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**Acronyms used in this document**

AAAS – American Association for the Advancement of Science (<http://www.aaas.org/>)

ASM – American Society of Metals, international (<http://www.asminternational.org/>)

ASME – American Society of Mechanical Engineers

ARO – Army research office

BES – Basic Energy Science

CINT – Center for Integrated Nanotechnologies (<http://cint.lanl.gov/>)

DMR- Division of Materials Research

DoE – Department of Energy

DURIP – Defense University Research Instrumentation Program

FCC – face centered cubic

MEEN – Mechanical Engineering

MRS – Materials Research Society (<http://www.mrs.org/home/>)

MSEN – Materials science and engineering

MS&T – Materials Science and Technology Conference (This is the fall meeting hosted annually by TMS)

NIRT- Nanoscale interdisciplinary research team

NSF – National Science Foundation

TMS – The Minerals, Metals, and Materials Society (<http://www.tms.org/TMSHome.aspx>)

## Section A: General information

### EDUCATION

Ph.D. Materials Science & Engineering, North Carolina State University, Raleigh, North Carolina, 2001.

M. S. Materials Science & Engineering, Institute of Metal Research, Shenyang, China, 1998

B. S. Materials Science & Engineering, Jilin University, Changchun, China, 1995

### EXPERIENCE

Aug. 2016 - present **Professor, School of Materials Engineering, Purdue University**

Sep. 2015-July 2016 **Professor, Dept. of Mechanical Engineering, Texas A&M**

**2011 – Aug. 2015 Associate professor, Dept. of Mechanical Engineering, Texas A&M**

**2005 – 2010 Assistant professor, Dept. of Mechanical Engineering, Texas A&M**

**2002 - 2004 Los Alamos National Laboratory**

Director funded postdoctoral fellow. Work with Michael Nastasi, Harriet Kung (now at DOE-BES), Amit Misra, Terry Mitchell, John D. Embury, John P. Hirth and Richard G. Hoagland.

**1998-2001 North Carolina State University**

Research Assistant. Thesis advisor: Prof. Carl C. Koch

Ph.D. Thesis committees: Carl Koch, Jagdish Narayan, Ronald Scattergood and Robert Kobas

Thesis title: Synthesis and Characterization of Nanocrystalline Zn.

**June 2001 Oxford University (UK)**

Visiting scholar

Study the microstructure of Al, Zn, Cu and their alloys and by three dimensional atomic probe (3DAP) and field ion microscopy at the Dept. of Materials in collaboration with Dr. Alfred Cerezo.

**1995-1998 Institute of Metal Research, Chinese Academy of Sciences**

Research Assistant. Thesis advisor: Prof. K. Lu (Director of the Institute of Metal Research, Chinese Academy of Sciences).

Thesis title: Characterization of amorphous Al-Y-Ni amorphous ribbons.

### HONORS

- TMS Brimacombe medalist award, 2018
- Gulf Oil/Thomas A. Dietz Career Development Professor, TAMU (2014-2015)
- College of Engineering Holleran-Bowman Faculty Fellow award, TAMU, 2014
- TEES (Texas Engineering Experiment Station) fellow award, 2013.

- Honorary professor, School of Materials Science, Hefei University of Technology (2010)
- Outstanding graduate teaching award, Mechanical Engineering Department, Texas A&M University, 2009.
- NSF Early Career Award, Division of Materials Research, Metals program (07-12)
- Morris Foster Faculty Fellow award, (2008-2009)
- TMS Young Leader of Electronic, Magnetic, Photonic Materials Division (2003).
- Director Funded Postdoctoral Fellowship, Los Alamos National Laboratory (2002 – 2004).
- ASM International Graduate Student Paper Contest Award, 2002.

### **RESEARCH EXPERTISE**

- Deformation physics of nanotwinned metals and metallic multilayers
- Radiation tolerant nanostructured metallic materials
- Hydrogen storage in Mg based nanocomposites
- Magnetic shape memory alloy thin films
- *In situ* nanoindentation of nanostructured metallic materials
- *In situ* radiation of nanostructured metallic materials
- Thin film stress and strain
- Microstructure analysis by high-resolution transmission electron microscopy (HRTEM)
- Synthesis of thin films by magnetron sputtering technique
- Fabrication of bulk nanostructured materials by severe plastic deformation

## Section B: Teaching and supervision of students

### B2. Supervision of students

**Currently supervising a total of 10 Ph.D. students.**

**Doctorate:**

Name	Degree (Ph.D., M.S.)	Expected Graduation Date	Thesis/Dissertation Title
Qiang Li	Ph.D.	12/2018	Nanotwins in metal films
Ruizhe Su	Ph.D.	12/2021	Mechanical properties of Co
Jie Ding	Ph.D.	12/2019	Corrosion resistance of Ni alloys
Cuncai Fan	Ph.D.	12/2019	Radiation damage in nanometals
Zhongxia Shang	Ph.D.	12/2020	Radiation damage in steels
Yifan Zhang	Ph.D.	12/2020	Nanotwinned Al
Jaehun Cho	Ph.D.	12/2020	Mechanical behavior of ceramics
Tongjun Niu	Ph.D.	12/2022	Radiation damage in nanometals

**14 Ph.D. students have graduated (from Texas A&M University)**

Name	Degree (Ph.D., M.S.)	Graduation Date	Current position
Zhe Fan	Ph.D.	8/2017	Metallic glasses
Jin Li	Ph.D.	8/2017	Radiation damage in metal films
Sichuang Xue	Ph.D.	8/2017	Nanotwins in metal films
Youxing Chen	Ph.D.	05/2015	Postdoc at Los Alamos National Lab
Steven Rios	Ph.D.	08/2015	Project manager, Gas and Oil Company
Yue Liu	Ph.D.	12/2014	Associate professor, Shanghai Jiaotong University, China
Daniel Bufford	Ph.D.	12/2014	Technical Staff Member at Sandia National Lab
Byoungsoo Ham	Ph.D.	08/2014	Intel, Process engineer
Miao Song	Ph.D.	07/2014	Postdoc at Univ. of Michigan

Cheng Sun	Ph.D.	06/2013	Staff scientist at Idaho National Lab
Kaiyuan Yu	Ph.D.	06/2013	Associate Professor, China Petroleum University, Beijing, China
Nan Li	Ph.D.	09/2011	Staff scientist at Los Alamos National Lab
Osman Anderoglu	Ph.D.	09/2010	Assistant professor, University of New Mexico
Engang Fu	Ph.D.	09/2010	Associate professor, Peking University, China

### Graduate student award of former/current students

1. Engang Fu, won the fellowship in American Vacuum Society, fall meeting, 2009.
2. Engang Fu, won the best graduate student paper contest, First prize, TMS, 2010. (The first prize is given to only one graduate student nationwide).
3. Engang Fu, won the MRS best poster award, 2008, MRS fall meeting, Boston, MA.
4. Nan Li, won the best graduate student paper contest, First prize, TMS, 2009. (The first prize is given to only one graduate student nationwide).
5. Osman Anderoglu, TMS best poster award, TMS annual meeting, San Francisco, CA, 2009.
6. Cheng Sun, the best graduate student paper contest, First prize, TMS, 2012.
7. Kaiyuan Yu, the best graduate student paper contest, First prize, TMS, 2013.
8. Engang Fu, 'highly commended' for the 2013 Young Writers Prize for his article "Fluence-dependent radiation damage in helium (He) ion-irradiated Cu/V multilayers" published in Philosophical Magazine, 2013.
9. Youxing Chen, Silver poster award, MRS, Dec. 2013, Boston, MA.
10. Youxing Chen, Distinguished graduate student award, Association of Former Student, Texas A&M University, \$500 cash award, 2015
11. Yue Liu, Graduate student thesis award, Texas A&M University, 2014.
12. Jin Li, MRS Graduate student award, Silver medal, Dec. 2016
13. Sichuang Xue, TMS best poster award, San Diego, CA, 2017
14. Jin Li, AVS graduate student contest award, fall, 2017

## **Section C: Service to technical society, community and Purdue community**

### **PROFESSIONAL ACTIVITIES AND AFFILIATIONS**

#### **External committee services**

1. Scientific advisory committee-Argonne National Lab-IVEM (In situ radiation facility) facility.
2. Chair for the Chemistry and Physics of Materials, at TMS (2008-2011)
3. DoE-Ames Lab external project review committee, 2014-2015.
4. TMS committee members: Nanomaterials;  
Mechanical Behavior of Materials (joint committee between ASM and TMS);  
Nanomechanical Behavior of Materials;  
Thin Films and Interface
5. JOM advisor (2015-2018)
6. JOM advisor (2008-2011)

#### **Purdue committee**

1. Mater Science Department-Graduate Admission Committee
2. Materials Science Department-Undergrad Curriculum Committee
3. Faculty Senate Committee – to be assigned

#### **Lead symposium organizer**

- 2017 TMS annual meeting, San Diego, CA, symposium lead organizer, “Mechanical behavior of nanostructured materials”,
- 2015 Society of Engineering Science, symposium lead organizer, “Mechanical behavior of nanostructured materials”, October 26-29, 2015, College Station, TX.
- 2013 MRS fall meeting, symposium lead organizer, “Nanostructured materials under extreme environment”, Dec. 2013; Boston, MA.
- 2010 MRS fall meeting, symposium lead organizer, “Nanostructured materials under extreme environment”, Nov. 2010; Boston, MA.
- 2009 TMS Annual meeting symposium lead organizer, “Mechanical Behavior of Nanostructured Materials”, February 15-19, 2009; San Francisco, California
- 2007 TMS Annual meeting symposium lead organizer, “Mechanical Behavior of Nanostructured Materials, in honor of Carl Koch”, February 25-March 1, Orlando, FL.
- 2005 TMS Annual meeting symposium lead organizer “Mechanical Behavior of Thin Films and Small Structures”, San Francisco, CA, February 14-17, 2005.
- Member of TMS, MRS, ASM-International, AAAS, Acers, ASME

#### **JOURNAL Editorial Services and Reviewer**

- Principal guest editor of a special issue of Metall. Trans. A, “Mechanical Behavior of Nanostructured materials”, to be published in 2017,
- Guest editor for MRS Bulletin, 2016, April issue on twinning
- Principal guest editor of a special issue of Metall. Trans. A, “Mechanical Behavior of Nanostructured materials”, published in 2010,
- Principal guest editor of a special issue of Materials Science and Engineering, A, “Mechanical Behavior of Nanostructured materials”, published in 2009,

- Principal guest editor of a special issue of Thin Solid Films, “Mechanical Behavior of Thin Films and Small Structures”, published in Feb. 2007.
- Reviewer for Science, Acta Materialia, Journal of Applied Physics, Applied Physics Letters, Journal of Materials Research, Scripta Materialia, Journal of Vacuum Science and Technology, Materials Science and Engineering, A, Journal of Nanomaterials, Metallurgical and Materials Transactions, and Journal of Materials Science.

### **RESEARCH COLLABORATIONS**

- (1) Mike Hundley and Mike Fitzsimmons, Los Alamos National Laboratory (LANL)
- (2) Ned Thomas, Rice University
- (3) Haiyan Wang, Dave Bahr, Antar El-Azab, and many others at Purdue University
- (4) Ted Hartwig, Ibrahim Karaman, Raymundo Arroyave, Dimitris Lagoudas, Alan Needleman and many others at Texas A&M University,
- (5) Many others from Argonne, Idaho, Oak Ridge, and Sandia National Laboratories
- (6) Tongde Shen, Yanshan University, China

### **REVIEWERS FOR PROPOSALS**

NSF review panels 2017, 2014  
BES proposal reviewers 2013-present  
DOE-Ames Lab BES program (\$20M) review panelist  
ARO proposal reviewer

### **EDITORIAL BOARD MEMBER**

Metallurgical and Materials Transactions, A. Key reader; (2011-present)  
Scientific Report, Nature’s journal (2014-present)

### **REVIEWERS FOR JOURNALS**

**Reviewer for numerous journals, including**  
Science, Science Advance  
Nature Communications  
Proceedings of National Academy of Sciences  
Materials Today  
Nano Letters  
Advanced Materials  
Advanced Interface Materials  
Nanoscale  
Materials Research Letters  
Acta Materialia, Scripta Materialia,  
International Journal of Hydrogen Energy  
Journal of Nuclear Materials,  
Journal of Applied Physics, Applied Physics Letters,  
Scientific Report  
API Advances  
Materials Science and Engineering, A  
Thin Solid Films

Journal of Alloys and Compounds  
Journal of Vacuum Science and Technology (A and B)  
Journal of Materials Research  
Philosophical Magazine  
Philosophical Magazine Letters  
Journal of Nanoscience and Nanotechnology  
Journal of Materials Science  
Materials Science and Engineering, A  
Journal of Alloys and Compounds  
Materials Letters  
Metallurgical and Materials Transactions A and E  
Physics Today



## Section D: Patent, Publications

### PATENTS

1. “*High-strength twinned Nanolayer Structure*”, US patent, Xinghang Zhang, Amit Misra, Michael A. Nastasi and Richard G. Hoagland, US Patent No.7,078,108B2, July 2006.
2. Method for Producing High Stacking Fault Energy (SFE) Metal Films, Foils, and Coatings with High-Density Nanoscale Twin Boundaries, X Zhang, D Bufford, H Wang, Y Liu, , Y Liu US Patent App. 14/428,538, 2013.

### PUBLICATIONS

**Over 190 articles in refereed international journals, 6 review articles, 1 book chapter, a total of more than 7,000 citations, h factor is 47 (per google scholar).**

#### Notations:

\* Zhang’s graduate students

° Corresponding author

#### **I. Journal articles (over 180 journal articles published or accepted)**

##### **2018**

1. J Li, Y Chen, H Wang, X Zhang, [In situ study on enhanced heavy ion irradiation tolerance of porous Mg](#), Scripta Materialia 144, 13-17, 2018.
2. S Xue, W Kuo, Q Li, Z Fan, J Ding, R Su, H Wang, X Zhang, [Texture-directed twin formation propensity in Al with high stacking fault energy](#), Acta Materialia 144, 226-234, 2018.
3. J Li, C Fan, Q Li, H Wang, X Zhang, [In situ studies on irradiation resistance of nanoporous Au through temperature-jump tests](#), Acta Materialia 143, 30-42, 2018.

##### **2017**

4. C. Fan, Y. Chen, Jin Li, Jie Ding, H.Wang, X.Zhang, Defect evolution in heavy ion irradiated nanotwinned Cu with nanovoids, [Journal of Nuclear Materials](#), **496** (2017) 293-300.
5. Sichuang Xue, Zhe Fan, Olawale B. Lawal, Ramathan Thevamaran, Qiang Li, Yue Liu, K.Y. Yu, Jian Wang, Edwin L. Thomas, Haiyan Wang & Xinghang Zhang, [High-velocity projectile impact induced 9R phase in ultrafine-grained aluminium](#), NATURE COMMUNICATIONS | 8: 1653 | DOI: 10.1038/s41467-017-01729-4, 2017.
6. C. FAN, JIN LI, ZHE FAN, H. WANG, and X. ZHANG, In Situ Studies on the Irradiation-Induced Twin Boundary-Defect Interactions in Cu, **Mettall. Trans. A**, 2017, DOI: 10.1007/s11661-017-4293-5.
7. Jin Li, C. Fan, Q. Li, H. Wang, X. Zhang, *In situ* studies on irradiation resistance of

- nanoporous Au through temperature-jump tests, **Acta Materialia**, in press.
8. Zhe Fan, Jin Li, Yingchao Yang, Jian Wang, Qiang Li, Sichuang Xue, Haiyan Wang, Jun Lou, Xinghang Zhang, “Ductile” Fracture of Metallic Glass Nanolaminates, *Advanced Materials Interfaces*, DOI: 10.1002/admi.201700510, 2017.
  9. Zhe Fan, Qiang Li, Jin Li, Sichuang Xue, Haiyan Wang, Xinghang Zhang, Tailoring plasticity of metallic glasses via interfaces in Cu/amorphous CuNb laminates, *J. Mater. Research*, 32 (2017) 2680-2689.
  10. Meng Fan, Bruce Zhang, Han Wang, Jie Jian, Xing Sun, Jijie Huang, Leigang Li, Xinghang Zhang, Haiyan Wang, Self-Organized Epitaxial Vertically Aligned Nanocomposites with Long-Range Ordering Enabled by Substrate Nanotemplating, 29, 2017, DOI: 10.1002/adma.201606861.
  11. Z Fan, Y Liu, S Xue, RM Rahimi, DF Bahr, H Wang, X Zhang<sup>c</sup>, Layer thickness dependent strain rate sensitivity of Cu/amorphous CuNb multilayer, *Applied Physics Letters* 110 (2017) 161905
  12. M Fan, B Zhang, H Wang, J Jian, X Sun, J Huang, L Li, X Zhang, H Wang, Self-Organized Epitaxial Vertically Aligned Nanocomposites with Long-Range Ordering Enabled by Substrate Nanotemplating, *Advanced Materials* (2017).
  13. Y Chen, H Wang, MA Kirk, M Li, J Wang, X Zhang<sup>c</sup>, Radiation induced detwinning in nanotwinned Cu, **Scripta Materialia** 130 (2017) 37-41.
  14. J Li, C Fan, J Ding, S Xue, Y Chen, Q Li, H Wang, X Zhang<sup>c</sup>, In situ heavy ion irradiation studies of nanopore shrinkage and enhanced radiation tolerance of nanoporous Au, **Scientific Reports** 7, 2017.
  15. Jin Li, Y. Chen, H. Wang, X. Zhang<sup>c</sup>, In Situ Studies on Twin-Thickness-Dependent Distribution of Defect Clusters in Heavy Ion-Irradiated Nanotwinned Ag, **Metallurgical and Materials Transactions A**, 48 (2017) 1466.

### 2016 (13 papers published)

16. K Yu, Y Chen, J Li, Y Liu, H Wang, MA Kirk, M Li, X Zhang, Measurement of heavy ion irradiation induced in-plane strain in patterned face-centered-cubic metal films: an in situ study, *Nano Lett.*, 2016, 16 (12), pp 7481–7489
17. Y Chen, J Li, KY Yu, H Wang, MA Kirk, M Li, X Zhang, In situ studies on radiation tolerance of nanotwinned Cu, **Acta Mater.**, 111 (2016) 148-156.
18. Y Chen, X Zhang, J Wang, Radiation Enhanced Absorption of Frank Loops by Nanovoids in Cu, **JOM**, 68 (2016) 235.
19. Jian Wang, Xinghang Zhang, Twinning effects on strength and plasticity of metallic materials, **MRS Bulletin**, 41 (2016) 274-281 (Guest editor).
20. Y. Chen, N. Li, D.C. Bufford, J. Li, K. Hattar, H. Wang, and X. Zhang, *In situ* study of heavy ion irradiation response of immiscible Cu/Fe multilayers, **J Nuclear Mater.**, 475 (2016) 274-279.
21. Z. Fan, S. Xue, J. Wang, K.Y. Yu, H. Wang, X. Zhang, Unusual size dependent strengthening mechanisms of Cu/amorphous CuNb multilayers, **Acta Materialia** 120 (2016) 327-336.
22. Jin Li, Y. Chen, S. Xue, H. Wang, X. Zhang, Comparison of size dependent strengthening mechanisms in Ag/Fe and Ag/Ni multilayers, **Acta Materialia** 114 (2016) 154-163.
23. Y. Liu, N Li, D Bufford, JH Lee, J Wang, H Wang, X Zhang, In situ nanoindentation

- studies on detwinning and work hardening in nanotwinned monolithic metals, **JOM** 68 (2016) 127-135.
24. J Jian, JH Lee, Y Liu, F Khatkhatay, K Yu, Q Su, X Zhang, L Jiao, H Wang, Plastic deformation in nanocrystalline TiN at ultra-low stress: An in situ nanoindentation study, **Materials Science and Engineering: A** 650, 445-453
  25. Leigang Li, Liuyang Sun, Juan Sebastian Gomez-Diaz, Nicki L Hogan, Ping Lu, Fauzia Khatkhatay, Wenrui Zhang, Jie Jian, Jijie Huang, Qing Su, Meng Fan, Clement Jacob, Jin Li, Xinghang Zhang, Quanxi Jia, Matthew Sheldon, Andrea Alu, Xiaoqin Li, Haiyan Wang, Self-Assembled Epitaxial Au-Oxide Vertically Aligned Nanocomposites for Nanoscale Metamaterials, **Nano Lett.**, 2016, 16 (6), pp 3936–3943
  26. M Song, C Sun, Z Fan, Y Chen, R Zhu, KY Yu, KT Hartwig, H Wang, X. Zhang, A roadmap for tailoring the strength and ductility of ferritic/martensitic T91 steel via thermo-mechanical treatment, **Acta Materialia** 112 (2016) 361-377
  27. Wenrui Zhang, Mingtao Li, Aiping Chen, Leigang Li, Yuanyuan Zhu, Zhenhai Xia, Ping Lu, Philippe Boullay, Lijun Wu, Yimei Zhu, Judith L MacManus-Driscoll, Quanxi Jia, Honghui Zhou, Jagdish Narayan, Xinghang Zhang, Haiyan Wang, Two-Dimensional Layered Oxide Structures Tailored by Self-Assembled Layer Stacking via Interfacial Strain, **ACS applied materials & interfaces** 8 (2016) 16845-16851
  28. Q Su, W Zhang, P Lu, S Fang, F Khatkhatay, J Jian, L Li, F Chen, X Zhang, Judith L MacManus-Driscoll, Aiping Chen, Quanxi Jia, Haiyan Wang, Self-Assembled Magnetic Metallic Nanopillars in Ceramic Matrix with Anisotropic Magnetic and Electrical Transport Properties, **ACS Applied Materials & Interfaces** 8 (2016), 20283-20291.

### 2015 (15 papers published)

29. Jin Li\*, Kaiyuan Yu\*, Youxing Chen\*, Miao Song\*, Haiyan Wang, Kirk Mark, Meimei Li, Xinghang Zhang, [In situ Study of Defect Migration Kinetics and Self-Healing of Twin Boundaries in Heavy Ion Irradiated Nanotwinned Metals](#), **Nano Letters**, Mar. 15 (2015), pp 2922–2927, DOI: 10.1021/nl504677z.
30. S. Xue\*, Z. Fan\*, Y. Chen\*, J. Li\*, H. Wang, X. Zhang, The formation mechanisms of growth twins in polycrystalline Al with high stacking fault energy, **Acta Materialia**, 101 (2015) 62–70.
31. C. Sun\*, B. P. Uberuaga, L. Yin, Y. Chen\*, J. Li\*, M. A. Kirk, M. Li, S. A. Maloy, H. Wang, C. Yu and X. Zhang, Resilient ZnO nanowires in an irradiation environment: an *in situ* study, **Acta Materialia**, 95 (2015) 156.
32. Z. Fan\*, J. Jian\*, Y. Liu\*, Y. Chen\*, M. Song\*, L. Jiao\*, H. Wang, X. Zhang, **In situ studies on superior thermal stability of bulk FeZr nanocomposites**, **Acta Materialia**, 101, 125-135, 2015.
33. Y. Liu\*, N. Li, D. Bufford\*, J.H. Lee\*, J. Wang, H. Wang, and X. Zhang, *In situ* nanoindentation studies on detwinning and work hardening in nanotwinned monolithic metals, **JOM**, review article, in press.

34. Y. Chen\*, K.Y. Yu\*, Y. Liu\*, S. Shao, H. Wang, M.A. Kirk, J. Wang and X. Zhang, Damage tolerant nanotwinned metals with nanovoids under radiation environments, *Nature Communications*, **6**, Article number 7036, doi:10.1038/ncomms8036, 2015.
35. C Sun\*, S Zheng, CC Wei, Y Wu, L Shao, Y Yang, KT Hartwig, SA Maloy, SJ Zinkle, TR Allen, H Wang, and X Zhang, Superior radiation-resistant nanoengineered austenitic 304L stainless steel for applications in extreme radiation environments, *Scientific Reports*, **5**, 2015. <http://dx.doi.org/10.1038/srep07801>.
36. Y. Chen\*, E.G. Fu, K.Y. Yu\*, M. Song\*, Y.Q. Wang, H. Wang, and X. Zhang, “Enhanced radiation tolerance in immiscible Cu/Fe multilayers with coherent and incoherent layer interfaces”, *Journal of Materials Research*, **30** (09), 1300-1309, 2015.
37. Y. Chen\*, Y. Liu\*, E.G. Fu\*, C. Sun\*, K.Y. Yu\*, M. Song\*, Jin Li\*, Y.Q. Wang, H. Wang, and X. Zhang, Unusual size dependent strengthening mechanisms in helium ion irradiated immiscible coherent Cu/Co nanolayers, *Acta Materialia*, **84** (2015) 393-404.
38. K.Y. Yu\*, Z. Fan\*, Y. Chen\*, M. Song\*, Y. Liu\*, H. Wang, M.A. Kirk, M. Li and X. Zhang<sup>c</sup>, *In situ* Observation of Defect Annihilation in Kr Ion-Irradiated Bulk Fe/Amorphous-Fe<sub>2</sub>Zr Nanocomposite Alloy, *Materials Research Letters*, **3** (2015) 35-42. <http://dx.doi.org/10.1080/21663831.2014.951494>.
39. L Jiao\*, KY Yu\*, D Chen, C Jacob, L Shao, X Zhang, H Wang, Radiation tolerant nanocrystalline ZrN films under high dose heavy-ion irradiations, *Journal of Applied Physics* **117** (14), 145901, 2015.
40. Y. Liu\*, H. Wang, and X. Zhang, *In situ* TEM nanoindentation studies on stress-induced phase transformations in metallic materials, *JOM*, invited review article, vol. 68, 2016, p 226.
41. Y Chen\*, X Zhang, J Wang, Radiation Enhanced Absorption of Frank Loops by Nanovoids in Cu, *JOM*, 1-7, 2015 (invited perspective).
42. W Zhang\*, L Li, P Lu, M Fan, Q Su, F Khatkhatay, A Chen, Q Jia, X Zhang, J. MacManus-Driscoll, H. Wang, Perpendicular Exchange-Biased Magnetotransport at the Vertical Heterointerfaces in La<sub>0.7</sub>Sr<sub>0.3</sub>MnO<sub>3</sub>: NiO Nanocomposites, *ACS applied materials & interfaces* **7** (39), 21646-21651, 2015.
43. W Zhang\*, A Chen, J Jian, Y Zhu, L Chen, P Lu, Q Jia, X Zhang, J. MacManus-Driscoll, H. Wang, Strong perpendicular exchange bias in epitaxial La<sub>0.7</sub>Sr<sub>0.3</sub>MnO<sub>3</sub>: BiFeO<sub>3</sub> nanocomposite films through vertical interfacial coupling, *Nanoscale* **7** (33), 13808-13815

#### 2014 (18 papers)

44. Byung-Gil Yoo, Steven T. Boles, Y. Liu\*, X. Zhang, Ruth Schwaiger, Christoph Eberl, Oliver Kraft, Quantitative damage and detwinning analysis of nanotwinned copper foil under cyclic loading, *Acta Materialia*, **81** (2014) 184-193.

45. D. Bufford\*, Y. Liu\*, J. Wang, H. Wang, and X. Zhang<sup>c</sup>, *In situ* nanoindentation study on plasticity and work hardening in twinned aluminum with high density incoherent twin boundaries, **Nature Communications**, 5 (2014) 4864. DOI: 10.1038/ncomms5864.
46. Irene J. Beyerlein, Xinghang Zhang, and Amit Misra, Growth twins and deformation twins in metals, **Annual Review of Materials Research**, 44 (2014) 329-363.
47. Y. Liu\*, J. Jian\*, Y. Chen\*, H. Wang, and X. Zhang<sup>c</sup>, [Plasticity and ultra-low stress induced twin boundary migration in nanotwinned Cu by in situ nanoindentation studies](#), **APPLIED PHYSICS LETTERS** 104, 231910 (2014).
48. M. Song\*, Y. D. Wu, D. Chen, X. M. Wang, C. Sun\*, K.Y. Yu\*, Y. Chen\*, L. Shao, Y. Yang, K. T. Hartwig, and X. Zhang<sup>c</sup>, Response of equal channel angular extrusion processed ultrafine grained T91 steel subjected to high temperature heavy ion irradiation, **Acta Materialia**, 74 (2014) 285-295.
49. Y. Liu\*, J. Jian\*, J. H. Lee\*, C. Wang, Q.P. Cao, C. Gutierrez\*, H. Wang, J. Z. Jiang, and X. Zhang<sup>c</sup>, Repetitive ultra-low stress induced nanocrystallization in amorphous Cu-Zr-Al alloy evidenced by *in situ* nanoindentation, **Materials Research Letters**, 2 (2014) 209.
50. B Ham\*, A Junkew\*, D Bufford\*, R Arróyave, X Zhang<sup>c</sup>, Fabrication of porous and pillar-shaped Mg by magnetron sputtering, **Thin Solid Films**, 550 (2014) 220–226.
51. B. Ham\*, A. Junkaew\*, R. Arroyave, J. Park, H.-C. Zhou, D. Foley\*, S. Rios\*, H. Wang, X. Zhang<sup>c</sup>, “Size and stress dependent hydrogen desorption in metastable Mg hydride films”, **International Journal of Hydrogen energy** 39 (2014) 2597-2607.
52. Y. Liu\*, I. Karaman, H. Wang, and X. Zhang<sup>c</sup>, Two types of martensitic phase transformations in magnetic shape memory alloys by *in-situ* nanoindentation studies, **Advanced Materials**, DOI: 10.1002/adma.201400217.
53. Y. Chen\*, L. Jiao, C. Sun\*, M. Song\*, K.Y. Yu\*, Y. Liu\*, M. Kirk, M. Li, H. Wang, and X. Zhang, *In situ* studies of Kr ion irradiation response of Fe/Y<sub>2</sub>O<sub>3</sub> nanolayers, **J. Nuclear Materials**, 452 (2014) 321.
54. KY Yu\*, D Bufford\*, Y Chen\*, Y Liu\*, H Wang, X Zhang<sup>c</sup>, Basic criteria for formation of growth twins in high stacking fault energy metals, **Applied Physics Letters** 103 (18), 181903, 2014.
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### Before Joining Texas A&M

#### 2004 (9 papers published)

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176. X. Zhang<sup>c</sup>, H. Wang and C. C. Koch, "*Mechanical Behavior of Bulk Nanocrystalline Zn*", **Reviews on Advanced Materials Science**, 6 (2004) 53. (review article)

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177. H. Wang, Ashutosh Tiwari, A. Gupta, X. Zhang, and J. Narayan, "Ta<sub>2</sub>N-TiN Binary-Component Thin Films as Diffusion Barriers for Copper Interconnects", **Journal of Electronic Materials**, 32 (2003) 994.
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**2000 and before (3 papers published)**

192. K. Lu and X. H. Zhang, "Identification of Crystal Nucleation and Growth in an Amorphous FeZr<sub>2</sub> Alloy by Means of Electrical Resistance Measurements", **Philosophical Magazine Letter**, 80 (2000) 797.
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**Impact factors of journals where Zhang has published his papers**

Journal name	Impact factor	# of papers published in this journal
Nature Communications	10	4
Annual Review of Materials Research	16	1
Advanced Materials	14	3
Advanced Functional Materials	9.7	3
Nano Letters	10	4
Physical Review Letters	7.9	1
International Journal of Plasticity	4.3	3
Acta Materialia (One of the most prestigious metallurgical materials journal)	5.0	28
Scientific Report	5	4
Scripta Materialia	3.8	12
Applied Physics Letters	3.5	19
Journal of Applied Physics	2.2	13
Thin Solid Films	1.6	6
Journal of Nuclear Materials	1.2	9
Materials Science and Engineering, A	2.1	5
Journal of Materials Science	2.2	2
Journal of Alloys and Compounds	2.4	1
Journal of Materials Research	1.7	8
Reviews on Advanced Materials Science	1.0	1

<b>Nuclear Instrument and Method Technology B (NIMB)</b>	<b>1.2</b>	<b>3</b>
<b>Materials Research Letters</b>		<b>3</b>
<b>Philosophical Magazine</b>	<b>1.6</b>	<b>2</b>
<b>Philosophical Magazine Letters</b>	<b>1.2</b>	<b>2</b>
<b>Metallurgical and Materials Transaction A</b>	<b>1.6</b>	<b>3</b>
<b>Journal of Materials (JOM) (review article journal)</b>	<b>1.0</b>	<b>4</b>
<b>Nanotechnology</b>	<b>3.8</b>	<b>3</b>

## Section E: Invited talks and seminars

### E1. Invited talks

#### At national and international conferences

1. “*Strengthening Mechanisms in Nanostructured Layered Materials*”, in the symposium of “Frontiers in Thin Film Growth and Nanostructured Materials: A Symposium in Honor of Professor Jagdish Narayan” 2005 TMS annual meeting, San Francisco, CA.
2. “*Radiation effects in nanostructured metallic materials*”, X. Zhang, S. Maloy, E. Fu, D. Foley, Nan Li, K. T. Hartwig, 19<sup>th</sup> International Conference on the Application of Accelerators in Research and Industry, Dallas, TX, 2006.
3. “*Synthesis, Microstructure and Properties of Metallic Materials with Nanoscale Growth Twins*”, 2006 Army Science Conference, Orlando, FL.
4. “*Radiation tolerance in nanostructured metallic nanolayers*”, MS&T (Materials Science and Technology conference), Pittsburgh, PA, October 2008.
5. “*Radiation tolerance mechanism in Cu/V nanolayers*”, TMS annual meeting, 2010, Seattle, WA, Feb. 14-17, 2010. (TMS meeting is an international conference).
6. “*Mechanical properties of nanotwinned metal films*”, Plasticity 2009, St. Thomas, VI, Jan. 4-9, 2009.
7. “*Radiation damage in nanostructured metallic nanolayers*”, TMS 2009, San Francisco, CA, Feb. 22-25, 2009.
8. “*Interface enabled defects reduction in helium ion irradiated Cu/V nanolayers*”, Xinghang Zhang, TMS annual meeting, Seattle, WA. Feb. 13-18, 2010.
9. “*Radiation damage in nanostructured metallic materials*”, Materials Working Group meeting, UC Santa Barbara, March 23, 2010.
10. “*Radiation tolerant metallic multilayers and bulk ultra-fine grained steels*”, Materials Working Group meeting, Vail, CO, Aug. 22-26, 2010.
11. “*Microstructure and properties of nanotwinned metal films*”, Los Alamos, NM, Los Alamos National Laboratory, May 2010, DOE-BES workshop.
12. “*Radiation damage in nanostructured metallic materials*”, Santa Barbara, University of California, Santa Barbara, March 2010.
13. “*Radiation tolerant metallic multilayers and bulk ultra-fine grained steels*”, Engineering Conference International, “Innovative Materials Immune to Radiation”, Vail, CO, Aug. 2010.
14. “*Properties of nanotwinned metallic materials*”, Zhe Jiang University, June, 2011.

15. “Interfaces and mechanical properties of nanotwinned metal films”, Hefei University of Science and Technology, June 2011.

16. “Microstructure and deformation mechanisms of equal channel angular pressing processed FeCrNi alloys”, Thermec 2011, Quebec, Canada, 2011.

17. “Radiation tolerant metallic multilayers and bulk ultra-fine grained steels”, The 5<sup>th</sup> Annual Asia-Pacific Nuclear Energy Forum on Materials for Nuclear Applications, June 2011, Berkeley, CA

18. “Radiation tolerant nanostructured metals”, Los Alamos National Laboratory, Los Alamos, NM, DOE workshop, Sep. 2012.

19. “Deformation mechanisms of nanotwinned metals”, MRS fall, Symposium of Mechanical behavior of nanostructured materials, 2012, (2 days of dedicated sessions in honor of Prof. Julia Weertman).

20. “Nanocrystalline and nanotwinned metallic materials under extreme radiation environment”, MS&T, Montreal, Canada, Oct. 2013.

21. “Radiation response of nanolayered, nanoporous and nanotwinned metals”, TMS Annual meeting, San Diego, CA, Feb. 2014.

22. “Stability of nanostructured metals at high temperature and against radiation”, TMS Annual meeting, San Diego, CA, Feb. 2014.

23. “Mechanical behavior of nanotwinned metals”, TMS Annual meeting, San Diego, CA, Feb. 2014.

24. “Nanostructured metallic materials in extreme environments”, OTC (Offshore Technology Conference), May, 2014, Houston, TX.

25. “Two types of martensitic phase transformations in magnetic shape memory alloys by *in-situ* nanoindentation studies”, Society of Engineering Science (SES) conference, Purdue, Oct. 2014.

26. (Key note) “Strengthening mechanisms of highly textured Cu/Co and Ag/Al nanolayers with high density twins and stacking faults”, Society of Engineering Science (SES) conference, Purdue, Oct. 2014.

27. “Growth Twins and Stacking Faults in Cu/Co Nanolayers and In Situ Studies of Stress Induced Martensitic Twins in NiFeGa Magnetic Shape Memory Alloys”, Yue Liu and X. Zhang, MS&T conference, Pittsburgh, OH, Oct. 2014.

28. Strengthening mechanisms of highly textured Cu/Co and Ag/Al nanolayers with high density twins and stacking faults, 2015 MRS Fall meeting.

29. Radiation response of nanolayered, nanoporous and nanotwinned metals, Society of Engineering Society (SES) conference, 2015, Oct, Texas A&M University.

30. Two types of martensitic phase transformations in magnetic shape memory alloys by in-situ nanoindentation studies, TMS annual meeting, Orlando, FL, 2015.
31. Mechanical behavior of nanotwinned metals, TMS annual meeting, Orlando, FL, 2015.
32. Mechanical behavior of nanotwinned metals, Mac Conference, John Hopkins University, 2016.
33. Radiation response of nanolayered, nanoporous and nanotwinned metals, TMS annual meeting, Nashville, Tennessee, 2016.
34. Deformation mechanisms of nanotwinned Al, TMS annual meeting, Nashville, Tennessee, 2016.
35. “Radiation damage of nanostructured metallic materials”, 2017, MRS spring meeting, Phoenix, AZ.
36. “Radiation response of nanotwinned metals”, 2017, TMS annual meeting, San Diego, CA, symposium in honor of Prof. K. L. Murty.
37. “Tailoring plasticity of metallic glasses via interfaces in Cu/amorphous CuNb laminates”, Plasticity conference, San Juan, Puerto Rico, 2018.
38. “*In situ* studies on radiation resistant nanotwinned metals”, Plasticity conference, San Juan, Puerto Rico, 2018.

## **E2. National and international seminars**

1. “*Interface Induced Strengthening in Nanolayered Materials*”, Institute of Metal Research, Chinese Academy of Sciences, December, 2005.
2. “*Mechanical properties and ion irradiation studies in metallic multilayers*”, Los Alamos National Laboratory, Los Alamos, NM, July 2007.
3. “*Mechanical properties of metal films with layer or twin interfaces and ion irradiation studies of metallic nanolayers*”, Sandia National Laboratory, Albuquerque, NM, July 2007.
4. “*Mechanical properties and ion irradiation studies in metallic multilayers*”, Oak Ridge National Laboratory, Oak Ridge, TN, Materials Working Group meeting, July 2008.
5. “*Nanotwinned metal films with high strength and high conductivity*”, University of Texas, Austin, graduate seminar, November 2008.
6. “*Nanotwinned metal films with high strength and high conductivity*”, University of North Carolina, Charlotte, graduate seminar, February, 2008.

7. “Nanotwinned metal films with high strength and high conductivity”, Shanghai Jiaotong University, Shanghai, China, June 2009. (Shanghai Jiaotong University’s materials science department ranks no. 2 in China among over 100 materials science department).
8. “Nanotwinned metal films with high strength and high conductivity”, Fushun University of Gas and Oil, Fushun, China, June 2009. (This University ranks no. 2 in China among all oil and gas universities).
9. “Radiation tolerant nanostructured materials”, Fu Dan University, Shanghai, China, July, 2012.
10. “Radiation tolerant nanostructured materials”, University of Science and Technology, Hefei, China, August, 2012.
11. “Mechanical behavior of nanotwinned metals”, Purdue University, Oct., 2014
12. “Radiation response of nanolayered, nanoporous and nanotwinned metals”, University of Texas, Arlington, Nov, 2014.
13. “Radiation response of nanoporous and nanotwinned metals”, Institute of Metal Research, China, July, 2017.
14. “Strain delocalization and fracture behaviors of metallic glass in nanolaminate”, Nanjing University of Science and Technology, June, 2017.
15. “Radiation response of nanoporous and nanotwinned metals”, Shanghai Jiaotong University, June, 2017.
16. “Radiation response of nanoporous and nanotwinned metals”, University of Science and Technology of China, Hefei, China, June, 2017.