JOSHUA NEW

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EDUCATION

The University of Tennessee, Knoxville (UTK) Knoxville, TN

2009, Ph.D. Computer Science (GPA 3.9/4.0); Dissertation *"Visual Analytics for Relationships in Scientific Data"*

Jacksonville State University (JSU) Jacksonville, AL

2004, M.S. Computer Systems and Software Design (GPA 4.0/4.0); Outstanding MCIS Graduate Award; Thesis: *"An Advanced User Interface for Pattern Recognition in Medical Imagery: Interactive Learning, Contextual Zooming, and Gesture Recognition"*

2001, B.S. Double-major Computer Science and Mathematics, Physics minor (GPA 3.5/4.0)

EXPERIENCE

2009- **UT-Battelle, Oak Ridge National Laboratory** Oak Ridge, TN

R&D STAFF, WHOLE BUILDING AND COMMUNITY INTEGRATION

- Serve as sub-program manager for "Software Tools & Models" in the ~75-person Building Technologies Research & Integration Center (BTRIC). Responsible for sponsor relations, securing funding, multi-disciplinary team communication and development, high-impact publications, and ensuring timely completion of all deliverables for projects including but not limited to: websites, web services, databases, software tools, simulation engine development, supercomputing, image processing, artificial intelligence for deep learning, and big data mining applications. Responsible for lab space management, maintenance and cybersecurity of BTRIC's server room, operational R&D software systems, and visualization wall.
- Funding – led a 5-year average of 9.2 funded projects per year (67.2% success rate), personal budget authority over $1.4 million per year, and total award amount over $4.8 million per year
- Deliverables – successfully led ORNL teams to complete 2-year average of 43 deliverables per year, 100% on-time and on-budget when no critical input needed from non-ORNL performers.
- Publications – 4-year average co-authorship of 14 accepted publications per year with 93% acceptance rate; h-index and i10-index (5 years) is 7
- Achievements – development of the world's #1:
  - fastest building simulator for 524,288 annual building simulations using 131,072 processors and writing 45TB of data to disk in 68 minutes on Titan (world's fastest HPC)
  - largest building simulation dataset totaling over 200TB; used for big data mining
  - fastest building creator on a laptop: 155,793 buildings, 35GB written to disk in 2.6 minutes
  - best calibration algorithm for changing simulation inputs such that output matches measured data: measured in terms of CV(RMSE) and NMBE output error metrics used by ASHRAE Guideline 14 as well as the new, co-developed input-side error standard
- 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 averaging 64 visits/day since April 2010.
- Managing the development of an integrated suite of open source, proprietary, custom, and commercial machine learning tools (MLsuite) for big data mining 200+ TB of building simulation data using supercomputers and lab computers simultaneously.
- Manage operational R&D systems and Flexible Research Platforms including robotically-emulated occupancy, data acquisition systems, server hardware, sensor analytics, wiki, dashboards, websites, and web services. Visual analytics tools including linked parallel coordinate plots, and data mining of simulations on 35+ megapixel powerwall displays.

2004-2009 **GRADUATE RESEARCH ASSISTANT** SeeLab, UTK

- Developed SeeBrain, a GPU-accelerated DT-MRI fiber bundle extraction, visualization, and query system for real-time, multi-dataset analysis in collaboration with Vanderbilt radiologists.

RESEARCH INTERN Oak Ridge National Laboratory

- Developed SeeGraph, a general 3D layout and graph visualization package applied to phenotype correlation of mice by ORNL biologists; extended with graph and matrix algorithms, image processing, statistics, data mining, and novel interaction techniques for microarray data analysis.
- ORNL/UTK collaboration to leverage supercomputers for climate simulation and prediction using parallel clustering for ecoregion classification, visualization with GIS tools, multivariate data analysis using parallel coordinate plots, and maintenance of parallel model fitting software.

Summer 2006 **Vital Images, Inc.** Minnetonka, MN

GENERAL TOOLS INTERN

- Enhanced usability of Vitrea, used worldwide to inspect medical imagery, with changes to 3D angiography, vessel probe and measurements, brain perfusion, cardiac, colonography, and lung analysis tools with Qt 5-button mouse, event bypass methods using XML, and usability testing.

2001-2004 **GRADUATE RESEARCH ASSISTANT** Knowledge Systems Laboratory, JSU

- Developed Med-LIFE, a medical system for visualization and interaction with MRI data allowing neurophysiologically-based image processing and fusion, interactive learning agents for database mining and disease segmentation, contextual zoom, and 3D isosurface extraction.
- Implemented a gesture recognition system for applied computer vision to live camera feed for direct manipulation of a 3D object via spatial and temporal hand gestures.

1997-2001 **Ft. McClellan** Anniston, AL

COMPUTER SPECIALIST

- Primary contributor to the inventory tracking system used to close the military for transfer of 11,200,000 tons of material in 215 shipments valued at $104,314,000. Installed and customized for use by the Department of Homeland Security, Wastren Inc., and the Joint Powers Authority.

PUBLICATIONS

1. **New, Joshua R.**, Miller, W.A., Huang, Y., and Levinson, R. (2016). "Comparison of Software Models for Energy Savings from Cool Roofs" [Special issue]. *Journal of Energy and Buildings* on *Countermeasures to Urban Heat Island*, volume 114, issue 0, pp. 130-135, February 2016. [ENB] [PDF]
2. Garrett, Aaron and **New, Joshua R.** (2015). "Scalable Tuning of Building Energy Models to Hourly Data." In *Journal of Energy*, volume 84, pp. 493-502, April 2015. [Energy] [PDF]
3. Bhandari, M., Shrestha, S., and **New, Joshua R.** (2012). "Survey and Analysis of Weather Data for Building Energy Simulations." In *Journal of Energy and Buildings*, pp. 109-118, volume 49, issue 0, June 2012. [PDF]
4. 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*, pp.591-603, volume 49, issue 0, June 2012. [PDF]
5. **New, Joshua R.** (2009). **PhD thesis:** "Visual Analytics for Relationships in Scientific Data" In *Archives of the UTK Library*, Knoxville, TN. [PDF] [deliverables]
6. **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]

All publications available at: http://web.eecs.utk.edu/~new/; citations available at Google Scholar.