

**Brad Lee Kinsey**  
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## EDUCATION

**Northwestern University, Department of Mechanical Engineering**                      Evanston, Illinois  
Doctor of Philosophy, June 2001

- Doctoral Dissertation: “A Combined Approach to Improve and Assess the Formability of Tailor Welded Blanks”
- Advisor: Dr. Jian Cao
- Grade Point Average: 3.8/4.0
- Doctoral committee: Jian Cao, Kornel Ehmann, and Henry Stoll.

Master of Science, June 1998

- Master’s Thesis: “Process Control in Sheet Metal Forming”,
- Advisor: Dr. Jian Cao
- Master’s committee: Jian Cao, Kornel Ehmann, Sara Solla, William Wilson, and James Conley.

**The University of Michigan, Department of Mechanical Engineering**                      Ann Arbor, Michigan  
Bachelor of Science, December 1992

- Magna Cum Laude, Grade Point Average: 3.6/4.0

## RESEARCH EXPERIENCE

**Assistant Professor, University of New Hampshire**    2001 through present

- Designing and conducting material tests for microscale specimens to evaluate if size effects exist for temperature and strain rate.
- Evaluating experimental micro/mesoscale extrusion specimens and bending data to characterize size effects and determine strain gradient effects.
- Provided numerical simulation support for a stress based failure criterion for sheet material.
- Developing a test apparatus which applies bi-axial loading to a cruciform specimen to investigate the stress based failure criterion for sheet materials.
- Determined an optimal cruciform specimen for bi-axial loading to evaluate the stress based failure criterion for sheet materials.
- Derived an analytical method to determine the initial weld line position for tailor welded blank forming and validated the model with experimental results and numerical simulations.
- Demonstrated the ability of numerical simulations to accurately predict, including strain path dependence, the failure of dome height specimens using a stress based failure criterion.
- Developed and analyzed numerically a methodology to determine a non-uniform binder force for tailor welded blank forming to prevent wrinkling in the draw wall of a sheet metal part.

- Designing and implementing reconfigurable hydraulic equipment to perform sheet metal forming experiments such as bi-axial tensile testing and deep drawing.
- Devising an apparatus to improve the spatial ability of engineering and non-engineering students using CAD software and a physical object rotator.

**Research Assistant, Northwestern University**

Academic years 1995 through 2001

- Designed and analyzed through numerical simulations and analytical calculations a sheet metal forming process innovation to improve the formability of tailor welded blanks.
- Implemented experimentally the process innovation for tailor welded blanks verifying improvements, such as a 20% increase in the potential depth of draw and 19% decrease in the maximum major strain in the critical forming area.
- Derived an analytical method to determine the weld line movement and potential forming depth for tailor welded blank applications.
- Contributed to the development of a method to track material draw-in for deep drawing process using electrical inductance of loop patterns on a printed circuit board.
- Assisted in the Limit Dome Height testing of Aluminum 5182-0 tailor welded blanks.
- Studied the ability of a neural network to control the amount of springback and strain in a sheet metal channel forming process through numerical simulations and physical experiments.
- Modified a 150-ton hydraulic stamping press by incorporating new hydraulic components and a data acquisition system to allow for closed loop control of press binder force.
- Conducted sheet metal forming experiments to verify a simplified 2D axisymmetric model for the corner area of a square cup.

**Consultant, General Motors Corporation-Flint Metal Fab**

Summer 1996

- Studied the feasibility of utilizing the control of process parameters to reduce part variation in sheet metal deep draw forming.
- Involved with the Department of Commerce funded “Near Zero Stamping” research project.

**Independent Research Project, The University of Michigan**

Winter 1992

- Researched and developed a Fluid Dynamics laboratory experiment which employed wind tunnels and flow visualization. Advisor: Dr. Steven Ceccio

**FUTURE RESEARCH INTERESTS**

- Bulk forming of components at the microscale and nanoscale
- Innovative improvements and advanced control of manufacturing processes
- Material characterization for bulk forming processes
- Intelligent sensor devices for manufacturing process monitoring and control

**TEACHING & MENTORING EXPERIENCE**

**Assistant Professor**

Fall 2001 through present

Department of Mechanical Engineering, University of New Hampshire

- Developed and teach Computer-Aided Engineering, which utilizes modules from ProEngineer software, such as ProMechanica, and reinforces material learned in core engineering courses.
- Developed and teach Solid Mechanics in Manufacturing (ME 795), which covers plastic characterization of material properties and analytical methods to calculate the stress and strain in manufacturing processes such as machining, metal forming, forging, and wire drawing.

- Teach Engineering Design and Solid Modeling (ME 441), which is a project based course where students learn and use ProEngineer CAD software extensively in the design process.
- Teach and significantly improved Manufacturing Engineering and Design (ME 442), which is innovative in that personnel from local industries give guest lectures to provide students with real world expertise in manufacturing processes.

**Instructor**

Fall 2000

Department of Civil Engineering, Northwestern University

- Instructor for Mechanics: Statics and Dynamics course. (CE 212)
- Solely responsible for course content, lecture material, assignments, and examinations.
- Utilized real world and research examples in lecture material wherever possible.
- Created an active learning environment by engaging students during lectures.

**Teaching Assistant**

Academic years 1995 through 1997

Department of Mechanical Engineering, Northwestern University

- Substitute lectured. (ME 340-1 Manufacturing Processes)
- Instructed material testing and selection, CAD drawing, and metal forming laboratories which culminated in an end of the quarter bracket design project. (ME 240 Introduction to Mechanical Design and Manufacturing)
- Instructed hands-on manufacturing laboratories in which processes such as metal casting, rapid prototyping, and machining were covered. (ME 340-1 Manufacturing Processes)
- Instructed Computer Integrated Manufacturing laboratories in which a part was designed on Pro/ENGINEER software, a mold cavity was machined on a CNC machining center, and a plastic injection part was produced in a molding machine. (ME 340-2 CAD/CAM)
- Instructed laboratories in which programmable logic controller coordinating, robotic programming, and visual sensing were used to assemble a small product. (ME 340-3 Process Automation)

**Graduate Teaching Assistant Fellow**

Academic year 1997 through 1998

Searle Center for Teaching Excellence, Northwestern University

- Designed and conducted workshops to prepare new Teaching Assistants in engineering disciplines for their assignments and wrote and presented a paper based on this training program at an American Society for Engineering Education conference.
- Organized a panel discussion to explore the role of Teaching Assistants at Northwestern.
- Facilitated workshops to further the pedagogical growth of Teaching Assistants.

**Team Leader**

Academic years 1997 through 1999

1999 Sunrayce Competition, Northwestern University

- Team leader for Mechanical Systems Group, which was responsible for the steering, braking, suspension, and drivetrain of Northwestern's first entry into the Sunrayce competition.
- Oversaw Technical Report submission to Sunrayce Headquarters that included descriptions and evaluations for each individual solar car system and finite element crash simulations.
- Facilitated weekly design review meetings and oversaw, along with faculty advisor, Independent Research Projects (ME 399) for members of the Mechanical Systems Group.

## INDUSTRIAL EXPERIENCE

### Varian Corporation

Gloucester, MA

Technical Intern

June 1997 through September 1997

- Created report comparing simulation vacuum pumpdown times from theoretical equations, a commercially available software package, and experimental data.
- Assisted in the experimentation of a revised vacuum pumping system to determine feasibility.
- Calculated the center of gravity of new ion implanter to address seismic concerns.

### Nastech

Bennington, Vermont

Project Coordinator

October 1994 through July 1995

- Oversaw all new program start-ups, domestic sourcing of component parts, and part design changes for the entire company.
- Revised new component part trial system including method of ordering, system for receiving, quality documentation, and organizing inspection timing.
- Created flowcharts for domestic sourcing and part design changes.
- Trained in Total Quality Management.

### Nastech

Bennington, Vermont

Quality Assurance Engineer

February 1993 through October 1994

- Responsible for a third of the customers and supplier base including problem analysis and solving, new program start-ups, and determining product testing requirements.
- Implemented new gage control software and created a system for calibrating all gages plant wide.
- Proficient with several quality gaging instruments including the ability to program a Coordinate Measuring Machine.
- Conducted in-house and component part supplier quality audits.

### Freudenberg-NOK General Partnership

Plymouth, Michigan

Co-op Student

April 1992 through November 1992

- Conducted studies and performed tests on Vibration Control Dampers in automobile crankshaft, half shaft, and belt coupling designs.
- Obtained valuable knowledge of transducers, amplifiers, and analyzers used in data acquisition.

## HONORS & AWARDS

- 2006 SAE Teetor Educational Award recipient
- 2005 ASME Manufacturing Engineering Division Best Organized Symposium Award
- 2004-05 UNH Outreach Scholars participant
- 2003 Faculty Instructional Technology Summer Institute participant (UNH)
- 2000 NSF Engineering Education Scholars Workshop participant (Carnegie Mellon University)
- 2000 ASME Elisabeth M. and Winchell M. Parsons Scholarship Recipient
- 2000 Apprentice Faculty Grant Recipient for Educational Research and Methods Division of American Society for Engineering Education
- 1999/2001 Society of Automotive Engineers Doctoral Scholars Program Recipient
- 1999 Finalist in ASME Manufacturing Engineering Student Paper Competition
- 1998 Integrated Manufacturing Predoctoral Fellow sponsored by the Department of Energy

## SOCIETY AFFILIATIONS

- American Society of Mechanical Engineers
  - American Society for Engineering Education
  - Society of Automotive Engineers
  - New Hampshire Industries of the Future
- Engineer in Training, State of Illinois
- North American Deep Draw Research Group (NADDRG)
  - American Association of University Professors (AAUP)

## SOFTWARE & ENGINEERING TOOLS

- Pro/ENGINEER
- Solidworks
- I-DEAS
- ABAQUS
- LS-DYNA
- Matlab
- Labview and C programming
- CNC, APL, & PLC programming
- Starett CMM programming

## GRANTS RECEIVED

- PI, Design, Manufacturing and Industrial Innovation (DMII) Division, National Science Foundation, “GOALI/Collaborative Research: Microforming Processes – Fundamental Studies and Developments”, \$180,887, 7/1/04 through 6/30/05. Co-PIs are colleagues from ALCOA and Northwestern University.
- PI, Engineering Education Program, National Science Foundation, “Improving and Assessing the Spatial Ability of Engineering Students Using a CAD Integrated Physical Object Rotator”. Edward O’Brien, Psychology Department, and Robert Champoux, Thompson School of Applied Science, are co-PIs on this grant and Chris Bauer, Chemistry Department, is a senior personnel. \$303,111, 5/1/04 through 4/30/07
- PI, Center for High-rate Nanomanufacturing, “An Innovative Approach to Fabricate and Functionalize Block Copolymer Templates”, \$66,634, 7/1/2005 through 6/30/2006.
- PI, Vice President for Research Discretionary Fund Competition, University of New Hampshire, “Strain Path Control in Sheet Metal Forming”, \$8,640, 6/02 through 8/03.
- PI, “Computer-Aided Engineering Curriculum Development and Implementation”, Instructional Technology Faculty Grant Program, University of New Hampshire, \$17,370, 1/04 through 5/06.
- PI, Educational Research and Methods Division, American Society for Engineering Education, “Devising and Implementing a CAD Integrated Physical Model Rotator”, \$2,500, 5/1/03 through 4/30/04.
- Senior Personnel, Division of Graduate Education, National Science Foundation, “Project PROBE - Partnership for Research Opportunities to Benefit Education”, \$1,919,030, 1/15/04 through 1/14/07.

## REVIEWED JOURNAL AND TRANSACTION PUBLICATIONS

- Aaron Sakash, Sumit Moondra and Brad Kinsey (2006) “Effect of Yield Criterion on Numerical Simulation Support for a Stress-based Failure Criterion”, accepted to the *Journal of Engineering Materials and Technology*.
- Brad Kinsey, Aaron Sakash, and Sumit Moondra (2006) “Robust Prediction of Forming Severity Using a Stress Based Failure Criterion for Sheet Metal”, accepted to the *Transactions of the North American Manufacturing Research Institute of SME*, Vol. 34.

- Sunal Parasiz, Brad Kinsey, Neil Krishnan, Jian Cao and Ming Li (2005) “Investigation of Deformation Size Effects during Microextrusion”, submitted to the *Journal of Manufacturing Science and Engineering*.
- Brad Kinsey, Matt Bravar, and Neil Krishnan (2005) “Comparison of Analytical Model to Experimental Results and Numerical Simulation for Tailor Welded Blank Forming”, submitted to the *Journal of Manufacturing Science and Engineering*.
- Brad Kinsey, Neil Krishnan, and Jian Cao (2004) “A Methodology to Reduce and Quantify Wrinkling in Tailor Welded Blank Forming”, *International Journal of Materials and Product Technology*, Vol. 21, No. ½.
- Sumit Moondra and Brad Kinsey (2004) “Evaluation of Cruciform Specimens for Stress Based Forming Limit Diagram Validation”, *Transactions of the North American Manufacturing Research Institute of SME*, Vol. 32, pp. 247-54.
- Matt Bravar and Brad Kinsey (2004) “Analytical Determination of Initial Weld Line Position in Tailor Welded Blank Forming”, *Transactions of the North American Manufacturing Research Institute of SME*, Vol. 32, pp. 597-604.
- Brad Kinsey and Jian Cao (2003) “An Analytical Model for Tailor Welded Blank Forming”, *Journal Manufacturing Science and Engineering*, Vol. 125, No. 2, pp. 344-51.
- Vikram Viswanathan, Brad Kinsey, and Jian Cao (2003) “Experimental Implementation of Neural Network Springback Control for Sheet Metal Forming”, *Journal of Engineering Materials and Technology*, Vol. 125, No. 2, pp. 141-7.
- Brad Kinsey, Vikram Viswanathan, and Jian Cao (2001) “Forming of Aluminum Tailor Welded Blanks”, *SAE Transactions – Journal of Materials & Manufacturing*, Vol. 110, Section 5, SAE Paper Number 2001-01-0822, pp. 673-9.
- Brad Kinsey and Jian Cao (2001) “Enhancement of Sheet Metal Formability via Local Adaptive Controllers”, *Transactions of the North American Manufacturing Research Institute of SME*, Vol. XXIX, pp. 81-8.
- Brad Kinsey, Zhihong Liu, and Jian Cao (2000) “A Novel Forming Technology for Tailor Welded Blanks”, *Journal of Materials Processing Technology*, Vol. 99, pp. 145-53.
- Jian Cao, Brad Kinsey, and Sara Solla (2000) “Consistent and Minimal Springback Using a Stepped Binder Force Trajectory and Neural Network Control”, *Journal of Engineering Materials and Technology*, Vol. 122, No. 1, pp. 113-8.
- Hong Yao, Brad Kinsey, and Jian Cao (2000) "Rapid Design of Corner Restraining Force in Deep Drawn Rectangular Parts", *International Journal of Machine Tools and Manufacture*, Vol. 40, No. 1, pp. 113-31.
- Jian Cao, Brad Kinsey, Hong Yao, Vikram Viswanathan and Nan Song (2000) "Next Generation Stamping Dies - Flexibility and Controllability", *Robotics and Computer Integrated Manufacturing*, Vol. 17, pp. 49-56.
- Brad Kinsey, Zhihong Liu, and Jian Cao (1999) “New Apparatus and Method for Forming Tailor Welded Blanks”, *SAE Transactions – Journal of Materials & Manufacturing*, Vol. 108, Section 5, SAE Paper No. 1999-01-0681, pp. 653-60.
- Hong Yao, Brad Kinsey, and Jian Cao (1999) “A Simplified 2D Model for Predicting Corner Failure in a Square Part”, *SAE Transactions – Journal of Materials & Manufacturing*, Vol. 108, Section 5, SAE Paper No. 1999-01-1317, pp. 958-66.

## PATENT

Jian Cao and Brad Kinsey (1999) “Adaptive Method and Apparatus for Forming Tailor Welded Blanks”, U.S. Patent No. 5,941,110.

## CONFERENCE PROCEEDINGS AND PRESENTATIONS

- Richard M. Onyancha and Brad L. Kinsey (2006) “Size Effects in Micromanufacturing Process Models: Microbending and Microextrusion”, submitted to the *International Conference on MicroManufacturing*.
- Richard M. Onyancha and Brad L. Kinsey (2006) “Investigation of Size Effects on Process Models for Plane Strain Microbending”, submitted to the *International Manufacturing Science and Engineering Conference*.
- Brad L. Kinsey, Erick Towle, Grace Hwang, Edward J. O’Brien, and Christopher F. Bauer (2006) “The Effect of Spatial Ability on the Retention of Students in a College of Engineering and Physical Science”, accepted to the *American Society for Engineering Education Conference*.
- Aaron Sakash and Brad Kinsey (2006) “Evaluation of Stress Saturation Effect with a Stress Based Failure Criterion for Sheet Metal Using Numerical Simulations”, *SAE World Conference and Exposition*, Detroit, MI, April 4-7.
- Neil Krishnan, Jian Cao, Sunal Parasiz, Brad Kinsey, and Ming Li, (2005) “Investigation of Deformation Characteristics of Micropins Fabricated Using Microextrusion”, *2005 International Mechanical Engineering Conference and Exposition*, MED-81511, Orlando, FL, Nov. 5-9.
- Robert E. Williams, Yong Huang, Shreyes Melkote, Brad Kinsey, Wei Sun, and Donggang Yao, (2005) “Recent Advances in Micro/Meso-scale Manufacturing Processes, *2005 International Mechanical Engineering Conference and Exposition*, MED-79889, Orlando, FL, Nov. 5-9.
- Sumit Moondra, Aaron Sakash, and Brad Kinsey (2005) “Numerical Simulation Support for a Stress-based Failure Criterion”, *2005 International Mechanical Engineering Conference and Exposition*, AMD-80317, Orlando, FL, Nov. 5-9.
- Erick Towle, Jennifer Mann, Edward J. O’Brien, Christopher F. Bauer, Robert Champoux, and Brad Kinsey, (2005) “Assessing the Self Efficacy and Spatial Ability of Engineering Students from Multiple Disciplines”, *Frontiers in Engineering Education Conference*, Oct. 19-22, 2005, Indianapolis, IN.
- Erick Towle, Jennifer Mann, and Brad Kinsey, (2005) “Work In Progress – Development of Tools to Improve the Spatial Ability of Engineering Students”, *Frontiers in Engineering Education Conference*, Oct. 19-22, 2005, Indianapolis, IN.
- Brad Kinsey, Kornel Ehmann, Horacio Espinosa, Wing K. Liu, Neil Krishnan, and Ming Li, (2005) “Microforming Processes – Preliminary Investigations and Developments”, *Proceedings of 2005 DMII Grantees Conference*, MPM 0400267, Scottsdale, AZ, Jan. 3-6.
- Brad Kinsey, Matt Bravar, and Neil Krishnan (2004) “Comparison of Analytical Model to Experimental Results and Numerical Simulation for Tailor Welded Blank Forming”, *Proceedings of the International Mechanical Engineering Conference and Exposition (IMECE)*, Paper AMD-59322, Anaheim, CA, Nov.
- Brad Kinsey, Matt Bravar, and Jian Cao (2003) “Methodology and Model to Determine Key Process Parameters for Tailor Welded Blank Forming”, *Symposium on Metal Forming: Microscale to Macroscale, Proceedings of the International Mechanical Engineering Conference and Exposition (IMECE)*, Paper AMD-43610, Washington, D.C., Nov.
- Brad Kinsey (2003) “Design of a CAD Integrated Physical Model Rotator”, *Proceedings from the 2003 ASEE Annual Conference*, Nashville, TN, June.
- Brad Kinsey and Neil Krishnan (2002) “Using FEA Simulations to Determine Advanced Process Parameters for Tailor Welded Blank Forming”, *A Glimpse into the Future of Sheet*

*Metal Forming, Proceedings of the International Mechanical Engineering Conference and Exposition (IMECE)*, Paper #34361, New Orleans, Louisiana, Nov.

- Brad Kinsey and Jian Cao (2001) “Numerical Simulations and Experimental Implementation of Tailor Welded Blank Forming”, *Second Global Symposium on Innovations in Materials Processing & Manufacturing: Sheet Materials*, 2001 TMS Annual Meeting.
- Kathleen Issen, Brad Kinsey, L. Catherine Brinson, and Linda Broadbelt (2001) “Preparing Future Engineering Faculty: A Professional Development Series”, *2001 ASEE Annual Conference and Exposition*.
- Brad Kinsey and Jim Lang (2000) “Don’t Throw Teaching Assistants to the Wolves: An Overview of Teaching Assistant Training Workshops”, *ASEE Spring Conference*, North Central Section, East Lansing, MI, March 31.
- Brad Kinsey and Jian Cao (1999) “An Advanced Manufacturing Process for Tailor Welded Blank Forming”, *1999 ASME Congress and Exposition* Nashville, TN, Nov. 15-19.
- Brad Kinsey, Nan Song, and Jian Cao (1999) "Analysis of Clamping Mechanism for Tailor Welded Blank Forming", *1999 SAE International Body Engineering Conference*, SAE Paper No. 1999-01-3192, Detroit, MI, Sept. 28-30.
- Brad Kinsey and Jian Cao (1999) “An Advanced Manufacturing Process for Tailor Welded Blank Forming”, *1999 Technical Meeting Society of Engineering Science*, Austin, TX, Oct. 25-28.
- Brad Kinsey and Jian Cao (1997) “An Experimental Study to Determine the Feasibility of Implementing Process Control to Reduce Part Variation in a Stamping Plant”, *Sheet Metal Stamping: Developments in Sheet Metal Stamping, SP-1221*, SAE Paper 970713, pp. 107-12.