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) 2010 – 2013

- *Double Major in Industrial Engineering*

B.S. **Uludag University**, Mechanical Engineering, (Turkey) 2008 – 2013

- *Honor student, Ranked 1^{st} in the class diploma*

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 maintanance

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** 1^{st} 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 therewidth", *(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. 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

†: Equal contribution ***:** Corresponding author

32. J. Jeon, **S. Akin***, "Physically unclonable surfaces enabled by cold spray deposition", **ACS Applied Materials & Interfaces, (2026)**, **(doi.org/10.1021/acsami.5c17570)**.

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)**.

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)**.

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 Precision 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/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†, **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 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)**.

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)**, (*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$^{\Psi}$*, "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**$^{\Psi}$*, 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 (WCMNM)*, Pattaya, Thailand, **2024**.

14. S. Jo, **S. Akin**, H. Yun, M. Park, MBG. Jun$^{\Psi*}$, "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$^{\Psi}$, **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$^{\Psi*}$, **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**$^{\Psi\star}$, 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$^{\Psi\star}$, **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**$^{\Psi\star}$, 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**$^{\Psi\star}$, 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$^{\Psi}$, **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**$^{\Psi\star}$, 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$^{\Psi\star}$, "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$^{\Psi}$, 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$^{\Psi}$, **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**$^{\Psi}$, 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**$^{\Psi}$, 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

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

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

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: Pyhton, MATLAB

Engineering software:

- **Computer-aided design (CAD):** Solidworks, CATIA, NX, AutoCAD, SpaceClaim
- **Computer-aided engineering (CAE):** ANSYS (Workbench, Fluent), Abaqus, HyperMesh
- **Other:** MS Office, LaTeX, 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 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

- **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

- **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" *Veterinary33*, 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]