

Stephen Thomas

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Research Interests

Computational modelling of thermal and mechanical properties of materials that span disparate time and space scales using methods such as concurrent coupling and coarse grained molecular dynamics.

Education

Pursuing MS and PhD in Materials Science and Engineering 08/2013 - Present
Boise State University, Boise, ID, USA.

Bachelor of Engineering in Computer Science 08/2000 - 05/2004
Periyar University, Salem, TamilNadu, India.

Employment History

Researcher 08/2013 - Present
Boise State University, Boise, ID
Designation: Graduate Research Assistant
Primary responsibility

- Design and development of coarse grained molecular dynamics models of epoxy resins to study the link between processing conditions, the resultant microstructure and ultimately, it's performance. This project uses a GPU based molecular dynamics tool called HOOMD-Blue.
- Implemented and analyzed the results of an improved contact algorithm for the Anm model, a virtual 3D microstructure model obtained by randomly packing irregular shapes. These irregular shapes are obtained from real aggregates using X-ray tomography and spherical harmonics analysis of the voxel data.
- Participated in proposal writing and developed prototype sensors for motion detection, thermal energy leakage using infra-red cameras, soil contamination detection. Arduino microcontrollers and Raspberry PI computers we used for developing the internet connected sensors commonly referred to as "Internet of Things".
- Development of a multiphysics, multiscale model for concurrently coupling thermomechanical behaviour of solids from atomic to continuum scale and vice versa. This project also involves linking the open source molecular dynamics simulation code called LAMMPS with MOOSE, an open source finite element analysis code based on libMesh and PETSc. Technologies used: OpenMP, Boost C++ library, LaTeX, OpenCV, git version control, C++, C, Python.

Programmer 05/2010 - 07/2013
General Electric Company, Bangalore, India
Last designation: Senior Systems Specialist
Primary responsibility:

- Design and development of a new software platform for assay development, data visualization and analysis for a confocal high content analysis instrument(HCA) used in life sciences.
- Designed and developed a directed acyclic graph based workflow and a Silverlight based thin client

capable of image display and manipulation.

Technologies used: .NET framework 4.0, Silverlight 4.0, WCF & C#

Programmer

10/2008 - 05/2010

Sasken Communication Technologies, Bangalore, India

Last designation: Senior Software Engineer.

Primary responsibility

- Comprehensive knowledge transfer from peers in Bochum, Germany
- Design and development of an automated test framework for the Bluetooth stack on the Nokia mobile phones.
- Comprehend new features from specification documents released by Bluetooth standards organization called Bluetooth Special Interest Group and identify key areas for testing and design effective test cases.

Technologies used: .NET framework 2 & C#

Programmer

08/2004 - 10/2008

Microview Technologies Pte Ltd, Singapore

Last designation: Senior Software Engineer.

Primary responsibility

- Design and development of a graphical programming framework using directed acyclic graph backend for rapid development of machine vision applications.
- Implementation of machine control and image processing algorithm for industrial automation projects in the domain of machine vision.

Technologies used: .NET framework 1.1 and 2, Direct X 9.0(Direct Draw), C++ and C#.

Publications

Peer-reviewed journals

1. Thomas, S., Lu, Y., and Garboczi, E. (2015). "Improved Model for Three-Dimensional Virtual Concrete: Anm Model." Journal of Computing in Civil Engineering, American Society of Civil Engineers, 4015027.

Peer-reviewed conference proceedings

1. Lu, Y., Thomas, S., and Garboczi, E. J. (2015). "Nanotechnology in Construction: Proceedings of NICOM5." K. Sobolev and P. S. Shah, eds., Springer International Publishing, Cham, 301–308.
2. Lu, Y., and Thomas, S. (2015). "Anm Model Approach for Lunar Soil Simulant Properties Study." Earth and Space 2014, American Society of Civil Engineers, 76–83.

Conference/Workshop Talks

1. Thomas, S., Lu, Y., and Garboczi, E. "Improved model for 3-D virtual concrete: Anm model". Poster presented at Transformational Technologies in Molecular Simulations 2014 Summer School, University of Wisconsin-Madison, Madison, WI, May 2014.
2. Lu, Y., Thomas, S., "Interdisciplinary Modeling of Sustainable Infrastructure Materials Across the Length Scales --- a characterization, simulation, and prognosis study", Center for Advanced Energy Studies (CAES) 2015 Materials, Modeling, Simulation, and Visualization workshop, McCall, ID, May 2015.