Joshua R. Biller, PhD

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Professional Experience

Biller Scientific, LLC

Principal Consultant

- Proposal Development, Red Team Review *2026 - present*
- Commercialization help for technical audiences.

Honeywell International, Advanced Cryogenic Platforms (ACP) Broomfield, CO

R&D Manager, Electromagnetics *2025- 2026*

Technical Management

- Mange portfolio of ~$7 million research projects to support roadmap, and also develop capabilities for future systems
- Guide team of 5-15 physicists, electrical engineers and technicians to develop magnetic, RF, and thermal/IR mitigation in cryogenic environments
- Collaborate with scientists and engineers to develop new concepts for controlling/influencing environment for quantum computing
- Mentor junior managers

Program Management

- Direct team resource allocation to deconflict business development, project work, IRAD to ensure milestones are met
- Tracking and reporting project progress in support of program deliverables and milestones
- Baselining projects and drafting pro-pricer workbooks

Business Development

- Supported road mapping for three different business cases
- Subject Matter Expert (SME) for organization proposal improvement team covering simple proposals through complex (color team review)

***TDA Research Inc., Golden**, CO*

External Funds Awarded: $15.7 million

Group Leader – New Technology Development & Commercialization *2021 - 2025*

- Electromagnetic/RF Related Projects
  - (ARL-SUTECH) High μ_R low tan δ substrates for antenna miniaturization
  - (DEVCOM-SC) Far-field, E-field RF shielding effectiveness measurements
  - (DEVCOM-SC) Near-field, H-field RF shielding effectiveness measurements
  - (USDA, DOE, NIH) Resonant structures for in-field magnetic resonance
  - (DOE) Near-field RF for imaging carbon fiber composites
- Manage cross functional team and collaborate with government and commercial stakeholders
  - As founder of the NDE lab, developed several complex electronic systems incorporating digital (AWG/Digitizer), analog (LNA) and RF signals (resonant circuits and pulse schemes)
  - Tracking and reporting technical progress and schedule/budget directly to program managers from DOD, USDA, NIH, DOT, USDA and DOE

- Devise and execute commercialization approach for new technologies
    - Refine RF imaging technology based on iterative prototypes and customer feedback to support product development
- Mentor and develop team members
    - Hold routine 1:1 meeting with direct reports, guiding and/or listening as needed
    - Instruct Sr. Scientists/Engineers (PhD level) on smooth interactions with support staff
    - Teach Sr. Scientists/Engineers how to draft inventions disclosures, provisional, and non-provisional patents

Senior Scientist *2018 - 2021*

- Research and Development TRL 0-6
    - Define, develop and test fast turn prototypes to demonstrate critical system requirements during successful SBIR Phase I 6-9 month "sprints"

***National Institute of Standards and Technology**, Boulder, CO*

External Funds Awarded: $1.5 million

Research Chemist *2017 - 2018*

- Interaction with stakeholders across a wide sphere of interest
    - Supported quantitative magnetic resonance imaging effort; co-developed 2018 NIST conference on quantitative MRI with input from government, academia, industry and clinical voices that synchronized direction of quantitative MRI.

National Research Council Post-Doctoral Fellow *2015 - 2017*

- Collaborated with other scientists and electrical engineers in the design and construction of low magnetic field spectroscopy instrument incorporating analog, digital and RF circuits.

***The University of Denver**, Denver, CO* *2009-2015*

Research Scientist, Department of Chemistry and Biochemistry

- Facilitated tech transfer under Academic Industrial Partnership (AIP) for commercialization of small animal pre-clinical imager.

***The Mayo Clinic,** Rochester, MN*

Technical Specialist I, Trace Metals Laboratory *2007 – 2009*

Clinical Laboratory Technologist, Trace Metals Laboratory *2005 – 2007*

Patents

1. US Patent **US12276703B2** "Non-Destructive Evaluation of Lithium-Ion Batteries", published April 15th, 2025
2. US Patent App. # *63/352246* "Encapsulated Nanoparticle Oxygen Imaging Agents for Radiotherapy Guidance", 06/15/22
3. US Patent App. # *18/222,249* "Electromagnetic Inductive Coupling Analysis for Detection of Carbon Fiber Defects", 07/15/22
4. US Patent **US1258460B1** "Undercoat Corrosion Monitoring Raman Sensor", published March 24th, 2026

Grants - $15.69 million **awarded** from 2018-2025

1. "Unmanned Aerial Systems (UAS) Materials and Prototype Development", Army Research Lab, **co-Primary Investigator**, $2,400,000
2. "In-Field Magnetometry for Detection of Lithium Battery SOC", DOT SBIR Phase II, **Primary Investigator**, $1,000,000
3. "Electromagnetic Inductive Coupling Analysis (EMICA) for In Situ Monitoring of Insulation on Energized Cables", DOE SBIR Phase I, **Primary Investigator**, *$200,000*
4. "Engineered RF Materials for Electrically Small Antenna" DOD SBIR Phase I, **Primary Investigator**, *$240,000*
5. "Material & Prototype Development to Support the Army Research Lab", congressional funding with Army Research Lab, **co-Primary Investigator**, *$2.7 million*
6. "Lithium-Ion Battery State-of-Charge Monitoring by Portable In-Field Magnetometry", DOT SBIR Phase I, **Primary Investigator**, *$200,000*,
7. "Ferromagnetic Analysis for Lithium-Ion Battery QA/QC", DOE SBIR Phase I, **Primary Investigator**, *$200,000*
8. "Non-Optical In-Situ Measurement of Phosphorous in Marine Environments", DOE SBIR Phase I, **Primary Investigator**, *$250,000*
9. "3D Kinematic Deformation Sensor Grid", DHA SBIR Phase I, **Primary Investigator**, *$250,000*
10. "Corrosion Indicating Coatings for Aircraft Bilges and Wheel Wells", Air Force SBIR Phase II Sequential, **Primary Investigator**, *$750,000* (2022)
11. "Onboard Monitoring Method for Detection of Damage to Carbon Fiber Composite Overwrap on Hydrogen Fuel Tanks", DOE SBIR Phase IIA, **Primary Investigator**, *$1.1 million* (2022)
12. "Development of High-Viscosity Pre-Penetrant Etching Materials", Navy SBIR Phase I, **Primary Investigator**, *$250,000*
13. "Fluctuation Enhanced Sensing (FES) for Monitoring of CO2 Storage", DOE SBIR Phase I, **Primary Investigator**, *$250,000*
14. "Paint Additive for Early Detection of Corrosion", Army Phase II Sequential SBIR, **Primary Investigator**, *$1.1 million*
15. "Novel Non-Destructive (NDE) of Defects in Li Ion Batteries", Air Force SBIR Phase I, Sr. Scientist, *$150,000*
16. "Encapsulated Nanoparticle Oxygen Imaging Agents for Radiotherapy Guidance", NCI SBIR Phase I, **Primary Investigator**, *$400,000*
17. "Onboard Monitoring Method for Detection of Damage to Carbon Fiber Composite Overwrap on Hydrogen Fuel Tanks", DOE SBIR Phase II, **Primary Investigator**, *$1.1 million*
18. "Onboard Monitoring Method for Detection of Damage to Carbon Fiber Composite Overwrap on Hydrogen Fuel Tanks" DOE SBIR Phase I, Sr. Scientist, *$200,000*
19. "Innovative Material (and Application Method) for a Hydrophobic/Oleophobic Coating to an Aluminum-bodied Heat Exchanger", Navy SBIR Phase II, Sr. Scientist, *$1 million*,
20. "A Novel NDE Instrument for Carbon-Carbon Materials for Hypersonic Applications", Air Force SBIR Phase I, Sr. Scientist, *$150,000* (2019)
21. "Corrosion Indicating Coatings for Aircraft Bilges and Wheel Wells", Air Force SBIR Phase II, Sr. Scientist, *$750,000*
22. "Rhizosphere Observations Optimizing Terrestrial Sequestration (ROOTS)", DOE ARPA-E, Research Chemist, *$1.3 million*

Service

2015 - SURF Mentor
2016 - SURF Mentor
2017 - SURF Mentor
2018 - NIST SURF Reviewer

2019 - NIST Low Field Magnetic Resonance Workshop
2020 - NSF Panel Reviewer, SBIR Phase I, Advanced Manufacturing
2020 - University of Denver Biophysics Career Symposium
2022 - Community College of Aurora "Career Conversations"
2024 - NSF Panel Reviewer, SBIR Phase I,
2024 - DOE Panel Reviewer, Battery Manufacturing

Outreach

2017 – 2026	Grand Awards Judge, Sr. Chem/Biochem Division, CO State Sci & Eng Fair
2018, 2019	Co-Chair, Bergen Valley & Bergen Meadow K-5 Science Fair (~300 kids)
2021 – 2023	Director, Bergen Valley & Bergen Meadow K-5 Science Fair (~300 kids)

Publications

Google Scholar: Joshua R. Biller**, h-index:** 14**, i10 index:** 18, **citations:** 692
Reviewer for: Applied Magnetic Resonance, IEEE Transactions on Magnetics, Coatings, Crystals, Applied Sciences, Materials, Sensors

1. Ogier, S.E., Russek, S.E., Martinez, J.A., Betz, K.M., Stupic, K.F., Moser, B.L., Simons, M.T., Holloway, C.L., **Biller, J.R**., Srivastava, D.J., Teixeira, R.P.A.G., Keenan, K.E. "Imaging Cell Phone Radiation in Tissue Mimics with Hyperpolarized Low-Field MRI" *Science Advances,* 12m eaea0223 (**2026**)
2. Finch, K., Long, D.C., Ott, T., Spatafore, B., **Biller, J.R.** "Overwrap Damage and Liner Failure in Composite Overwrapped Pressure Vessels Measured Using Electromagnetic Inductive Coupling Analysis" *SAMPE Journal*, **2025**, 61(3)
3. Finch, K.F., Long, D.C., Ott, T., Spatafore, B., **Biller, J.R.** "Electromagnetic Inductive Coupling Analysis (EMICA): A New Tool for Imaging Internal Defects in Carbon Fiber Composites" *Journal of Non-destructive evaluation,* **2025,** 44 (1), pg. 15
4. Delluva, A., Cook, R.L., Peppel, M., Diaz, S., Martin, R. M., Nguyen, V.T., Elliott, J.E., **Biller, J.R.** "In Situ Raman Spectroscopy for Early Corrosion Detection in Coated AA2024-T3" *Sensors*, 25 (1), 179. (**2025**)
5. Finch, K.F. & **Biller, J.R.** "Magnetic Resonance and Magnetometry: Complimentary Tools for Probing Different Size Scales in Lithium-Ion Batteries" *Applied Magnetic Resonance, Special Issue "EPR at 80"* (**2024**)
6. Martin, R., Diaz, S., Poncelet, M., Driesschaert, B., Barth, E., Kotecha, M., Epel, B., Eaton, G.R., **Biller, J.R.** "Towards a Nano-encapsulated EPR Imaging Agent for Clinical Use", *Molecular Imaging & Biology, Special Issue on EPR Imaging, accepted* (**2023**)
7. **Biller, J.R.** and McPeak, J.E. "EPR Everywhere" *Applied Magnetic Resonance*, 52(8), 1113-1139 (**2021)**
8. Russek, S.E., Stupic, K.F., **Biller, J.R**., Boss, M.A., Keenan, K.E., Mirowski, E. "Electromagnetics for Quantitative Magnetic Resonance Imaging" *Compendium on Electromagnetic Analysis,* Chapter 3, 95-147 (**2020**)
9. Gin, D.L., Malecha, J.J., Biller, J.R., Lama, B. "System for Living ROMP of a Paramagnetic FeCL4- Based Ionic Liquid Monomer: Direct Synthesis of Magnetically Responsive Block Copolymers" *ACS Macro Letters*, 9, 140-145 (**2020**)
10. Keenan, K.E., **Biller, J.R.,** et. al. "Progress Towards Standards for Quantitative MRI (qMRI) and Outstanding Needs" *Journal of Magnetic Resonance Imaging*, 49(7), e26 (**2019**)
11. **Biller, J.R**., McPeak, J.E., Eaton, S.S., Eaton, G.R. "Measurement of T_{1e}, T_{1N}, T_{1HE}, $T_{2e}$and T_{2HE} by Pulse EPR at X-band for Nitroxides at Concentrations Relevant to Solution DNP" *Applied Magnetic Resonance*, 49(11), 1235-1251 (**2018**)
12. **Biller, J.R.,** Barnes, R., Han, S. "Perspective of Overhauser Dynamic Nuclear Polarization for the Study of Soft Materials" *Current Opinion in Colloid & Interface Science*, 33, 72-85 (**2018**)

13. **Biller, J.R.,** Stupic, K., Moreland, J. "A table-top PXI based low-field spectrometer for solution dynamic nuclear polarization" *Magnetic Resonance in Chemistry,* 56(3), 153-163 (**2018**)
14. **Biller, J.R.**, Stupic, K.F., Kos, A., Weilert, T., Rinard, G.A., Nakashima, Y., Moreland, J. "Low Field Digital NMR Spectrometer: Hardware and Characterization" *Concepts in Magnetic Resonance B: Magnetic Resonance Engineering,*47B (1), e21350 (**2017**)
15. Quine, R.W., Rinard, G.A., Shi, R., Buchanan, L., **Biller, J.R.**, Eaton, S.S., Eaton, G.R "UHF EPR spectrometer operating at frequencies between 400 MHz and 1 GHz" *Concepts in Magnetic Resonance, Part B: Magnetic Resonance Engineering*, 46B(3), 123-133 (**2016**)
16. **Biller, J.R.**, Mitchell, D.G., Tseytlin, M., Elajaili, H., Rinard, G.A., Quine, R.W., Eaton, S.S., Eaton, G.R. "Rapid Scan Electron Paramagnetic Resonance Opens New Avenues for Imaging Physiologically Important Parameters *In Vivo*" *Journal of Visualized Experiments* (115), e54068, doi:10.3791/54068, (**2016**)
17. Elajaili, H., **Biller, J.R.**, Rosen, G.M., Kao, J.P.Y., Tseytlin, M., Buchanan, L.A., Rinard, G.A., Quine, R.W., McPeak, J., Shi, Y., Eaton, S.S., Eaton, G.R . "Imaging disulfide dinitroxides at 250 MHz to monitor thiol redox status" *Journal of Magnetic Resonance,* 260, 77-82 (**2016**)
18. **Biller, J.R**., Tseitlin, M., Mitchell, D.G., Yu, Z., Buchanan, L.A., Elajaili, H., Rosen, G.M., Kao, J.P.Y., Eaton, S.S., Eaton, G.R. "Improved Sensitivity for Imaging Spin Trapped Hydroxyl Radical at 250 MHz" *Chemphyschem*,16 (3), 528-531 (**2015**)
19. Elajaili, H.B., **Biller, J.R.**, Tseitlin, M., Dhimitruka, I., Khramtsov, V.V., Eaton, S.S., Eaton, G.R. "Electron Spin Relaxation Times and Rapid Scan EPR Imaging of pH-sensitive Amino Substituted Trityl Radicals" *Magnetic Resonance in Chemistry*, 53(4), 280-284 (**2015**)
20. Elajaili, H., **Biller, J.R.,** Eaton, S.S., Eaton, G.R. "Frequency Dependence of Electron Spin-lattice Relaxation for Semiquinones in Alcohol Solutions" *Journal of Magnetic Resonance* 247, 81-87 (**2014**)
21. Tseytlin, M., **Biller, J.R.**, Mtichell, D.G., Yu, Z., Quine, R.W., Rinard, G.A., Eaton, S.S., Eaton, G.R. "Rapid-Scan EPR" *International EPR Society News Letter*, 23 (4), 8-9 (**2014**)
22. Tseitlin, M., **Biller, J.R.,** Elajaili, H., Eaton S.S., Eaton G.R. "New spectral-spatial imaging algorithm for full EPR spectra of multiline nitroxides and pH sensitive trityl radicals" *Journal of Magnetic Resonance,* 245, 150-155 (**2014**)
23. **Biller, J.R.**, Tseitlin, M., Quine, R.W., Rinard, G.A., Weismiller, H.A., Elajaili, H., Rosen, G.M., Kao, J.P.Y., Eaton, S.S., Eaton, G.R. "Imaging of Nitroxides at 250 MHz using Rapid-Scan Electron Paramagnetic Resonance" *Journal of Magnetic Resonance* 242, 162-168 (**2014**)
24. **Biller, J.R**., Elajaili, H., Meyer, V., Rosen, G.M., Eaton, S.S., & Eaton, G.R. "Electron spin-lattice relaxation mechanisms of rapidly-tumbling nitroxide radicals" *Journal of Magnetic Resonance***,** *236,* 47–56 (**2013**)
25. **Biller, J.R.**, Meyer, M., Elajaili, H. Rosen, G.M., Eaton, S.S., & Eaton, G.R. "Frequency Dependence of Spin Relaxation Times in Aqueous Solution for a Nitronyl Nitroxide Radical and Per-deuterated-Tempone between 250 MHz and 34 GHz" *Journal of Magnetic Resonance*, 225, 52-57 (**2012**)
26. Rinard, G.A., Quine, R.W., **Biller, J.R**., & Eaton, G.R. "A wire-crossed-loop resonator for rapid scan EPR" *Concepts in Magnetic Resonance Part B: Magnetic Resonance Engineering*, 37B (2), 86-91 (**2010**)

Oral Presentations

1. **Biller, J.R.** "In-Field Spectroscopic Analysis of Corrosion Under Coatings to Facilitate Condition Based Maintenance" *DoD Corrosion Prevention Technology & Innovation Symposium: SERDP ASETSDefense Workshop*, Tucson, AZ, August 16th 2023
2. **Biller, J.R.** "Magnetometry Based Approaches for Ferromagnetic Analysis of Lithium-Ion Battery Materials" *Sandia National Labs,* Albuquerque, NM, February 27th 2023
3. **Biller, J.R.** "Magnetometry Based Approaches for Ferromagnetic Analysis of Lithium-Ion Battery Materials" *NIST,* Boulder, CO, February 27th 2023

4. **Biller, J.R.** "Measurement and the Scale of Things" *Colorado School of Mines Ansell Lecture Series*, Golden, CO, February 2nd 2023
5. Martin, R., Driesschaert, B., Kotecha, M., Epel, B., Eaton, G.R**., Biller, J.R**. "Development of an Injectable EPR Imaging Agent for Clinical Use" *Rocky Mountain Conference on Magnetic Resonance*, Copper Mountain, CO July 26th 2022
6. Biller, J.R. "", *Community College of Aurora, Career Conversations,* February 21st 2022
7. **Biller, J.R.** "Things to do with NMR other than peak assignment: Toward quantitative dynamic nuclear polarization at NIST" *Regis University*, Denver, CO, September 22nd 2017
8. **Biller, J.R.**, Eaton, G.R., Moreland, JM "Nitroxide T1 and T2 from 0.1 to 10 mM: Implications for solution-state DNP experiments at low magnetic field" *International Society for Magnetic Resonance (ISMAR)*, Quebec City, Canada, July 23rd-28th 2017
9. **Biller, J.R.** "One Chemist's Strange Trip: Low Field Magnetic Resonance at the National Institute of Standards and Technology" Colorado College, Colorado Springs, CO, February 26th 2016
10. **Biller, J.R.** "Nitroxide Relaxation Mechanisms From 250 MHz to 34 GHz: Insights for Longer Nitroxide T1" at the 48th Annual International Meeting of the ESR Spectroscopy Group of the Royal Society of Chemistry, Southampton, U.K. 2015
11. **Biller, J.R.**, Eaton, S.S., Eaton, G.R. "Probes for In Vivo Imaging with Electron Paramagnetic Resonance" National Institute of Standards and Technology, Boulder, CO August 8 2013
12. **Biller, J.R.**, Eaton, S.S., Eaton, G.R. "250 MHz to 34 GHz Study of Nitroxide Relaxation Mechanisms" 55th Rocky Mountain Conference on Analytical Chemistry, Denver, CO July 28-August 1 2013
13. **Biller, J.R**. Eaton, S.S. and Eaton, G.R., "2D Rapid Scan Imaging at 250 MHz" EPR Workshop, 55th Rocky Mountain Conference on Analytical Chemistry, Denver, CO July 28-August 1 2013
14. **Biller, J.R.** "Expression and localization of cel3, a cellulose gene in Arabidopsis associated with abscission and seedling development" Research Experience and Undergraduate Symposium, Purdue University, July 21st 2003

Education

PhD, Physical Chemistry
***University of Denver**, Denver, CO* 2009–2014

Dissertation: Nitroxides for Low Frequency *In Vivo* EPR Imaging

B.S., Chemistry, *minor* ***Biology***
***Edgewood College**, Madison, WI* 2001–2005