

# Semih Akin

Assistant Professor of Mechanical Engineering  
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📍 Rensselaer Polytech. Inst. ↗️ 📩 akins@rpi.edu 🌐 <https://semilab-rpi.com> 💬 Semih Akin

## EDUCATION

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<b>Ph.D.</b> <b>Purdue University</b> , Mechanical Engineering, (West Lafayette, USA)	2017 – 2022
<b>M.S.</b> <b>Bursa Technical University</b> , Mechanical Engineering, (Turkey)	2013 – 2016
<b>B.S.</b> <b>Uludag University</b> , Industrial Engineering, (Turkey) • <i>Double Major in Industrial Engineering</i>	2010 – 2013
<b>B.S.</b> <b>Uludag University</b> , Mechanical Engineering, (Turkey) • <i>Honor student, Ranked 1<sup>st</sup> in the class diploma</i>	2008 – 2013

## RESEARCH & PROFESSIONAL EXPERIENCE

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<b>Assistant Professor</b> , Rensselaer Polytechnic Institute, USA	Jan 2024 - Now
<b>Post-Doctoral Associate</b> , Purdue University, USA	2022 - 2023
<b>Lecturer</b> , Purdue University, USA	2021 - 2022
<b>Teaching Assistant</b> , Purdue University, USA	2019 - 2021
<b>Research Assistant</b> , Purdue University, USA	2017 - 2021
<b>Research Assistant</b> , Bursa Technical University, Turkey	2013 - 2016

## RESEARCH INTEREST

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**Additive Manufacturing:** Cold spray additive manufacturing, Directed energy deposition, Aerosol jet printing, Multi-material 3-D printing, Smart structures

**Surface Engineering:** Surface-matter interaction, Meta-material surface deposition, Smart thin-films, Electroless deposition, Functional surface metallization of polymers

**Cyber-Physical Manufacturing:** Physical Unclonable Functions (PUFs), Spectral part authentication, Adaptive manufacturing, Predictive maintenance

**Space Manufacturing:** Manufacturing for space and in-situ resource utilization

**Printed Electronics:** Flexible electronics, Electronic textiles, Microheaters

**Energy Devices:** Triboelectric nanogenerators, Piezoelectric nanogenerators, Lithium-ion batteries

# HONORS, AWARDS & RECOGNITION

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## Research Awards:

- **Outstanding Reviewer**, *Journal of Manufacturing Processes*, 2024
- **ASME Reviewers of the Year**, *Journal of Micro and Nano Science and Engineering*, 2024
- **SigmaXI Scientific Research Honor Society** (Full Member), 2024
- **Outstanding Graduate Student Research Award**, Purdue University, CoE, 2023
- **International Research Awards** on Computer-Aided Design in Mechanical Engineering, 2023
- **Italian Packaging Technology Award** by the Italian Trade Agency, 2023
- **Graduate School Summer Research Grant**, Purdue University, CoE, 2022
- **Featured Article** in the Purdue News, (e-textiles for health monitoring), 2022
- **Master Thesis Scholarship** by the Technological Research Council of Turkey, 2015
- **Honor Student, ranked 1<sup>st</sup>** in Mechanical Engineering, Bursa Uludag University, 2013
- **Outstanding Student Scholarship** by the Turkish Automobile Factory (TOFAS), 2009-2013

## Paper Awards:

- **Student Best Paper Award**, *International Workshop on Structural Health Monitoring*, 2025
- **Best Paper Award**, *Journal of Manufacturing Processes*, 2024.
- **Best Paper Award**, *International Mechanical Engineering Congress & Exposition*, (IMECE), 2024
- **Frontispiece Cover Article**, *Advanced Materials*, 2022
- **Editor's Choice Article**, *Journal of Thermal Spray Technology*, 2021
- **Best Paper Award**, *World Congress on Micro and Nano Manufacturing* (WCMNM), 2021

## Teaching Awards:

- **Ward A. Lambert Graduate Teaching Fellowship**, Purdue University, 2022
- **Outstanding Graduate Teaching Award**, Purdue University Teaching Academy, 2022

## Travel Awards:

- **National Science Foundation (NSF) travel award** for the WCMNM 2023
- **NSF Early-Career Travel Award** for NAMRC 51/MSEC 2023
- **NSF Student Travel Award** for the WCMNM 2019
- **Technical Trip Award** to Germany by the Durmazlar Machine Company, 2013

## INTELLECTUAL PROPERTY (PATENTS)

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7. **S. Akin**, J. Jeon, "A Blockchain-coupled physical unclonable function (PUF) framework for robust part authentication, traceability, and cyber-physical security", (*U.S. Patent application*), (2025).
6. **S. Akin**, SH. Abir, J. Samuel, "Method for fabricating flexible metallized composite bacterial cellulose structures for energy harvesting and sensing applications", (*U.S. Patent application*), (2025).
5. MBG. Jun, J. Lee. H. Lee, **S. Akin**, C. Han, T. Gabor, Y. Sim, "Cold spray-enabled physically unclonable identifier and its spectral authentication via implicit neural representation", (*U.S. Patent application*), (2025).
4. **S. Akin**, J. Samuel, F. Kopsaftopoulos, J. Ren, P. Zhou, G. Saunders, "Method for enhanced adhesion across fully encapsulated metal-ceramic interfaces in additive manufacturing processes", (*U.S. Patent application*), (2025).
3. C.H. Lee, **S. Akin**, T. Chang, MBG. Jun, "Electronic textiles and systems and processes associated therewith", (*U.S. Patent application-pending*), (2023). [\[Link\]](#)
2. MBG. Jun, **S. Akin**, "Cold spray printed flexible electronics and method for manufacturing the same" (*U.S. Patent application-pending*), (2022). [\[Link\]](#)
1. C.H. Lee, T. Chang, **S. Akin**, MBG. Jun, L. Couetil, "Electronic textiles and methods for fabrication thereof", (*U.S. Patent*), (Active by 2043). [\[Link\]](#)

## EXTRAMURAL RESEARCH GRANTS (Akin's Share: \$486,942 → Total: \$1,524,133)

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- **Funding Agency:** DURIP (Defense University Research Instrumentation Program)  
**Title:** "A direct-writing platform for the development of smart structural systems with embedded sensing capabilities"  
**Role:** Co-PI  
**Project budget** = \$300,499 (Akin's share = 25%)  
**Project term:** 01/01/26 - 01/01/27
- **Funding Agency:** NSF Engines R&D Awards - New York Energy Storage Engine Projects  
**Title:** "Dry-coating of lithium-ion battery anodes by cold spray"  
**Role:** Lead PI  
**Project budget** = \$223,634 (Akin's share = 50%)  
**Project term:** 01/01/25 - 01/01/26
- **Funding Agency:** Defense Advanced Research Projects Agency (DARPA)  
**Title:** "Convergent manufacturing of smart metal structures with embedded sensing capabilities"  
**Role:** Co-PI  
**Project budget** = \$1,000,000 (Akin's share = 30%)  
**Project term:** 01/22/24 - 01/22/26

## PUBLICATIONS SUBMITTED FOR PEER-REVIEW

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†: Equal contribution

\*: Corresponding author

**1.** J. Ren, S. Huang, S. Rahman, K. Young, S. Mishra, JT Wen, F. Kopsaftopoulos \*, J. Samuel \*, **S. Akin** \*, "A convergent manufacturing pathway for smart metallic structures with embedded sensing", (To be submitted).

**2.** H. Lee, C. Han, T. Gabor, **S. Akin** \*, MBG. Jun, J. Lee\*, "Cold spray-based secure and unique product identification with neural encoding: A full-stack framework for scalable authentication in manufacturing ", **Journal of Intelligent Manufacturing**, (Under revision).

## PEER-REVIEWED JOURNAL PUBLICATIONS

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†: Equal contribution

\*: Corresponding author

**32.** J. Jeon, **S. Akin** \*, "Physically unclonable surfaces enabled by cold spray deposition", **ACS Applied Materials & Interfaces**, (2026), ([doi.org/10.1016/j.surfin.2025.108224](https://doi.org/10.1016/j.surfin.2025.108224)) ↗.

**31.** S. Rahman, **S. Akin** \*, J. Ren, P. Zhou, F. Kopsaftopoulos, J. Samuel, "Additively manufactured smart metallic structures with embedded sensing: A review", **Progress in Additive Manufacturing**, (2026), ([doi.org/10.1007/s40964-025-01481-y](https://doi.org/10.1007/s40964-025-01481-y)) ↗.

**30.** S. Rahman, **S. Akin** \*, "Cold spray deposition of lunar regolith on polymeric substrates: A pathway toward in-situ resource utilization on the Moon", **Surfaces and Interfaces** (2026), ([doi.org/10.1016/j.surfin.2025.108224](https://doi.org/10.1016/j.surfin.2025.108224)) ↗.

**29.** C. Han, T. Gabor, H. Lee, J. Lee, **S. Akin**, MBG. Jun\*, "Pulsed cold spray system for physical unclonable function generation", **Procedia CIRP**, (2025), ([doi.org/10.1016/j.procir.2025.02.269](https://doi.org/10.1016/j.procir.2025.02.269)) ↗.

**28.** C. Han, T. Gabor, H. Lee, J. Lee, **S. Akin**, MBG. Jun\*, "Pulsed cold spray system for physical unclonable function generation", **Procedia CIRP**, (2025), ([doi.org/10.1016/j.procir.2025.02.269](https://doi.org/10.1016/j.procir.2025.02.269)) ↗.

**27.** SH. Abir, C. Smith, J. Zorniter, J. Samuel\*, **S. Akin** \*, "A composite bacterial cellulose for enhanced performance triboelectric and piezoelectric nanogenerators", **Nano Energy**, (2025), ([doi.org/10.1016/j.nanoen.2025.111123](https://doi.org/10.1016/j.nanoen.2025.111123)) ↗.

**26.** T. Gabor, Y. Wang, **S. Akin**, F. Zhou, J. Chen, MBG. Jun\*, "Design, modeling, and characterization of a pulsed cold spray", **Surface & Coatings Technology**, (2025), ([doi.org/10.1016/j.surfcoat](https://doi.org/10.1016/j.surfcoat)) ↗.

**25.** F. Zhou, S. Chen, **S. Akin**, T. Gabor, MBG. Jun\*, "Real-time monitoring of thin film thickness and surface roughness using a single mode optical fiber", **Mechanical Systems and Signal Processing**, (2025), ([doi.org/10.1016/j.ymssp.2024.112219](https://doi.org/10.1016/j.ymssp.2024.112219)) ↗.

**24.** J. Lee, **S. Akin** \*, Y. Kim, E. Kim, J. Nam, K. Song, MBG. Jun\*, "A stethoscope-guided interpretable deep learning framework for powder flow diagnosis in cold spray additive manufacturing", **Manufacturing Letters**, (2024), ([doi.org/10.1016/j.mfglet.2024.09.178](https://doi.org/10.1016/j.mfglet.2024.09.178)) ↗.

- 23.** **S. Akin**<sup>†\*</sup>, T. Chang<sup>†</sup>, S.H. Abir<sup>†</sup>, Y. W. Kim, S. Xu, J. Lim, Y. Sim, J. Lee, J.T. Tsai, C. Nath, H. Lee, W. Wu, J. Samuel, C.H. Lee\*, MBG. Jun\*, "One-step fabrication of functionalized electrodes on 3D-printed polymers for triboelectric nanogenerators", **Nano Energy**, (2024), ([doi.org/10.1016/](https://doi.org/10.1016/)) ↗.
- 22.** DG. Ruzgar, **S. Akin**, S.Lee, J. Walsh, YH. Jeong, H.Lee, MBG. Jun\*, "Highly flexible, conductive, and antibacterial surfaces toward multifunctional flexible electronics", **International Journal of Precision Engineering and Manufacturing Green Technology**, (2024), ([doi.org/10.1007/s40684-024-00608-w](https://doi.org/10.1007/s40684-024-00608-w)) ↗.
- 21.** **S. Akin**\* , S.Kim, C.K. Song, S.Y. Nam, MBG. Jun\*, "Fully additively manufactured counter electrodes for dye-sensitized solar cells", **Micromachines**, (2024), ([doi.org/10.3390/mi15040464](https://doi.org/10.3390/mi15040464)) ↗.
- 20.** JT. Tsai\*, **S. Akin**, DF. Bahr, MBG. Jun, "A predictive modeling approach for cold spray metallization on polymers", **Surface & Coatings Technology**, (2024), ([doi.org/10.1016/j.surfcoat.2024](https://doi.org/10.1016/j.surfcoat.2024)) ↗.
- 19.** T. Gabor, **S. Akin**, MBG. Jun\*, "Numerical studies on cold spray gas dynamics and powder flow in circular and rectangular nozzles", **Journal of Manufacturing Processes**, (2024), (*Best Paper Award*) ([doi.org/10.1016/j.jmapro.2024.02.005](https://doi.org/10.1016/j.jmapro.2024.02.005)) ↗.
- 18.** Jeong H. Kim, **S. Akin**, MBG. Jun, Y. H, Jeong\*, "Fabrication of electrospun nanofibers with spray direct-write conductive patterns", **Journal of the Korean Society for Precision Engineering**, (2024), ([doi.org/10.7736/jkspe](https://doi.org/10.7736/jkspe)) ↗.
- 17.** T. Chang<sup>†</sup>, **S. Akin**<sup>†</sup>, S. Cho<sup>†</sup>, S. Lee, J. Lee, S. Lee, T. Park, S. Hong, T. Yu, Y. Ji, S. Gong, D.R. Kim, Y.L. Kim, MBG. Jun\*, C.H. Lee\*, "*In-situ* spray polymerization of conductive polymers for personalized e-textiles", **ACS Nano**, (2023), ([doi.org/10.1021/acsnano.3c07283](https://doi.org/10.1021/acsnano.3c07283)) ↗.
- 16.** **S. Akin**\* , C. Nath, MBG. Jun, "Selective surface metallization of 3D-printed polymers by cold spray-assisted electroless deposition", **ACS Applied Electronic Materials**, (2023), ([doi.org/10.1021/acsaelm.3c00893](https://doi.org/10.1021/acsaelm.3c00893)) ↗.
- 15.** J. Lee, **S. Akin**, J. Walsh, H. Lee, MBG. Jun, Y. Shin\*, "A Nitinol structure with functionally gradient pure titanium layers and hydroxyapatite over-coating for orthopedic implant applications", **Progress in Additive Manufacturing**, (2023), ([doi.org/10.1007/s40964](https://doi.org/10.1007/s40964)) ↗.
- 14.** **S. Akin**\* , Y.W. Kim, S. Xu, C. Nath, W. Wu, MBG. Jun, "Cold spray direct writing of flexible electrodes for enhanced performance triboelectric nanogenerators", **Journal of Manufacturing Processes**, (2023), ([doi.org/10.1016/j.jmapro.2023.05.015](https://doi.org/10.1016/j.jmapro.2023.05.015)) ↗.
- 13.** **S. Akin**, P. Wu, C. Nath, J. Chen, MBG. Jun\*, "A study on converging-diverging nozzle design for supersonic spraying of liquid droplets towards nanocoating applications", **ASME Journal of Manufacturing Science and Engineering**, (2023), ([doi.org/10.1115/1.4062351](https://doi.org/10.1115/1.4062351)) ↗.
- 12.** **S. Akin**, S. Jo, MBG. Jun\*, "A cold spray-based novel manufacturing route for flexible electronics", **Journal of Manufacturing Processes**, (2023), ([doi.org/10.1016/j.jmapro.2022](https://doi.org/10.1016/j.jmapro.2022)) ↗.
- 11.** **S. Akin**, S. Lee, S. Jo, DG. Ruzgar, JT. Tsai, MBG. Jun\*, "Cold spray-based rapid and scalable production of printed flexible electronics", **Additive Manufacturing**, (2022), ([doi.org/10.1016/j.addma.2022.103244](https://doi.org/10.1016/j.addma.2022.103244)) ↗.
- 10.** Y.W. Kim\*, **S. Akin**, H. Yun, S. Xu, W. Wu, MBG. Jun, "Enhanced performance of triboelectric nanogenerator and sensor via cold spray particle deposition", **ACS Applied Materials & Interfaces**, (2022),

(doi/10.1021/acsami.2c09367) ↗.

9. T. Gabor, H. Yun, **S. Akin**, K.H. Kim, J.K. Park, MBG. Jun\*, “Continuous coaxial nozzle designs for improved powder focusing in direct laser metal deposition”, **Journal of Manufacturing Processes**, (2022), (doi.org/10.1016/j.jmapro.2022.08.03900) ↗.
8. JT. Tsai, **S. Akin**, F. Zhou, MS Park, D.F. Bahr, MBG. Jun\*, “Electrically conductive metallized polymers by cold spray and co-electroless deposition”, **ASME Open Journal of Engineering**, (2022), (doi.org/10.1115/1.4053781) ↗.
7. T. Chang<sup>†</sup>, **S. Akin<sup>†</sup>**, M.K. Kim, L. Murray, S. Cho, L. Couetil, MBG. Jun\*, C.H. Lee\* “A Programmable dual regime spray for large-scale and custom-designed electronic textiles”, **Advanced Materials**, (2022), (doi.org/10.1002/adma.202108021) ↗, (Cover Article), [Link] ↗.
6. S. Jo, **S. Akin**, MS. Park, MBG. Jun\*, “Selective metallization on glass surface by laser direct writing combined with supersonic particle deposition”, **Manufacturing Letters**, (2022), (doi.org/10.1016/j.mfglet.2021.07.009) ↗.
5. **S. Akin**, P. Wu, JT. Tsai, C. Nath, J. Chen, MBG. Jun\*, “A study on droplets dispersion and deposition characteristics under supersonic spray flow for nanomaterial coating applications”, **Surface & Coatings Technology**, (2021), (doi.org/10.1016/j.surfcoat.2021.127788) ↗.
4. JT. Tsai, **S. Akin**, F. Zhou, DF. Bahr\*, MBG. Jun, “Establishing a cold spray particle deposition window on polymer substrate”, **Journal of Thermal Spray Technology**, (2021), (doi.org/10.1007/s11666-021-01179-x) ↗, (Editor's choice article)
3. **S. Akin**, JT. Tsai, MS. Park, YH. Jeong, MBG. Jun\*, “Fabrication of electrically conductive patterns on ABS polymer using low-pressure cold spray and electroless plating”, **ASME Journal of Micro and Nano-Manufacturing**, (2020), (doi.org/10.1115/1.4049578) ↗.
2. **S. Akin**, T. Gabor, S. Jo, H. Joe, JT. Tsai, Y. Park, C.H. Lee, MS. Park, MBG. Jun\*, “Dual regime spray deposition based laser direct writing of metal patterns on polymer substrates”, **ASME Journal of Micro and Nano-Manufacturing**, (2020), (doi.org/10.1115/1.4046282) ↗.
1. **S. Akin\***, Y. Kara, “An assessment of wind power potential along the coast of Bursa, Turkey: A wind power plant feasibility study for Gemlik Region”, **Journal of Clean Energy Technologies**, (2017), (doi:10.18178/jocet.2017.5.2.352) ↗.

## CONFERENCE PROCEEDINGS & PRESENTATIONS

Ψ: Presenter

\*: Corresponding author

25. S. Rahman, **S. Akin**\*, “Cold spraying of lunar regolith composite powders toward in-space electronics manufacturing”, **ASME International Manufacturing Science and Engineering Conference (MSEC)** ↗, Penn State, Pennsylvania, USA, **2026**, (Under revision).
24. J. Jeon, FT. Zohora, **S. Akin**\*, “Direct-writing of physical unclonable function (PUF)-augmented QR-codes for cyber-physical authentication”, **North American Manufacturing Research Conference, NAMRC-53** ↗, Penn State, Pennsylvania, USA, **(2026)**, (Under revision).

- 23.** J. Jeon, A. Wong, M. Koca, F. Thompson, O. Tumuklu, **S. Akin\***, "Conductivity-tunable reactive aerosol jet metallization of textiles", *ASME International Mechanical Engineering Congress & Exposition, IMECE* ↗, Memphis, TN, USA, (2025), (Accepted).
- 22.** S. Huang, J. Ren, P. Zhou, S. Rahman, K. Young, S.S. Rahman, S. Mishra, J. Samuel, F. Kopsaftopoulos, **S. Akin\***, "A multifunctional smart metal beam with sub-surface embedded sensors for real-time structural health monitoring", *International Workshop on Structural Health Monitoring (IWSHM)* ↗, Stanford University, CA, USA, (2025), ([10.12783/shm2025/37491](https://doi.org/10.12783/shm2025/37491)) ↗.
- 21.** P. Zhou, J. Ren, J.S. Schure, S. Huang, S. Rahman, J. Samuel\*, **S. Akin\***, F. Kopsaftopoulos\*, "Embedded piezoelectric sensing for metallic components: A novel SHM architecture for self-aware structures", *International Workshop on Structural Health Monitoring (IWSHM)* ↗, Stanford University, CA, USA, (2025), ([10.12783/shm2025/37301](https://doi.org/10.12783/shm2025/37301)) ↗, (Best Paper Award).
- 20.** C. Han, T. Gabor, H. Lee, J. Lee, **S. Akin**, MBG. Jun\*, "Pulsed cold spray system for physical unclonable function generation", *CIRP Conference on Electro Physical and Chemical Machining (ISEM XXII)* ↗, University of British Columbia, Vancouver, BC, Canada, (2025).
- 19.** S. Chen, F. Zhou, BN. Reggetz, EG. Lee, MA. Virji, AA. Afshari, MBG. Jun, **S. Akin\***, "Polymer metallization via cold spray: an investigation into the effects of particle hardness and morphology", *North American Manufacturing Research Conference, NAMRC-53* ↗, Greenville, South Carolina, USA, (2025), ([doi.org/10.1016/j.mfglet.2025.06.039](https://doi.org/10.1016/j.mfglet.2025.06.039)) ↗
- 18.** M. Muhtadin, JT. Tsai\*, **S. Akin**, "Additive manufacturing of radially oriented gyroid carbon fiber composites for low-temperature thermal absorber applications", *North American Manufacturing Research Conference, NAMRC-53* ↗, Greenville, South Carolina, (2025), ([doi.org/10.1016/j.mfglet.2025.06.096](https://doi.org/10.1016/j.mfglet.2025.06.096)) ↗
- 17.** J. Lee, **S. Akin**, J. Walsh, H. Lee, MBG. Jun, Y. Shin<sup>Ψ</sup>\*, "Functionally gradient nitinol structure with pure titanium layers and hydroxyapatite over-coating for orthopedic implant applications", *TMS Annual Meeting & Exhibition* ↗, Las Vegas, Nevada USA, (2025).
- 16.** Y.W. Kim, **S. Akin**<sup>Ψ</sup>\*, MBG. Jun, J. Sutherland, "Cold spray-produced functional surfaces for triboelectric nanogenerators", *ASME International Mechanical Engineering Congress & Exposition, IMECE* ↗, Portland, OR, USA, (2024), ([doi.org/10.1115/IMECE2024-145320](https://doi.org/10.1115/IMECE2024-145320)) ↗, (Best Paper Award).
- 15.** S. Jo, **S. Akin**, M.S. Park, M.B.G. Jun\*, "A study on supersonic spray-assisted laser-induced ultrafine selective metallization of glass surface," *World Congress on Micro and Nano Manufacturing (WCMNM)* ↗, Pattaya, Thailand, 2024.
- 14.** S. Jo, **S. Akin**, H. Yun, M. Park, MBG. Jun<sup>Ψ</sup>\*, "Laser-assisted ultrafine selective metallization of glass surface using supersonic spray deposition", *International Conference on Precision Engineering and Sustainable Manufacturing* ↗, Chiang Mai, Thailand, (2025).
- 13.** J. Lee<sup>Ψ</sup>, **S. Akin\***, Y. Kim, E. Kim, J. Nam, K. Song, MBG. Jun\*, "A stethoscope-guided interpretable deep learning framework for powder flow diagnosis in cold spray additive manufacturing", *North American Manufacturing Research Conference, NAMRC-52* ↗, Knoxville, Tennessee, USA, (2024) ([doi.org/10.1016/j.mfglet.2024.09.178](https://doi.org/10.1016/j.mfglet.2024.09.178)) ↗
- 12.** JT. Tsai<sup>Ψ</sup>\*, **S. Akin**, DF. Bahr, MBG. Jun, "A predictive modeling for cold spray deposition and the resulting microstructure toward additive manufacturing using polymeric templates",

*International Thin Films Conference (TACT-2023) ↗, Taipei, Taiwan, (2023).*

- 11.** S. Akin<sup>Ψ\*</sup>, MBG. Jun, “Additively manufactured counter electrodes for dye-sensitized solar cells”, *World Congress on Micro and Nano Manufacturing (WCMNM) ↗, Evanston, IL, USA (2023)*.
- 10.** MBG. Jun<sup>Ψ\*</sup>, S. Akin, “Unleashing the potential of cold spray additive manufacturing in triboelectric energy harvesting”, *US-Korea Conference on Science, Technology and Entrepreneurship ↗*.
- 9.** S. Akin<sup>Ψ\*</sup>, Y.W. Kim, S. Xu, C. Nath, W. Wu, MBG. Jun, “Cold spray direct writing of flexible electrodes for enhanced performance triboelectric nanogenerators”, *North American Manufacturing Research Conference, NAMRC ↗, New Brunswick, New Jersey, USA, (2023)*.
- 8.** S. Akin<sup>Ψ\*</sup>, P. Wu, C. Nath, J. Chen, MBG. Jun\*, “A study on the effect of nozzle geometrical parameters on supersonic cold spraying of droplets”, *ASME International Manufacturing Science and Engineering Conference, (2022), West Lafayette, Indiana, USA, (doi.org/10.1115/MSEC2022-85703) ↗*.
- 7.** T. Gabor<sup>Ψ</sup>, S. Akin, JT. Tsai, S. Jo, F. Najjar, MBG. Jun\*, “Numerical studies on cold spray particle deposition using a rectangular nozzle”, *ASME MSEC, (2022), West Lafayette, Indiana, USA, (doi.org/10.1115/MSEC2022-85673) ↗*.
- 6.** S. Akin<sup>Ψ\*</sup>, J.H. Kim, MBG. Jun\*, “Electrically conductive textiles based on decoupled atomized spray coating and electroless plating”, *International Symposium on Precision Engineering and Sustainable Manufacturing (PRESM) ↗, South Korea, (2021)*.
- 5.** S. Jo, S. Akin, MS. Park, MBG. Jun<sup>Ψ\*</sup>, “An integrated method for selective metallization on glass surface: Laser direct writing coupled with supersonic spray coating”, *World Congress on Micro and Nano Manufacturing (WCMNM) ↗, IIT Bombay, India, (2021), (Best Paper Award)*.
- 4.** T. Gabor<sup>Ψ</sup>, H. Joe, S. Akin, KH. Kim, JK. Park, MBG. Jun\*, “Numerical investigations of various coaxial nozzle designs for direct laser deposition”, *ASME International Manufacturing Science and Engineering Conference (MSEC), Cincinnati, Ohio, USA, (2020), (doi.org/10.1115/MSEC2020-8444) ↗*.
- 3.** JT. Tsai<sup>Ψ</sup>, S. Akin, F. Zhou, DF. Bahr, MBG. Jun\*, “Simulation and characterization of cold spray deposition of metal powders on polymer substrate electrically conductive application”, *ASME International Manufacturing Science and Engineering Conference, Cincinnati, Ohio, USA, (2020), (doi.org/10.1115/MSEC2020-8461) ↗*.
- 2.** S. Akin<sup>Ψ</sup>, JT. Tsai, MS. Park, YH. Jeong, MBG. Jun\*, “Fabrication of electrically conductive patterns on ABS polymer using low-pressure cold spray and electroless plating”, *ASME International Manufacturing Science and Engineering Conference, Cincinnati, Ohio, USA, (2020), (doi.org/10.1115/) ↗*.
- 1.** S. Akin<sup>Ψ</sup>, T. Gabor, S. Jo, H. Joe, JT. Tsai, Y. Park, CH. Lee, MS. Park, MBG. Jun\*, “Dual regime spray deposition based laser direct writing of metal patterns on polymer substrates”, *The 3rd World Congress on Micro and Nano-Manufacturing, Raleigh, North Caroline, USA, (2019), (WCMNM-2019) ↗*.

## **POSTER PRESENTATIONS**

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6. SH. Abir, J. Samuel, **S. Akin**, "Metal-embedded bacterial cellulose for triboelectric energy harvesting", *ASME Manufacturing Science and Engineering Conference (MSEC)* , Greenville, USA, **2025**.
5. **S. Akin**, DA. Borca-Tasciuc, W. Ji, F. Kopsaftopoulos, A. Maniatty, K. Panneerselvam, C. Picu, A. Svirsky, "Curriculum integration through collaborative teaching", *ASME International Mechanical Engineering Congress & Exposition, IMECE* , Portland, OR, USA, **2024**, (*Best Poster Award*).
4. B. Reggetz, A. Virji, MBG. Jun, **S. Akin**, D. Hard, EG. Lee, "Assessment of cold spray powder emissions in a controlled laboratory Setting", *Cold Spray Action Team (CSAT)* , Worcester, MA, USA (**2024**).
3. B. Reggetz, EG. Lee, A. Virji, S. Friend, MBG. Jun, **S. Akin**, "Cold spray powder emissions in a laboratory setting", *AIHA Connect* , (**2024**).
2. T. Chang, **S. Akin**, L. Couetil, MBG. Jun, C.H. Lee "Dual regime spray of functional nanomaterials for electronic textiles", *Material Research Society (MRS)* , Hawaii, HI, USA (**2022**).
1. **S. Akin**, JT. Tsai, H. Joe, H. Joe, MBG. Jun, "Smart thin film on polymer and textile substrates by controlled spray and electroless plating", *NextFlex, IN, USA*, (**2020**).

## **TEACHING & MENTORING EXPERIENCE**

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### Instructor:

#### **Rensselaer Polytechnic Institute**

- **MANE 6962:** Additive Manufacturing Spring 2026
- **ENGR 4710/MANE 4610:** Manufacturing Processes and Systems I Fall 2025
- **ENGR 4720/MANE 4620:** Manufacturing Processes and Systems II Spring 2025  
Instructor Rating: 5/5
- **ENGR 2050:** Introduction to Engineering Design Spring 2024, Fall 2024  
Instructor Rating: 4.3/5

#### **Purdue University, West Lafayette**

Aug 2022-Dec 2022

#### Instructor as the *Ward A. Lambert Fellow*

- **ME 354:** Machine Design  
Instructor Rating: 4.4/5

### Teaching Assistant:

#### **Purdue University, West Lafayette**

2019-2022

- **ME 352:** Machine Design I (Fall 2019, Spring 2020, Spring 2022)
- **ME 354:** Machine Design II (Fall 2020, Spring 2021, Fall 2021)

#### **Bursa Technical University, TURKEY**

2013- 2016

- Computer-aided design (CAD), Thermodynamics, Machine Laboratory, Senior Design Project

## INDUSTRIAL EXPERIENCE

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Intern at the **OYAK-RENAULT Automotive Company** , TURKEY

2012-2013

- Assisted a project from concept to minimize quality errors in vehicle batteries.
- Collected and analyzed data on quality errors of the vehicle batteries.
- Designed the software for quality control of the batteries.

## TECHNICAL SKILLS

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**Programming languages:** Python, MATLAB

**Engineering software:**

- **Computer-aided design (CAD):** Solidworks, CATIA, NX, AutoCAD, SpaceClaim
- **Computer-aided engineering (CAE):** ANSYS (Workbench, Fluent), Abaqus, HyperMesh
- **Other:** MS Office, L<sup>A</sup>T<sub>E</sub>X, Overleaf, Jupyter Notebook, Google Colab, OriginPro, MS Visio

## INVITED TALKS & SEMINARS

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### 1. "Solid-state additive manufacturing: Building without melting"

*Union College, Mechanical Engineering Department, Schenectady, NY, USA (June 2025)*

### 2. "Additive Manufacturing of Functional Smart Surfaces"

*RPI MANE Department Graduate Seminar (2024)*

### 3. "Spray-Based Additive Manufacturing of Functional Smart Surfaces"

*University of Illinois Chicago (UIC), Department of Mechanical and Industrial Engineering, October (2023)*

### 4. "Additively Manufactured Counter Electrodes for Dye-Sensitized Solar Cells"

*World Congress on Micro and Nano Manufacturing (WCMNM), Evanston, IL, USA (2023)*

### 5. "Cold Spray Direct Writing of Flexible Electrodes for Enhanced Performance TENGs"

*North American Manufacturing Research Conference (NAMRC), New Jersey, USA (2023)*

### 6. "A Study on the Effect of Nozzle Geometrical Parameters on Supersonic Cold Spraying of Droplets"

*ASME International Manufacturing Science and Engineering Conference (MSEC), West Lafayette, Indiana, USA (2022)*

### 7. "Electrically Conductive Textiles Based on Decoupled Spray Coating and Electroless Plating"

*International Symposium on Precision Engineering and Sustainable Manufacturing (PRESM), South Korea (2021)*

### 8. "Fabrication of Electrically Conductive Patterns on ABS Polymer Using Low-Pressure Cold Spray and Electroless Plating"

*ASME International Manufacturing Science and Engineering Conference, Cincinnati, Ohio, USA (2020)*

**9. "Dual Regime Spray Deposition-Based Laser Direct Writing of Metal Patterns on Polymer Substrates"**

*World Congress on Micro and Nano-Manufacturing, Raleigh, North Carolina, USA (2019)*

## **PROFESSIONAL SOCIETY MEMBERSHIP**

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- American Society of Mechanical Engineering (ASME)
- Society of Manufacturing Engineers (SME)
- SigmaXI Scientific Research Honor Society (Full Member)

## **PROFESSIONAL SERVICES**

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### **Journal Paper Peer-Reviewer:**

- Journal of Manufacturing Process
- ASME Journal of Micro and Nano Science and Engineering
- Journal of Manufacturing and Materials Processing
- Surface & Coatings Techonology
- Applied Surface Science Advances
- Applied Surface Science
- Surfaces & Interfaces
- Structural Health Monitoring
- Additive Manufacturing
- Energy Technology
- Applied Mechanics
- International Journal of Heat and Mass Transfer
- Scientific Reports - Nature
- Materials Letters
- Micromachines
- Electronics
- Processes
- Coatings

### **Conference Reviewer:**

- ASME Manufacturing Science and Engineering Conference (MSEC, 2026)
- Additive Manufacturing Conference (AMC, Turkey), 2026
- ASME International Mechanical Engineering Conference and Exposition (IMECE, 2025)
- ASME Manufacturing Science and Engineering Conference (MSEC, 2025)
- World Congress on Micro-and Nano-Manufacturing (WCMNM-2025)
- North American Manufacturing Research Conference (NAMRC-53, 2025)

- North American Manufacturing Research Conference (NAMRC-52, 2024)
- North American Manufacturing Research Conference (NAMRC-51, 2023)
- World Congress on Micro-and Nano-Manufacturing (WCMNM-2023)

### **Services:**

- Symposium Organizer, “*Recent Advancements in Solid-State Materials & Manufacturing Processes*”, ASME IMECE 2026
- Symposium Organizer, “*Advances in Solid-state Additive Manufacturing*”, ASME/MSEC 2026
- Symposium Organizer, “*Advances in Manufacturing of Thin Films and Coatings*”, ASME/MSEC 2025
- Session Chair, “*Additive Manufacturing*”, SME NAMRC-2025
- Judge, ASME/SME Student Manufacturing Design Competition, 2025
- Head volunteer, ASME MSEC/SME NAMRC-2022

## **GRADUATE STUDENT MENTORING**

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- **Advisor - Ph.D. Students:**

Sazedur Rahman (Aug 2024 - Present), Jaehun Jeon (Spring 2025 - Present), Fatema-Tuj- Zohora (Fall 2025 - Present)

- **Advisor - Master of Eng. Students:**

Kate Goldstein (Spring 2026 - Present), Leo Woytomich (Spring 2026 - Present), Jules Philips (Fall 2025 - Present), Nicholas Walker (Fall 2025 - Present), Faydia Thompson (Spring 2025 - Fall 2025)

- **Mentor - Ph.D. Students:**

Jinhan Ren, Joni C. Dhar, Shamim H. Abir (Jan 2024 - Present)

- **Mentor - Master of Science Students:**

Kyle Young (Fall 2025 - Present)

- **Mentor - Master of Eng. Students:**

Charli Smith, Jared Zornitger (Spring 2024 - Fall 2024)

## **UNDERGRADUATE STUDENT MENTORING**

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- **Advisor - Undergraduate Research Students:**

Alex Wong (Fall 2024 - Present)

Grace Richard, Akshay Rao Ananda (Fall 2025 - Present)

Brandon Villanueva, Zach Goncalves, Zhi Guan, Travis Johnson (Spring 2024)

Hongfei Liu, Hongru Liu, (Fall 2024 - Spring 2025)

## Ph.D. COMMITTEE MEMBER

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Rohit Monaj	RPI	2025 - Present
Sk. Shamim H. Abir	RPI	2025 - Present
Sikharin Pranompont	RPI	2025 - Present
Joni C. Dhar	RPI	2024 - Present
Apurva Anjan	RPI	2024 - Present
Chieloka Ibekwe	RPI	2024 - Present

## SELECTED MEDIA COVERAGE

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- "SME Journal Awards: Best Paper Award, Journal of Manufacturing Processes", 2025, [\[Link\]](#)
- "Journal Awards: Outstanding Reviewer, Journal of Manufacturing Processes", 2025, [\[Link\]](#)
- "ASME Reviewers of the Year", 2024, [\[Link1\]](#), [\[Link2\]](#)
- "Outstanding Research Award *Purdue University, College of Engineering*", 2023. [\[Link\]](#)
- "Remote horse slicker monitors chronic health conditions" *Veterinary* 33, July 2022. [\[Link\]](#)
- "How do you test for equine asthma and heart disease using a remote horse slicker? Put the horse on a treadmill" *Purdue Research News*, April 2022. [\[Link\]](#)
- "Specially designed slicker captures horse's vital signs on a laptop via Bluetooth" *Phys.org*, February 2022. [\[Link\]](#)
- "Horse slicker may help tell of animal's chronic diseases" *Newsbug*, February 2022. [\[Link\]](#)