CENTER FOR MATERIALS PROCESSING DATA (CMPD)

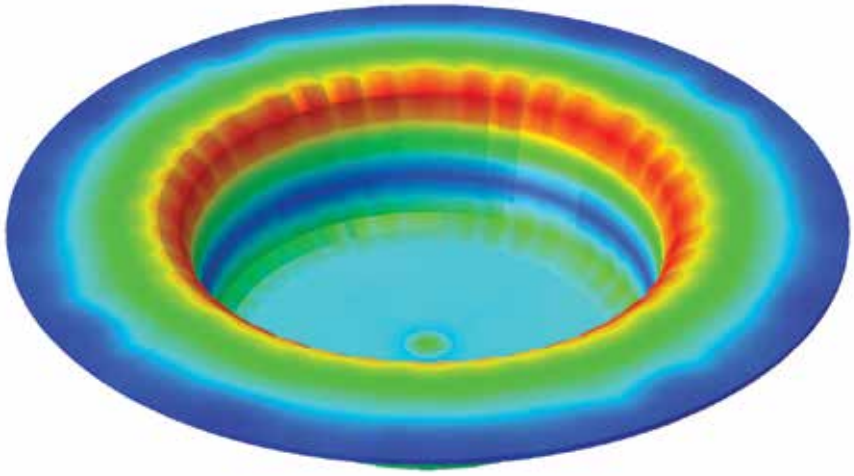
INNOVATION PARTNERSHIP BUILDING AT UCONN TECH PARK

About

The Center for Materials Processing Data (CMPD) is a research center dedicated to producing and collecting pre-competitive transient material property data used in materials process simulations. It is a member-driven, multi-university consortium with industry. Founding members include University of Connecticut (UConn), Worcester Polytechnic Institute (WPI), and the Research Foundation for the State University of New York on behalf of the University at Buffalo (RF), along with ASM International, a non-profit materials science and engineering society (ASM). CMPD is dedicated to research in materials process simulations and process designs via integrated computational materials engineering (ICME). Industry members develop the project portfolio. University members will educate future industry leaders, and disseminate research and data to industry members.

Member organizations will benefit from shared expertise, collaborative quality assurance, access to more high-quality data, and development and use of best practices for verifying data needed for modeling materials. In addition, CMPD aims to enhance the competitive position of industry members by ensuring that data used for material and process development are obtained through reproducible studies and available to industry as a whole.

CMPD strives to be the premier platform for the materials community to access pedigreed data as well as to experimentally generate data as input to existing and new models. By developing best practices for data management, data exchange, and integration with models, it will become a data hub for accelerating the transition between discoveries in materials science and engineering and implementation in manufacturing. Finally, CMPD will help in developing software for manufacturing that utilizes curated materials data. Inter-site collaborations are an equally vital component for CMPD. The semi-annual CMPD membership meetings, involving all CMPD members, include formal review of all CMPD projects or proposed projects to ensure that a true multi-institutional center is realized.



Abaqus simulation of deep drawn 305 stainless steel with Von Mises strain plotted.

Areas of Expertise

Each university brings specific research expertise to the center. UConn is a leader in experimentally generated materials data. The world-class facilities at the Innovation Partnership Building and elsewhere on the UConn Storrs campus allow for the generation of transient materials property data in controlled laboratory settings.

WPI is a leader in process modeling methods. The contribution of skills and expertise by WPI include software, modeling, and process knowledge.

University at Buffalo is a leader in materials data analytics. Methods that include machine learning and image analysis as well as database management and analytics modeling are critical to the success of this center.

ASM International provides administrative support to the center to ensure that materials data generated through the efforts of the university members are properly archived for access by industry.

Industry members drive the projects for this center. Projects are recommended by industry members and together with the universities, projects are selected and planned. Industry members also provide guidance during project execution as well as resources for "in the plant" data collection that serves as comparison to the lab-based data.

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Center Characteristics

Overview

What makes this center unique is the reliance on several organizations (academic, professional society, and industry-based) to solve big problems in materials processing. The translation of data from laboratory settings to process models, and ultimately, to a physical industry-scale process requires input from each of these groups. CMPD facilitates these efforts to push our understanding of materials to the next level.

Vision

CMPD will be the premier industry-university alliance dedicated to the stewardship of materials data for modeling of materials and process design via integrated computational materials engineering (ICME). CMPD will serve the needs of the membership organizations by educating future leaders of the industry and disseminating experimentally obtained data to industry.

CMPD membership organizations will have access to greater amounts of high-quality, pre-competitive data than individuals can generate alone. Member organizations will benefit from shared expertise, collaborative quality assurance, and development and use of best practices for verifying data needed for modeling materials.

Center Goals

Associate Professor R. Hebert and CMPD Director L. Frame

CMPD will act as an independent catalyst for industrial innovation and the exchange of information and ideas in materials process modeling. By integrating faculties from different disciplines, CMPD will help to address the scientific and engineering issues facing the materials processing industry today, as well as address needs that are not yet anticipated.

Center goals include:

- Experimentally and computationally determining materials properties relevant to industry processes;
- Generating transient data for easy input into design and manufacturing models;
- Extracting information from raw data collected from known reputable sources;
- Reproduction of experimental and computational data and related models for pedigree;
- Reviewing existing and newly developed models with various data sources;
- Disseminating raw data and application information to member organizations;
- Helping to train today's workforce and tomorrow's leaders on the experimental collection of materials data and the use of ICME and similar methods;
- Directly supporting research needs of industry members in a cost-effective manner with pooled, leveraged resources and maximized synergy;
- Enhancing the educational experience for top quality graduate and undergraduate students with industrial guidance on research;
- Advancing knowledge and technologies in this emerging field to help ensure commercial relevance of the research with rapid and effective technology transfer, lending high value to industry.

Contact

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