

Shun-lai ZANG

Associate Professor

School of Mechanical Engineering
Xi'an Jiaotong University
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Process Modeling in Sheet Metal Forming

EDUCATION

- Feb. 2004 - Nov. 2007
 - PhD in School of Mechanical Engineering, Xi'an Jiaotong University, People's Republic of China
 - Supervisor: Prof. Dr. Guo Cheng
 - Dissertation title: Research on Elasto-Plastic Constitutive Model and Sheet Springback
- Sept. 2001 - Jan. 2004
 - MS in School of Mechanical Engineering, Xi'an Jiaotong University, People's Republic of China
 - Supervisor: Associate Prof. Dr. Cheng Yu
 - Thesis title: The Research on Precision Forming of Spur Gear and Compensation of Spring-back
- Sept. 1997 - Jul. 2001
 - BS in Department of Material Forming and Controlling, Xi'an Jiaotong University, People's Republic of China

PROFESSIONAL EXPERIENCE

- Jan. 2013 - Present
 - *Associate Professor*
 - School of Mechanical Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi Province, People's Republic of China.
 - Key Laboratory of Education Ministry for Modern Design & Rotor-Bearing System, Xi'an, Shaanxi Province, People's Republic of China.
- July 2016 - July 2016
 - *Visiting Professor*
 - Host Professors: Prof. Myoung gyu Lee and Prof. Ji-Hoon Kim
 - Korea University and Pusan National University, Republic of Korea
- June 2014 - July. 2014
 - *Visiting Professor*

PROFESSIONAL EXPERIENCE (continued)

- Host Professor: Prof. Sandrine Thuillier and Prof. Pierre-Yves Manach
- Universite de Bretagne-Sud - LIMATB, Rue de Saint Maude - BP 92116 - 56321 Lorient Cedex, Republic of France.
- Feb. 2014 - Feb. 2014
 - *Visiting Professor*
 - Host Professor: Prof. Myoung gyu Lee
 - Graduate Institute of Ferrous Technology, Pohang University of Science and Technology (POSTECH), Republic of Korea
- Jan. 2013 - Jan. 2013
 - *Visiting Professor*
 - Host Professor: Prof. Myoung gyu Lee
 - Graduate Institute of Ferrous Technology, Pohang University of Science and Technology (POSTECH), Republic of Korea
- Nov. 2008 - Nov. 2009
 - *Postdoctoral Fellowship*
 - Supervisors: Prof. Sandrine Thuillier and Prof. Pierre-Yves Manach
 - Universite de Bretagne-Sud - LIMATB, Rue de Saint Maude - BP 92116 - 56321 Lorient Cedex, Republic of France.
- Jan. 2008 - Dec. 2012
 - *Lecturer (Assistant Professor)*
 - School of Mechanical Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi Province, People's Republic of China.

PEER-REVIEWED JOURNAL PAPERS

15. • Ya-zhou Wang, **Shun-lai Zang***, Li Sun, Jia-wei Ma. Constructing Micro-mechanical Representative Volume Element of Medium Mn Steel from EBSD data. *Materials & Design*. 129(2017):34-43.
14. • Shunying Zhang, Lionel Leotoing, Dominique Guines, Sandrine Thuillier, **Shun-lai Zang**. Calibration of anisotropic yield criterion with conventional tests or biaxial test. *International Journal of Mechanical Sciences* 85(2014):142-151.
13. • Xiangfan Nie, Weifeng He, **Shun-lai Zang**, Xuede Wang, Jie Zhao. Effects study and application to improve high cycle fatigue resistance of TC11 titanium alloy by laser shock peening with multiple impacts. *Surface and Coatings Technology* 253(2014):68-75.
12. • **Shun-lai Zang***, Myoung-gyu Lee, Li Sun, Ji Hoon Kim. Measurement of the Bauschinger behavior of sheet metals by three-point bending springback test with pre-strained strips. *International Journal of Plasticity* 59(2014):84-107.
11. • Mohsen Safaei, Myoung-gyu Lee, **Shun-lai Zang**, Wim De Waele. An evolutionary anisotropic model for sheet metals based on non-associated flow rule approach. *Computational Materials Science* 81(2014):15-29.
10. • **Shun-lai Zang***, Myoung-gyu Lee, Ji-hoon Kim. Evaluating the significance of hardening behaviour and unloading modulus under strain reversal in sheet springback prediction. *International Journal of Mechanical Sciences* 77(2013):194-204.
9. • **Shun-lai Zang***, Li Sun, Chao Niu. Measurements of Bauschinger effect and transient behavior of a quenched and partitioned advanced high strength steel. *Material Science & Engineering A* 586(2013):31-37.

PEER-REVIEWED JOURNAL PAPERS (continued)

8. • Yanfang Zhao, Weifeng Wang, Haitao Xin, **Shun-lai Zang**, Zhiyuan Zhang, Yulu Wu. The remodeling of alveolar bone supporting the mandibular first molar with different levels of periodontal attachment. *Medical & Biological Engineering & Computing* 51(2013):991-997.
7. • Jun-hang Guo, Sheng-dun Zhao, Ri-ichi Murakami, **Shun-lai Zang**. Experimental and numerical investigation for ductile fracture of Al-alloy 5052 using modified Rousselier model. *Computational Materials Science* 71(2013):115-123.
6. • Mohsen Safaei, **Shun-lai Zang**, Myoung-gyu Lee, Wim De Waele. Evaluation of anisotropic constitutive models: mixed anisotropic hardening and non-associated flow rule approach. *International Journal of Mechanical Sciences* 73(2013):53-68.
5. • Mohsen Safaei, Wim De Waele, **Shun-lai Zang**. Evaluation of associated and non-associated flow metal plasticity: application for DC06 deep drawing steel. *Key Engineering Materials* 504-506(2012):661-666. (non-SCI)
4. • **S.L. Zang***, C. Guo, S. Thuillier, Myoung-gyu, Lee. A model of one-surface cyclic plasticity and its application to springback prediction, *International Journal of Mechanical Sciences* 53(2011):425-435.
3. • **S.L. Zang**, S. Thuillier, A. Le Port, P.Y. Manach. Prediction of anisotropy and hardening for metallic sheets in tension, simple shear and biaxial tension. *International Journal of Mechanical Sciences* 53(2011):338-347.
2. • **S.L. Zang***, J.Liang, C. Guo. A constitutive model for sheet springback prediction in which the change of Young's modulus with plastic deformation is considered, *International Journal of Machine Tools and Manufacture* 47(2007):1791-1797.
1. • **ZANG Shun-lai***, GUO Cheng, WEI Gong-ji, CHEN Feng, DONG Wei, ZHANG Ke, "A new model to describe the effect of plastic deformation on elastic modulus of aluminum alloy, *Transactions of Nonferrous Metals Society of China* 2006(SP3):1314-1318.

CONFERENCE PAPERS

5. • **Shun-lai Zang***, Fang Shao. Calibration of the Bauschinger behavior of aluminum alloy sheet by prestrain-bending approach. In: 7th International Conference on Tube Hydroforming (Tubehydro 2015), Xi'an, China, September 9-11, 2015.
4. • **Shun-lai Zang***, Myoung-gyu Lee, Ji Hoon Kim, Mohsen Safaei. A new representation of linear transformation tensor for the description of plastic subsequent anisotropy. In: Numisheet2014, the 9th International Conference and Workshop on Numerical Simulation of 3D Sheet Metal Forming Processes, Melbourne Australia, Jan 6-10, 2014.
3. • Mohsen Safaei, **Shun-lai Zang***. Benchmark04: Wrinkling during cup draw. In: Numisheet2014, the 9th International Conference and Workshop on Numerical Simulation of 3D Sheet Metal Forming Processes, Melbourne Australia, Jan 6-10, 2014.
2. • Mohsen Safaei, Wim De Waele, **Shun-lai Zang**. A rate-independent non-associated constitutive model for finite element simulation of sheet metal forming. In: *Plasticity 2012*, Puerto rico, Jan 3-8, 2012

CONFERENCE PAPERS (continued)

1. • **Shun-lai Zang**, Myoung-gyu Lee. A general yield function within the framework of linear transformations of stress tensors for the description of plastic-strain-induced anisotropy. In: NUMISHEET2011: The 8th International Conference and Workshop on Numerical Simulation of 3D Sheet Metal Forming Processes, Seoul, Korea. August 21-26, 2011.

RESEARCH PROJECTS

- | | |
|-------------------------|---|
| June 2016 - Dec. 2017 | <ul style="list-style-type: none">• Project: Constitutive Modeling of Medium Mn Advanced High Strength Steel by Polycrystalline Crystal Plasticity Finite Element Analysis.• Supported by grants from the GM (China) Investment Co., LTD, China Science Lab.• <i>Primary Investigator</i> |
| June 2016 - June 2017 | <ul style="list-style-type: none">• Project: Measurement of Residual Stress.• Supported by grants from the Science and Technology on Plasma Dynamics lab, AFEU, China• <i>Primary Investigator</i> |
| Jan. 2014 - Dec. 2015 | <ul style="list-style-type: none">• Project: National Science and Technology Major Project: high precision gear grinding machine.• Supported by grants from the Ministry of Science and Technology of China (No. 2014ZX04001191).• <i>Primary Investigator of Sub-task</i> |
| Jan. 2014 - Dec. 2014 | <ul style="list-style-type: none">• Project: Numerical Simulation of Mechanical Structure of Steel Wire Rope (Second stage)• Supported by grants from the Aviation Industry Corporation of China.• <i>Primary Investigator</i> |
| Jan. 2013 - Dec. 2013 | <ul style="list-style-type: none">• Project: Numerical Simulation of Mechanical Structure of Steel Wire Rope (First stage)• Supported by grants from the Aviation Industry Corporation of China.• <i>Primary Investigator</i> |
| Sept. 2011 - Sept. 2014 | <ul style="list-style-type: none">• Project: Multiscale Modeling of Advanced High Strength Steel• Supported by grants from the GM (China) Investment Co., LTD, China Science Lab.• <i>Primary Investigator</i> |
| Jan. 2012 - Dec. 2012 | <ul style="list-style-type: none">• Project: Numerical Simulation of Bone Remodelling Process under Mechanical Stimulus.• Supported by grants from the Fourth Military Medical University.• <i>Primary Investigator</i> |
| Jan. 2011 - Dec. 2012 | <ul style="list-style-type: none">• Project: High Frequency Microwave Focused Beam Glass Forming Process Modeling.• Supported by grants from the PPG LTD. USA.• <i>Member (30% Money)</i> |

RESEARCH PROJECTS (continued)

- Jan. 2011 - Dec. 2013
- Project: Research on Anisotropic Constitutive Model for Metallic Sheets under Strain Path Changes
 - Supported by grants from the National Natural Science Foundation of China (No.11002105), People's Republic of China.
 - *Primary Investigator*
- Jan. 2011 - Dec. 2013
- Project: Forming Limit Curves of Advanced High Strength Steels
 - Supported by grants from the Key Laboratory of Testing Technology for Manufacturing Process (Southwest University of Science and Technology), Ministry of Education (No.10ZXZK03), People's Republic of China.
 - *Primary Investigator*
- Jan. 2011 - Jun. 2013
- Project: Numerical Simulation of Laser Shock Peening Process
 - Supported by grants from the Xian Science and Technology Agency.
 - *Primary Investigator*
- Jan. 2011 - Dec. 2012
- Project: Constitutive Modeling of Materials at Very High Strain Rate
 - Supported by grants from the Air Force Engineering University, People's Republic of China.
 - *Primary Investigator*
- July 2010 - June 2012
- Project: Multiscale Modelling and Parameter Optimization for Hot Forging Process of Gas-turbine Blades.
 - Supported by grants from the DONGFANG TURBINE CO., LTD, People's Republic of China.
 - *Member (40% Money)*
- Dec. 2009 - Dec. 2011
- Project: Prediction of anisotropic work-hardening for metallic sheets
 - Supported by grants from the Research Fund for New Researcher of Xi'an Jiaotong University, People's Republic of China.
 - *Primary Investigator*
- Jan. 2009 - Dec. 2012
- Project: Study on elasto-plastic constitutive model for sheet springback prediction
 - Supported by grants from the Specialized Research Fund for the Doctoral Program of Higher Education, People's Republic of China. (No.200806981025)
 - *Primary Investigator*
- Nov. 2008 - Nov. 2009
- Project: Virtual control of the quality of automotive opening parts: Identification of material parameters for numerical simulations of the process to obtain opening parts.
 - Supported by grants from some French industries and research laboratories, Republic of France.
 - *Member (Postdoctoral work)*

PROFESSIONAL SOCIETIES/SERVICES:

- **Reviewer** for International Journal of Mechanical Sciences, International Journal of Plasticity, Computer Methods in Applied Mechanics and Engineering, Materials & Design, International Journal of Material Forming, Journal of Engineering Manufacture, International Journal of Impact Engineering, International Journal of Digital Content Technology and its Applications, Laser in Engineering, Applied Surface Science, International Journal of Material Forming, Materials Science & Engineering A, Journal of Materials Processing Technology, Journal of Materials Engineering & Performance, Metallurgical and Materials Transactions A.
- **Session Chair** in the 8th International Conference and Workshop on Numerical Simulation of 3D Sheet Metal Forming Processes (NUMISHEET2011), Seoul, South Korea, 2011

CHINESE PATENTS

4. • **Shun-lai Zang**, Chao Niu. A Matlab Toolbox SMAT for parameters identification of material parameters of constitutive model. (Copyright of Computer Software No. 2013SR038190)
3. • **Shun-lai Zang**, Chao Niu, Shao-peng Li. A method to estimate the Bauschinger behavior under reversal strain path for metallic sheets. (ZL 2010 1 0553215.8)
2. • **Shun-lai Zang**, Xiang-fan Nie, Shao-peng Li, Jie Zhao, Jun-hua Liu. A method to calibrate the material parameters of metals under very high strain rate. (ZL 2013 1 0287333.2)
1. • **Shun-lai Zang**, Cheng Guo, Yong-xin Wang, Huan-huan Zhang, Ying-jun Zheng. A device to measure the mechanical behavior under simple shear deformation. (ZL 2010 1 0553215.8)

SKILLS

Computer systems

Computation

Programming Languages

Experiments

- Windows, Have a good command of GNU/Linux
- Material Parameter Identification: Developed and maintained a MATLAB toolbox, **SMAT**, for parameter identification of constitutive models
- Material Parameter Identification: Have a good command of SiDoLo (Material parameter identification program at UBS, developed by Prof. P. Pilvin (1983))
- Finite Element Program: ABAQUS (quite good at dealing with material routines, UMAT/VUMAT), DEFORM-2D, DEFORM-3D, DYNAFORM
- Pre Program: HyperMesh
- Texture Analysis Program: MTEX (a matlab toolbox)
- Mathematics Program: Matlab, Scilab, Maple
- Data Visualization: Gnuplot, Xfig, G3data, Origin
- CAD Program: AutoCad, Qcad, Pro/E
- Office Program: LaTeX, MS-Office, Open-office, Nedit
- Fortran 77/90, C/C++, HTML, JSP, Java, Bash Shell Script, Python
- Mechanical Test Machine: MTS

SKILLS (continued)

- Springback Device: Drawbead tester (XJTU)
- Mechanical Properties Device: Bulge tester (UBS), Simple Shear tester (UBS)
- Deep Drawing Device: Two-Stage Deep Drawing tester (UBS)
- Strain Measurement System: XJTUDIC (XJTU, similar as Aramis, developed by Xi'an Jiaotong University)

TEACHING EXPERIENCE

- | | |
|-----------------------|--|
| Feb. 2012 - June 2017 | • Fundamental of Plastic Forming Process. (Undergraduate course, each year) |
| Feb. 2006 - June 2014 | • Numerical simulation theory and technology in metal plasticity forming process. (Graduate course, each year) |
| Jan. 2010 - Jan. 2010 | • Basic of Materials Forming Technique. (Graduate course) |