

Exponent®
Engineering & Scientific Consulting

Randy Groves, Ph.D.

Senior Manager | Metallurgical and Corrosion Engineering
Bowie
+1-301-291-2597 | rgroves@exponent.com

Professional Profile

Randy Groves, Ph.D., is a senior manager in Exponent's Metallurgical & Corrosion Engineering practice with over 30 years of experience in defense technology, materials science, semiconductors, and advanced manufacturing. He advises defense agencies, government contractors, and technology organizations on Army modernization, digital engineering, failure analysis, and technology strategy.

Army Modernization & Robotics

Dr. Groves brings a rare combination of operational military command experience and advanced materials science expertise to Army modernization and defense technology consulting. As a colonel and group director at the Army Reserve Innovation Command, he led strategic initiatives to identify and integrate emerging technologies in support of Army Futures Command, overseeing a brigade-equivalent unit and coordinating innovation efforts across five city teams within the Army Reserve's 75th Innovation Command. His combat deployments to Iraq, Afghanistan, and Kuwait included command of an engineer brigade and an engineer battalion, management of a $180M base construction project, and the deconstruction of 17 forward operating bases. Dr. Groves advises clients on robotics and autonomous systems (RAS) integration, force modernization planning, and the translation of emerging technology into operational military capability.

Digital Engineering & MBSE

Dr. Groves holds certification as an Expert Systems Engineer Professional and is a member of the International Council on Systems Engineering (INCOSE). He applies model-based systems engineering (MBSE) and the Unified Architecture Framework (UAF) to help defense clients structure complex system-of-systems problems, align technical architectures with acquisition requirements, and reduce integration risk across large programs. His experience spans the intersection of digital engineering and physical systems, enabling clients to build defensible, traceable architectures that satisfy both technical and programmatic stakeholders.

Materials Science & Failure Analysis

Dr. Groves offers deep expertise in materials science and engineering, with particular strength in thin-film deposition, materials characterization, and the investigation of material failures. His characterization toolkit includes X-ray diffraction (XRD), X-ray fluorescence (XRF), X-ray photoelectron spectroscopy (XPS), Rutherford backscattering spectrometry (RBS), secondary-ion mass spectrometry (SIMS), scanning and transmission electron microscopy (SEM/TEM), and reflection high-energy electron diffraction (RHEED). He applies these methods to investigate root causes of material degradation, coating failures, and manufacturing defects across defense, energy, and industrial applications. His

research has contributed to the development of high-temperature superconducting tapes, photovoltaic absorber layers, hydrogen storage nanoparticles, and wear-resistant coatings, giving him a broad foundation for failure investigation across advanced material systems.

Semiconductors, Solar & Manufacturing

Dr. Groves has extensive hands-on experience in semiconductor process engineering and advanced manufacturing, including dielectric etch process optimization for high-volume analog integrated circuits (ICs) and the development of low-cost 3D metal printing (additive manufacturing) processes. He has applied ion beam assisted deposition (IBAD), magnetron sputtering, ion beam sputtering, electron beam evaporation, laser ablation, and chemical vapor deposition (CVD) — including flash evaporation and solid/liquid source processing — across national laboratory, academic, manufacturing, and startup environments. His work on photovoltaic (solar cell) absorber layers and metallization pastes, reflected in multiple issued U.S. patents, positions him to advise manufacturers on process yield, materials selection, and failure modes in solar cell and semiconductor fabrication.

Technology Strategy & Defense Acquisition

Dr. Groves advises organizations navigating the intersection of technology innovation and defense acquisition. His recent experience leading materials innovation under the $1B EDITS contract, founding and leading technology companies, and directing innovation strategy for the Army provides clients with a practitioner's perspective on technology transition, R&D investment prioritization, and acquisition program support. He helps defense contractors, government program offices, and technology startups translate advanced materials and manufacturing capabilities into programs of record, competitive proposals, and fielded systems. His Legion of Merit and Bronze Star Medal reflect a career of influential leadership in high-stakes, resource-constrained environments where technical credibility and strategic judgment are equally essential.

Capabilities

- **Program, Portfolio & Business Leadership:** Large program management; portfolio leadership; capture and business development; client relationship management; operations; resource planning; budget execution; risk management; technology strategy and transition.

- **Defense, Mission Autonomy & Digital Engineering:** Army modernization; mission autonomy; PM RCI support; systems engineering; engineering management; MBSE; UAF; system-of-systems architecture; requirements, interface, and integration analysis.

- **Materials, Manufacturing & Failure Analysis:** Materials engineering; metallurgy and corrosion; root-cause and failure analysis; thin films; materials characterization; semiconductor processing; photovoltaics; superconductors; additive manufacturing; process development and improvement.

- **Methods, Tools & Credentials:** Lean Six Sigma Black Belt Professional; Expert Systems Engineering Professional; MATLAB; Mathematica; Python; SolidWorks; LabVIEW; Microsoft Office; XRD; XRF; XPS; RBS; SIMS; SEM/TEM; RHEED.

Selected Technical Authority

Inventor or co-inventor on patents and applications in metal additive manufacturing, photovoltaics, superconductors, textured substrates, and deposition. Author of 18 first-author and 37 co-authored publications in leading materials and engineering journals.

- **Selected recognition:** 2003 R&D 100 Award for Flexible Superconducting Tape; Los Alamos awards for technology transfer and industrial partnerships; Ashman Award for Materials Science; Legion of Merit (2x); and Bronze Star Medal (2X).

- **Professional affiliations:** International Council on Systems Engineering, American Society of Mechanical Engineers, and Materials Research Society.

Academic Credentials & Professional Honors

Masters, Strategic Studies, US Army War College, 2017

Ph.D., Materials Science and Engineering, Stanford University, 2011

M.S., Materials Engineering, New Mexico Inst. of Mining and Technology, 1996

B.S., Materials Engineering, New Mexico Inst. of Mining and Technology, 1991

2003 R&D Award for Flexible Superconducting Tape, Los Alamos National Laboratory

1997 Los Alamos Award for Excellence in Technology Transfer for Partnership Development Activity, Los Alamos National Laboratory

1996 Award for Excellence in Industrial Partnerships, Los Alamos National Laboratory

1991 Ashman Award for Materials Science, New Mexico Institute of Mining and Technology

1989 Alpha Sigma Mu National Materials Science Honors Society

1988 Tau Beta Pi National Engineering Honor Society

Prior Experience

Exponent | Senior Manager, Metallurgical and Corrosion Practice | Bowie, Maryland | September 2025-Present

Leads multidisciplinary consulting engagements for defense, manufacturing, and energy clients and supports Army mission autonomy through Army CPE MA PM RCI.

Booz Allen Hamilton | Distinguished Engineer/Principal | Alexandria, Virginia | October 2022-August 2025

Served as a senior technical and program leader in the Digital Battlespace Platform team and as materials-engineering key personnel for the approximately $1B Army EDITS contract vehicle.

Tower Semiconductor | Senior Process Engineer/Quality Engineer | San Antonio, Texas | June 2018-September 2022

Managed dielectric etch processes, process development, technology transfer, tool qualification, root-cause investigations, and yield and defect improvement in high-volume analog semiconductor manufacturing.

Lemondrop Consulting | Co-founder, Science and Technology Consultant | San Antonio, Texas | April 2021-September 2022

Provided technical, strategic, commercialization, proposal, resource-planning, and business-development support for materials science and mechanical engineering ventures.

Exabyte.io | Public Sector Business Development Lead | San Francisco, California | September 2021-May 2022

Led public-sector R&D opportunity development, engineering proposals, schedules, marketing materials, and capture-related coordination.

Mantle | Co-founder, President & Senior Engineer | San Francisco, California | November 2015-June 2018

Directed strategy, engineering, operations, financing, and product development for an advanced metal additive-manufacturing startup.

Plant PV | Senior Scientist | Berkeley, California | November 2011-November 2015

Led II-VI photovoltaic materials deposition, characterization, equipment development, and low-cost solar manufacturing research for a DOE-funded startup.

Los Alamos National Laboratory | Technical Staff Member | Los Alamos, New Mexico | October 1996-May 2011

Developed high-temperature superconducting coated-conductor technology, established industrial and academic collaborations, and built a licensed U.S. and international patent portfolio.

United States Army Reserve | Colonel; Director, Army Reserve Innovation Command | Various Locations

| May 1991-June 2021

Completed a 30-year career in engineering, innovation, command, modernization, force integration, human capital, and deployed program leadership.

Professional Affiliations

Member – ASTM International (2022)

Member – International Council on Systems Engineering (2022)

Member – American Society of Mechanical Engineers (ASME) (2012 – Present)

Member – Materials Research Society (MRS) (1996 – Present)

Patents

US Patent 10,807,162: System and Method for Additive Metal Manufacturing, 2020 (Connor ST, Sorom TC, Groves JR)

US Patent 10,418,497: Silver-Bismuth Non-Contact Metallization Pastes for Silicon Solar Cells, 2019 (Hardin BE, Connor ST, Groves JR, Peters CH)

US Patent 10,087,332: Sinterable Metal Paste for Use in Additive Manufacturing, 2018 (Connor ST, Sorom TC, Groves JR)

US Patent 9,873,938: Depositing Calcium Fluoride Template Layers for Solar Cells, 2018 (Hardin BE, Groves JR, Peters CH)

US Patent 9,331,216: Core-Shell Nickel Alloy Composite Particle Metallization Layers for Silicon Solar Cells, 2016(Hardin BE, Groves JR, Peters CH)

US Patent 9,070,811: Multi-crystalline II-VI based Multijunction Solar Cells and Modules, 2015 (Hardin BE, Groves JR)

US Patent 6,933,065: High Temperature Superconducting Thick Films, 2005 (Arendt PN, Foltyn SR, Groves JR)

US Patent 6,921,741: Substrate Structure for Growth of Highly Oriented and/or Epitaxial Layers Thereon, 2005(Arendt PN, Groves JR)

US Patent 6,899,928: Dual Ion-beam Assisted Deposition of Biaxially Textured Cubic Magnesium Oxide Template Layers, 2005 (Arendt PN, Foltyn SR, Groves JR)

US Patent 6,884,527: Biaxially Textured Composite Substrates, 2005 (Arendt PN, Groves JR)

US Patent 6,843,898: High Temperature Superconducting Composite Conductors, 2005 (Foltyn SR, Groves JR)

US Patent 6,800,591: Buffer Layers on Metal Alloy Substrates for Superconducting Tapes, 2004 (Arendt PN, Groves JR)

US Patent 6,756,139: Buffer Layers on Metal Alloy Substrates for Superconducting Tapes, 2004 (Arendt PN, Groves JR)

US Patent 6,716,545: High Temperature Superconducting Composite Conductors, 2004 (Foltyn SR, Groves JR)

Publications

First Author Publications

Groves JR, Li J, Clemens BM, Branz HM, Lasalvia V, Hassoon F, Teplin CW. Biaxially-textured Silicon on Ion Beam Assisted Deposition CaF□ Seed Layers on Glass for Photovoltaics. Energy Environ. Sci. 2012;5:6905–6908.

Groves JR, Hammond RH, Matias V, DePaula RF, Stan L, Clemens BM. Biaxial Texture Development in the Ion Beam Assisted Deposition of Magnesium Oxide. Nucl. Instrum. Methods Phys. Res. B. 2012;272:28–32.

Groves JR, Matias V, DePaula RF, Stan L, Hammond RH, Clemens BM. The Role of Nucleation Surfaces in the Texture Development of Magnesium Oxide During Ion Beam Assisted Deposition. IEEE Trans. Appl. Supercond.2011;21(3).

Groves JR, Hayes GJ, Li JB, DePaula RF, Hammond RH, Salleo A, Clemens BM. Biaxial Texturing of Inorganic Photovoltaic Thin Films Using Low Energy Ion Beam Irradiation During Growth. MRS Proc. 2010;1245:A20-06.

Groves JR, Hammond RH, Matias V, Stan L, DePaula RF, Clemens BM. Optimization of Ion Assist Beam Deposition of Magnesium Oxide Template Films During Initial Nucleation and Growth. MRS Proc. 2010;1254E:L5.10.

Groves JR, DePaula RF, Stan L, Hammond RH, Clemens BM. Fundamental Aspects of Ion Beam Assisted Deposition of Magnesium Oxide Template Films. IEEE Trans. Appl. Supercond. 2009;19(3):3311–3314.

Groves JR, Hammond RH, DePaula RF, Stan L, Clemens BM. Ion-beam Texturing at Nucleation – Manipulation of Crystallographic Orientation in Cubic Materials at the Nanometer Scale. MRS Proc. 2009;1181.

Groves JR, Hammond RH, DePaula RF, Clemens BM. Investigation of Early Nucleation Events in Magnesium Oxide During Ion Beam Assisted Deposition. MRS Proc. 2009;1150E:RR02-02.

Groves JR, Arendt PN, Holesinger TG, DePaula RF, Stan L, Usov IO, Hammond RH. Dual Ion Assist Beam Processing of Magnesium Oxide Template Layers for 2nd Generation Coated Conductors. IEEE Trans. Appl. Supercond. 2007;17(2):3402–3405.

Groves JR, Arendt PN, Foltyn SR, Jia QX, Holesinger TG, Emmert LA, DePaula RF, Dowden PC, Stan L. Improvement of IBAD MgO Template Layers on Metallic Substrates for YBCO HTS Deposition. IEEE Trans. Appl. Supercond. 2003;13(2):2651–2654.

Groves JR, Arendt PN, Foltyn SR, Jia QX, Holesinger TG, Kung H, DePaula RF, Dowden PC, Peterson EJ, Stan L, Emmert LA. Recent Progress in Continuously Processed IBAD MgO Template Meters for HTS Applications. PhysicaC. 2002;382:43–47.

Groves JR, Arendt PN, Foltyn SR, Jia QX, DePaula RF, Dowden PC, Kung H, Holesinger TG, Stan L, Emmert LA, Peterson EJ. Ion-beam Assisted Deposition of MgO with In Situ RHEED Monitoring to Control Bi-axial Texture. MRSProc. 2002;666:F10.6.1–F10.6.7.

Groves JR, Arendt PN, Foltyn SR, Jia QX, Holesinger TG, Kung H, Peterson EJ, DePaula RF, Dowden PC, Stan L, Emmert LA. High Critical Current Density YBa□Cu□O□-δ Thick Films Using Ion Beam

Assisted Deposition MgO Bi-axially Oriented Template Layers on Nickel-based Super Alloy Substrates. J. Mater. Res. 2001;16(8):2175–2181.

Groves JR, Yashar PC, Arendt PN, DePaula RF, Peterson EJ, Fitzsimmons MR. Ultra-thin Bi-axially Textured IBAD MgO Template Layers Resolved by Grazing Incidence X-ray Diffraction. Physica C. 2001;355(3–4):293–298.

Groves JR, Arendt PN, Kung H, Foltyn SR, DePaula RF, Emmert LA, Storer JG. Texture Development in IBAD MgO Films as a Function of Deposition Thickness and Rate. IEEE Trans. Appl. Supercond. 2001;11(1):2822–2825.

Groves JR, Arendt PN, Jia QX, Foltyn SR, DePaula RF, Dowden PC, Kinder LR, Fan Y, Peterson EJ. High Critical Current Density PLD YBCO Deposited on Highly Textured IBAD MgO Buffer Layers. Ceramic Trans. 2000;104:219–224.

Groves JR, Arendt PN, Foltyn SR, DePaula RF, Dowden PC, Peterson EJ, Peterson DE, Springer RW, Hammond RH, Wang CP.Ion-Beam Assisted Deposition of Biaxially Aligned Magnesium Oxide Template Films for Yttrium-Barium-Copper-Oxide Coated Conductors. IEEE Trans. Appl. Supercond. 1999;9(2):1964–1966.

Groves JR. Sputter Deposited Mo/MoN Microlaminate Composites. Master's Thesis, New Mexico Institute of Mining and Technology, May 1996.

Co-authored Publications

Clemens BM, Kadis J, Clemens DM, Pollak EJ, Clark P, Groves JR. Effect of Vibration Treatment on Guitar Tone: A Comparative Study. Savart J. 2014;1(4).

Barnard ES, Hoke ET, Connor ST, Groves JR, Kuykendall T, Yan Z, Samulon EC, Bourret-Courchesne E, Aloni S, Schuck PJ, Peters CH, Hardin BE. Probing Carrier Lifetimes in Photovoltaic Materials Using Subsurface Two-Photon Microscopy. Sci. Rep. 2013;3:2098. doi:10.1038/srep02098.

Han SM, Feng G, Jung JY, Jung HJ, Groves JR, Nix WD, Cui Y. Critical-Temperature/Peierls-Stress Dependent Size Effects in Body Centered Cubic Nanopillars. Appl. Phys. Lett. 2013;102:041910.

Chung CJ, Lee SC, Groves JR, Brower EN, Sinclair R, Clemens BM. Interfacial Alloy Hydride Destabilization in Mg/Pd Thin Films. Phys. Rev. Lett. 2012;108:106102.

Cooke DW, Hellman F, Groves JR, Clemens BM, Moyerman S, Fullerton EE. Calorimetry of Epitaxial Thin Films. Rev. Sci. Instrum. 2011;82:023908

Han SM, Bozorg-Grayeli T, Groves JR, Nix WD. Size Effects on Strength and Plasticity of Vanadium Nanopillars. Scripta Mater. 2010;63(12):1153–1156.

Gsell S, Schreck M, Brescia R, Stritzker B, Arendt PN, Groves JR. Iridium on Biaxially Textured Oxide Templates: A Concept to Grow Single Crystals on Arbitrary Substrates. Jpn. J. Appl. Phys. 2008;47(12):8925–8927.

Stan L, Arendt PN, Wang HY, Foltyn SR, Holesinger TG, Maiorov B, Civale L, Usov IO, Groves JR, DePaula RF, Li YL. Study of $Sm_xZr□□_xO_y$ Buffer Layer and Its Effects on YBCO Properties. IEEE Trans. Appl. Supercond.2007;17(2):3409–3412.

Stan L, Arendt PN, Usov IO, Wang HY, Foltyn SR, Holesinger TG, Maiorov B, Groves JR, DePaula RF, Li YL. Engineered Reactive Co-Sputtered $Sm_xZr□□_xO_y$ Thin Films as Buffer Layers for YBa□Cu□O□□δ Coated Conductors. J. Mater. Res. 2007;22(4):1082–1086.

Stan L, Arendt PN, DePaula RF, Groves JR. Effect of Substrate Temperature on the Texture of MgO Films Grown by Ion Beam Assisted Deposition. Supercond. Sci. Technol. 2006;19(4):365–367.

Cooke DW, Lee JK, Bennett BL, Groves JR, Jacobsohn LG, McKigney EA, Muenchausen RE, Nastasi M, Sickafus KE, Tang M, Valdez JA, Kim JY, Hong KS. Luminescent Properties and Reduced Dimensional Behavior of Hydrothermally Prepared Y□SiO□:Ce Nanophosphors. Appl. Phys. Lett. 2006;88(10):103108.

Usov IO, Arendt PN, Groves JR, Stan L, DePaula RF. Annealing of Radiation Damage in (100), (110), and (111) MgO Single Crystals Implanted with Ar□ Ions. Nucl. Instrum. Methods Phys. Res. B. 2006;243(1):87–91.

Usov IO, Arendt PN, Groves JR, Stan L, DePaula RF. Crystallographic Orientation Dependence of Radiation Damage in Ar□ Implanted YSZ and MgO Single Crystals. Nucl. Instrum. Methods Phys. Res. B. 2005;240(3):661–665.

Arendt PN, Foltyn SR, Civale L, DePaula RF, Dowden PC, Groves JR, Holesinger TG, Jia QX, Kreiskott S, Stan L, Usov IO, Wang H, Coulter JY. High Critical Current YBCO Coated Conductors Based on IBAD MgO. Physica C.2004;412–414:795–800.

Arendt PN, Foltyn SR, Civale L, DePaula RF, Dowden PC, Groves JR, Holesinger TG, Jia QX, Kreiskott S, Stan L, Coulter JY. IBAD MgO Templates for YBCO Coated Conductors. Proc. 11th Japan-US Workshop on High-Tc Superconductors. 2004;80.

Jia QX, Foltyn SR, Arendt PN, Holesinger T, Groves JR, Hawley M. Growth and Characterization of SrRuO□ Buffer Layer on MgO Template for Coated Conductors. IEEE Trans. Appl. Supercond. 2003;13(2):2655–2657.

Paranthaman MP, Aytug T, Kang S, Feenstra RM, Budai JD, Christen DK, Arendt PN, Stan L, Groves JR, DePaula RF. Fabrication of High Jc YBa□Cu□O□□δ Tapes Using Lanthanum Manganate Single Buffer Layers. IEEE Trans. Appl. Supercond. 2003;13(2):2481–2483.

Brewer RT, Atwater HA, Groves JR, Arendt PN. Reflection High-Energy Electron Diffraction Experimental Analysis of Polycrystalline MgO Films with Grain Size and Orientation Distributions. J. Appl. Phys. 2003;93(1):205–210.

Fitzsimmons MR, Leighton C, Nogues J, et al. Influence of In-Plane Crystalline Quality of an Antiferromagnet on Perpendicular Exchange Coupling and Exchange Bias. Phys. Rev. B. 2002;65(13):134436.

Brewer RT, Hartman JW, Groves JR, Arendt PN, Yashar PC, Atwater HA. RHEED In-Plane Rocking Curve Analysis of Biaxially-Textured Polycrystalline MgO Films on Amorphous Substrates Grown by Ion Beam-Assisted Deposition. Appl. Surf. Sci. 2001;175–176:691–696.

Selvamanickam V, Carota G, Funk M, Vo N, Haldar P, Balachandran U, Chudzik M, Arendt PN, Groves JR, DePaula RF. High-Current YBa□Cu□O□□δ Coated Conductor Using MOCVD and IBAD. IEEE Trans. Appl. Supercond.2001;11(1):3379–3381.

Holesinger TG, Foltyn SR, Arendt PN, Jia QX, Dickerson RM, Dowden PC, DePaula RF, Groves JR, Coulter JY. Comparison of Buffer Layer Architectures on Continuously Processed YBCO Coated Conductors Based on IBADYSZ Process. IEEE Trans. Appl. Supercond. 2001;11(1):3359–3364.

Foltyn SR, Arendt PN, DePaula RF, Dowden PC, Coulter JY, Groves JR, Haussamen LN, Winston LP, Jia QX, Maley MP. Development of Meter-Long YBCO Coated Conductors Produced by IBAD and PLD. Physica C.2000;341(4):2305–2308.

Willis JO, Foltyn SR, Arendt PN, Dowden PC, Groves JR, Roper JM, Coulter JY, Rodriguez J. High Current YBCO Coated Conductor Development. Physica C. 2000;335(1–4):73–77.

Jiang H, Hu W, Liang S, Fouflyguine V, Zhao J, Jia QX, Groves JR, Arendt P, Miranda F, Drehman A, Wang S, Yip P. High Quality BaxSr□□xTiO□ Films and Dual-Tuning Microwave Structures. Integr. Ferroelectr. 2000;29(1–2):63–79.

Selvamanickam V, Galinski GB, Carota G, DeFrank J, Trautwein C, Haldar P, Balachandran U, Chudzik M, Coulter JY, Arendt PN, Groves JR, DePaula RF, Newnam BE, Peterson DE. High-Current YBCO Films by MOCVD on Flexible Metal Substrates. Physica C. 2000;333(3–4):155–162.

Holesinger TG, Foltyn SR, Arendt PN, Kung H, Jia QX, Dickerson RM, Dowden PC, DePaula RF, Groves JR, Coulter JY. Microstructure of YBCO Coated Conductors with CeO_2 and IBAD YSZ Buffer Layers. J. Mater. Res.2000;15(5):1110–1119.

Coulter JY, Willis JO, Mann MM, Dowden PC, Foltyn SR, Arendt PN, Groves JR, DePaula RF, Maley MP, Peterson DE. Magnetic-Field Anisotropy of High-Critical Current YBCO Coated Conductors. IEEE Trans. Appl. Supercond.1999;9(2):1487–1489.

Peterson EJ, Arendt PN, Coulter JY, Dowden PC, Foltyn SR, Groves JR, Hults WL, Smith JL, Willis JO. XRD Analysis of YBCO Superconducting Film. Impact of Recent Advances in Processing of Ceramic Superconductors.1998;83.

Jia QX, Groves JR, Arendt P, Fan Y, Findikoglu AT, Foltyn SR. Integration of Nonlinear Dielectric BST with Polycrystalline YIG for Dual-Tuning Microwave Devices. Appl. Phys. Lett. 1999;74(11):1564–1566.

Foltyn SR, Arendt PN, Dowden PC, DePaula RF, Groves JR, Coulter JY, Jia QX, Maley MP, Peterson DE. Performance of Meter-Long YBCO/IBAD Flexible Tapes. IEEE Trans. Appl. Supercond. 1999;9(2):1519–1522.

Jia QX, Arendt PN, Groves JR, Fan Y, Roper JM, Foltyn SR. Role of IBAD YSZ on Properties of RuO_2 and SiO_2/Si. J. Mater. Res. 1998;13(9):2461–2464.

Jia QX, Roper JM, Arendt PN, Foltyn SR, Fan Y, Groves JR. Oriented Conductive Oxide Electrodes on SiO□/Si. Integr. Ferroelectr. 1998;21:397–406.

Jia QX, Findikoglu AT, Arendt PN, Foltyn SR, Roper JM, Groves JR, Coulter JY. Superconducting YBCO Thin Films on Polycrystalline Ferrite for Tunable Microwave Components. Appl. Phys. Lett. 1998;72(14):1763–1765.

Arendt PN, Foltyn SR, Groves JR, DePaula RF, Dowden PC, Roper JM, Coulter JY. YBCO/YSZ Coated Conductors on Flexible Ni Alloy Substrates. Appl. Supercond. 1998;4(10–11):429–434.

Jia QX, Arendt PN, Kwon C, Roper JM, Fan Y, Groves JR, Foltyn SR. Biaxially Oriented Conductive La□.□Sr□.□CoO□ Thin Films on SiO□/Si. J. Vac. Sci. Technol. A. 1998;16(3):1380–1383.

Findikoglu AT, Foltyn SR, Arendt PN, Groves JR, Jia QX, Peterson EJ, Maley MP, Reagor DW. Power-Dependent Microwave Properties of YBCO Films on Buffered Polycrystalline Substrates. Appl. Phys. Lett. 1997;70(24):3293–3295.

Foltyn SR, Arendt PN, Dowden PC, Groves JR, Coulter JY, Peterson EJ. Continuous Processing of YBCO/IBAD Coated Conductors on Flexible Substrates. Proc. Int. Workshop on Superconductivity. 1997.

Presentations

Invited Presentations

Groves JR, Hammond RH, DePaula RF, Clemens BM. Investigation of Early Nucleation Events in Magnesium Oxide During Ion Beam Assisted Deposition. Poster presentation, Symposium RR: Artificially Induced Grain Alignment in Thin Films, MRS Fall Meeting, Boston, MA, December 1–5, 2008.

Groves JR, Arendt PN, Usov I, Stan L, DePaula RF. Ion Damage Anisotropy Investigations of MgO Crystals. Poster presentation, Symposium RR: Artificially Induced Grain Alignment in Thin Films, MRS Fall Meeting, Boston, MA, December 1–5, 2008.

Groves JR, Arendt PN, Foltyn SR, DePaula RF, Dowden PC, Stan L. IBAD Template Layers for HTS Coated Conductors: Issues and Current Status at LANL. Oral presentation, MRS International Workshop on Processing and Applications of Superconductors, Gatlinburg, TN, July 31–August 2, 2002.

Groves JR, Arendt PN, Foltyn SR, Jia QX, Holesinger TG, Kung H, DePaula RF, Dowden PC, Peterson EJ, Stan L, Emmert LA. Recent Progress in IBAD MgO Template Meter HTS Performance at LANL. Oral presentation, 10thAnnual US-Japan Workshop on High-Tc Superconductors, Santa Fe, NM, December 2–5, 2001.

Groves JR, Arendt PN, Foltyn SR, Jia QX, Holesinger TG, Kung H, DePaula RF, Dowden PC, Peterson EJ, Stan L, Emmert LA. Development of the IBAD MgO Process for HTS Coated Conductors. Oral presentation, International Workshop on Superconductivity, Honolulu, HI, June 24–27, 2001.

Conference Presentations

Groves JR, Hammond RH, Matias V, DePaula RF, Stan L, Clemens BM. The Effect of Nucleation Layers on Biaxial Texture Development in IBAD MgO. Oral presentation, Symposium DD: Artificially Induced Crystalline Alignment, Thin Films and Nanostructures, MRS Fall Meeting, Boston, MA, November 30–December 1, 2010.

Groves JR, Matias V, DePaula RF, Stan L, Hammond RH, Clemens BM. Optimization of Ion Assist Beam Deposition of Magnesium Oxide Template Films During Initial Nucleation and Growth. Oral presentation, Symposium L: Recent Advances in High-Temperature Superconductivity, MRS Spring Meeting, San Francisco, CA, April 6–9, 2010.

Groves JR, Hayes GJ, Li JB, DePaula RF, Hammond RH, Salleo A, Clemens BM. Biaxial Texturing of Inorganic Photovoltaic Thin Films Using Low Energy Ion Beam Irradiation During Growth. Oral presentation, Symposium A:Amorphous and Polycrystalline Thin-Film Silicon Science and Technology, MRS Spring Meeting, San Francisco, CA, April 6–9, 2010.

Clemens BM, Groves JR, Hayes GJ. Thin Film Seed Layer Deposition for Photovoltaic Materials. Oral presentation, Stanford Photonics Research Center Workshop: Inorganic Thin Film PV Materials Toward Grid Parity, Stanford University, CA, March 14, 2009.

Groves JR, Hammond RH, DePaula RF, Stan L, Clemens BM. Ion-Beam Texturing at Nucleation – Manipulation of Crystallographic Orientation in Cubic Materials at the Nanometer Scale. Oral presentation, Symposium DD: Ion Beams and Nano-Engineering, MRS Spring Meeting, San Francisco, CA, April 14–17, 2009.

Groves JR, Clemens BM, Holesinger TG, Stan L, DePaula RF, Hammond RH. Fundamental Aspects of Ion Beam Assisted Deposition of Magnesium Oxide Template Films. Oral presentation, Applied Superconductivity Conference, Chicago, IL, August 17–22, 2008.

Groves JR, Arendt PN, Foltyn SR, DePaula RF, Dowden PC, Peterson EJ, Kung H, Smith JF, Jia QX, Holesinger TG. Analysis and Performance of IBAD MgO Template Films Used for Second Generation YBCO Coated Conductors. Oral presentation, Applied Superconductivity Conference, Virginia Beach, VA, September 2000.

Groves JR, Arendt PN, Foltyn SR, DePaula RF, Dowden PC, Peterson EJ, Peterson DE, Springer RW, Hammond RH, Wang CP. Ion-Beam Assisted Deposition of Biaxially Aligned Magnesium Oxide Template Films for Yttrium-Barium-Copper-Oxide Coated Conductors. Oral presentation, Applied Superconductivity Conference, Palm Desert, CA, September 1998.

Groves JR, Arendt PN, DePaula RF, Peterson EJ. LANL Progress on IBAD MgO for 3M CRADA. Oral presentation, 3M CRADA Quarterly Meeting, Los Alamos, NM, September 28, 1998.

Project Experience

Army Modernization, Robotics & Autonomous Systems

- **Built an Army innovation organization:** Established a brigade-equivalent Central Innovation Group supporting Army Futures Command and coordinated Army, university, and technology partners to accelerate emerging innovation capabilities for the U.S. Army.
- **Supported PM RCI mission autonomy at Exponent:** Applied materials, systems, and operational expertise to Army mission-autonomy and emerging-technology efforts.
- **Supported the Army EDITS vehicle at Booz Allen Hamilton:** Served as a Distinguished Engineer and materials-engineering key person supporting emerging soldier solutions, technology integration, and Army modernization under the approximately $1B contract vehicle.
- **Led deployed engineering programs:** Managed a $180M Iraq construction program, commanded 1,000+ engineer soldiers in Afghanistan, closed 17 forward operating bases, and later commanded an engineer brigade in Kuwait.

Digital Engineering, Systems Engineering & Program Integration

- **Built Army mission-autonomy architectures:** Applied MBSE and UAF to define operational, system, interface, and data relationships supporting PM RCI's mission-autonomy effort.
- **Applied systems-engineering leadership:** Guided multidisciplinary teams in structuring mission-autonomy architectures, defining interfaces, and improving traceability and integration.

Materials Science, Failure Analysis & Manufacturing

- **Advanced superconducting conductors:** Developed a high-speed, low-cost ion beam assisted deposition (IBAD) process at Los Alamos that set multiple world records and supported U.S. technology transfer.
- **Improved semiconductor manufacturing:** Managed dielectric etch for Power FET, SiGe, SOI, CMOS, and BiCMOS processes; developed 0.18-0.8 micrometer nodes; and improved yield, controls, and defects.
- **Developed metal additive manufacturing:** Co-founded Mantle, raised $10M through Series A, built a metal-paste printer prototype, and generated two patents and one application.

Semiconductors, Solar Cells & Energy Materials

- **Developed photovoltaic manufacturing:** Led a $2M II-VI deposition and characterization effort, built prototype equipment, and supported a DOE-funded startup later acquired by Hitachi.

- **Built energy-materials IP:** Contributed to patents in solar-cell templates, metallization, multijunction cells, superconductors, and related materials.

Technology Strategy, Capture & Business Development

- **Led consulting growth:** Managed scope, budget, schedule, quality, profitability, client relationships, and business development for defense, manufacturing, and energy engagements.

- **Developed public-sector opportunities:** Led proposal strategy, writing, schedules, and marketing for government R&D pursuits.

- **Advised technology ventures:** Co-founded Lemondrop Consulting and supported technical strategy, commercialization, proposals, resources, and business development.

Advisory Appointments

Member of Advisory Board, Department of Materials Science and Engineering, New Mexico Tech

Editorships & Editorial Review Boards

Editor, IEEE Transactions on Applied Superconductivity, 2001

Peer Reviews

IEEE Transactions on Applied Superconductivity

MRS Proceedings