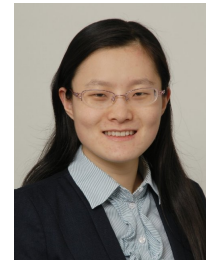


Wenqi Liu  
Visiting Doctoral Candidate  
Department of Mechanical Engineering  
Advanced Manufacturing and Materials  
Email: wenqi.liu@aalto.fi



## Artistic and research interests

My research focuses on the microstructure modeling guided design of damage-tolerant high-strength steels, involving the experimental and numerical investigation of the multiscale mechanical properties of steels, and bridging the microstructure and mechanical properties as well as the component performance by integrated computational materials engineering (ICME) approach.

The microstructure and mechanical property characterization involving grain/phase levels and plastic deformation/damage mechanism analyses are achieved by microscopy techniques and micro-/macro-mechanical testing. The general numerical simulation methods are representative volume elements, crystal plasticity modeling, macroscopic damage and fracture modeling, finite element methods, etc.

Currently, I also research on the additive manufacturing steel in terms of understanding their process-microstructure-mechanical properties relationship.

## Education

M.Sc., Metallurgical Engineering, RWTH Aachen University  
Sep 2011 → Mar 2016

B.Eng., Materials Science and Engineering, University of Science and Technology Beijing  
Sep 2007 → Jun 2011

Dr.-Ing. Candidate, RWTH Aachen University  
Jun 2016 → ...

## Research outputs

### Plasticity evolution of an aluminum-magnesium alloy under abrupt strain path changes

Lian, J., Liu, W., Gastañares, X., Juan, R. & Mendiguren, J., May 2022, In: INTERNATIONAL JOURNAL OF MATERIAL FORMING. 15, 3, 14 p., 40.

### Strain rate dependent plasticity and fracture of DP1000 steel under proportional and non-proportional loading

Chandran, S., Liu, W., Lian, J., Münstermann, S. & Verleysen, P., 1 Mar 2022, In: European Journal of Mechanics, A/Solids. 92, 21 p., 104446.

### Dynamic strain aging in DP1000: Effect of temperature and strain rate

Chandran, S., Liu, W., Lian, J., Münstermann, S. & Verleysen, P., 14 Jan 2022, In: Materials Science and Engineering A. 832, p. 1-14 14 p., 142509.

### Local formability of medium-Mn steel

Shen, F., Wang, H., Liu, Z., Liu, W., Könemann, M., Yuan, G., Wang, G., Münstermann, S. & Lian, J., Jan 2022, In: Journal of Materials Processing Technology. 299, 10 p., 117368.

### Stress-state dependence of dynamic strain aging: Thermal hardening and blue brittleness

Liu, W. Q. & Lian, J. H., 6 May 2021, In: International Journal of Minerals, Metallurgy and Materials. 28, 5, p. 854-866 13 p.

### In-depth analysis of the fatigue mechanism induced by inclusions for high-strength bearing steels

Gu, C., Liu, W. Q., Lian, J. H. & Bao, Y. P., May 2021, In: International Journal of Minerals, Metallurgy and Materials. 28, 5, p. 826-834 9 p.

### Anisotropic Plastic Behavior of Additively Manufactured PH1 Steel

Liu, W., Li, Z., Bossuyt, S., Forsström, A., Que, Z., Björkstrand, R., Salmi, M., Partanen, J. & Lian, J., 1 Apr 2021, *ESAFORM 2021 - 24th International Conference on Material Forming*. 10 p. 4236

**A numerical investigation on the effects of porosity on the plastic anisotropy of additive manufactured stainless steel with various crystallographic textures**

Wu, J., Liu, W., Vajragupta, N., Hartmaier, A. & Lian, J., 1 Apr 2021, *ESAFORM 2021 - 24th International Conference on Material Forming*. 10 p. 4308

**Investigation on the ductile fracture of a high-strength dual-phase steel with anisotropic damage mechanics model**

Li, Z., Liu, W., Shen, F., Münstermann, S. & Lian, J., 1 Apr 2021, *ESAFORM 2021 - 24th International Conference on Material Forming*. 10 p. 4322

**Numerical Evaluation of Surface Roughness Influences on Cold Formability of Dual-Phase Steel**

Wechsuwanmanee, P., Lian, J., Liu, W. & Münstermann, S., 1 Nov 2020, In: *Steel Research International*. 91, 11, 8 p., 2000141.

**Prediction of crack formation in the progressive folding of square tubes during dynamic axial crushing**

Liu, W., Lian, J., Münstermann, S., Zeng, C. & Fang, X., 15 Jun 2020, In: *International Journal of Mechanical Sciences*. 176, 15 p., 105534.

**Microstructure effects on the plastic anisotropy of a fine-structured dual-phase steel**

Liu, W. & Lian, J., 26 Apr 2020, *23rd International Conference on Material Forming (ESAFORM 2020)*. Elsevier, p. 1552-1560 9 p. (Procedia Manufacturing; vol. 47).

**A strategy for synthetic microstructure generation and crystal plasticity parameter calibration of fine-grain-structured dual-phase steel**

Liu, W., Lian, J., Aravas, N. & Münstermann, S., 1 Mar 2020, In: *INTERNATIONAL JOURNAL OF PLASTICITY*. 126, 27 p., 102614.

**Temperature dependence of plastic flow, anisotropy and ductile fracture**

Lian, J., Liu, W., Sparrer, Y., Shen, F. & Münstermann, S., 1 Jan 2020, *23rd International Conference on Material Forming (ESAFORM 2020)*. Elsevier, Vol. 47. p. 1308-1313 6 p. (Procedia Manufacturing).

**Damage mechanism analysis of a high-strength dual-phase steel sheet with optimized fracture samples for various stress states and loading rates**

Liu, W., Lian, J. & Münstermann, S., Dec 2019, In: *ENGINEERING FAILURE ANALYSIS*. 106, 23 p., 104138.

**Crystal plasticity modelling of flow behavior under various strain rates**

Lian, J., Liu, W., Zhang, W., Shen, F. & Münstermann, S., 2 Jul 2019, *Proceedings of the 22nd International ESAFORM Conference on Material Forming, ESAFORM 2019*. Arrazola, P., Saenz de Argandoña, E., Otegi, N., Mendiguren, J., Saez de Buruaga, M., Madariaga, A. & Galdos, L. (eds.). American Institute of Physics, 180015. (AIP Conference Proceedings; vol. 2113).

**Surface roughness influences on localization and damage during forming of DP1000 sheet steel**

Münstermann, S., Wechsuwanmanee, P., Liu, W. & Lian, J., 2019, *18th International Conference on Sheet Metal, SHEMET 2019, New Trends and Developments in Sheet Metal Processing*. Elsevier, p. 504-511 (Procedia Manufacturing; vol. 29).

**A numerical approach to evaluate roughness effects on localization and damage in sheet materials**

Münstermann, S., Wechsuwanmanee, P., Liu, W. & Lian, J., 21 Sep 2018, In: *IOP Conference Series: Materials Science and Engineering*. 418, 1, 012038.

**Dynamic fracture of a dual phase automotive steel**

Chandran, S., Verleysen, P., Lian, J., Liu, W. & Münstermann, S., 7 Sep 2018, *DYMAT 2018 - 12th International Conference on the Mechanical and Physical Behaviour of Materials under Dynamic Loading*. EDP SCIENCES, Vol. 183. 02047

**Plasticity and failure behavior modeling of high-strength steels under various strain rates and temperatures :  
microstructure to components**

Lian, J., Liu, W., Papadioti, I., Bellas, I., Chandran, S., Verleysen, P., Richter, H., Aravas, N. & Münstermann, S., 2018, In: *Procedia Structural Integrity*. 13, p. 1421-1426 6 p.

**Crystal plasticity assisted prediction on the yield locus evolution and forming limit curves**

Lian, J., Liu, W., Shen, F. & Münstermann, S., 16 Oct 2017, *Proceedings of the 20th International ESAFORM Conference on Material Forming, ESAFORM 2017*. American Institute of Physics, Vol. 1896. 020030

**Dynamic Fracture Behavior of High Strength Pipeline Steel**

Chandran, S., Verleysen, P., Lian, J., Liu, W., Cooreman, S. & Münstermann, S., 1 Jan 2017, In: *Procedia Engineering*. 197, p. 214-223 10 p.

**Prizes**

**ESAFORM 2020 Best communication award - Silver medal**

Liu, Wenqi (Recipient), 2020