SRDJAN SIMUNOVIC

Distinguished Research Staff

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PROFILE

I combine fundamental and applied research for the energy-related problems funded by the US government agencies and private industry. My work primarily consists of the development of computational methods and models, and utilization of the High Performance Computing resources at the DOE research laboratories.

I have led research proposals, R&D projects, research teams and groups, established collaborations between the government agencies, companies, industry consortia and universities. I have experience in various fields of research such as materials, impact mechanics, crashworthiness, manufacturing, nuclear energy, batteries, electric energy transmission, and computing. I have experience in evaluating proposals, publications, performance, and research organizations.

EXPERIENCE

Oak Ridge National Laboratory

Distinguished Research Staff

📅 Since May 1994

- Computational models for crashworthiness analysis of passenger vehicles for government agencies and industry consortia.
- Lightweight designs for passenger vehicles and busses in collaboration with industry.
- Models for heavy vehicles for analysis of roadside structures and national security applications.
- Computational models for polymer matrix composites and light metals for use in vehicle main structural components.
- Test methods for material properties at high rates of loading.
- Led research projects, groups and teams.
- High performance computing software for multiphysics analysis of materials.
- Modeling for additive manufacturing.
- Models and designs of armors and projectiles.
- Models for chemical transport in nuclear fuels.
- Impact safety for lithium ion batteries.
- Massively parallel solvers for modeling of dynamics of electric power grids.
- Graph theory and artificial intelligence for modeling reliability of power grids.
- Visit energy.ornl.gov for examples and more information.

EDUCATION

PhD Civil Engineering – Computational Mechanics

Carnegie Mellon University

📅 August 1990 – August 1993

MSc Civil Engineering – Computational Mechanics

Carnegie Mellon University

📅 August 1990 – August 1991

BSc Civil Engineering

University of Split, Croatia

📅 September 1983 – December 1988

AWARDS

Two R&D100 Awards

2020 R&D100 Finalist

Three US Patents

DOMAIN

Computational Mechanics

Materials Modeling

Vehicle Crashworthiness   Composites

Carbon Fiber Manufacturing

Multiphysics Simulations

Additive Manufacturing

Impact Mechanics   Experiments

Terminal Ballistics

Modeling of Nuclear Fuels

Dynamics of Electric Power Grid

Impact Safety of Batteries

Applied Mathematics

High Performance Computing

EXPERIENCE

United States Senate
Legislative Fellow for Senator Marsha Blackburn
📅 January 2021 – December 2023

- Advisor for science, technology, energy, aerospace, and education.
- Provided support for science and technology legislation.
- Data analytics, geographical data analysis, data aggregation and processing.

Oak Ridge National Laboratory
Postdoctoral Researcher
📅 Aug 1993 – May 1994

- Impact models for vehicle simulations using parallel computing.
- Modeling of polymer composite materials for vehicle crashworthiness.

Carnegie Mellon University
Research Assistant
📅 Aug 1990 – Aug 1993

- Contact formulations for Boundary Element Method.
- Teaching assistant.

Swanson Analysis Systems
Software Developer
📅 Aug 1992 – Aug 1993

- Development of block Lanczos eigenvalue solver.
- Development of computer graphics and visualization methods.

University of Split, Croatia
Junior Lecturer
📅 Dec 1988 – Aug 1990

- Junior lecturer for structural materials.
- Engineer for testing and certification of structures.

RECENT JOURNAL PUBLICATIONS

- Y. Lee, P. Nandwana, and S. Simunovic. *"Powder spreading, densification, and part deformation in binder jetting additive manufacturing,"* Progress in Additive Manufacturing, 2021.
- A. Nycz, Y. Lee, M. Noakes, D. Ankit, C. Masuo, S. Simunovic, J. Bunn, L. Love, V. Oancea, A. Payzant, and C. M. Fancher. *"Effective residual stress prediction validated with neutron diffraction method for metal large-scale additive manufacturing,"* Materials & Design, 205, 2021.
- S. Simunovic, L. P. Bindeman, and A. Kumar, *"Modeling of deformation of battery cells using thick shell element formulation,"* Computer Methods in Applied Mechanics and Engineering, vol. 362, Art. 112840, 2020.
- S. Simunovic, T.M. Besmann, E. Moore, M. Poschmann, M. Piro, K. T. Clarno, J. W. McMurray, W. A. Wieselquist, *"Modeling and simulation of oxygen transport in high-burnup LWR fuel,"* J. Nuclear Mat., v 538, Art. 152194, 2020.
- Visit my ORNL staff profile for up to date list of publications.

SKILLS

Computational Modeling

Research & Development

Project Development

Technical and Policy Writing

Project Management

Industry and Government Collaborations

Proposal and Project Evaluation

Energy Efficiency Technologies

High Performance Computing

Data Analytics

LANGUAGES

English

Croatian

PERSONAL INTEREST

Hiking   Snowboarding   Sailing
Scuba diving   Travel   Mentoring