
EDUCATION

Doctor of Philosophy	Materials Science and Engineering, Lehigh University, May, 2005
Masters of Science	Materials Science and Engineering, Lehigh University, June 2002
Bachelors of Science	Materials Science and Engineering, Rensselaer Polytechnic Institute, June 1997

WORK EXPERIENCE

Founder/CEO

Columbus Idea Foundry, Columbus OH 2008-present

2008–Present

Founder/director of a novel community workshop, educational center, micromanufacturing facility and business/incubator (the Columbus Idea Foundry). CIF offers classes and provides member access to design/fabrication/programming resources. Within three years, grew the business from a 2,400 square foot garage to a 65,000 square foot industrial facility with 20 rental tenants, 300 members, and multiple business spin-offs. Responsible for all strategy, management, business and promotional duties, and interface with organizations such as Battelle Memorial Institute, OSU, COSI, Ohio Department of Education, NSF, etc. In 2013, received \$435k in grants to build out a new building to be purchased and relocated to in 2014. Relocated in 2014, purchased building in 2015 after receiving 7-figure investment.

Senior Research Scientist

Scientific Forming Technologies Corporation, Columbus OH

2005–2013

Develop and implement new material and process models in the Finite Element Modeling code DEFORM™ and standalone programs. Provide technical support to hundreds of users (including GE, USAF, US Navy, GM, etc). Manage technical implementation and documentation (including proposal and report writing) of multiple SBIR, STTR and internal R&D programs simultaneously. Interface with government, industry, and academic program managers and partners. Lecture nationally and internationally about computational material modeling.

Graduate Research Assistant

Institute for Metal Forming, Lehigh University, Bethlehem, PA

1997–2005

Helped rebuild the IMF as 1st graduate student to work with Prof. Wojciech Z. Misiolek at Lehigh University. Performed many materials science R&D projects, from mechanical metallurgy to SEM/TEM to numerical modeling.

Virtual Environment Programmer

Ashton Graybiel Spatial Orientation Laboratory, Brandeis University, Waltham, MA

1995

Programmed and operated three-dimensional virtual environment during research co-op. Simulated aerospace motion to study the effect of rapid acceleration on human perception.

Research Assistant

NY State Center for Advanced Technology in Automation and Robotics, RPI, Troy, NY

1992–1996

Performed various independent and team research projects, including rapid prototyping of powdered metals, die design for aluminum extrusion, and development of electroactive polymers for virtual interfaces.

RESEARCH EXPERIENCE

Computer Modeling of Recrystallization in 6xxx Aluminum Alloys, PhD Dissertation, Lehigh University

2003–Present

Developed a unified recrystallization model to predict properties of hot-formed parts phenomenologically via FEM. In addition to modeling, this involved hands-on experiments/analysis.

3D Characterization and Modeling of Al-Mg-Si Alloys, NSF grant, in collaboration with RPI

2002–2004

Collaborated with researchers from Mechanical, Aerospace, and Nuclear Engineering Dept. at RPI to characterize and model 3D microstructures of Al-Mg-Si alloys during hot bulk forming.

Metallurgical R&D Projects, Institute for Metal Forming, MS&E Department, Lehigh University

1997–2004

Performed/managed many applied and theoretical metal forming projects, e.g. process optimization; new alloy characterization; design/construction of metal forming press. Wrote/presented reports to technical, managerial, and financial persons in industry, government, and academia in US and abroad.

Visioplasic Quantification Software for Aluminum Extrusion, Masters Thesis, Lehigh University

2000–2002

Authored software which quantifies flow during extrusion, calibrates metal-flow patterns predicted by FEM packages, visualizes defects, and helps optimize die design and extrusion process parameters.

Process Engineering – Forging & Wire Drawing, Intelligent Materials & Mfg. Lab, Lehigh University

2000–2002

Tailored properties of steel wire/forging slugs by tuning process parameters for PEM Corp., Danboro, PA. Collaborated with industry and government partners, implemented final design in-house.

Process Engineering – Powder Metallurgy/Rapid Prototyping, Rensselaer Design Research Center, RPI

1995–1996

Improved net-shape accuracy of steel powder metallurgy parts fabricated by a rapid-prototyping process. Calculated warping during sintering and wrote software to compensate for error in the initial part design.

TEACHING EXPERIENCE

- Guest Lecturer – ‘Metal Methods’, Johnson State College, Johnson, VT** 2003-2005
Teach “Academic Metalsmithing” workshop session twice per year for a metalsmithing art class. This presents the engaging challenge of instructing technical material to non-technical metal forming artists.
- FEM Instructor, Metal-Forming Short Course, Institute for Metal Forming , Lehigh University** 2002
Technical presenter and lab demonstrator for a two-day short course attended by industry professionals.
- SEM Demonstrator, Electron Microscopy Short Course, MS&E Dept., Lehigh University** 2001
SEM operator for Lehigh University Electron Microscopy short course, attended by industry professionals.
- Teaching Assistant – ‘SEM&TEM’, MS&E. Department, Lehigh University** 1999
Lectured labs, instructed SEM, graded weekly lab reports. Most time-intensive class in MS&E Dept; costliest course at LU to operate; ‘only course in the world’ where undergraduate students receive SEM and TEM instruction and experience. TA while also a graduate RA and also taking graduate MS&E courses.
- Teaching Assistant – ‘Technical Presentations’, MS&E. Department, Lehigh University** 1998
Assisted undergraduate engineering students to learn how to compose and deliver effective technical presentations. TA while also a graduate RA and also taking graduate MS&E courses.
- Teaching Assistant – ‘Powder Metallurgy’, MS&E. Department, Lehigh University** 1997
Graded P/M course while also a graduate RA and also taking graduate MS&E courses.
- Teaching Assistant – ‘Embedded Control Lab’, Electrical, Computer, and Systems Engineering Dept., RPI** 1994
1st undergraduate, as well as the 1st non-ECSE Dept. student, to TA intensive electronics and control-systems course ‘Introduction to Embedded Control’. Also a full-time undergraduate student at the time.

MATERIALS SCIENCE & ENGINEERING SKILLS

Materials Science and Engineering Theory and Practice

Metal forming (especially extrusion, wire drawing, forging). Welding; solidification; P/M; light alloys; composites; electronic packaging. Theoretical and experimental; emphasis on microstructural evolution during forming, with an interest in predicting macroscopic properties as a result of forming processes and parameters.

Numerical Modeling in Materials Science and Engineering

FEM; Monte Carlo; Voronoi cell; neural networks. Specializing in combinations of these methods for optimum predictive properties displayed and operated via intuitive, web-based graphical user interfaces.

Electron Microscopy

SEM, TEM (operation and sample-prep), EBSD; EPMA; X-EDS/WDS (qualitative/quantitative); EELS/PEELS. Have taken every electron microscopy graduate and undergraduate class at Lehigh University.

Light-Optical Microscopy

Metallography; sample prep; lapping. Image analysis of serial-polishing for 3D microstructure visualization.

Mechanical Testing

Hardness/microhardness, physical (tensile, compressile, thermo-mech., fatigue), heat treating.

Hands-On Fabrication and Design Experience

Machine shop (machining, basic welding). Experience in design and construction of control systems & instrumentation for laboratory metal forming/testing equipment.

PROGRAMMING AND ELECTRONICS SKILLS

Computer Languages: Java, C/C++, HTML, Fortran, Assembler (IBM, Sun, and Motorola), Pascal, VBasic.

Hardware Instrumentation: Experienced in computer interface and control of equipment (e.g. presses, furnaces, test beds)

FOREIGN LANGUAGE SKILLS

French Fluent (*reading and writing*)

Japanese Conversational (2 yrs) Guest lectured at Waseda, Japan’s premier private technical university (2002).

Arabic Elementary

AWARDS & PUBLICATIONS

1st Place – *Extrusion Technology Student Design Competition, 2003*

2nd Place – *Extrusion Technology Student Design Competition, 2002*

Axsel Madsen Scholarship – *Powder Metallurgy and Particulate Materials Conference, 2001*

Student Grand Prize – *Extrusion Technology Student Design Competition, 1999*

Publications – *6 refereed journal articles, 2 chapters in refereed books, 16 conference proceedings publications*

REFEREED JOURNAL PUBLICATIONS

- *Analysis of Strain Distribution and Microstructural Evolution during Wire Drawing*, A. R. Bandar, R. B. Gifford, W. Z. Misiolek, J. P. Coulter. *Journal of Materials and Manufacturing Processes* (in review)
- *Metal Flow Analysis in Aluminum Extrusion: Microstructure Characterization and Modeling*. Wojciech Z. Misiolek, William H. Van Geertruyden, Steven R. Claves, Alexander Bandar, Pawel A. Kazanowski, and Panya A. Kansuwan, submitted to *International Journal of Forming Processes* (accepted and in press).
- *The Analysis and Control of Micro-Hardness Distribution during Wire Drawing*, R. B. Gifford, A. R. Bandar, J. P. Coulter, W. Z. Misiolek. *ASME Journal of Manufacturing Science and Engineering* (accepted and in press)
- *Three-Dimensional (3D) Reconstruction of AlFeSi Intermetallic Particles in 6xxx Aluminum Alloys Using the Focused Ion Beam (FIB)*. S.R. Claves, A.R. Bandar, W.Z. Misiolek. *Microscopy and Microanalysis*, vol. 10, (Supplement 2), 2004, pp. 1138-1139.
- *Impact of Die Geometry on Microhardness and Grain Size of Cold-Drawn Steel Wire*, A. R. Bandar, R. B. Gifford, W. Z. Misiolek, J. P. Coulter. *Materials and Manufacturing Processes*, V. 19, No. 3, 2004, pp. 507-521.
- *Three-dimensional material flow analysis of asymmetric hollow extrusions*, Alexander R. Bandar, Kai Lorcharoensery, Wojciech Z. Misiolek. *Journal of Materials Processing Technology*, v. 80-81, (1998), pp. 657-664.

REFEREED ARTICLES IN BOOKS OR NOMOGRAPHS

- *Artifacts in Qualitative X-Ray Microanalysis of Loose Powder*, S. K. Lorcharoensery, A. R. Bandar, W. Z. Misiolek. *Advances in Powder Metallurgy and Particulate Materials*, 2001, part 2, pp. 140-148.
- *A Numerical Analysis of the Wire Drawing Process*. R. B. Gifford, A. R. Bandar, J. P. Coulter, W. Z. Misiolek. *Metal Forming 2000*, (eds. M. Pietrzyk, J. Kusiak, J. Majta, P. Hartley and I. Pillinger), A.A. Belkema, Rotterdam, 2000, 597-604.

REVIEWED CONFERENCE PROCEEDINGS

- *The Effect of Additional Shear Strain Layer on Mechanical Properties of Fine Drawn Wire*, S. Kajino, M. Asakawa, W. Z. Misiolek, A. R. Bandar, S. R. Claves. *The 10th International Conference Metal Forming 2004*, Krakow, Poland, September 19-22, 2004
- *A Methodology for Quantitative Three-Dimensional Comparison of Experimental and Computer Simulated Microstructure Textures of 6xxx Aluminum Alloy*. Alexander R. Bandar, Steven R. Claves, Jing Lu, Karel Matous, Wojciech Z. Misiolek, Antoinette M. Maniatty. *Proceedings of the 8th Aluminum Extrusion Technology Seminar, ET'04*, Orlando, FL, AA&AEC, 2004, pp. 169-176, (I).
- *Multiscale Modeling of Large Deformations in 3-D Polycrystals*, J. Lu, A.M. Maniatty, W.Z. Misiolek and A. Bandar. *Proceedings of the 8th International Conference on Numerical Methods in Industrial Forming Processes*, eds. S. Ghosh, J. M. Castro, J. K. Lee, Columbus, Ohio, June 13-17, 2004, pp. 1784-1787.
- *Microstructural Evaluation of 6xxx Aluminum Alloys for Computer-Simulated Texture Prediction*. Alexander R. Bandar, Steven R. Claves, Jing Lu, Karel Matous, Wojciech Z. Misiolek, Antoinette M. Maniatty. *8th International Aluminum Extrusion Technology Seminar ET 2004*, Orlando, FL, May 2004, The Aluminum Association & Aluminum Extruders Council (accepted for publication)
- *Elasto-viscoplastic finite element analysis of polycrystals*. A.M. Maniatty, K. Matous, A. Bandar, S.R. Claves, and W.Z. Misiolek, *Proceedings of the US National Congress on Computational Mechanics*, Albuquerque, NM, CD-ROM, 2003.
- *Characterization of Aluminum Extrusions: Modeling of Metal Flow and Microstructure Response*. Wojciech Z. Misiolek, William H. Van Geertruyden, Steven R. Claves, and Alexander Bandar *Proceedings of The 5th International ESAFORM Conference on Material Forming*, eds. M. Pietrzyk, Z. Mitura, J. Kaczmar, AGH, Krakow, April 14-17, 2002, pp. 431-434.
- *Analysis of Material Response to Processing Conditions: A Case Study of Aluminum Extrusion*. Wojciech Z. Misiolek, William H. Van Geertruyden, Steven R. Claves, Alexander R. Bandar, Pawel Kazanowski, Panya A. Kansuwan, *The 10th JSME/ASME International Conference on Materials and Processing*, October 15-18, 2002, Honolulu, Hawaii, Vol. 2. 143-148.
- *Physical Modeling of Direct Extrusion through Weld Plates to Increase Yield*, A. R. Bandar, Wojciech Z. Misiolek. *Proceedings of the 7th International Conference on Technology of Plasticity*, Yokohama, Japan, Oct. 27-Nov 1, 2002, pp. 421-426 (I).
- *PM²TEC Student Perspective* – Alexander R. Bandar, *International Journal of Powder Metallurgy*, August-September, 2001.
- *Physical and Numerical Modeling of Billet Upsetting*, Alexander R. Bandar, Leonard Negvesky, Wojciech Z. Misiolek, Pawel Kazanowski. *Proceedings of the Seventh International Aluminum Extrusion Technology Seminar, ET'00*, Chicago, IL, May 16-19, 2000, pp. 159-166 (I)

- *Improving Flow in Soft-Core Bimaterial Billets*, Alexander R. Bandar, Wojciech Z. Misiolek, Kevin E. Kloske, TaeHo Jeong. Proceedings of the Seventh International Aluminum Extrusion Technology Seminar, ET'00, Chicago, IL, May 16-19, 2000, pp. 223-227 (II)
- *A Numerical Analysis of the Wire Drawing Process*, R. B. Gifford, A. R. Bandar, J. P. Coulter, W. Z. Misiolek. Metal Forming 2000 (eds. M. Pietrzyk, J. Kusiak, J. Majta, P. Hartley, and I. Pillinger), A. A. Belkema, Rotterdam, 2000, pp. 597-604.
- *Material Flow in Round-to-Round Bimaterial Billets*, Alexander R. Bandar, Kevin E. Kloske, Taeho Jeong, Wojciech Z. Misiolek. Proceedings of the 13th Conference with Industry – Competing in a Global Manufacturing Environment, Center for Manufacturing Systems Engineering, Lehigh University, May 24-25, 1999, Bethlehem, PA.
- *Real-time Three-dimensional Visualization of Material Flow in Extrusion*, A. R. Bandar, K. E. Kloske, T. Jeong, W. Z. Misiolek. 6th International Conference on Technology of Plasticity, Sept. 19-24, 1999, Nuremberg, Germany, vol. III, pp. 1795-1800.
- *EBSD Analysis of Metal Flow of 360 Cutting Brass in Indirect Extrusion*, W. H. VanGeertruyden, A. R. Bandar, K. Lorcharoensery, W. Z. Misiolek. Advanced Technology of Plasticity 1999 – Proceedings of the 6th International Conference on Technology of Plasticity – Nuremberg, Germany, September 19-24, 1999, vol. III, 1851-1856.
- *Quantitative Vision-Based Strain Analysis for Rapid Manufacturing*, A. R. Bandar, S. J. Rock, W. Z. Misiolek. Proceedings of the 11th Conference with Industry – Strategic Technologies for Global Manufacturing, Center for Manufacturing Systems Engineering, Lehigh University, April 28-29, 1997, Bethlehem, PA.