Fan Chen

Research profile: https://fanchennus.github.io/

(+32) 049 062 8117 Bât. B52/3 Bureau +1/447 | Département Argenco : Secteur MS2F | Quartier Polytech 1 | allée de la Découverte 9 | 4000 Liège 1 | Belgique. - fanchen@u.nus.edu

EDUCATION

National University of Singapore, Singapore

- 2018-2022: Ph.D., *Mechanical Engineering*

Huazhong University of Science & Technology, China

- 2015-2018: Master degree, *Design & Manufacture of Ships and Marine Structure*
- 2011-2015: Bachelor degree, *Naval Architecture & Ocean Engineering*

ACADEMIC EXPERIENCE

Reviewer for Journals:

2025   *Journal of Manufacturing and Materials Processing* (Guest Editor)

2024   *Journal of Materials Processing Tech*

2024   *Additive Manufacturing*

2023   *Chinese Journal of Mechanical Engineering: Additive Manufacturing Frontiers*

2022   *Smart Manufacturing*

Experience of Research & Projects selected:

2018-2022, *in Mechanical Engineering, National University of Singapore, Singapore*

   - as Ph.D. candidate, funded by Singapore Research Scholarship

   - Supervisor: Wentao Yan (mpeyanw@nus.edu.sg)

- *High-fidelity coupled CFD-FEM simulation on DED and LPBF*
  -- corporation with ANSYS
  My duty: Link the high-fidelity molten pool dynamics model with the finite element solver for thermal stress simulation; incorporation of the defects (voids and rough surface morphology) into thermal stress analysis.

- *High-density dislocations in additively manufactured metals*
  -- corporation with Shanghai Jiaotong University
  My duty: Numerical support for the thermal-mechanical behavior analysis; demonstration (first of the world) that thermal stresses are the origin of high-density dislocations in additively manufactured metals.

- *Physically informed data-driven prognostic model for the temperature prediction in AM*
  -- corporation with Singapore A*STAR
  My duty: High accuracy and significantly faster computation speed for the track-scale AM modeling based on the data-driven prediction (CNN, GPR, QR) of the isotherms and the isotherm-reconstructed temperature attribution on FEM model.

- *Pattern-oriented Strain Attribution in Part-scale Modeling of Additive Manufacturing*
  -- corporation with Singapore A*STAR
  My duty: Efficient large-scale AM modeling approaches with sound physical basis; layer-wise element progressive activation applied with base strain pattern attributed onto the arbitrarily shaped sample layers.

2022 – 2023 *in McCormick School of Engineering, Northwestern University, the United States*

   - as Postdoctoral researcher, funded by USA Vannevar Bush Faculty Fellowship award

   - PI: Jian Cao (jcao@northwestern.edu)

- *Hybrid Autonomous Manufacturing, Moving from Evolution to Revolution* (HAMMER)
  -- corporation with N.C. A&T State University et al.
  My duty: High-fidelity English wheel simulation; distortion analysis of the sheet metal under rolling of two wheel of different size and curvature; data-driven surrogate model for the sheet distortion prediction.

- *Micro-Casting of Titanium Alloy in Self-boiling Molds*

My duty: Heat transfer analysis of liquid materials in multiple self-boiling molds for micro-casting.

- *DED on Sheet Metal Forming*

  -- corporation with Nissan

  My duty: Deformation prediction and bulking analysis under the residual stress pattern achieved by track-scale DED simulation; inverse design of the scanning tracks based on the high-fidelity simulation of the formed-sheet deformation.

2024-2025 *in Urban and Environmental Engineering, University of Liege, Belgium*

   - as Research Scientist, funded by European Union

   - PI: Anne Marie Habraken (anne.habraken@uliege.be)

- ***Horizon Europe Project n° 101091912***

  AI powered characterization and modelling for green steel technology, (AID4Greenest)

  -- corporation with Fraunhofer, IWM and IMDEA et al.

  My duty: Microstructure and precipitation analysis for the green steel (30CrMoNiV5-11); Python-based development of the Mean Field Creep model；Fortran-based self-developed Lagamine coding platform for implementation of H. Morch creep law.

Teaching:

2018-2022 *in Mechanical Engineering, National University of Singapore*

   - as Teaching Assistant
  - ME1102 - Engineering Principles and Practice I
  - ME2112 - Strength of Materials
  - ME2115 - Mechanics of Machines: Vibration Lab
  - Student supervision - Paper, software and coding supervision for Ph.D./Master/undergraduate students

2022-2023 in Mechanical Engineering, Northwestern University, USA

   - as Postdoc
  - Software (ABAQUS/Fluent) and coding (Fortran, pyhton) supervision assistance for Ph.D. students

AWARDS & SCHOLARSHIP

PUBLICATIONS SELECTED

- **Fan Chen**, & Yan, W. (2020). High-fidelity modelling of thermal stress for additive manufacturing by linking thermal-fluid and mechanical models. *Materials & Design*, *196*, 109185. https://doi.org/10.1016/j.matdes.2020.109185 (IF: 7.9)

- **Fan Chen**, Yang, M., & Yan, W. (2022). Data-driven prognostic model for temperature field in additive manufacturing based on the high-fidelity thermal-fluid flow simulation. *Computer Methods in Applied Mechanics and Engineering*, *392*, 114652. https://doi.org/10.1016/j.cma.2022.114652 (IF: 7.3)

- **Ziyuan Xie & Fan Chen (co-first author)**, L., Ge, W., & Yan, W. (2024). Data-driven prediction of keyhole features in metal additive manufacturing based on physics-based simulation. *Journal of Intelligent Manufacturing*, *35*(5), 2313-2326. https://doi.org/10.1007/s10845-023-02157-6 (IF: 7.3)

- **Fan Chen**, Kozjek, D., Porter, C., & Cao, J. (2025). Acceleration of powder-bed-size thermal simulation considering scanning-path-scale through a pseudo-layer-wise equivalent heat flux model. *Journal of Manufacturing Processes*, *134*, 394-409. https://doi.org/10.1016/j.jmapro.2024.12.057(IF: 6.8)

- **Fan Chen,** Rujing, Z., Jihoon, J., Liao, S., Cao, J. (2025) Directed energy deposition on sheet metal forming for reinforcement structures. *Journal of Manufacturing Processes* 144, 339-349. ---- won the North American Manufacturing Research Conference (NAMRC) 53 Outstanding Paper Award in Manufacturing Processes https://doi.org/10.1016/j.jmapro.2025.03.120 (IF: 6.8)

- Li, Z., Cui, Y., Yan, W., Zhang, D., Fang, Y., Chen, Y., Qian, Y., Ge, W., Heng. O., **Fan Chen,** … & Wang, Y. M. (2021). Enhanced strengthening and hardening via self-stabilized dislocation network in additively manufactured metals. *Materials Today*, *50*, 79-88. https://doi.org/10.1016/j.mattod.2021.06.002 (IF: 22)

- Li, G., Yang, S., Wu, W., **Fan Chen**, Li, X., Tian, Q., ... & Ren, L. (2023). Biomimetic 4D printing catapult: from biological prototype to practical implementation. *Advanced Functional Materials*, *33*(32), 2301286. https://doi.org/10.1002/adfm.202301286 (IF: 19)

- Deng, Q., **Fan Chen,** Wang, L., Liu, Z., Wu, Q., Chang, Z., ... & Ding, W. (2025). Exceptional strength paired with increased cold cracking susceptibility in laser powder bed fusion of a Mg-RE alloy. *Journal of Materials Science & Technology*, *213*, 300-314. https://doi.org/10.1016/j.jmst.2024.07.005 (IF: 14.3)

- Derick, S., **Fan Chen**, Kang, P., Forbes, B., Gao, M., Ineza, O., ... & Cao, J. (2024). On the feasibility of an integrated English wheel system. *Journal of Manufacturing Systems*, *74*, 665-675. https://doi.org/10.1016/j.jmsy.2024.04.022 (IF: 14.2)

- Wu,W., Zhou, Y., Liu, Q., Ren, L., **Fan Chen,** Fuh, J. Y. H., ... & Li, G. (2023). Metallic 4D printing of laser stimulation. *Advanced Science*, *10*(12), 2206486. ---- selected as the Cover Page on Journal "*Advanced Science* 12/2023." https://doi.org/10.1002/advs.202206486 (IF: 14.1)

- Giam, A., **Fan Chen**, Cai, J., & Yan, W. (2023). Factorial design analytics on effects of material parameter uncertainties in multiphysics modeling of additive manufacturing. *npj Computational Materials*, *9*(1), 51. https://doi.org/10.1038/s41524-023-01004-9 (IF: 11.9)

- Chen, H., Wei, Q., Zhang, Y., **Fan Chen,** Shi, Y., & Yan, W. (2019). Powder-spreading mechanisms in powder-bed-based additive manufacturing: Experiments and computational modeling. *Acta Materialia*, *179*, 158-171. https://doi.org/10.1016/j.actamat.2019.08.030 (IF: 9.3)

- Wang, G., Ouyang, H., **Fan Chen,** Guo, Q., Li, Z., Yan, W., & Li, Z. (2020). The origin of high-density dislocations in additively manufactured metals. *Materials Research Letters*, *8*(8), 283-290. ---- won Materials Research Letters (MRL) 2022 Impact Award https://doi.org/10.1080/21663831.2020.1751739 (IF: 8.3)

- Grilli, N., Hu, D., Yushu, D., **Fan Chen,** & Yan, W. (2022). Crystal plasticity model of residual stress in additive manufacturing using the element elimination and reactivation method. *Computational Mechanics*, 1-21. https://doi.org/10.1007/s00466-021-02116-z (IF: 3.8)

- Bryndza, G., Tchuindjang, J. T., **Fan Chen**, Habraken, A. M., Sepúlveda, H., Tuninetti, V., ... & Duchêne, L. (2025). Review of the Microstructural Impact on Creep Mechanisms and Performance for Laser Powder Bed Fusion Inconel 718. *Materials*, *18*(2), 276. https://doi.org/10.3390/ma18020276 (IF: 3.2)

- Bouffioux, C., Papeleux, L., Calvat, M., Tran, H. S., **Fan Chen**, Ponthot, J. P., ... & Habraken, A. M. (2024). Efficient Representative Volume Element of a Matrix–Precipitate Microstructure—Application on AlSi10Mg Alloy. *Metals*, *14*(11), 1244. https://doi.org/10.3390/met14111244 (IF: 2.5)

- Jun, Z. H. A. N. G., Tianyun, L. I., Xiang, Z. H. U., Wenjie, G. U. O., & **Fan Chen**. (2018). Analysis of free vibration characteristics of thin rectangular plate with typically-shaped central opening. *Chinese Journal of Ship Research*, *13*(2), 76-83. https://www.ship-research.com/article/doi/10.3969/j.issn.1673-3185.2018.02.010 (IF: 0.89)

CONFERENCE PRESENTATIONS

- (August 27, 2017. Hong Kong, China) *43rd International Congress on Noise Control Engineering*, Free vibration characteristics analysis of rectangular plate with central opening used in arbitrary boundary conditions.
- (August 1, 2021. Texas, USA.) *International Solid Freeform Fabrication Symposium,* High-fidelity Modelling of Thermal

Stress for Additive Manufacturing by Linking Thermal-fluid and Mechanical Models.

- (September 26, 2021. California, USA.) *Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology,* Data-driven prognostic model for temperature field in additive manufacturing based on the high-fidelity thermal-fluid flow simulation.
- (July 23-27, 2023. New Mexico, USA.) *17th U.S. National Congress on Computational Mechanics,* Enhanced Large-Scale Modeling of Additive Manufacturing: Layer-Wise Equivalent Heat Flux Attribution for Thermal Interaction Analysis Across Multiple Fabrications.

PATENTS & DISCLOSOURS

A Novel Inherent Strain Modelling Tool to Predict Thermal Stress and Distortion in Additive Manufacturing. ILO Ref: 2020-156. Yan Wentao, **Fan Chen.**

PROFESSIONAL SKILLS

- Chinese, English, French (A2 level)
- Software: ABAQUS (User subroutines), COMSOL Multiphysics, FLOW 3D
- Programming languages: FORTRAN, Python, MATLAB

ONLINE PORTFOLIOS

ResearchGate: https://www.researchgate.net/profile/Fan-Chen-51

LinkedIn: https://www.linkedin.com/in/fan-chen-75956b23b/

Google Scholar: https://scholar.google.com/citations?hl=en&user=NSwBSDUAAAAJ

ORCiD: https://orcid.org/0000-0003-2823-6667

Fan's Homepage: https://fanchennus.github.io/