

Semih Akin

Assistant Professor of Mechanical Engineering
Department of Mechanical, Aerospace, and Nuclear Engineering
Rensselaer Polytechnic Institute, Troy, New York, 12180

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

EDUCATION

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

RESEARCH & PROFESSIONAL EXPERIENCE

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

RESEARCH INTEREST

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

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 1st** 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)

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)

- **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

†: Equal contribution

*: Corresponding author

1. **S. Akin***, J. Ren, P. Zhou, F. Kopsaftopoulos, J. Samuel, "Additively manufactured smart metallic structures with embedded sensing: A review", **Progress in Additive Manufacturing (In revision)**.
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 review).

PEER-REVIEWED JOURNAL PUBLICATIONS

†: Equal contribution

*: Corresponding author

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) ↗.
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) ↗.
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) ↗.
- tbf28. 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) ↗.
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) ↗.
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) ↗.
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) ↗.
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) ↗.

23. **S. Akin^{†*}**, T. Chang[†], S.H. Abir[†], 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/) ↗.
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 Pre-**

cision Engineering and Manufacturing Green Technology, (2024),
(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) ↗.
- 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) ↗.
- 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) ↗.
- 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) ↗.
- 17.** T. Chang[†], **S. Akin**[†], S. Cho[†], 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) ↗.
- 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) ↗.
- 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) ↗.
- 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) ↗.
- 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) ↗.
- 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) ↗.
- 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) ↗.
- 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.org/10.1021/acsmami.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[†], **S. Akin**[†], 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 review).
- 24.** J. Jeon, FT. Zohora, **S. Akin***, “Direct-writing of physically unclonable surfaces for anti-counterfeiting”, **North American Manufacturing Research Conference, NAMRC-53** ↗, Penn State, Pennsylvania, USA, **(2026)**, (Under review).
- 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) ↗

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) ↗

17. J. Lee, **S. Akin**, J. Walsh, H. Lee, MBG. Jun, Y. Shin^Ψ*, "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**^Ψ*, 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) ↗, (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 (WCMMN)* ↗, Pattaya, Thailand, 2024.

14. S. Jo, **S. Akin**, H. Yun, M. Park, MBG. Jun^Ψ*, "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^Ψ, **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) ↗

12. JT. Tsai^Ψ*, **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**^Ψ*, MBG. Jun, "Additively manufactured counter electrodes for dye-sensitized solar cells", *World Congress on Micro and Nano Manufacturing (WCMMN)* ↗, Evanston, IL, USA (2023).

10. MBG. Jun^Ψ*, **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**^{Ψ*}, 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**^{Ψ*}, 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^Ψ, **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**^{Ψ*}, 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^{Ψ*}, “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^Ψ, 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^Ψ, **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**^Ψ, 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**^Ψ, 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](https://www.wcmnm-2019.com/)) ↗.

POSTER PRESENTATIONS

- 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, S. Friend, 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

Instructor:

Rensselaer Polytechnic Institute

- **ENGR 4710/MANE 4610:** Manufacturing Processes and Systems I Fall 2025
 - **ENGR 4720/MANE 4620:** Manufacturing Processes and Systems II
Instructor Rating: 5/5 Spring 2025
 - **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

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

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^AT_EX, Overleaf, Jupyter Notebook, Google Colab, OriginPro, MS Visio

INVITED TALKS & SEMINARS

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

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

PROFESSIONAL SERVICES

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 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, "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

- **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:**

Faydia Thompson (Spring 2025 - Present), Jules Philips (Fall 2025 - Present), Nicholas Walker (Fall 2025 - Present)

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

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

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

Kyle Young (Fall 2025 - Present)

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

UNDERGRADUATE STUDENT MENTORING

- **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

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

- "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. [\[Link\]](#)