

Jibonananda Sanyal

*Staff Scientist and Team Lead: Scalable and High Performance Geocomputation
Oak Ridge National Laboratory*

Contact Information

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Education

- 2007 – 2011: PhD (Doctor of Philosophy) in Computer Science
Department of Computer Science and Engineering, Mississippi State University, USA
Dissertation: Uncertainty Visualization of Ensemble Simulations.
Simulated severe weather events using the Weather Research and Forecast model, used operational HEC-RAS flood simulations from the NWS Lower Mississippi River Forecast Center to evaluate and developed uncertainty visualization techniques, and developed ensemble analysis software tools for operational forecasting.
www.cse.msstate.edu
- 2006 – 2009: MS (Master of Science) in Computer Science
Department of Computer Science and Engineering, Mississippi State University, USA
www.cse.msstate.edu
- 2002 – 2005: BS (Bachelor of Technology) in Computer Science and Engineering
University College of Science & Technology, University of Calcutta, India
10th rank in the University
www.cucse.org/, www.caluniv.ac.in/
- 1998 – 2001: BS (Bachelor of Science) in Computer Science
St. Edmund's College, North-Eastern Hill University, Shillong, India
Gold Medalist and 1st rank in the University
www.sec.edu.in/

Experience

- 2016 – Current: Team Lead, Scalable and High Performance Geocomputation at the Oak Ridge National Laboratory (ORNL), www.ornl.gov
- Leading a select team of ~14 members to provide the vision and supervision of the team of individual researchers to define and align its activities with the group and division science agenda. Establishing and conducting research within the field of geographic information science, with special emphasis on scalable geocomputation architecture that is directly applicable to current national security, environmental, and other geospatial research issues.
- 2013 – 2016: R&D Staff at the Oak Ridge National Laboratory (ORNL), www.ornl.gov
Projects as PI, Co-PI, or Investigator:
- Lab-Corps Team-Tunation:** Entrepreneurial Lead of 'Team Tunation' in DOE's 7-week technology incubator program aimed at developing a viable business model from DOE funded research.
<http://energy.gov/eere/technology-to-market/lab-corps-teams#tunation>

Modernizing the AMO Software Suite: Overhauling the software suite for DOE's Advanced Manufacturing Office to use latest software development tools and techniques to create cross-platform software. The final suite will operate on desktop, web, as well as tablet devices across different operating systems.

IGATE-E CHP: Development of web-based national scale analytics to understand the potential and opportunities of using combined heat and power generation.

OpenStudio Results Framework: Development of an interoperable results schema for EnergyPlus simulation engine for interoperability.

<https://github.com/NREL/EnergyPlus/tree/ResultsSchema>

Autotune: A methodology for calibrating building energy models (BEM) is aimed at developing an automated BEM tuning methodology that enables models to reproduce measured data such as utility bills, sub-meter, and/or sensor data accurately and robustly by selecting best-match E+ input parameters in a systematic, automated, and repeatable fashion. Big-data management and data movement of about 270 TB+ was undertaken and a web interface to enable data access from the database was made in addition to creating dashboards for simple visual analytics.

<http://rsc.ornl.gov/autotune/>

XSEDE and OLCF computational allocation for Autotune: Massively parallel simulations using competitively allocated HPC resources from the Extreme Science and Engineering Discovery Experiment (XSEDE) and the Oak Ridge Leadership Computing Facility (OLCF). Machines include Nautilus and Kraken from the National Institute of Computational Sciences, Gordon at the San Diego Supercomputer Center, Blacklight at the Pittsburgh Supercomputer Center, Wrangler at the Texas Advanced Computing Center, and Titan at the OLCF.

Roof Savings Calculator: Department of Energy's advanced roof and attic simulation calculator to enable comparisons of energy saving retrofits for roofs.

<http://rsc.ornl.gov/>

Provenance Data Management: Creation of provenance enabled data management for real-time sensor data from ORNL's Flexible Research Platforms (FRP), including web-enabled visualization of the provenance graph and interactive exploration of the FRP models. Architected multi-level authentication with individual user permissions with a de-coupled, multi-system database architecture.

Modbus XML schematization for seamless interoperability: Development of interoperable schemas for interoperability of sensors and controls based on the Modbus Protocol.

<https://github.com/ORNL-BTRIC/ModbusXMLSchema>

Volttron Agent Development: Development of control agents for device control and data archival on the Volttron platform. Investigation includes scalability studies of the platform.

<https://github.com/VOLTTRON/volttron>

Others: EnergyPlus – whole building energy simulation engine enhancements, OpenStudio Refrigeration module design, and web-enabled heat-pump design simulation model, Flexible Research Platforms data architecture, consolidation, and readiness.

2011 – 2013: Research Associate Postdoc at the Oak Ridge National Laboratory (ORNL)

Projects include Autotune and the Roof Savings calculator described previously. These were multi-year projects spanning both appointments.

2009 – 2011: Research Assistant to Dr. Philip Amburn at the Northern Gulf Institute (NGI)/ Geosystems Research Institute (GRI), High Performance Computing Collaboratory (HPC²), Mississippi State University.

www.northerngulfinstitute.org, www.gri.msstate.edu,

Project: Visual Analytics for Assessment and Interpretation of Simulated River Flooding

Co-developer for a visual analytics tool for the simulated river flooding scenarios for the NWS Lower Mississippi River Forecast Center. Software development included the design of projection classes and geo-scientific data readers. Research involving geo-spatial visualization of ensemble river

- simulations was conducted.
www.gri.msstate.edu/rsearch/visualization.php
- 2007 – 2009: Research Assistant to Dr. Robert Moorhead at the Northern Gulf Institute (NGI)/ Geosystems Research Institute (GRI), High Performance Computing Collaboratory (HPC²), Mississippi State University.
www.northerngulfinstitute.org, www.gri.msstate.edu
Project: Visualization Techniques for Improving Public Understanding of Severe Storms
Designed and developed immersive 3D visualization techniques for the study of severe storms. It included the use of vGeo for developing hurricane visualizations for hurricane experts.
P.I: Robert Moorhead, www.gri.msstate.edu/rsearch/visualization.php
- 2006 – 2007: Research Assistant to Dr. Valentine Anantharaj at Geosystems Research Institute (GRI), High Performance Computing Collaboratory (HPC²), Mississippi State University.
www.gri.msstate.edu, www.hpc.msstate.edu
Project: Rapid Prototyping Capability of Earth-Sun System Sciences
Encoding of NOAA LSM data into NetCDF using its Java library. Also included was the evaluation of CDAT, IDV, OPeNDAP geo-spatial data server, OCAPI Matlab interface, and developing Perl scripts for processing and quality assurance of data from SCAN sites.
www.gri.msstate.edu/rsearch/sensors_modeling.php
www.gri.msstate.edu/rsearch/hydro.php
- 2005 – 2006: Software Engineer at Product Operations Division of Sasken Communication Technologies Limited, Bangalore, India
www.sasken.com
Project: Aria – Complete 3G solution
Member of the product integration team for a complete 3G mobile solution. Activities involved code-base management, integration, and testing, both on the simulator and by the use of hardware debuggers on the form factor board.

Grants/Funding

1. PI, Modernizing the AMO Software Suite, DOE, FY16-18, \$1.65M
2. PI, Openstudio/EnergyPlus Results Framework, DOE, FY14-15, \$50 K
3. PI, Provenance Sensor Data Management, DOE, FY13, \$40K
4. Co-PI, IGATE-E CHP, DOE, FY16, \$150K
5. Co-PI, Migration of DOE's Roof savings Calculator, Carlisle, FY15, \$41K
6. Co-PI, Competitive XSEDE supercomputing time allocation on supercomputers at PSC, TACC, SDSC, and NICS, FY15, 750K hours
7. Co-PI, Development of a Web-Based Energy savings calculator for Air Tightness, ABAA, FY16, \$140K

Peer-Reviewed Journals

1. Eric Ragan, Alex Endert, Jibonananda Sanyal, and Jian Chen, "Characterizing Provenance in Visualization and Data Analysis: An Organizational Framework of Provenance Types and Purposes", In *IEEE Transactions in Visualization and Computer Graphics*, pp. 31-40, 22(1), 2015.
2. James Nutaro, David Fugate, Teja Kuruganti, Jibonananda Sanyal, Michael Starke, "Cost Effective Retrofit Technology for Reducing Peak Power Demand in Small and Medium Commercial Buildings", In *Science and Technology for the Built Environment*, 2015, doi:10.1080/23744731.2015.1047719
3. Castello, Charles C., Sanyal, Jibonananda, Rossiter, Jeffrey S., Hensley, Zachary P., and New, Joshua R., "Sensor Data Management, Validation, Correction, and Provenance for Building Technologies." Technical paper TRNS-00223-2013.R1. In *ASHRAE Transactions and Proceedings of the ASHRAE Annual Conference*, Seattle, WA, June 28-July 2, 2014

4. Mellot, Joe, New, Joshua R., and Sanyal, Jibonananda, “Cool Roofing: Analysis of Energy Consumption for Cool Roofing”, In *Western Roofing - Insulation and Siding*, pp. 50-56, issue January/February, 2014
5. Jibonananda Sanyal, Richard Edwards, Joshua New, and Lynne Parker, “Calibrating Building Energy Models Using Supercomputer Trained Machine Learning Agents”, In *Concurrency and Computation: Practice and Experience*, vol. 26, no. 13, 2014
6. Zachary Hensley, Jibonananda Sanyal, and Joshua New, “Provenance in sensor data management”, In *Communications of the Association for Computing Machinery*, vol. 57, no. 2, pp. 55-62, 2014. DOI=10.1145/2556647.2556657 <http://doi.acm.org/10.1145/2556647.2556657>
7. Zachary Hensley, Jibonananda Sanyal, and Joshua New, “Provenance in Sensor Data Management”. In *Queue*, vol. 11, no. 12, 2013. DOI=10.1145/2559899.2574836 <http://doi.acm.org/10.1145/2559899.2574836>
8. Mellot, Joseph W., New, Joshua R., and Sanyal, Jibonananda. “Preliminary Analysis of Energy Consumption for Cool Roofing Measures.” In *RCI Interface Technical Journal*, vol. 31, no. 9, pp. 25-36, October, 2013
9. Jibonananda Sanyal, Song Zhang, Jamie Dyer, Andrew Mercer, Phil Amburn, and Robert J. Moorhead, “Noodles – A Tool for Visualization of Numerical Weather Model Ensemble Uncertainty”, In *IEEE Transactions on Visualization and Computer Graphics*, vol. 16, no 6, pp. 1421-1430, November/December, 2010.
10. Jibonananda Sanyal, Song Zhang, Gargi Bhattacharya, Phil Amburn, Robert Moorhead, “A User Study to Compare Four Uncertainty Visualization Methods for 1D and 2D Datasets”, In *IEEE Transactions on Visualization and Computer Graphics*, vol. 15, no. 6, pp. 1209-1218, November/December, 2009.
11. J. Sanyal, Phil Amburn, S. Zhang, J. Dyer, P. J. Fitzpatrick, Robert J. Moorhead II, “User Experience of Hurricane Visualization in an Immersive 3D Environment”, In *Lecture Notes in Computer Science*, Springer-Verlag, ISVC (1) 2008: 867-878.

Technical Reports

1. Sanyal, Jibonananda, Fugate, David L., Woodworth, Ken, Nutaro, James J., & Kuruganti, Teja. *Embedded Volttron specification - benchmarking small footprint compute device for Volttron*. United States. 2015. doi:10.2172/1214028
2. New, Joshua R., Levinson, Ronnen, Huang, Yu (Joe), Sanyal, Jibonananda, Miller, William A., Mellot, Joe, Childs, Kenneth W., and Kriner, Scott, “In-Depth Analysis of Simulation Engine Codes for Comparison with DOE's Roof Savings Calculator and Measured Data”, *ORNL report*, ORNL/TM-2014/218, June 27, 2014, 69 pages.
3. New, Joshua Ryan, Yu Huang, Ronnen Levinson, Joe Mellot, Jibonananda Sanyal, and Kenneth W Childs. 2014. “Analysis of DOE S Roof Savings Calculator with Comparison to Other Simulation Engines”. United States. *ORNL Report*. doi:10.2172/1185373. <http://www.osti.gov/scitech/servlets/purl/1185373>.
4. Sanyal, Jibonananda and New, Joshua R, “Oak Ridge Institutional Cluster Autotune Test Drive Report”, *ORNL report*, ORNL/TM-2014/46, February 17, 2014.
5. Hensley, Zachary P, Sanyal, Jibonananda, & New, Joshua Ryan. *Tracking Provenance in ORNL's Flexible Research Platforms*. 2013. United States. doi:10.2172/1136793
6. Ranjan, Niloo, Sanyal, Jibonananda, & New, Joshua Ryan. *In-Situ Statistical Analysis of Autotune Simulation Data using Graphical Processing Units*. 2013. United States. doi:10.2172/1093099
7. New, Joshua R., Huang, Yu (Joe), Levinson, Ronnen, Mellot, Joe, Sanyal, Jibonananda, Miller, William A., and Childs, Kenneth W., “Analysis of DOE's Roof Savings Calculator with Comparison to other Simulation Engines”, *ORNL report*, ORNL/TM-2013/501, November 1, 2013, 63 pages

Software Guide and Manuals

1. Jibonananda Sanyal and James Nutaro, “The ModBus XML Schema Definition Specification: Version 0.9b”, 2014
2. Jibonananda Sanyal and James Nutaro, “ModBus XML Driver Generation Guide”, 2014

Peer-Reviewed Conference Papers/Posters

1. Sanyal, Jibonananda, Nutaro, James J., New, Joshua Ryan, Fugate, David L., and Kuruganti, Teja, The Modbus Definition Language Specification: A first step towards device interoperability, *Building Simulation 2015*, Hyderabad, India, December 2015.
2. Jackson Stone, Jibonananda Sanyal, Charles Castello and Joshua New, “Gamification and Visualization of Sensor Data Analysis in Research Buildings”, In *MODSIM World 2015*, Virginia Beach, VA, March 31 – 2 April, 2015. (Special Guest)
3. Sanyal, Jibonananda and New, Joshua R., “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.
4. Adams, Mark, Sanyal, Jibonananda, Fricke, Brian, and Benne, Kyle, “Refrigeration Modeling Components in OpenStudio”, In *Proceedings of International Refrigeration and Air Conditioning Conference*, Purdue, West Lafayette, IN, USA, July 14-17, 2014
5. Sanyal, Jibonananda and New, Joshua R, Pragneshkumar Patel, George Ostruchov, “Uncertainty Analysis of a Heavily Instrumented Building at Different Scales of Simulation”, In *Proceedings of 3rd International High Performance Buildings Conference*, Purdue, West Lafayette, IN, USA in July 14-17, 2014.
6. New, Joshua R. and Sanyal, Jibonananda, “Supercomputers (Titan!), Big Data Analytics, and Energy Efficient Robo-Homes”, In *Codestock*, 77 slides. Knoxville, TN, July 11-12, 2014
7. Sanyal, Jibonananda and New, Joshua R., “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*, San Diego, CA, July 22-25, 2013. Selected as a prestigious ‘Lightning Talk’ for the plenary session.
8. Mellot, Joseph W., Sanyal, Jibonananda, and New, Joshua R., “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.
9. Jibonananda Sanyal and Joshua New, “Simulation and Big Data Challenges in Tuning Building Energy Models”, In *IEEE Workshop on Modeling and Simulation of Cyber-Physical Energy Systems*, Berkeley, May, 2013.
10. Jones, Chad, New, Joshua R., Sanyal, Jibonananda, and Ma, Kwan-Liu, “Visual Analytics for Roof Savings Calculator Ensembles”, In *Proceedings of the 2nd Energy Informatics Conference*, Atlanta, GA, Oct. 6, 2012.
11. New, Joshua R., Sanyal, Jibonananda, Bhandari, Mahabir S., Shrestha, Som S., “Autotune E+ Building Energy Models”, In *Proceedings of the 5th SimBuild of IBPSA-USA*, International Building Performance Simulation Association (IBPSA), Aug. 1-3, 2012.
12. 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, “Building Energy Model Calibration using EnergyPlus, Machine Learning, and Supercomputing”, In *Proceedings of the 5th SimBuild of IBPSA-USA*, International Building Performance Simulation Association (IBPSA), Aug. 1-3, 2012.

13. Jibonananda Sanyal, Song Zhang , Philip Amburn, Jamie Dyer, John van der Zwaag, Derek Irby, Robert J. Moorhead , “FloodViz – An Ensemble Enabled Tool for River Flood and Inundation Mapping”, In *IEEE Visweek 2011*, Providence, Rhode Island, USA, 23 – 28 October, 2011.
14. Jibonananda Sanyal, Song Zhang, Jamie Dyer, Andrew Mercer, Phil Amburn, and Robert J. Moorhead, “Uncertainty Visualization of Ensemble Weather Forecasts”, In *Bays and Bayous Symposium 2010*, Mobile, Alabama, USA, December 1-2, 2010.
15. Jibonananda Sanyal, Phil Amburn, Song Zhang, Patrick J Fitzpatrick, Robert Moorhead, “Applying Immersive Visualization Techniques to Analyze Model Outputs: A Case Study of Hurricane Lili”, *Proceedings of IEEE Visualization 2008*, Columbus, Ohio, USA. Recipient of the Best Poster Award
16. Jibonananda Sanyal, Phil Amburn, Song Zhang, Patrick J Fitzpatrick, and Robert J Moorhead, “3D Immersive Visualization for Evaluation of Mesoscale Model Outputs Simulating Hurricane Lili’s (2002) Rapid Weakening”, *Proceedings of IEEE Oceans 2008*, Quebec City, Canada, 2008.

Other Publications/Talks/Posters

1. Kumar, Jitendra, Hoffman, Forrest M., New, Joshua R., and Sanyal, Jibonananda, “Reimagining Climate Zones for Energy Efficient Building Codes”, Presented to Technical Committee 4.2 - Climatic Information, Research subcommittee, In *ASHRAE Annual Conference 2014*, Seattle, WA, June 28-July 2, 2014
2. Vasile Tudor Garbulet and Jibonananda Sanyal, “Visual Data Analysis in Building Model Calibration”, *Report as part of the Science Undergraduate Laboratory Internships (SULI) program*, August 8, 2014.
3. Vasile Tudor Garbulet and Jibonananda Sanyal, “Witty Interface for Visual Data Analysis in Building Model Calibration”, *Presented as part of the Science Undergraduate Laboratory Internships (SULI) program*, August 8, 2014.
4. Jackson Stone and Jibonananda Sanyal, “Gamification: A New Approach to Data Analysis”, *Report as part of the Science Undergraduate Laboratory Internships (SULI) program*, 2014.
5. Jackson Stone, Jibonananda Sanyal, and Charles Castello, “Gamification: Gamification and Analysis: A New Approach to Data Analysis”, *Poster as part of the Science Undergraduate Laboratory Internships (SULI) program*, 2014.
6. Hensley, Zachary, Sanyal, Jibonananda, and New, Joshua R., “ProvDMS -- A Provenance Data Management System for Sensor Data”, *Presented as part of the Science Undergraduate Laboratory Internships (SULI) program*, August 8, 2013.
7. Ranjan, Niloo, Sanyal, Jibonananda, and New, Joshua R., “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.
8. Sanyal, Jibonananda, New, Joshua R., and Edwards, Richard E., “Calibration of Building Energy Models: Supercomputing, Big-Data and Machine-Learning”, In *Proceedings of the ORNL Postdoc Symposium*. Oak Ridge, TN, July 19, 2013.
9. Al-Wadei, Yusof H., New, Joshua R., and Sanyal, Jibonananda, “Interactive Web Design through Survey and Adoption of Modern Web-Technologies”, *Presented as part of the Science Undergraduate Laboratory Internships (SULI) program*, August 2012.
10. Jibonananda Sanyal, Song Zhang, Philip Amburn, Jamie Dyer, Andrew Mercer, Robert J. Moorhead, “Uncertainty Visualization of Weather Ensembles”, *NGI Annual Conference*, 2011.
11. Jibonananda Sanyal, Philip Amburn, Jamie Dyer, Song Zhang, Robert J. Moorhead, “Visualization of River Forecast Ensembles”, *NGI Annual Conference*, 2011.

12. John van der Zwaag, Derek Irby, Jibonananda Sanyal, Philip Amburn, Jamie Dyer, Song Zhang, "FloodViz - Visual Analytics for Assessment and Interpretation of Simulated River Flooding", *NGI Annual Conference*, 2011.
13. Jibonananda Sanyal, Song Zhang, Jamie Dyer, Andrew Mercer, Philip Amburn, and Robert J. Moorhead, "Visualizing Uncertainty of WRF Ensemble Parameters", *NGI Annual Meeting*, Mobile, AL, May 2010.
14. Jibonananda Sanyal, Philip Amburn, Derek Irby, John van der Zwaag, Song Zhang, and Robert J. Moorhead, "Level-of-Detail for Terrain Rendering", *NGI Annual Meeting*, Mobile, AL, May 2010.– Recipient of 3rd prize in the poster contest
15. Philip Amburn, Jamie Dyer, Jeff Grascnell, Derek Irby, Robert Moorhead, David Ramirez, David Reed, Jibonananda Sanyal, John van der Zwaag, David Welch, and Song Zhang, "Flood Visualization: Visual Analytics for Assessment and Interpretation of Simulated River Flooding", *NGI Annual Meeting*, Mobile, AL, May 2010.
16. Keqin Wu, Jibonananda Sanyal, Song Zhang, Phil Amburn, and Robert J Moorhead, "Using LIC-like Flow Vis Technique to Visualize Hurricane Lili's Rapid Weakening", *NGI Annual Meeting*, Mobile, AL, May 2009.
17. Keqin Wu, Song Zhang, Jibonananda Sanyal, Phil Amburn, and Robert J Moorhead, "Using FlowVis Techniques to Study Hurricane Cases", *NGI Annual Meeting*, Mobile, AL, May 2009.
18. Jibonananda Sanyal, Phil Amburn, Robert J Moorhead, and Patrick J Fitzpatrick, "Visualization of Numerical Model Outputs of Hurricane Lili's Rapid Weakening in a Virtual 3D Environment", *NGI Annual Meeting*, Biloxi, MS, May 2008.
19. Jean Mohammadi-Aragh, Derek Irby, Jibonananda Sanyal, Phil Amburn, Robert Moorhead, Song Zhang, and Keqin Wu, "Improving Public Understanding of Catastrophic Events", *NGI Annual Meeting*, Biloxi, MS, May 2008.
20. Y Ling, V Anantharaj, Q Lu, J Turk, P Houser, J Sanyal, "A computational framework for the evaluation of satellite precipitation estimates for hydrological applications", *American Geophysical Union 2007 Fall Meeting*, San Francisco, California, USA, December 20, 2007.

Invited Talks

1. Invited plenary "Lightning talk", XSEDE, San Diego, July 25, 2013
2. Supercomputing and BTRIC, National Renewable Energy Laboratory, June 22, 2013
3. Uncertainty in Ensembles, Oak Ridge National Laboratory, 29 August, 2011
4. Visualization of Weather and Flood Simulation Ensembles, Scientific Computing Institute, University of Utah, 8 July, 2011
5. Visualizing Uncertainty in Ensemble Simulations, Lawrence Livermore National Laboratory, 1 July, 2011

Panels/Advisory Committees

1. Panel on Engaging the Public, Nuclear Science Week, 2015.
2. ORNL IoT Workshop, 7 August 2015.
3. DOE's Open Energy Information Systems workshop participant led by Lawrence Berkeley National Laboratory (LBNL) to identify research requirements and funding objectives. June, 2013
4. EnergyPlus Results Schema Design Advisory Committee, DOE/LBNL, 2014
5. Improving NGI Research Transitions to Applications, NOAA-NGI Annual meeting, Mobile, Alabama, May, 2011
6. Panel for REU students, CSE, Mississippi State University, 2011

Awards, Honors, and Recognition

1. ‘Original 6 Trailblazers’, Oak Ridge National Laboratory, October, 2014.
2. ‘Lightning Talks’, Plenary Session, XSEDE, San Diego, July 2013
3. Outstanding Research Award, Geosystems Research Institute, 2011
4. Graduate Student of the Month of August 2010, CSE, Mississippi State University, 2010
5. 3rd Position, Posters, Northern Gulf Institute Annual Conference, 2010
6. Best Overall Award, Photo Contest, Northern Gulf Institute Annual Conference, 2009
7. Best Poster Award, IEEE Visweek, 2008
8. 10th Rank in B.Tech. Computer Science & Engineering, 2005 (class of 38)
9. 1st Rank and Gold Medal in B.Sc. Computer Science, 2001 (class of 45)
10. Gold Medal for the Best Graduate Award, 2001 (in about 5000 university students)

Leadership

ASHRAE TC 4.2 Climate Change, Research Chair and Voting Member
ASHRAE TC 4.7, Energy Calculations, Corresponding Member
Founding member, International Building Simulation Performance Association, USA, East TN chapter, 2014
Member, Research sub-committee, International Building Simulation Performance Association, 2015.
Founding member, Research Chair, and President, Oak Ridge Postdoctoral Association, 2013 - 2014

Service

Program Committee, Visualization and Data Analysis, San Francisco, CA, 2016.
Chair, Workshops, ACM/IEEE Joint Conference for Digital Libraries, Knoxville, TN, 2015.
Program Committee, Winter Simulation Conference, Huntington Beach, CA, 2015.
Program Committee, Winter Simulation Conference, Savannah, GA, 2014.
Organizing Committee, 2nd Annual ORNL Postdoc Research Symposium, 10 July, 2014
Organizing Committee, 1st Annual Postdoctoral Research Symposium, 2013
Special Tracks Committee, Immersive Visualization, International Symposium on Visual Computing, 2011
Chair, Student Volunteers, IEEE Visweek, Providence, Rhode Island, USA, 2011
Chair, Student Volunteers, IEEE Visweek, Salt Lake City, Utah, USA, 2010

Grant Reviewer for ORNL SEED funding proposals, 2015.

Reviewer for Building Simulation, 2015
Reviewer for IEEE Vis, InfoVis, VAST 2015
Reviewer for ASHRAE Annual Conference, 2015
Reviewer for Cartography and Geographic Information Science, 2015
Reviewer for Spatial Cognition and Computation: An Interdisciplinary Journal, 2015
Reviewer for Sensors, 2014
Reviewer for the Bulletin of the American Meteorological Society, 2014
Reviewer for ACEEE, 2014
Reviewer for WinterSim, 2014
Reviewer for EuroVis, 2013
Reviewer for IEEE Vis, InfoVis, VAST 2013
Reviewer for IEEE Vis, InfoVis, VAST 2012
Reviewer for IEEE Transactions in Visualization and Computer Graphics, Information Visualization, 2012
Reviewer for Eurographics, 2012
Reviewer for EuroVis, 2012
Reviewer for International Symposium on Visual Computing, 2011
Reviewer for IEEE Transactions in Visualization and Computer Graphics, Visweek, Vis 2010
Reviewer for IEEE Transactions in Visualization and Computer Graphics, Visweek, Vis 2009

Judge, Game Development Competition, MS Middle School, Summer, 2011
Judge, Game Development Competition, MS Middle School, Summer, 2010

Graduate Ambassador for Department of CSE, Mississippi State University, USA, 2009, 2010
Editor of *Reflections '04*, the Departmental magazine of CSE, University of Calcutta, India, 2004
Member of college automation team for St. Edmund's College, Shillong, India, 2000-2001
Member of web-site development committee of St. Edmund's College, Shillong, India, 2000-2001
Volunteered at the Bethany Society for the Blind, Shillong, India, 1996

Student Mentoring

Andrew Valesky and Joshua Lipstone, ORNL 2015
Jackson Stone, ORNL, 2014
Student sessions at XSEDE 2013
Zachary Hensley and Niloo Ranjan, ORNL, 2013
Yusof-AI-Wadehi, ORNL, 2012

Creative Works

Cover design of *Reflections '03*, the departmental magazine of CSE, University of Calcutta, 2003
Let's get creative, Short story, In *Reflections '03*, CSE, University of Calcutta, 2003
Cover design of *The Edmundian '00*, the college magazine of St. Edmund's College, 2000
Reply to a scientific love letter, Short story, In *The Edmundian '99*, St. Edmund's College, 1999

Media:

1. HPCWire: <http://www.hpcwire.com/2014/09/23/autotune-software-helps-model-energy-use/>
2. ArchNews: <http://www.achrnews.com/articles/127844-oct-14-2014-autotune-software-makes-it-quicker-easier-to-model-energy-use-of-buildings>
3. Phys.org: <http://phys.org/news/2014-09-team-autotune-software-quicker-easier.html>
4. GCN: <http://gcn.com/articles/2014/10/16/energy-management-tools.aspx>
5. Sourceable.net: <http://sourceable.net/autotune-software-help-building-energy-modelling/>
6. Tempsensornews.com: <http://www.tempsensornews.com/Research/quicker-easier-cheaper-modeling-of-energy-use-of-buildings/>
7. XSEDE scientific spotlight
8. National Institute of Computational Sciences article: <https://www.nics.tennessee.edu/autotune>
9. Education and Outreach XSEDE: <https://www.xsede.org/education-outreach-blog/-/blogs/500432>
10. InsideHPC online article: <http://insidehpc.com/2013/03/08/autotune-supercomputer-assisted-calibration-for-better-energy-models/>

Professional Affiliations (Member and Nominated)

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
Association for Computing Machinery (ACM) Member
Institute of Electrical and Electronics Engineers (IEEE) Society Member
International Building Simulation Performance Association (IBPSA)
American Geophysical Union (AGU) Member
Upsilon Pi Epsilon Scholars Honor Society
National Scholars Honors Society

Scholarship

North Eastern Council Scholarship and Book Grant of the Government of India for the B.Tech. program in Computer Science and Engineering (2003, 2004, 2005), ~ Rs. 18,000 per year