



**Professor Jian Cao**

See:

<http://www.mccormick.northwestern.edu/research-faculty/directory/profiles/cao-jian.html>

<http://www.tam.northwestern.edu/people/cao.html>

[http://www.mccormick.northwestern.edu/docs/public\\_cv/Cao-Jian-CV.pdf](http://www.mccormick.northwestern.edu/docs/public_cv/Cao-Jian-CV.pdf)

[https://www.youtube.com/watch?v=OkDhVPeb\\_MY](https://www.youtube.com/watch?v=OkDhVPeb_MY)

Associate Vice President for Research

Professor of Mechanical Engineering and (by courtesy) Civil and Environmental Engineering

Director, Northwestern Initiative for Manufacturing Science and Innovation (NIMSI)

Northwestern University, Evanston, Illinois

**Education:**

1995 Ph.D. Mechanical Engineering, MIT, Cambridge, MA

1992 M.S. Mechanical Engineering, MIT, Cambridge, MA

1985 B.S. Materials Science and Engineering & Automatic Control, Shanghai JiaoTong University, Shanghai, China

**Research Interests:**

Prof. Cao's major research interests include innovative manufacturing processes and systems, particularly in the area of deformation-based processes and laser ablation processes. Her work has made fundamental contributions to the understanding of wrinkling in sheet forming and the effects of material microstructure and material architecture on forming behavior of metals and woven composites. Her research has integrated analytical and numerical simulation methods, control and sensors, design methodologies to advance manufacturing processes. Her research group has designed unique manufacturing equipment for microforming and flexible rapid forming. Current research on flexible dieless forming, micro-forming, laser ablation processes has direct impacts on energy-efficient manufacturing, surface engineering and rapid prototyping. She has

published about 250 technical articles, including over 100 journal articles, 10 book chapters, and more than 10 awarded and pending patents. She has given over 100 invited talks.

**Significant Recognition:**

- Fellow, The International Academy for Production Engineering (CIRP), 2014
- STLE Best Paper Award, 2014
- ISFA Best Application Paper Award at the ISFA 2014
- Distinguished Service Award, ASME Manufacturing Engineering Division, 2013
- ASME Blackall Machine Tool and Gage Award, 2012
- ASME Dedicated Service Award, 2011
- Fellow, Society of Manufacturing Engineers, 2010
- Fellow, American Society of Mechanical Engineers, 2007
- Best Poster Award, ASME Manufacturing Science and Engineering Conference, 2008
- Young Investigator Award, American Society of Mechanical Engineers/Applied Mechanics, 2006
- Outstanding Young Manufacturing Engineer Award, Society of Manufacturing Engineers, 2002
- Outstanding Young Investigator Award, Japan-US Flexible Automation, 2002
- Young Chinese Leader, Dragon Foundation, Hong Kong, 2002
- Ralph R. Teetor Educational Award, International Society of Automotive Engineers, 1999
- CAREER Award, National Science Foundation 1997-2001
- ALCOA Foundation award 1997

**Selected Publications:**

Jian Cao, Apostolos Karafillis and Michael Ostrowski, “Prediction of flange wrinkles in deep drawing”, *Studies in Applied Mechanics*, Vol. 45, 1997, pp. 301-310, Special Issue: Advanced Methods in Materials Processing Defects

J. Cao and M.C. Boyce, “A predictive tool for delaying wrinkling and tearing failures in sheet metal forming”, *ASME Journal of Engineering Materials and Technology*, Vol. 119, October 1997, pp. 354-365

J. Cao and M.C. Boyce, Wrinkling behaviour of rectangular plates under lateral constraint, *International Journal of Solids and Structures*, 34, 153–176, 1997.

J. Cao, Prediction of plastic wrinkling using the energy method, *Journal of Applied Mechanics – Transactions of ASME*, 66, 646–652, 1999.

Wang, X., and Cao, J., 1999, “On the onset of wrinkling of sheet with in-plane curvatures and without normal constraint,” *Transaction of North American Manufacturing Research Conference, SME, XXVII*, pp. 55–60.

Xi Wang and Jian Cao, “An analytical prediction of flange wrinkling in sheet metal forming”, *Journal of Manufacturing Processes*, Vol. 2, No. 2, 2000, pp.100-107

Jian Cao and Xi Wang, “An analytical model for plate wrinkling under tri-axial loading and its application”, *International Journal of Mechanical Sciences*, Vol. 42, No. 3, March 2000, pp. 617-633

Xi Wang and Jian Cao, “On the prediction of side-wall wrinkling in sheet metal forming processes”, *International Journal of Mechanical Sciences*, Vol. 42, No. 12, December 2000, pp. 2369-2394

Xi Wang, Jian Cao and Ming Li, “Wrinkling Analysis in Shrink Flanging”, ASME J. Manuf. Sci. Eng., Vol. 123, No. 3, August 2001, pp.426 –432

Xi Wang and Jian Cao, “Wrinkling Limit in Tube Bending”, J. Eng. Mater. Technol., Vol. 123, No. 4, October, 2001, pp. 430 – 435

Hongsheng Lu, Hang Shawn Cheng, Jian Cao and Wing Kam Liu, “Adaptive enrichment meshfree simulation and experiment on buckling and post-buckling analysis in sheet metal forming”, Computer Methods in Applied Mechanics and Engineering, Vol. 194, Nos. 21-24, June 2005, pp. 2569-2590, Special Issue: Computational Methods for Shells