

Curriculum Vitae – Cheng Lu

NAME: Cheng Lu
ORGANIZATION: School of Mechanical, Materials,
Mechatronic and Biomedical Engineering,
University of Wollongong
POSITION: Professor



QUALIFICATIONS

- B. E. (July 1993), Northeastern University, China
- Ph.D. (March 1999), Northeastern University, China

EMPLOYMENT HISTORY

- 2018- : Professor, School of Mechanical, Materials, Mechatronic and Biomedical Engineering, University of Wollongong
- 2013- 2017: Associate Professor, School of Mechanical, Materials, Mechatronic and Biomedical Engineering, University of Wollongong
- 2009-2012: Lecturer/Senior Lecturer, School of Mechanical, Materials and Mechatronic Engineering, University of Wollongong
- 2002-2009: Research Fellow/Senior Research Fellow, School of Mechanical, Materials and Mechatronic Engineering, University of Wollongong
- 2000-2002: Visiting Fellow, School of Mechanical, Materials and Mechatronic Engineering, University of Wollongong
- 1998-2000: Lecturer, Northeastern University, China
- 1997-1998: Associate Lecturer, Northeastern University, China

RESEARCH AREAS

- Fracture control and failure analysis
- Natural gas and CO₂ pipelines
- Rolling technology
- Computational material science (crystal plasticity FEM and molecular dynamic).
- Fabrication of ultrafine grained materials.

ACADEMIC OUTPUTS

- Since 2000 I have been awarded 55 grants with more than \$10 million research funding including \$6.5 million as the first chief investigator (CI) or research team leader.
- Published 2 book chapters, 215 refereed journal papers and 60 conference papers.
- H-index:24
- First-named inventor of an international patent.
- National program leader of Program 3 of Energy Pipeline Cooperative Centre (EPCRC). EPCRC has four technical research programs.

- Group leader, pipeline research group at the University of Wollongong.
- Won a runner-up prize out of 361 papers in the 2012 International Pipeline Conference

REFEREED JOURNAL ARTICLES PUBLISHED IN LAST FIVE YEARS

1. C. Zhang, **C. Lu**, L. Pei, J. Li, R. Wang, K. Tieu, The negative Poisson's ratio and strengthening mechanism of nanolayered graphene/Cu composites, *Carbon*, 143 (2019) 125-137.
2. L. Zhang, Y. Shibuta, X. Huang, **C. Lu**, M. Liu, Grain boundary induced deformation mechanisms in nanocrystalline Al by molecular dynamics simulation: From interatomic potential perspective, *Computational Materials Science*, 156 (2019) 421-433.
3. R. Wang, M. Wang, Z. Li, **C. Lu**, Physics-based Constitutive Model for the Hot Deformation of 2Cr11Mo1VNbN Martensitic Stainless Steel, *Journal of Materials Engineering and Performance*, 27 (2018) 4932-4940.
4. P. He, R. Hong, H. Wang, X. Ji, **C. Lu**, Calculation analysis of yaw bearings with a hardened raceway, *International Journal of Mechanical Sciences*, 144 (2018) 540-552.
5. P. He, R. Hong, H. Wang, X. Ji, **C. Lu**, Calculation analysis of yaw bearings with a hardened raceway, *International Journal of Mechanical Sciences*, 144 (2018) 540-552.
6. Q. Gao, **C. Lu**, H. Li, J. Li, J. Han, L. Chen, Anisotropy and microstructural evolutions of X70 pipeline steel during tensile deformation, *Journal of Materials Research*, (2018) 1-9.
7. P. He, R. Hong, H. Wang, **C. Lu**, Fatigue life analysis of slewing bearings in wind turbines, *International Journal of Fatigue*, 111 (2018) 233-242.
8. P. He, R. Hong, H. Wang, **C. Lu**, Pitch bearing/raceway fretting: Influence of contact angle, *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*, (2018).
9. P. He, R. Liu, R. Hong, H. Wang, G. Yang, **C. Lu**, Hardened raceway calculation analysis of a three-row roller slewing bearing, *International Journal of Mechanical Sciences*, 137 (2018) 133-144.
10. B. Liu, X. Liu, **C. Lu**, A. Godbole, G. Michal, A.K. Tieu, A CFD decompression model for CO₂ mixture and the influence of non-equilibrium phase transition, *Applied Energy*, 227 (2018) 516-524.
11. H. Wang, **C. Lu**, A.K. Tieu, L. Su, G. Deng, Coupled effects of initial orientation scatter and grain-interaction to texture evolution: a crystal plasticity FE study, *International Journal of Material Forming*, (2018) 1-11.
12. H. Wang, L. Su, H. Yu, **C. Lu**, A.K. Tieu, Y. Liu, J. Zhang, A new finite element model for multi-cycle accumulative roll-bonding process and experiment verification, *Materials Science and Engineering A*, 726 (2018) 93-101.
13. H. Yu, Q. Du, A. Godbole, **C. Lu**, C. Kong, Improvement in Strength and Ductility of Asymmetric-Cryorolled Copper Sheets Under Low-Temperature Annealing,

Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science, 49 (2018) 4398-4403.

14. L. Zhang, **C. Lu**, Y. Shibuta, Shear response of grain boundaries with metastable structures by molecular dynamics simulations, *Modelling and Simulation in Materials Science and Engineering*, 26 (2018).
15. L. Zhang, **C. Lu**, A.K. Tieu, Nonlinear elastic response of single crystal Cu under uniaxial loading by molecular dynamics study, *Materials Letters*, 227 (2018) 236-239.
16. L. Zhang, Y. Shibuta, **C. Lu**, X. Huang, Atomistic Simulation of the Interaction Between Point Defects and Twin Boundary, *Physica Status Solidi (B) Basic Research*, 255 (2018).
17. X. Zhao, **C. Lu**, A. K. Tieu, L. Zhan, L. Pei, M. Huang, Deformation mechanisms and slip-twin interactions in nanotwinned body-centered cubic iron by molecular dynamics simulations, *Computational Materials Science*, 147(2018), 34-48.
18. H. Yu, **C. Lu**, A. K. Tieu, H. Li, A. Godbole, C. Kong, Nanoporous Al sandwich foils using size effect of Al layer thickness during Cu/Al/Cu laminate rolling, *Philosophical Magazine*, accepted in Jan 2018
19. L. Zhang, **C. Lu**, K. Tieu, Y. Shibuta, Dynamic interaction between grain boundary and stacking fault tetrahedron, *Scripta Materialia*, 144(2018), 78-83
20. X. Zhao, C. Lu, A. K. Tieu, L. Zhan, M. Huang, L. Su, L. Pei, L. Zhang, Deformation twinning and dislocation processes in nanotwinned copper by molecular dynamics simulations, *Computational Materials Science*, 142(2018), 59-71.
21. H. Yu, M. Yan, J. Li, A. Godbole, **C. Lu**, K. Tieu, H. Li, C. Kong, Mechanical properties and microstructure of a Ti-6Al-4V alloy subjected to cold rolling, asymmetric rolling and asymmetric cryorolling, *Materials Science and Engineering A*, 710(2018), 10-16,
22. L. Pei, **C. Lu**, Q. Tang, K. Tieu, X. Zhao, L. Zhang, A dual fracture transition mechanism in nanotwinned Ni, *Materials Letters*, 210(2018), 243-247.
23. P. Wei, **C. Lu**, H. Liu, L. Su, G. Deng, K. Tieu, Study of Anisotropic Plastic Behavior in High Pressure Torsion of Aluminum Single Crystal by Crystal Plasticity Finite Element Method, *Crystals*, 7(2017), Article number 362
24. X. Liu, A. Godbole, **C. Lu**, G. Michal, Investigation of terrain effects on the consequence distance of CO₂ released from high-pressure pipelines, *International Journal of Greenhouse Gas Control*, 66(2017), 264-275
25. H. Yu, **C. Lu**, K. Tieu, H. Li, A. Godbole, X. Liu, C. Kong, Enhanced materials performance of Al/Ti/Al laminate sheets subjected to cryogenic roll bonding, *Journal of Materials Research*, 32(2017), 3761-3768
26. M. Liu, J. Y. Lin, **C. Lu**, K. A. Tieu, K. Zhou, T. Koseki, Progress in indentation study of materials via both experimental and numerical methods, *Crystals*, 7(2017), Article number 258
27. B. Liu, X. Liu, **C. Lu**, A. Godbole, G. Michal, A. K. Tieu, Decompression Modelling of Pipelines Carrying CO₂-N₂ Mixture and the Influence of Non-equilibrium Phase Transition, *Energy Procedia*, 105(2017), 4204-4209
28. X. Zhao, **C. Lu**, A.K. Tieu, L. Pei, L. Zhang, L. Su, L. Zhan, Deformation mechanisms

in nanotwinned copper by molecular dynamics simulation, *Materials Science and Engineering A*, 687 (2017) 343-351.

29. L. Zhang, **C. Lu**, K. Tieu, L. Su, X. Zhao, L. Pei, Stacking fault tetrahedron induced plasticity in copper single crystal, *Materials Science and Engineering A*, 680 (2017) 27-38.
30. L. Zhang, **C. Lu**, G. Michal, K. Tieu, X. Zhao, G. Deng, Influence of temperature and local structure on the shear-coupled grain boundary migration, *Physica Status Solidi (B) Basic Research*, 254 (2017).
31. L. Zhang, **C. Lu**, G. Michal, G. Deng, K. Tieu, The formation and destruction of stacking fault tetrahedron in fcc metals: A molecular dynamics study, *Scripta Materialia*, 136 (2017) 78-82.
32. P. Wei, **C. Lu**, K. Tieu, L. Su, G. Deng, W. Huang, A study on the texture evolution mechanism of nickel single crystal deformed by high pressure torsion, *Materials Science and Engineering A*, 684 (2017) 239-248.
33. X. Liu, **C. Lu**, S. Liang, A. Godbole, Y. Chen, Vibration-induced aerodynamic loads on large horizontal axis wind turbine blades, *Applied Energy*, 185 (2017) 1109-1119.
34. B. Liu, X. Liu, **C. Lu**, A. Godbole, G. Michal, A.K. Tieu, Multi-phase decompression modeling of CO₂ pipelines, *Greenhouse Gases: Science and Technology*, (2017).
35. J. Han, **C. Lu**, B. Wu, J. Li, H. Li, Y. Lu, Q. Gao, Innovative analysis of Luders band behaviour in X80 pipeline steel, *Materials Science and Engineering A*, 683 (2017) 123-128.
36. G.Y. Deng, Q. Zhu, K. Tieu, H.T. Zhu, M. Reid, A.A. Saleh, L.H. Su, T.D. Ta, J. Zhang, **C. Lu**, Q. Wu, D.L. Sun, Evolution of microstructure, temperature and stress in a high speed steel work roll during hot rolling: Experiment and modelling, *Journal of Materials Processing Technology*, 240 (2017) 200-208.
37. X. Zhao, **C. Lu**, A.K. Tieu, L. Pei, L. Zhang, K. Cheng, M. Huang, Strengthening mechanisms and dislocation processes in <111> textured nanotwinned copper, *Materials Science and Engineering A*, 676 (2016) 474-486.
38. H.L. Yu, H. Wang, **C. Lu**, K. Tieu, H.J. Li, A. Godbole, X. Liu, C. Kong, X. Zhao. Microstructure evolution of accumulative roll bonding processed pure aluminium during cryorolling. *Journal of Materials Research*, 31(2016),
39. B. Liu, X. Liu, **C. Lu**, A. Godbole, G. Michal and A. K. Tieu, Computational fluid dynamics simulation of carbon dioxide dispersion in a complex environment, *Journal of Loss Prevention in the Process Industries*, 2016, 40: 419-432
40. L. Zhang, **C. Lu**, J. Zhang, K. Tieu. A dual deformation mechanism of grain boundary at different stress stages. *Materials Letters*, 2016, 167: 278-283.
41. L. Zhang, **C. Lu**, K. Tieu, G. Michal, J. Zhang, G. Deng, Tension/compression asymmetry of grain boundaries with non-planar structure, *Materials Research Express*, 3 (2016).
42. L. Zhang, **C. Lu**, K. Tieu, A review on atomistic simulation of grain boundary behaviors in face-centered cubic metals, *Computational Materials Science*, 118 (2016) 180-191.
43. Z. Zhu, J. Han, H.J. Li, **C. Lu**. High temperature processed high Nb X80 steel with excellent heat-affected zone toughness. *Materials Letters*, 2016, 163: 171-174.
44. H.L. Yu, **C. Lu**, A.K. Tieu, H.J. Li, A. Godbole, S.H. Zhang, Special rolling techniques for improvement of mechanical properties of ultrafine-grained metal sheets: A review, *Advanced Engineering Materials*, 18 (2016) 754-769.

45. H. Yu, M. Yan, **C. Lu**, A.K. Tieu, H. Li, Q. Zhu, A. Godbole, J. Li, L. Su, C. Kong, Superstrength of nanograined steel with nanoscale intermetallic precipitates transformed from shock-compressed martensitic steel, *Scientific Reports*, 6 (2016).
46. H. Yu, L. Su, **C. Lu**, K. Tieu, H. Li, J. Li, A. Godbole, C. Kong, Enhanced mechanical properties of ARB-processed aluminum alloy 6061 sheets by subsequent asymmetric cryorolling and ageing, *Materials Science and Engineering A*, 674 (2016) 256-261.
47. H. Yu, **C. Lu**, A.K. Tieu, H. Li, A. Godbole, C. Kong, X. Zhao, Simultaneous Grain Growth and Grain Refinement in Bulk Ultrafine-Grained Copper under Tensile Deformation at Room Temperature, *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 47 (2016) 3785-3789.
48. H. Yu, **C. Lu**, A.K. Tieu, H. Li, A. Godbole, C. Kong, Annealing effect on microstructure and mechanical properties of Al/Ti/Al laminate sheets, *Materials Science and Engineering A*, 660 (2016) 195-204.
49. L. Su, H. Li, **C. Lu**, J. Li, L. Fletcher, I. Simpson, F. Barbaro, L. Zheng, M. Bai, J. Shen, X. Qu, Transverse and z-Direction CVN Impact Tests of X65 Line Pipe Steels of Two Centerline Segregation Ratings, *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*, 47 (2016) 3919-3932.
50. K. Cheng, L. Zhang, **C. Lu**, K. Tieu, Coupled grain boundary motion in aluminium: The effect of structural multiplicity, *Scientific Reports*, 6 (2016).
51. J.T. Li, G.M. Xu, H.L. Yu, G. Chen, H.J. Li, **C. Lu**, J.Y. Guo. Improvement of AA5052 sheet properties by electromagnetic twin-roll casting. *International Journal of Advanced Manufacturing Technology*, 2015, DOI: 10.1007/s00170-015-7963-8.
52. X. Liu, A. Godbole, **C. Lu**, G. Michal, P. Venton, Optimisation of dispersion parameters of Gaussian plume model for CO₂ dispersion, *Environmental Science and Pollution Research*, 2015, 22: 18288-18299.
53. M. Liu, **C. Lu**, K. Tieu, C. T. Peng, C. Kong, A combined experimental-numerical approach for determining mechanical properties of aluminum subjects to nanoindentation, *Scientific Reports*, 2015: 5: 15072
54. X. Liu, A. Godbole, **C. Lu**, G. Michal, P. Venton, Study of the consequences of CO₂ released from high-pressure pipelines, *Atmospheric Environment*, 2015, 116: 51-64
55. M. Liu, **C. Lu**, K. Tieu, K. Zhou, Crystal plasticity FEM study of nanoindentation behaviors of Cu bicrystals and Cu-Al bicrystals, *Journal of Materials Research* 2015, 30 (16): 2485-2499
56. T. Chuluunbat, **C. Lu**, A. Kostryzhev and K. Tieu. Investigation of X70 line pipe steel fracture during single edge-notched tensile testing using acoustic emission monitoring, *Materials Science & Engineering A*, 2015, 640:471-479
57. L.Q. Pei, **C. Lu**, K. Tieu, X. Zhao, L. Zhang and K. Y. Cheng, Ductile-to-brittle fracture transition in polycrystalline nickel under tensile hydrostatic stress, *Computational Materials Science*, 2015, 109: 147-156
58. H. Yu, A.K. Tieu, **C. Lu**, X. Liu, M. Liu, A. Godbole, C. Kong, Q. Qin, A new insight into ductile fracture of ultrafine-grained Al-Mg alloys. *Scientific Reports*, 2015, 5: 9568 (9 pages)
59. L. Pei, **C. Lu**, K. Tieu, X. Zhao, L. Zhang, K. Cheng, G. Michal, Brittle versus ductile fracture behaviour in nanotwinned FCC crystals. *Materials Letters*, 2015, 152: 65-67. (Corresponding author, IF=2.489)
60. M. Liu, **C. Lu**, A.K. Tieu, Crystal plasticity finite element method modelling of

indentation size effect. *International Journal of Solids and Structures* 2015, 54:42-49.

61. L. Zhang, **C. Lu**, K. Tieu, X. Zhao, L. Pei, The shear response of copper bicrystals with $\Sigma 11$ symmetric and asymmetric tilt grain boundaries by molecular dynamics simulation. *Nanoscale* 2015, 7(16):7224-7233.
62. Y. Sun, **C. Lu**, H. Yu, A.K. Tieu, L. Su, Y. Zhao, H. Zhu, C. Kong. Nanomechanical properties of TiCN and TiCN/Ti coatings on Ti prepared by filtered arc deposition. *Materials Science and Engineering A*. 2015, 625:56-64
63. L. Pei L, **C. Lu**, X. Zhao, L. Zhang, K. Cheng, G. Michal, T. Tieu. Brittle versus ductile behaviour of nanotwinned copper: A molecular dynamics study. *Acta Materialia*. 2015, 89:1-13
64. A. Elshahomi, **C. Lu**, G. Michal, X. Liu, A. Godbole, P. Venton, Decompression wave speed in CO₂ mixtures: CFD modelling with the GERG-2008 equation of state. *Applied Energy*. 2015, 140:20-32
65. L. Zhang, **C. Lu**, K. Tieu. Atomistic simulation of tensile deformation behavior of $\sigma 5$ tilt grain boundaries in copper bicrystal. *Scientific Reports*. 2014, 4:5919 (9 pages)
66. L. Zhang, **C. Lu**, A.K. Tieu. Fatigue analysis of a motorcycle frame system based on a road test and the finite element method. *Materials Science Forum*. 2014, 773-774:842-850
67. H.L. Yu, **C. Lu**, A.K. Tieu, C. Kong, Fabrication of nanostructured aluminum sheets using four-layer accumulative roll bonding. *Materials and Manufacturing Processes*. 2014, 29:448-453
68. H.L. Yu, A.K. Tieu, **C. Lu**, Y. Lou, X. Liu, A. Godbole, C. Kong. Tensile fracture of ultrafine grained aluminum 6061 sheets by asymmetric cryorolling for microforming. *International Journal of Damage Mechanics*. 2014, 23:1077-1095
69. H. Yu, K. Tieu, S. Hadi, **C. Lu**, A. Godbole, Kong C. High strength and ductility of ultrathin laminate foils using accumulative roll bonding and asymmetric rolling. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*. 2014, 46:869-879
70. H.L. Yu, A.K. Tieu, **C. Lu**, X. Liu, A. Godbole, H. Li, C. Kong, Q. Qin. A deformation mechanism of hard metal surrounded by soft metal during roll forming. *Scientific Reports*. 2014, 4:5017 (8 pages)
71. H. Yu, A.K. Tieu, **C. Lu**, C. Kong. Abnormally high residual dislocation density in pure aluminum after al/ti/al laminate annealing for seven days. *Philosophical Magazine Letters*. 2014, 94:732-740
72. H. Yu, A.K. Tieu, **C. Lu**, A. Godbole, An investigation of interface bonding of bimetallic foils by combined accumulative roll bonding and asymmetric rolling techniques. *Metallurgical and Materials Transactions A: Physical Metallurgy and Materials Science*. 2014, 45:4038-4045
73. H. Yu, A.K. Tieu, **C. Lu**, A. Godbole. Investigation of closure of internal cracks during rolling by FE model considering crack surface roughness. *International Journal of Advanced Manufacturing Technology*. 2014, 75:1633-1640
74. Y. Sun, A.K. Tieu, **C. Lu**, H. Yu, Y. Zhao, H. Zhu, C. Kong, K.Y. Xie. The mechanical behaviour of TiN and multi-layered coating of TiN/Ti on Ti6Al4V substrate during nano-indentation. *International Journal of Surface Science and Engineering*. 2014, 8:95-108
75. Y. Sun, **C. Lu**, H. Y. Yu, A.K. Tieu, Q. Zhu, Y. Zhao, H.T. Zhu. Deformation behavior and wear resistance of hard tcn and TiCN/Ti coatings on Ti6Al4V alloy. *Advanced*

Materials Research. 2014, 939:451-458

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80. G. Michal, **C. Lu**, A. Kiet Tieu. Multiscale model of elastic nanocontacts. *Computational Materials Science*. 2014, 81:98-103
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- accumulative roll bonding. *Metallurgical and Materials Transactions B: Process Metallurgy and Materials Processing Science*. 2014, 45:404-408
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