Ming Tang

• tangming.buaa@gmail.com • (412)944-3036 • Chicago, IL • Lawful permanent resident
• Linkedin • Google Scholar • GitHub • Portfolio: https://tangming2008.github.io/

Highlights

- Specialized in metallurgical failure analysis, metal additive manufacturing, and machine learning
- 10-years research experience in metals, including aluminum, iron & steel, titanium, and nickel
- Strong academic record with 7 first-author peer-reviewed journal articles and 1000+ citations

Professional Experience

Research Engineer, ArcelorMittal Global R&D Mar 2018 - Present

Engineer, Mar 2018 – Dec 2021
Senior Engineer, Dec 2021 – Present

- Managed the steel cleanliness characterization facility in support for product development, root cause analysis, and quality evaluation (consistently analyzing and reporting > 20 samples/week)
- Led projects on R&D fundamental steelmaking research to sustain new high-strength steel product manufacturability for the automotive customers, such as Tesla, Toyota, Nissan, and GM. For example, I served as the principal investigator of an industry-university partnership project ($300,000 DOE funding) on AI-driven accelerated defect analysis for energy-efficient steelmaking
- Provided technical support to steelmaking mills to optimize the manufacturing reliability and minimize product defects (resulting in $1.1 million alloy saving in 2020 and 19% higher steel sheet bendability)
- Appointed by the senior management to co-chair the deliberation committee (9 members) and organize the annual R&D Innovation Awards (joined by ~300 participants across 4 labs in 2021)

Academic Research Experience

Research Assistant, Carnegie Mellon University Aug 2014 - May 2017

Doctoral thesis: Microstructure, Defect, and Fatigue of 3D-printed Metallic Parts

- Developed a 3D geometrical model (implemented in Excel and Python) which saves build time (by 50%) and predicts volume % of residual pores in printed parts (with 97% accuracy); first-author article based on this model is 0.1% most-cited in Materials Science in 2017
- Discovered the oxide-induced porosity as a novel type of defect which dominates the fatigue performance of 3D-printed aluminum parts
- Collaborated closely with researchers in the Department of Mechanical Engineering and industrial partners from Arconic on fatigue, tension, and compression tests

Research Assistant, Carnegie Mellon University Aug 2012 - Dec 2013

Master thesis: Oxidation of Magnetite pellet

- Designed and performed experiments to evaluate the effect of processing variables (heating rate, peak temperature, $\%H_2O$, and $\%O_2$) and particle size distribution on magnetite oxidation
- Utilized the oxygen enrichment at the initial reaction stage, increased the pellet strength by 75% and successfully met the strength requirement listed by industrial ironmaking operations

Skills

Materials Science	• Mechanical tests: fatigue, tension, bendability, hole expansion, nano-indentation • Characterization: SEM/EDX (highly skilled in automated-SEM), micro-CT, XRD, DSC
Data Science (in Python)	• Machine learning: sklearn, pandas, Keras/TensorFlow (image classification), xgb • Web application: streamlit, Heroku • Advanced statistics: rpy2 (for extreme value analysis) • Project posts: available on my GitHub site

Education

PhD	Materials Science & Engineering	Carnegie Mellon University, Pittsburgh, PA	May 2017
MS	Materials Science & Engineering	Carnegie Mellon University, Pittsburgh, PA	Dec 2013
BS	Materials Science & Engineering	Beihang University, Beijing, P. R. China	Jun 2012

Educational activities

Trainer for courses on liquid steel processing, ArcelorMittal Global R&D Oct 2019 - present

- Designed annual in-person training on liquid steel processing for ~25 steelmaking professionals
- Received an overall rating of 3.91 out of 4
- Feedback from trainees available on my portfolio website (here)

Teaching Assistant for 5 graduate courses, Carnegie Mellon University Aug 2014 - Aug 2016

- Courses include: Thermodynamics, Kinetics of Metallurgical Reactions and Processes, Solidification Processing, Process Design
- Coached lab projects, graded assignments, and provided feedback

Selected Publications (1000+ citations; Google Scholar)

1. S. Yang, A. Rebmann, M. Tang, R. Moravec, D. Behrmann, M. Baird, W. Bequette, "Process monitoring using causal graphical models, with application to clogging detection in steel continuous casting," *J. Process Control*, vol. 105, pp. 259-266, 2021, doi: 10.1016/j.jprocont.2021.08.006
2. M. Tang and P. C. Pistorius, "Fatigue Life Prediction for AlSi10Mg Parts Produced by Selective Laser Melting," *Int. J. Fatigue*, vol. 125, pp. 479-490, 2019. doi: 10.1016/j.ijfatigue.2019.04.015
3. M. Tang and P. C. Pistorius, C. Montgomery, J. Beuth, "Build Rate Optimization for Powder Bed Fusion," *J. Mater. Eng. Perform.*, vol. 28, pp. 641–647, 2019. doi: 10.1007/s11665-018-3647-5
4. M. Tang and P. C. Pistorius, "Anisotropic Mechanical Behavior of AlSi10Mg Parts Produced by Selective Laser Melting," *JOM*, vol. 69, pp. 516–522, 2017. doi: 10.1007/s11837-016-2230-5
5. M. Tang, P. C. Pistorius, and J.L. Beuth, "Prediction of Lack-of-fusion Porosity for Powder Bed Fusion," *Addit. Manuf.*, vol. 14, pp. 39-48, 2017. doi: 10.1016/j.addma.2016.12.001
6. M. Tang and P. C. Pistorius, "Oxide, Porosity and Fatigue performance of AlSi10Mg Parts Produced by Selective Laser Melting," *Int. J. Fatigue*, vol. 94, pp. 192-201, 2017. doi: 10.1016/j.ijfatigue.2016.06.002
7. M. Tang, P. C. Pistorius, S. Narra, and J.L. Beuth, "Rapid Solidification: Selective Laser Melting of AlSi10Mg," *JOM*, vol. 68, pp. 960-966, 2016. doi: 10.1007/s11837-015-1763-3
8. M. Tang, H. J. Cho, and P. C. Pistorius, "Early Gaseous Oxygen Enrichment to Enhance Magnetite Pellet Oxidation," *Metall. Mater. Trans. B*, vol. 45, pp. 1304-1314, 2014. doi: 10.1007/s11663-014-0064-5

Conference Presentations

1. M. Tang and P. C. Pistorius, "Fatigue Life Prediction for AlSi10Mg Parts Produced by Selective Laser Melting," *RAPID + TCT Conference*, Pittsburgh, PA, May 2017.
2. M. Tang and P. C. Pistorius, "Anisotropic Mechanical Behavior of AlSi10Mg Parts Produced by Selective Laser Melting," *TMS*, San Diego, CA, Mar 2017.
3. M. Tang and P. C. Pistorius, "Relationship between Porosity Size and Fatigue Life Distributions of AlSi10Mg Parts Produced by Selective Laser Melting," *MS&T*, Salt Lake City, UT, 2016.
4. M. Tang, P. C. Pistorius, "Oxide, Porosity and Fatigue Performance of AlSi10Mg Parts Produced by Selective Laser Melting," *TMS*, Nashville, TN, 2016.
5. M. Tang, P. C. Pistorius, and J.L. Beuth, "Geometric Model to Predict Porosity of Part Produced in Powder Bed System," *MS&T*, Columbus, OH, 2015.
6. M. Tang and P. C. Pistorius, "Magnetite Pellet Oxidation: Effects of Water Vapor and Non-isothermal Reaction," *AISTech*, Indianapolis, IN, 2014.

Reviewers

- AISTech Transactions (*Key reviewer*)
- Materials Science and Engineering A (Outstanding reviewer)
- Journal of Materials Processing Technology (Outstanding reviewer)
- Journal of Alloy and Compounds
- International Journal of Fatigue
- Metallurgical and Materials Transactions B