

Education & Certification

PhD, Mechanical Engineering (*Materials Science Emphasis*)

Brigham Young University, Provo, UT | Dec 2010 | 3.83 GPA

BS, Mechanical Engineering (*Math Minor*)

Brigham Young University, Provo, UT | Apr 2006 | 3.84 GPA

Professional Engineering License (*Metallurgical and Materials Engineering, Mechanical Engineering*)

Texas Board of Professional Engineers | Dec 2014–Present | License Texas PE 118748

Work Experience

Senior Materials Scientist

Halliburton | Oct 2013–Present | Conroe, TX

- » Provide metallurgical, materials, and mechanical engineering technical expertise to improve drill-bit manufacturing
- » Develop and enhance metal-matrix composite (MMC) materials:
 - Alloys: copper, nickel, manganese, zinc, tin (non-ferrous)
 - Powders/grit: tungsten carbide, diamond, tungsten, nickel, copper, manganese, iron, cobalt, phosphorus, zinc
 - Ceramics: cemented tungsten carbide (WC), alumina (monolithic and fiber composite), high-temperature insulators
- » Evaluate and enhance manufacturing processes:
 - Pre-manufacture: graphite machining, sand molding, steel machining, powder blending
 - Manufacture: mold loading and vibration; pre-heating; furnace cycling and quenching (radiation and conduction heat transfer; utilized numerical modeling to qualify and select optimal material configurations)
 - Post-manufacture: lathe and grinding operations
- » Analyze and identify materials, morphologies, and microstructures using scanning electron (SEM) and optical microscopy, energy-dispersive spectroscopy (EDS), and x-ray fluorescence (XRF)
- » Create test methods and metrics to qualify new materials and manufacturing processes; use statistics to quantify process effects
- » Create data-mining, image-analysis, and statistical-optimization routines, including for design of experiments (DoE)
- » Write and implement test plans for research, quality, and manufacturing; document results in presentations and reports
- » Identify optimal material substitutions while maintaining quality, performance, and manufacturability; 2016 project yields savings of \$1–2M per year
- » Develop a comprehensive and aggressive IP strategy for materials and manufacturing; filed 40 patent applications

Academic Reviewer

Various Technical Journals | Oct 2011–Present

Conducted about 60 article reviews for technical journals, including:

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| » <i>Journal of Alloys & Compounds</i> | » <i>Metallurgical and Materials Transactions A</i> |
| » <i>Journal of Materials Engineering and Performance</i> | » <i>Science and Technology of Welding and Joining</i> |
| » <i>Journal of Materials Science</i> | » <i>Surface and Coatings Technology</i> |
| » <i>Materials & Design</i> | » <i>Vacuum</i> |

Technical Advisor (*Community Advisory Board*)

The MathWorks | Apr 2016–Present

- » Provide frequent feedback on Matlab and Cody to The MathWorks employees
- » Perform administrative functions on the Cody website

Technology Development Specialist

Pratt & Whitney (UTC), East Hartford, CT | 2011–13

- » Served as technical advisor to materials, structures, design, management, and project groups
- » Managed budgets totaling over \$300k, and provided guidance on additional budgets totaling over \$1M, to support testing and validation of novel material systems
- » Drafted a comprehensive technology development plan (TRL 1–6), including material test plans and non-destructive inspection (NDI) techniques
- » Presented monthly material recommendations to executives
- » Coordinated and led various meetings to gain support for implementing new technology
- » Developed and implemented a comprehensive and aggressive IP strategy to ensure adequate patent protection; filed over 40 patent applications
- » Led a cross-sectional group of the company to submit a large and diverse group of IP disclosures
- » Named as an expert reviewer for the internal patent review committee
- » Leveraged stereolithography (SLA), selective laser sintering (SLS), fused deposition modeling (FDM), electron-beam melting (EBM), laser-engineered net shaping (LENS), and direct-metal laser sintering (DMLS) for product development
- » Directed a plating process-parameter design of experiment (DoE)
- » Tested various polymers with and without plating to select optimal performer and/or reduce cost
- » Coordinated with various additive manufacturing (AM) and plating/electroforming vendors
- » Developed standard operating procedures and documents

Doctoral and Post-doc Researcher

Brigham Young University, Provo, UT | 2006–11 (*Funded by the Office of Naval Research*)

- » Published a review of transient liquid phase (TLP) and partial TLP (PTLP) bonding
- » Developed and documented a novel filtering procedure to identify ideal PTLP bond interlayer combinations
- » Conducted sessile-drop and bonding tests of metallic and ceramic materials; analyzed these using a scanning electron microscope (SEM) and energy-dispersive spectroscopy (EDS)
 - metals: copper, gold, silver, palladium, aluminum, titanium, magnesium, cobalt, nickel, antimony, zinc, tin, lithium, indium, bismuth, lead, germanium, praseodymium, neodymium, cerium, tellurium, lanthanum, europium, and ytterbium
 - ceramics: cemented tungsten carbide (WC) and polycrystalline cubic boron nitride (PCBN)
- » Bonded ceramic materials using plasma-vapor deposited (PVD) metal interlayers to withstand high stresses at high temperatures for a friction-stir welding application

Publications

- » “Partial transient liquid phase bonding, part I: A novel selection procedure for determining ideal interlayer combinations, validated against Al_2O_3 PTLP bonding experience,” *Metallurgical and Materials Transactions A*, 2013.
- » “Partial transient liquid phase bonding, part II: A filtering routine for determining all possible interlayer combinations,” *Metallurgical and Materials Transactions A*, 2013.
- » “Overview of Transient Liquid Phase and Partial Transient Liquid Phase Bonding,” *Journal of Materials Science*, 2011. (Sapphire Prize finalist) (cited over 200 times, over 6000 downloads from SpringerLink)
- » “Joining Polycrystalline Cubic Boron Nitride and Tungsten Carbide by Partial Transient Liquid Phase Bonding,” PhD Dissertation, Brigham Young University, 2010.

Links to these publications are available at my [LinkedIn profile](#).

Computer Skills

- » Matlab
- » JMP and Minitab
- » SAP
- » Microsoft Office (Excel, Word, PowerPoint, and Outlook)
- » Adobe Acrobat Pro, Illustrator, InDesign, and Photoshop
- » Macintosh, Windows, and Unix/Linux OSs