

Junkun Ma, Ph.D.

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Department of Engineering Technology
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EDUCATION

Ph.D., Engineering Science/Applied Mechanics (Joint Doctoral Degree) 2004

Dept. of Mechanical Engineering San Diego State University
Dept. of Mechanical & Aerospace Engineering University of California, San Diego
Dissertation: Synthesis of Dense TiC-Ti Based Cermets via Self Propagating High Temperature Synthesis and Quasi-Isostatic Pressing

M.S., Mechanical Engineering 1999

Dept. of Mechanical Engineering N. China Electric Power University
Thesis: Safety and Durability Evaluation of High-Pressure Vessels Containing Non-Through Defects

B.S., Applied Engineering Mechanics 1996

Dept. of Applied Engineering Mechanics Tsinghua University
Thesis: Distribution of Elastic-Plastic Field on Circular Rings Containing a Rounded Tip V-Notch under Incline Compressive Load

PROFESSIONAL EXPERIENCE

Associate Professor of Engineering Technology (tenure track)

Dept. of Agricultural Sci. & Engineering Tech., Sam Houston State Univ. 08/2016 ~ Current

Teaching:

ETDD 1361: Engineering Graphics – Fundamental Engineering Drafting
ETDD 3310: Product Design and Development - Processes of Product Design
ETEC 4369: Manufacturing Processes and Systems - Manufacturing Methods

Research:

- Simulation and modeling based on Finite Element Analysis (FEA) method
- Alternative energy and its integration into LEED certified construction

Service:

- Curriculum development of the Design and Development program

Associate Professor of Engineering Technology (tenured)

Dept. of Computer Sci. & Industrial Tech., Southeastern Louisiana Univ. 08/2013 ~ 07/2016

Teaching:

ET205: Mathematical Methods for Engineers – Post-calculus mathematics
ET241: Introduction to Engineering Materials – Fundamentals of engineering materials

ET271: Engineering Statics – Forces, equilibrium, moments, and work of rigid bodies
ET361: Solar Thermal Systems – Solar thermal systems and their applications
ET381: Strength of Materials – Mechanics and strength of engineering materials
ET385: Mechanical Design – Design of mechanical components and mechanisms
ET433: Wind Turbines – Technologies, applications, and economics of wind turbines
ET480: Advanced Strength of Materials – Finite Element Method stress/strain analysis
ET493/494: Senior Design I/II– Capstone design projects
ISAT770: Graduate Thesis – Investigation of a significant interdisciplinary topic

Research:

- Simulation and modeling based on Computational Fluid Mechanics (CFD) method
- Development of a sustainability center in which various alternative energy systems are integrated together for undergraduate research and education purposes

Service:

- Lead the efforts to apply for, and successfully obtained ABET accreditation for the Engineering Technology program for six years
- Serving as the undergraduate coordinator for the Engineering Technology program
- Serving as senator on behalf of the department in the university faculty senate
- Serving the university facility planning committee and experiential learning council
- Serving other duties such as judge for future city and science fair competitions

Assistant Professor of Engineering/Industrial Technology (tenure track)

Dept. of Computer Sci. & Industrial Tech., Southeastern Louisiana Univ. 08/2007 ~ 07/2013

Teaching:

IT209/309: Special Topics – Organized class or individual instruction
IT264: Industrial Fluid Power – Theory and practice of hydraulic and pneumatic systems
IT322: Material Science and Metallurgy – Study of major industrial materials
IT406: Facility Planning – Principles, methods, and techniques for facility planning
ET205; ET241; ET271; ET361; ET381; ET385; ET433; ET480; ET493/494; ISAT770
ET465: Industrial Simulation & Modeling – Simulation of manufacturing process
ISAT592: Scientific Visualization – Computer visualization of scientific data

Research:

- Computational Solid/Fluid Mechanics based on Finite Element Method (FEM)
- Development of functional gradient multi-layered composite materials for thermal management of micro-electronics
- Modeling and simulation of sintering of particulate materials

Service:

- Lead the effort to create and build curricula and course materials for the Engineering Technology program
- Served as the curriculum chair for the Engineering Technology program to create and get University Curriculum Committee to approve 60 new courses

- Served as the undergraduate coordinator for the Engineering Technology program
- Serving other duties such as judge for future city and science fair competitions

Visiting Assistant Professor

Division of Math and Natural Science, Penn State Univ., Altoona 04/2005 ~07/2007

- Taught calculus based General Physics and algebra based Technical Physics
- Research focusing on single mode microwave powder metal processing and sintering
- Supervised undergraduate students on research projects

Postdoctoral Fellow

Powder Technology Laboratory, San Diego State University 11/2004 ~ 04/2005

- Taught Finite Element Method
- Research focusing on microwave heating and sintering of powder materials
- Supervised undergraduate and graduate students

Co-Op Internship

RAS Computer Analysis Lab, Sun Microsystems Inc. San Diego, CA 06/2003 ~ 11/2004

- Development of functional gradient composite material for thermal management of high-power micro-electronics
- Research focusing on electro-deposition of copper

Graduate Research Assistant

San Diego State University/ University of California, San Diego 09/1999 ~ 11/2004

- Research focusing on development of cermets composite using combined self-propagating high-temperature synthesis and quasi-isostatic pressing method
- Teaching assistant of Finite Element Method, Scientific Visualization, and Strength of Materials

Mechanical Engineer

DeShiChuang Corp. Beijing, China 06/1996 ~ 07/1999

- Mechanical design using Computer Aided Design (CAD) software
- Software development for application such as telephone banking
- Business development such as preparing project bid package

PUBLICATIONS

Journal papers

- Chaojie Cui, **Junkun Ma**, Bin Liu, Optimized Staggered Composites based on the Energy Measured Material Usage Efficiency, *Composite Sciences and Technology*, (Submitted in Jan. 2018, currently in review)
- Cris Koutsougeras, **Junkun Ma**, Hao Luo, *Study of a Vertical Axis Wind Turbine with Deflection Panels: COMSOL 2D Simulation of a Single Panel*, *Engineering Journal*, (Submitted in Dec. 2107, currently in review)
- **J. Ma**, K. Cris, *Effects of Design Parameters on the Fluid Flow and the Efficiency of Single Ended Evacuated Tubular Solar Thermal Collectors via FEM Modeling and Experimentation*, *Engineering Journal*, Vol. 19, No 5 (2015).
- **J. Ma**, E.A. Olevsky, *Numerical Simulation of Densification and Deformation of*

Porous Bodies in a Granular Pressure-Transmitting Medium, Advances in Sintering Science and Technology, Ceramic Transactions, Vol. 209, Pages 113-124 (2009).

- **J. Ma**, G.J. Weisel, B.L. Weiss, N.M. Miskovsky, D.T. Zimmerman, *Systematic Study of Microwave Absorption, Heating, and Microstructure Evolution of Porous Copper Powder Metal Compacts*, J. of Applied Physics, 101, 074906 (2007).
- E.A. Olevsky, **J. Ma** and M.A. Meyers, *Densification of Porous Bodies in a Granular Pressure-Transmitting Medium*, Acta. Materialia, Vol. 55, Issue 4, Pages 1351-1366 Feb., (2007).
- **J. Ma**, E.A. Olevsky, and M.A. Meyers, *Modeling of pressure transmission during post-reactive-sintering quasi-isostatic pressing*, Sintering 2003, Eds. R.M. German, G.L. Messing, R.G. Cornwall, 6 p. (2003).
- H. Shi, **J. Ma**, X. Qing, *Distribution of Elastic-Plastic Field on Circular Rings Containing a Rounded Tip V-Notch under Incline Compressive Load*, Chinese Journal of Applied Mechanics, Page 13, No2, (1999).

Conference proceedings and presentations

- J. Ma, Further Development of Capstone Design Project Courses based on a Case Study, ASEE's 124th Annual Conference & Exposition, Columbus, OH, June, (2017)
- **J. Ma**, K. Cris, H. Luo, Efficiency of a Vertical Axis Wind Turbine (VAWT) with Airfoil Pitch Control, International COMSOL 2016 Conference, Boston, MA, October, (2016)
- **J. Ma**, K. Cris, Evaluation of Design Efficiency via COMSOL Simulations, 2014 EPSCoR Industry-Academia Workshop on Advanced Materials and Manufacturing, New Orleans, November (2014)
- **J. Ma**, *Microwave and Spark Plasma Sintering (SPS): recent experimental development, modeling and simulation using COMSOL Multiphysics*, Pole University Leonard De Vinci International Week, Paris, France. March, (2013)
- **J. Ma**, A. Parker, K. Kuan, *Thermal Properties of Copper Tungsten with Copper Via Composite*, International COMSOL 2011 Conference, Boston, MA, October, (2011).
- **J. Ma**, X. Wei, *Efficiency of Evacuated Tubular Solar Thermal Collector*, International COMSOL 2011 Conference, Boston, MA, October, (2011)
- K. Kuang, D. Zhu, **J. Ma**, *Development of Super Copper Tungsten IMAPS ATW on RF/Microwave Packaging*, San Diego, CA, September, (2009).
- **J. Ma**, X. Wei, *Numerical Study of the Performance of a Super CuW / BeO Package IMAPS ATW on RF/Microwave Packaging*, San Diego, CA, September, (2009).
- D. Zimmerman, J. Diehl, E. Johnson, K. Martin, **J. Ma**, *Systematic Study of Microwave Absorption, Heating, and Microstructure Evolution of Porous Copper Powder Metal Compacts*, APS Spring 2008 Conference, New Orleans, March, (2008).
- K. Martin, J. Cardellino, E. Johnson D. Zimmerman, **J. Ma**, *Percolation Studies of Metal-insulator Composites at Microwave Frequencies*, APS Spring 2008 Conference, New Orleans, LA March, 2008

- **J. Ma**, C.T. Smith, G.J. Weisel, B.L. Weiss, N.M. Miskovsky, D.T. Zimmerman, *Single Mode Microwave Heating of Copper Powder Metal Compacts*, COMSOL User Conference, Boston, Oct. (2006).
- **J. Ma**, E.A. Olevsky, and M.A. Meyers, *Synthesis of dense TiC-Ti based cermets via self-propagating high temperature synthesis and quasi-isostatic pressing*, Proc. 36th International SAMPE Technical Conference (2004).
- X. Wang, **J. Ma**, A. Maximenko, E.A. Olevsky, M. B. Stern, and B. M. Guenin, *Preliminary study on synthesis of composites by electrophoretic deposition and microwave sintering*, Proc. Annual IMAPS Conf., Long Beach, CA (2004).
- **J. Ma**, E. Olevsky, and M. Meyers, *Modeling of Densification of Cermet Composites*, 16th Annual CSU Student Research Competition, Long Beach, CA, May, (2002).

GRANTS

- H. Martinez (Student), J. Ma (Faculty), Experimental Study of Vertical Axis Wind Turbine (VAWT) with Pitch and Camber Controls, Enhancing Undergraduate Research Experiences & Creative Activities (EURECA), Summer 2018 Faculty And Student Team (FAST) Awards, \$6,000 (pending review)
- **J. Ma (PI)**, K. Coogler (Co-PI), Development of a Project-based Introductory Manufacturing Process Course, Professional and Academic Center for Excellence, Sam Houston State University, \$7,000 (2017)
- **J. Ma (PI)**, M. Saadeh (Co-PI), L. Ho-hoon (Co-PI), *Development of an Engineering Design, Analysis, and Prototyping Laboratory*, Louisiana Board of Regents (\$53,500) and Southeastern Louisiana University (\$17,000). Total **\$70,500** (2015)
- V. Sebastian (PI), **J. Ma (Co-PI)**, *Tapping into a Well of Potential*, American Association of Drilling Engineers. **\$25,000** (2014)
- M. Saadeh (PI), **J. Ma (Co-PI)**, *Automated Rod Singulation Station*, Louisiana Board of Regents (\$11,850) and Laitram LLC. (\$9,736). Total **\$21,586** (2014)
- **J. Ma (PI)**, *Expanding Computational Power of the COMSOL Software Package by Acquiring Computational Fluid Dynamics (CFD) Module*, Office of Technology, Southeastern Louisiana University. **\$4,495** (2013)
- **J. Ma (PI)**, *Microwave and Spark Plasma Sintering (SPS): recent experimental development, modeling and simulation using COMSOL Multiphysics*, International Week, Pole University France. **\$3,000** (2013)
- **J. Ma (PI)**, *Acquisition of the SolidWorks 3D CAD Software*, Center for Faculty Excellence of Southeastern Louisiana University. **\$1,000** (2012)
- **J. Ma (PI)**, *Biomass based experimental Bio-Ethanol production plant*, Office of Technology of Southeastern Louisiana University. **\$5,000** (2011)
- **J. Ma (PI)**, *Evaluation of the Performance of a Vacuumed Tube Solar Water Heater*, Office of Technology of Southeastern Louisiana University. **\$4,730** (2010)
- N. Huy, D. Joshua, D. Aaron, R. Thomas, C. Bradley, **J. Ma (Faculty Advisor)**, *Solar Water Heating System Analog-to-Digital Signal Converter*, STAR Program of the College of Science and Technology, Southeastern Louisiana University. **\$1,497.94**

(2009)

- P. Derek, F. Jameson, **J. Ma (Faculty Advisor)**, *Mini Baja Car Project*, STAR Program of the College of Science and Technology, Southeastern Louisiana University. **\$2,145** (2009)
- **J. Ma (PI)**, *Numerical Computing and Graphics Power for the Engineering Technology Bachelors Degree Program*, Office of Technology of Southeastern Louisiana University. **\$15,348** (2008)
- **J. Ma (PI)**, *Design and Fabrication of Miniature Lightweight Bridge*, Office of Technology of Southeastern Louisiana University. **\$4,989** (2008)

PROFESSIONAL AFFILIATIONS

- The American Society of Mechanical Engineers (ASME)
- Materials Research Society (MRS)
- International Microelectronics and Packaging Society (IMAPS)