Publications

2015

1. Stone, Jackson, Sanyal, Jibonananda, Castello, Charles, and New, Joshua R. (2015). "Gamification: A New Approach to Data Analysis" In *Proceedings of the Modeling and Simulation (MODSIM) World 2015 Conference*, Virginia Beach, VA, March 30-April 2, 2015.

New, Joshua R. (2015). "ORNL Flexible Research Platforms." Presented at the *Workshop for Empirical Validation of Whole Building Energy Simulation Programs*, 41 slides. Chicago, IL, January 28, 2015. [[PPT](#)]
2. New, Joshua R. (2015). "Autotune Calibration" presented as part of "Seminar 55 - Simulation Calibration." In *Proceedings of the ASHRAE Winter Conference*, 22 slides. Chicago, IL, January 28, 2015. [[PPT](#)]

New, Joshua R. (2015). "Visualization and Software Simulations for Actualized Energy Savings." Presented at *ASHRAE Local Chapter Meeting*, 62 slides. Knoxville, TN, January 21, 2015. [[PPT](#)]

2014

3. Garrett, Aaron and New, Joshua R. (2014). "A Scientific Study of Automated Calibration applied to DOE Commercial Reference Buildings." ORNL internal report ORNL/TM-2014/709, automated/reproducible report, December 31, 2014, 114 pages.
4. Gehl, Anthony C., Munk, Jeffrey D., Jackson, Roderick K., Boudreaux, Philip R., Miller, William A., and New, Joshua R. (2014). "Final Review of the Campbell Creek Demonstrations showcased by the Tennessee Valley Authority." ORNL internal report ORNL/TM-2014/666, December 31, 2014, 42 pages.

New, Joshua R. (2014). "Autotune." Presented at *Consortium for Building Energy Innovation's 2nd Annual Building Energy Informatics Summit*, 29 slides. Philadelphia, PA, December 19, 2014. [[PPT](#)]

New, Joshua R. (2014). "Simulation-informed Optimization and Techniques for Big Data Mining." Presented at *Urban Dynamics Institute Seminar Series*, 60 slides. Oak Ridge, TN, November 17, 2014. [[PPT](#)]
5. Miller, William A., Shrestha, Som, Gu, Lixing, and New, Joshua R. (2014). "A Comparison of Simulation Capabilities for Ducts." ORNL internal letter report ORNL/LTR-2014/283, November 24, 2014, 54 pages. [[ORNL](#)] [[PDF](#)]

New, Joshua R. (2014). "Autotune Building Models: Calibration, Simulation Data, and Data Mining." Presented at *Data Science Seminar Series*, 67 slides. Oak Ridge, TN, October 23, 2014. [[PPT](#)]
6. New, Joshua R., Miller, William A., Huang, Yu (Joe), and Levinson, Ronnen. (2014). "Comparison of Software Models for Energy Savings from Cool Roofs." In *Proceedings of the 3rd International Conference on Countermeasures to Urban Heat Island (IC2UHI)*, Venice, Italy, October 13-15, 2014. [[PDF](#)] [[PPT](#)]
7. Sanyal, Jibonananda and New, Joshua R. (2014). "Building Simulation Modelers - Are We Big Data Ready?" In *Proceedings of the ASHRAE/IBPSA-USA Building Simulation Conference*, pp. 449-456, Atlanta, GA, September 10-12, 2014. [[ASHRAE](#)] [[PDF](#)] [[PPT](#)]
8. Ostrouchov, George, New, Joshua R., Sanyal, Jibonananda, and Patel, Pragnesh (2014). "Uncertainty Analysis of a Heavily Instrumented Building at Different Scales of Simulation." In *Proceedings of the 3rd International High Performance Buildings Conference*, Purdue, West Lafayette, IN, July 14-17, 2014. [[PDF](#)] [[PPT](#)]
9. New, Joshua R. and Sanyal, Jibonananda. (2014). "Supercomputers (Titan!), Big Data Analytics, and Energy Efficient Robo-Homes." In *Codestock*, 77 slides. Knoxville, TN, July 11-12, 2014. [[PPT](#)]

Kumar, Jitendra, Hoffman, Forrest M., New, Joshua R., and Sanyal, Jibonananda (2014). "Reimagining Climate Zones for Energy Efficient Building Codes." Presented to Technical Committee 4.2 - Climatic Information, Research subcommittee. *ASHRAE Annual Conference 2014*, 25 slides. Seattle, WA, June 28-July 2, 2014. [[PPT](#)]
10. Castello, Charles C., Sanyal, Jibonananda, Rossiter, Jeffrey S., Hensley, Zachary P., and New, Joshua R. (2014). "Sensor Data Management, Validation, Correction, and Provenance for Building Technologies." Technical paper TRNS-00223-2013.R1. In *Proceedings of the ASHRAE Annual Conference and ASHRAE Transactions 2014*, Seattle, WA, June 28-July 2, 2014. [[PDF](#)] [[PPT](#)]
11. New, Joshua R., Levinson, Ronnen, Huang, Yu (Joe), Sanyal, Jibonananda, Miller, William A., Mellot, Joe, Childs, Kenneth W., and Kriner, Scott (2013). "In-Depth Analysis of Simulation

- Engine Codes for Comparison with DOE's Roof Savings Calculator and Measured Data." ORNL internal report ORNL/TM-2014/218, June 27, 2014, 69 pages.
- New, Joshua R. (2014). "Roof Savings Calculator and Autotune." Presented two posters as part of *ORNL's Software Expo*. Oak Ridge, TN, May 7, 2014.
- New, Joshua R. (2014). *Invited Speaker*. "Software vs. Reality - Bridging the Gap." *Building Technologies Research and Integration Center Science Research Seminar Series*, ORNL internal presentation 49608, 93 slides. Oak Ridge, TN, May 2, 2014.
12. Sanyal, Jibonananda, New, Joshua R., Edwards, Richard E., and Parker, Lynne E. (2014). "Calibrating Building Energy Models Using Supercomputer Trained Machine Learning Agents." In *Journal on Concurrency and Computation: Practice and Experience*, volume 26, issue 13, pp. 2122-2133, September 10, 2014. [[CCPE](#)] [[PDF](#)]
 13. Sanyal, Jibonananda and New, Joshua R. (2013). "Oak Ridge Institutional Cluster Autotune Test Drive Report." ORNL internal report, February 17, 2014, 6 pages.
 14. Mellot, Joe, New, Joshua R., and Sanyal, Jibonananda. (2014). "Cool Roofing: Analysis of Energy Consumption for Cool Roofing." In *Western Roofing - Insulation and Siding*, issue January/February, volume 37, number 1, pp. 50-56, February, 2014.

New, Joshua R. (2014). *Invited Speaker*. "DOE's Roof Savings Calculator." *Metal Construction Association's (MCA) MetalCon Roofing Council*, Clearwater Beach, FL, January 27, 2014. [[PPT](#)]
 15. New, Joshua R., Bhaduri, Budhendra L., Ott, Ron, and Roth, Stephen B. (2014). "Emerging Technologies in the Built Environment: Geographic Information Science (GIS), 3D Printing, and Additive Manufacturing." Multi-speaker seminar in *Proceedings of the ASHRAE Winter Conference*, New York, NY, January 19, 2014. [[PPT](#)] [[PPT](#)]
- 2013**
16. Hensley, Zachary P., Sanyal, Jibonananda, and New, Joshua R. (2014). "Provenance in Sensor Data Management: A Cohesive, Independent Solution for Bringing Provenance to Scientific Research." In *Communications of the ACM*, volume 57, issue 2, pp. 55-62, December 2013 and *ACM Queue*, volume 11, issue 12, pp. 1-14, December 2013. Video featured in the ACM Digital Library. [[ACM](#)] [[Queue](#)] [[PDF](#)]
 17. Edwards, Richard E., Zhang, Hao, New, Joshua R., and Parker, Lynne E. (2013). "Approximate 1-fold Cross-Validation with Least Squares SVM and Kernel Ridge Regression." In *Proceedings of the IEEE 12th International Conference on Machine Learning and Applications (ICMLA13)*, Miami, FL, December 4-7, 2013. [[PDF](#)] [[PPT](#)] [[PPT](#)]
 18. Smith, Matt K., Castello, Charles C., and New, Joshua R. (2013). "Machine Learning Techniques Applied to Sensor Data Correction in Building Technologies." In *Proceedings of the IEEE 12th International Conference on Machine Learning and Applications (ICMLA13)*, Miami, FL, December 4-7, 2013. [[PDF](#)] [[Poster](#)]
 19. Castello, Charles C., New, Joshua R., and Smith, Matt K. (2013). "Autonomous Correction of Sensor Data Applied to Building Technologies Using Filtering Methods." In *Proceedings of the IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, Austin, TX, December 3-5, 2013. [[PDF](#)] [[Poster](#)]
 20. New, Joshua R., Huang, Yu (Joe), Levinson, Ronnen, Mellot, Joe, Sanyal, Jibonananda, Miller, William A., and Childs, Kenneth W. (2013). "Analysis of DOE's Roof Savings Calculator with Comparison to other Simulation Engines." ORNL internal report ORNL/TM-2013/501, November 1, 2013, 63 pages.

- New, Joshua R. (2013). *Invited Speaker*. "Science Behind ORNL's Building Technology Research Integration Center (BTRIC)." *Roof Coating Manufacturer's Association*, Oak Ridge, TN, October 8, 2013. [[PPT](#)]
21. Mellot, Joseph W., New, Joshua R., and Sanyal, Jibonananda. (2013). "Preliminary Analysis of Energy Consumption for Cool Roofing Measures." In *RCI Interface Technical Journal*, volume 31, issue 9, pp. 25-36, October, 2013. [[RCI](#)] [[PDF](#)]
 22. Edwards, Richard E., New, Joshua R., and Parker, Lynne E. (2013). "Estimating Building Simulation Parameters via Bayesian Structure Learning." In *Proceedings of the 2nd International Workshop on Big Data, Streams and Heterogeneous Source Mining: Algorithms, Systems, Programming Models and Applications (BigMine13)*, part of the *19th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD2013)*, Chicago, IL, August 11, 2013. [[PDF](#)] [[Poster](#)]
 23. Hensley, Zachary, Sanyal, Jibonananda, and New, Joshua R. (2013). "ProvDMS -- A Provenance Data Management System for Sensor Data." Presented as part of the Science Undergraduate Laboratory Internships (SULI) program, August 8, 2013. [[OSTI](#)] [[PDF](#)] [[Poster](#)]
 24. Ranjan, Niloo, Sanyal, Jibonananda, and New, Joshua R. (2013). "In-Situ Statistical Analysis of Autotune Simulation Data using Graphical Processing Units." Presented as part of the Science Undergraduate Laboratory Internships (SULI) program, August 8, 2013. [[PDF](#)] [[Poster](#)]
 25. Smith, Matt K., Castello, Charles C., and New, Joshua R. (2013). "Sensor Validation with Machine Learning." Presented as part of the Science Undergraduate Laboratory Internships (SULI) program, July 29, 2013. [[PDF](#)] [[Poster](#)]
 26. Sanyal, Jibonananda, New, Joshua R., and Edwards, Richard E. (2013). "Supercomputer Assisted Generation of Machine Learning Agents for the Calibration of Building Energy Models." In *Proceedings of the Extreme Science and Engineering Discovery Environment (XSEDE13) Conference* and selected to be featured in *Lightning Talks*, San Diego, CA, July 22-25, 2013. [[PDF](#)] [[PPT](#)] [[Poster](#)]
 27. Sanyal, Jibonananda, New, Joshua R., and Edwards, Richard E. (2013). "Calibration of Building Energy Models: Supercomputing, Big-Data and Machine-Learning." In *Proceedings of the ORNL Postdoc Symposium*. Oak Ridge, TN, July 19, 2013. [[PDF](#)]
 28. Garrett, Aaron, New, Joshua R., and Chandler, Theodore (2013). "Evolutionary Tuning of Building Models to Monthly Electrical Consumption." Technical paper DE-13-008. In *Proceedings of the ASHRAE Annual Conference and ASHRAE Transactions 2013*, volume 119, part 2, pp. 89-100, Denver, CO, June 22-26, 2013. [[PDF](#)] [[PPT](#)]
 29. Edwards, Richard E. (2013). "Automating Large-Scale Simulation Calibration to Real-World Sensor Data." Doctoral Committee: Lynne E. Parker (advisor), Joshua R. New, Michael Berry, Hamparsum Bozdogan, and Husheng Li. A Dissertation presented for the Doctor of Philosophy Degree in *Archives of The University of Tennessee*, Knoxville, TN, March 13, 2013. [[PDF](#)] [[PPT](#)]
 30. Edwards, Richard E., Parker, Lynne E., and New, Joshua R. (2013). "MLSuite Software Transfer Document." ORNL internal report ORNL/TM-2013/131, May 8, 2013, 36 pages. [[PPT](#)]
 31. Sanyal, Jibonananda and New, Joshua R. (2013). "Simulation and Big Data Challenges in Tuning Building Energy Models." In *Proceedings of the IEEE Workshop on Modeling and Simulation of Cyber-Physical Energy Systems (MSCPES)*, Berkeley, CA, May 20, 2013. Republished in *IEEE Xplore* October, 2013. [[IEEE](#)] [[PDF](#)] [[PPT](#)]
 32. Mellot, Joseph W., Sanyal, Jibonananda, and New, Joshua R. (2013). "Preliminary Analysis of Energy Consumption for Cool Roofing Measures." Presented at the International Reflective

Roofing Symposium, the American Coating Association's (ACA) conference, and in *Proceedings of the ACA's Coating Regulations and Analytical Methods Conference*, Pittsburgh, PA, May 14-15, 2013. [[PDF](#)] [[PPT](#)]

New, Joshua R. (2013). "Autotune Building Energy Models." *DOE Building Technology Office (BTO) Peer Review*, Washington DC, April 2, 2013. [[BTO](#)] [[PPT](#)]

33. Garret, Aaron and New, Joshua R. (2013). "Trinity Test: Effectiveness of Automatic Tuning for Commercial Building Models." ORNL internal report ORNL/TM-2013/130, March 7, 2013, 24 pages.

2012

34. Castello, Charles C. and New, Joshua R. (2012). "Autonomous Correction of Sensor Data Applied to Building Technologies Utilizing Statistical Processing Methods." In *Proceedings of the 2nd Energy Informatics Conference*, Atlanta, GA, Oct. 6, 2012. [[AIS](#)] [[PDF](#)] [[PPT](#)]
35. Jones, Chad, New, Joshua R., Sanyal, Jibonananda, and Ma, Kwan-Liu (2012). "Visual Analytics for Roof Savings Calculator Ensembles." In *Proceedings of the 2nd Energy Informatics Conference*, Atlanta, GA, Oct. 6, 2012. [[AIS](#)] [[PDF](#)] [[PPT](#)]
36. Edwards, Richard E., New, Joshua R., and Parker, Lynne E. (2012). "MLSuite - FY2012 Final Report." ORNL internal report ORNL/TM-2013/385, October 2012, 68 pages.
37. Edwards, Richard E., Zhang, Hao, Parker, Lynne E. and New, Joshua R. (2012). "Approximate 1-fold Cross-Validation with Least Squares SVM and Kernel Ridge Regression." ORNL internal report ORNL/TM-2012/419, August 2012, 9 pages.
38. Al-Wadei, Yusof H., New, Joshua R., and Sanyal, Jibonananda (2012). "Interactive Web Design through Survey and Adoption of Modern Web-Technologies." Presented as part of the Science Undergraduate Laboratory Internships (SULI) program, August 2012. [[PDF](#)] [[Poster](#)]
39. New, Joshua R., Sanyal, Jibonananda, Bhandari, Mahabir S., Shrestha, Som S. (2012). "Autotune E+ Building Energy Models." In *Proceedings of the 5th National SimBuild of IBPSA-USA*, International Building Performance Simulation Association (IBPSA), August 1-3, 2012. [[PDF](#)] [[PPT](#)]
40. Sanyal, Jibonananda, Al-Wadei, Yusof H., Bhandari, Mahabir S., Shrestha, Som S., Karpay, Buzz, Garret, Aaron L., Edwards, Richard E., Parker, Lynne E., and New, Joshua R. (2012). "Autotune: Building Energy Model Calibration using EnergyPlus, Machine Learning, and Supercomputing." In *Proceedings of the 5th National SimBuild of IBPSA-USA*, International Building Performance Simulation Association (IBPSA), August 1-3, 2012. [[Poster](#)]
41. Boudreaux, Philip R., Gehl, Anthony C., New, Joshua R., and Christian, Jeffrey E. (2012). "Campbell Creek Energy Efficient Homes Project: Summer 2011 Performance Report." ORNL internal report ORNL/TM-2012/51, July 2012, 49 pages.
42. Omitaomu, Olufemi A., Bhaduri, Budhendra L., Kodysh, Jeffrey B., Kramer, Ian S., Lapsa, Melissa V., New, Joshua R., Matheson, Michael A., and Shankar, Mallikarjun (2011). "LDRD Report: Citizen Engagement for Energy Efficient Communities (CoCONNECT)." ORNL internal report LDRD LOIS #05971, July 2012.
43. Bhandari, Mahabir S., Shrestha, Som S., and New, Joshua R. (2012). "Evaluation of Weather Data for Building Energy Simulations." In *Journal of Energy and Buildings*, volume 49, issue 0, pp. 109-118, June 2012. [[PDF](#)]
44. Edwards, Richard E., New, Joshua R., and Parker, Lynne E. (2012). "Predicting Future Hourly Residential Electrical Consumption: A Machine Learning Case Study." In *Journal of Energy and Buildings*, volume 49, issue 0, pp. 591-603, June 2012. [[PDF](#)]

45. Malhotra, Mini, MacDonald, Michael, Accawi, Gina K., New, Joshua R., and Im, Piljae (2012). "National Energy Audit Tool for Multifamily Buildings - Development Plan." ORNL internal report ORNL/TM-2010/328, March 2012, 88 pages.
46. Garrett, Aaron and New, Joshua R. (2012). "An Evolutionary Approach to Parameter Tuning of Building Models (Experiments 1-17)." ORNL internal report ORNL/TM-2012/418, April 2012, 68 pages.

2011

47. Edwards, Richard E., New, Joshua R., and Parker, Lynne E. (2011). "Sensor-based Building Energy Modeling." ORNL internal report ORNL/TM-2011/328, September 2011, 79 pages.
48. Cheng, Mengdawn, Miller, William (Bill), New, Joshua R., and Berdahl, Paul (2011). "Understanding the Long-Term Effects of Environmental Exposure on Roof Reflectance in California." In *Journal of Construction and Building Materials*, volume 26, issue 1, pp. 516-26, August 2011. [\[PDF\]](#)
49. New, Joshua R., Jones, Chad, Miller, William A., Desjarlais, Andre, Huang, Yu Joe, and Erdem, Ender (2011). "Poster: Roof Savings Calculator." In *Proceedings of the International Conference on Advances in Cool Roof Research*, Berkeley, CA, July 2011. [\[PDF\]](#)
50. New, Joshua R., Miller, William (Bill), Desjarlais, A., Huang, Yu Joe, and Erdem, E. (2011). "Development of a Roof Savings Calculator." In *Proceedings of the RCI 26th International Convention and Trade Show*, Reno, NV, April 2011. [\[PDF\]](#) [\[PPT\]](#)

2010

51. Boudreaux, Philip R., Gehl, Anthony C., Dockery, R., New, Joshua R., and Christian, Jeffrey E. (2010). "Tennessee Valley Authority's Campbell Creek Energy Efficient Homes Project: 2010 First Year Performance Report July 1, 2009 - August 31, 2010." ORNL internal report ORNL/TM-2010/206, November 2010, 165 pages. [\[PDF\]](#)
52. Miller, William A., New, Joshua R., Desjarlais, Andre O., Huang, Yu (Joe), Erdem, Ender, and Levinson, Ronnen (2010). "Task 2.5.4 - Development of an Energy Savings Calculator." California Energy Commissions (CEC) PIER Project, ORNL internal report ORNL/TM-2010/111, March 2010, 32 pages.
53. Miller, William A., Cheng, Mengdawn, New, Joshua R., Levinson, Ronnen, Akbari, Hashem, and Berdahl, Paul (2010). "Task 2.5.5 - Natural Exposure Testing in California." California Energy Commissions (CEC) PIER Project, ORNL internal report ORNL/TM-2010/112, March 2010, 56 pages.

2005-2009 (PhD)

54. New, Joshua R. (2009). **PhD thesis:** "Visual Analytics for Relationships in Scientific Data" In *Archives of the UTK Library*, Knoxville, TN. [\[PDF\]](#) [\[deliverables\]](#)
55. New, Joshua R., Kendall, Wesley, Huang, Jian, and Chesler, Elissa (2008). "Dynamic Visualization of Co-expression in Systems Genetics Data" In *Journal of IEEE Transactions on Visualization and Computer Graphics (TVCG)*, volume 14, issue 5, pp. 1081-94, 2008. [\[PDF\]](#)
56. Jian Huang and Markus Glatter and Wesley Kendall and Brandon Langley and Joshua New and Roberto Sisneros and Forrest Hoffman and David Erickson (2008). "Time-Varying Multivariate Visualization for Understanding the Climate Science of the Terrestrial Biosphere." In *Proceedings of the 13th Annual Community Climate System Model Workshop*, Breckenridge, Colorado, June 2008. [\[PDF\]](#)
57. New, Joshua R. (2008). "SeeGraph: A Visual Analytics System for Correlation Data." In *Proceedings of the 2nd annual Gaggle Workshop*, Institute for Systems Biology, Seattle, WA.

New, Joshua R. (2007). "SeeShader: A System for General Purpose Computation on the GPU." Presented as part of a special edition of the UTK Computer Graphics Course, Knoxville, TN.

New, Joshua R. (2006). "SeeBrain: A System for Comparative Visualization of Brain Nerve Fiber Tracts." Presented as the East Tennessee chapter of the Association for Computing Machinery (ACM), Knoxville, TN.

New, Joshua R. (2006). "Fiber Renderer: A System for Visualizing Queries of DT-MRI tracts." Presented at the Vanderbilt University's Institute of Imaging Science, Nashville, TN.

New, Joshua R. (2005). "SeeGraph: A System for Visualizing Weighted-Edge Graphs." Presented at the Oak Ridge National Laboratory, Oak Ridge, TN.

2001-2004 (MS)

58. New, Joshua R. (2004). **Master's Thesis:** "An Advanced User Interface for Pattern Recognition in Medical Imagery: Interactive Learning, Contextual Zooming, and Gesture Recognition." In *Archives of the JSU and MCIS Libraries*, Jacksonville, AL. [[PDF](#)] [[PPT](#)] [[deliverables](#)]
59. New, Joshua R., Hasanbelliu, E., and Aguilar, M. (2004). "Med-LIFE: A Diagnostic Aid for Medical Imagery." In *Proceedings of the International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences*, Las Vegas, Nevada. [[PDF](#)]
60. New, Joshua R. (2004). "Heterogeneous ARTMAPs for Image Segmentation." In *Proceedings of the JSU Graduate Research Colloquium*, Jacksonville, AL. [[PDF](#)] [[PPT](#)]
61. New, Joshua R. (2004). "A Method for Temporal Hand Gesture Recognition." In *MCIS Technical Report*, Jacksonville, AL. [[PDF](#)] [[PPT](#)]
62. Aguilar, M., New, Joshua R., and Hasanbelliu, E. (2003). "Advances in the Use of Neurophysiologically-based Fusion for Visualization and Pattern Recognition of Medical Imagery." In *Proceedings of the 6th International Conf. on Information Fusion*, Cairns, Australia. [[PDF](#)] [[PPT](#)]
63. New, Joshua R. and Aguilar, M. (2003). "The Sword: A Role Playing Game for Demonstrating Computer Graphics Techniques." In *Proceedings of the JSU Graduate Research Symposium*, Jacksonville, AL. [[PPT](#)]
64. New, Joshua R. and Aguilar, M. (2003). "Pliable Display Technology: Contextual Zoom as a Learning System Interface." In *Proceedings of the JSU Graduate Research Symposium*, Jacksonville, AL. [[PPT](#)]
65. New, Joshua R., Hasanbelliu, E., and Aguilar, M. (2003). "Facilitating User Interaction with Complex Systems via Hand Gesture Recognition." In *Proceedings of the 2003 ACM Southeast Conference*, Savannah, GA. [[PDF](#)] [[PPT](#)]
66. New, Joshua R. (2002). "A Method for Hand Gesture Recognition." In *Proceedings of the ACM Mid-Southeast Fall Conference*, Gatlinburg, TN. [[PDF](#)] [[PPT](#)]
67. Aguilar, M. and New, Joshua R. (2002). "Fusion of Multi-Modality Volumetric Medical Imagery." In *Proceedings of the Fifth International Conference on Information Fusion*, Annapolis, MD. [[PDF](#)] [[PPT](#)]
68. New, Joshua R. and Hasanbelliu, E. (2002). "Med-LIFE: A System for Medical Imagery Exploration." In *Proceedings of the JSU Graduate Research Colloquium*, Jacksonville, AL. [[PDF](#)] [[PPT](#)]

1999

69. New, Joshua R. (1999). "Sonoluminescence." In *Proceedings of the College of Arts and Sciences 3rd Annual Undergraduate Research Symposium*, Jacksonville State University, Jacksonville, AL.

Memberships

- ASHRAE (Amer. Society of Heating, Refrigeration, and A/C Engineers) 2010-Present
- IEEE (Institute of Electrical and Electronics Engineers) 2004-Present
- ACM (Association for Computing Machinery) and UTK local chapter 2004-2012
- JSU Math Club and MAA (Mathematical Association of America) 1997-2002
- President of the JSU Math Club 1998-2001
- JSU Computer Science Club 1997-2003
- AITP (Association of Information Technology Professionals) 1997-2002
- AIP (American Institute of Physicists) 1998-2002
- Phi Eta Sigma (Freshman Honor Society); Omicron Delta Kappa (Senior Honor Society); Mu Alpha Theta (Math Honor Society); National Honor Society; and other honor societies.

Relevant Courses

The University of Tennessee, Knoxville:

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|---|-------------|
| Recent Visualization Literature | Fall 2008 |
| Recent Visualization Literature | Spring 2008 |
| Recent Visualization Literature | Fall 2007 |
| Microarray Technology and Database Applications | Fall 2007 |
| Journal Club on Modern Genetics | Fall 2007 |
| Interactive Computational Simulation | Fall 2006 |
| Recent Visualization Literature | Fall 2006 |
| Independent Study – Large Data Visualization | Spring 2006 |
| Machine Learning | Spring 2006 |
| Algorithm Complexity | Spring 2006 |
| Independent Study – Feature Tracking | Fall 2005 |
| Graphical User Interface Design | Fall 2005 |
| Image Analysis | Spring 2005 |
| Operating and Software Systems | Spring 2005 |
| Independent Study – Diffusion Tensor MRI | Fall 2004 |
| Scripts and Utilities | Fall 2004 |
| Computer Systems Organization | Fall 2004 |
| Artificial Intelligence | Fall 2004 |

Jacksonville State University:

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|---|-------------|
| Computer Special Topics - Gesture Recognition | Fall 2003 |
| Modern Analysis | Fall 2003 |
| Computer Special Topics - Contextual Zoom | Spring 2003 |
| Computer Graphics | Spring 2003 |
| Software Architectures and Methodologies | Fall 2002 |
| Software Cost Estimation and Metrics | Spring 2002 |
| Fundamentals of Human-Computer Interaction | Spring 2002 |
| Applied Software Engineering 2 | Spring 2002 |
| Applied Software Engineering | Fall 2001 |
| Applied Artificial Intelligence | Fall 2001 |
| Database & DBMS | Fall 2001 |
| Programming Languages | Spring 2001 |
| Electrodynamics | Spring 2001 |
| Physics Special Topics - General Relativity | Spring 2001 |
| Computer Networking | Fall 2000 |

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|--------------------------------------|-------------------------|
| Artificial Intelligence | Fall 2000 |
| Survey of Geometries | Fall 2000 |
| Algorithm Design & Analysis | Fall 2000 |
| Introduction to Abstract Algebra | Fall 2000 |
| Modern Physics | Fall 2000 |
| Database and DBMS | Spring 2000 |
| Mathematical Statistics | Spring 2000 |
| Differential Equations | Spring 2000 |
| Astronomy | Spring 2000 |
| Operating Systems | Fall 1999 |
| Mathematical Statistics I | Fall 1999 |
| Numerical Analysis | Fall 1999 |
| Advanced Calculus | Fall 1999 |
| Elements of Linear Algebra | Spring 1999 |
| Data Structures | Spring 1999 |
| Discrete Structures | Spring 1999 |
| Digital Logic and Architecture | Spring 1999 |
| Physics for Scientists and Engineers | Fall 1998 - Spring 1999 |
| Advanced Mathematics and proofs | Spring 1998 |
| Calculus I – IV | Fall 1997 - Fall 1998 |

Community Service

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|--|--------------|
| IEEE VisWeek Conference Student Volunteer Chair | 2008-2010 |
| IEEE Visualization Conference Student Volunteer | 2005-2007 |
| Church audio-visual director | 2005-Present |
| Assistant, Alabama Statewide Mathematics Tournament, Jacksonville State University | 2002 |
| Event Judge, Science Olympiad, Jacksonville State University | 1999 |
| Assistant, Alabama Statewide Mathematics Tournament | 1998 |
| Church technical lead - puppeteer, technical trainer, sound and light conductor | 1990-2003 |

References provided upon request.