

# Yang Liu-Curriculum Vitae

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## EDUCATION&WORK

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- Feb, 2019-Jun 2019 Full-time internship position at **QuesTek Innovations LLC** (<https://www.questek.com>)
- Sep, 2017-Dec, 2018 **Master of Science**, Department of Materials Science and Engineering, Northwestern University (NU)  
Major: Materials Science & Engineering (15-month program)  
**Advisor: Prof. David. C. Dunand**
- Sep, 2013-Jun, 2017 **Bachelor of Engineering**, School of Mechanical Engineering, Shanghai Jiao Tong University (SJTU)  
Major: Energy & Power Engineering, International Pilot Class  
**TOEFL 108 (R29 + L30 + S22 + W27) GRE 322 (V152 + Q170) + AW3.0**
- Jul 3-Aug 13, 2016 **UC Berkeley Summer Sessions**
- Professional Communication (Credit / Score: 3.0 / A)
  - Academic Vocabulary (Credit / Score: 3.0 / A)

## SKILLS

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- **Material Characterization Methods:** TEM, SEM, EDS, XRD, XSW, etc.
- **Material Analysis and Testing Methods:** Creep Tensile Tester, Fractography, Hardness Tester
- **Software Packages:** C++, Python, Origin, Unigraphics NX, Auto CAD, Matlab, ThermoCalc, Pandat, COMSOL, etc.

## PAPERS

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- **First author, Y Liu**, RA Michi, DC Dunand, Creep Properties of Eutectic Al-Ce Alloys, *Mater Sci & Eng. A*, **submitted**
- **First author, Y Liu**, M Liu, X Chen, Y Cao, HJ Roven, et al., Effect of Mg on microstructure and mechanical properties of Al-Mg alloy produced by high pressure torsion, *Scr. Mater.*, **159 (2019), pp. 137-141**
- **Second author**, H Hu, Y Liu, D Zhang, Z Ou. The Influences of extrusion-shear process on microstructure evolution and mechanical properties of AZ31 magnesium alloy, *J. Alloys Comp. (IF 3.01)*, **2017, Vol. 695, P1088-1095**
- **Third author**, J Liu, H Hu, Y Liu, et al., Mechanical properties and wear-corrosion resistances of a novel compound extruded magnesium alloy AZ61, *Mater. Testing (SCI)*, **61 (2019), in press**
- **Third author**, JW Jiang, MP Liu, Y Liu, K Tang, ZB Wang, et al., Microstructure and mechanical properties of 6013 aluminum alloy processed by a combination of ECAP and pre-aging treatment, *Mater. Sci. Forum (EI)*, **2016, Vol. 877, P437-443**

## RESEARCH & PROJECT

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- Feb 2019-Present **QuesTek Materials Engineer Internship**
- Optimal design of a single crystal Ni-based alloy by Python and Pandat
  - Fracture toughness analysis of additive manufactured Inconel 718 alloy
  - Optimization of surface hardening effect on a gear steel
  - Optimal design of corrosion resistant Cu-based alloy
  - Surface roughness and porosity analysis of an additive manufactured Al-based alloy
- Dec 2017-Jun 2019 **Strengthening Mechanisms of Al<sub>11</sub>Ce<sub>3</sub> Precipitates in Al-16wt%Ce Creep-Resistant Alloy**
- Advisor: Prof. David. C. Dunand**, Northwestern University
- Etched the samples by Tucker's reagent, observed millimeter-sized grains resistant to diffusional creep
  - Observed and measured the length (~5μm) and width (~100nm) of precipitates by optical microscope and SEM
  - Conducted compression creep test at 260, 300 and 350 °C, found that the alloy could stand less stress at higher temperatures, obtained the stress-strain relations for further comparisons
  - Found more coarsened Al<sub>11</sub>Ce<sub>3</sub> precipitates, Ce-rich phases and cracks at 350 °C sample after test, which explained the loss of creep resistance at higher temperatures
  - Compared the strain rate-stress curves and found that the alloy could stand more stress than some other binary or even ternary Al alloys, indicating the strengthening of Ce additions

Apr 2018-Jun 2018 **Materials Design for Cool and Partition TRIP Steel**

**Advisor:** Prof. Gregory. B. Olson, Northwestern University

- Proposed a new concept of C&P TRIP steel which enhanced TRIP effect and weldability by avoiding martensite
- Used ThermoCalc and Matlab to estimate the element concentration ranges that optimize the strength, ductility, weldability as well as the processing temperature and time of the steel
- Modified Olson-Cohen model by taking Hall Petch effect into consideration, the results showed that Cr<0.6wt% and more Si is preferred to increase the strength
- Designed two kinds of C&P TRIP steel with an optimal strength of 2094 MPa and elongation of 17.2%

Jul 2017-Aug 2017 **Grain Refinement of a Mg-RE alloy by a Two-step Forming Process**

**Advisor:** Prof. Hao Zhou, Nanjing University of Science & Technology

- Cold-rolled the sample followed by annealing at 530 °C
- Hot-rolled the comparison sample at 400, 450 and 530 °C for 20, 40, 60 and 80%.
- Obtained grain refinement from 100 μm to 20 μm in the two-step forming samples, compared by 30 μm in hot-rolled samples
- Obtained higher density of precipitates in two-step forming samples

Dec 2016-Jun 2017 **Erythritol/ Glauber's Salt-Expanded Graphite Phase Transformation Energy-storage Material**

**Advisor:** Prof. Ye Yao, Prof. Tingxian Li, Shanghai Jiao Tong University

- Introduced erythritol as the energy-storage material for the first time
- Found out the suitable preparation methods as 130 °C dissolve adsorption and 40 °C vacuum adsorption methods
- Determined the concentration of graphite (15%) and the density of the compressed samples (1.2g/cm<sup>3</sup>) for optimal performances by HotDisk and DSC
- Designed cuboid and cylindrical energy-storage modulus to fit the thermal control conditions in buildings and constructed a series of cylindrical modulus for test in practical applications
- Optimized the energy efficiency to be 67.34% higher than electric heat supply by test and calculation

Oct 2015-Mar 2016 **Adsorption Test and Analysis of Refrigeration Working Pairs**

**Advisor:** Prof. Liwei Wang, Shanghai Jiao Tong University

- Experimented adsorption performances of MnCl<sub>2</sub>-NH<sub>3</sub> and CaCl<sub>2</sub>-NH<sub>3</sub> refrigeration working pairs
- Analyzed data from the experiments and found desorption hysteresis in chloride

**COURSEWORK**

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|--------------------------|----------------------|---------------------------|--|
| 1. Fluid Mechanics       | 2. Thermodynamics    | 3. Heat Transfer          | 4. Material Mechanics                  |
| 5. Engineering Materials | 6. System Control    | 7. Measurement Technology | 8. Introduction to Electron Microscopy |
| 9. Phase Transformation  | 10. Materials Design | 11. Mechanical Properties | 12. X-Ray Diffraction Methods          |

**SCHOLARSHIP**

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- Oct 2016 The Third Prize of Shanghai Jiao Tong University Excellence Scholarship
- Sep 2015 Academic Progress Scholarship of Shanghai Jiao Tong University

**VOLUNTEER&LEADERSHIP**

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Apr 2016 **Volunteer of SJTU 120<sup>th</sup> Anniversary**

- Welcomed and treated schoolmates who graduated 30 years ago

Jul 2014 **Volunteer of a migrate worker community**

- Gave the kids of migrate workers lessons on astronomy
- Instructed the kids to do their summer holiday homework

Sep 2013-Jun 2014 **Member of Students Union, SJTU**

- Organized a Christmas party and a New Year dumpling party for exchange students in SJTU
- Communicated with exchange students in SJTU and solved their problems in daily life
- Evaluated performances of different associations' activities
- Managed associations' applications for budget