Paul Emadi

Ph.D., P.Eng.

Vancouver, British Columbia

EDUCATION AND TRAINING

Ph.D. - Mechanical Engineering (2022)
Specialization in Materials Science and Engineering
Toronto Metropolitan University, Toronto ON

MASc - Mechanical Engineering (2017)
Specialization in Materials Science and Engineering
Toronto Metropolitan University, Toronto ON

B.Eng. - Mechanical Engineering (2014)
Toronto Metropolitan University, Toronto ON

PROFESSIONAL REGISTRATION/LICENSING

Professional Engineer (P.Eng.),
Engineers and Geoscientists British Columbia (EGBC)
Association of Professional Engineers and Geoscientists of Alberta (APEGA)

PROFESSIONAL AFFILIATIONS

American Society for Metals (ASM)

Society of Automotive Engineers (SAE)

American Society for Mechanical Engineers (ASME)

American Foundry Society (AFS)

Association for Iron and Steel Technology (AIST)

The Minerals, Metals & Materials Society (TMS)

The American Ceramic Society (ACerS)

PROFESSIONAL EXPERIENCE

Paul is a licensed Professional Engineer specializing in Mechanical and Materials Engineering with expertise in forensic failure analysis. His skills encompass materials testing, metallurgical sample preparation and microstructure characterization. With hands-on experience in automotive product design and testing, Paul's knowledge extends to failures in consumer and industrial products, plumbing systems, automotive components, and issues stemming from corrosion, fatigue, improper installation, and poor material selection. He is proficient in analysing failures related to metals, polymers, glass, ceramics and composites using analytical tools like XRD, XRF, SEM, EDX, and optical microscopy. Paul has collaborated with insurance companies, law firms and industrial risk management teams. His contribution to the field of materials science and engineering is validated by 21 technical publications and presentations.

May 2023 to Present

Forensic Mechanical and Materials Engineer, ***Origin and Cause***
Vancouver, B.C.

- Conduct failure analysis on a diverse range of engineering materials, including metals, plastics, and ceramics, to pinpoint the root cause of service failures across sectors such as residential, consumer products, commercial and industrial
- Conduct comprehensive evaluations, tests, and characterizations of materials and components
- Compile detailed technical reports on failure analysis and offer expert litigation support to stakeholders including insurance companies, law firms and independent adjusters

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September 2022 to April 2023

Forensic Materials Failure Analysis Engineer, ***Rimkus Consulting Group***
Vancouver, B.C.

- Performed inspections and failure analysis including those involving industrial equipment, mechanical systems and components, and residential and commercial appliances
- Field inspections, destructive testing, review of pictures/depositions and report preparation
- Identification of various failure mechanisms such as overload, corrosion (pitting, stress corrosion cracking, fatigue, etc.), environmental stress cracking (ESC), chemical incompatibility, oxidation, improper installation, and manufacturing defects
- Identification of root cause(s) of failures such as manufacturing defects, impact, or improper handling

September 2015 to August 2022

Research Assistant, ***TMU – Centre for Near-net-shape Processing of Materials***
Toronto, ON

- Research in the fields of materials science, metallurgy, casting and characterization of lightweight alloys.
- Development of research projects, experimental design, data analysis and scientific report generation.
- Laboratory level testing of material properties, data collection, laboratory equipment and instrument
- installation, inspections and maintenance, inventory and database management.
- Course and labs taught: Materials Science Fundamentals, Materials Science II, Biomaterials.

April 2014 to September 2015

Project Engineering – Power Systems, ***MAGNA***
Toronto, ON

- Coordinated and implemented customer requirements for product and process development, leading to the successful launch of several components for OEMs such as GM, FCA and HKMC
- Performed CAD design, developed prototypes, documents for engineering design and analysis (DFMEA, DVP&R, Engineering Specifications, Test Plans, Engineering Drawings and Technical Reports)
- Failure analysis, troubleshooting, assessment and investigations using technical problem-solving techniques, root cause analysis and technical support

SELECTED PUBLICATIONS – JOURNAL PAPERS

- **Emadi, P.**, Andilab, B., and Ravindran, C., "Effects of Sonication Amplitude on the Microstructure and Mechanical Properties of AZ91E Magnesium Alloy", Journal of Magnesium and Alloys, 2022. https://doi.org/10.1016/j.jma.2022.05.019

- **Emadi, P.**, Andilab, B., and Ravindran, C., "Processing and Properties of Magnesium-Based Composites Reinforced with Low Levels of Al2O3", International Journal of Metalcasting, 2022. https://doi.org/10.1007/s40962-021-00738-w

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- **Emadi, P.**, Andilab, B., and Ravindran, C. “A Preliminary Study on the Casting, Characterization, and Heat-treatment of a Mg-Zn-Al-Si Alloy,” Under-review.

- **Emadi, P.**, Andilab, B., Borodianskiy, K. and Ravindran, C., “Strengthening of Mg-Al-Zn-Mn Alloy Using SiC/Al Nanocomposite Extrusion, Journal of Alloys and Compounds”, Journal of Alloys and Compounds, 2022. https://doi.org/10.1016/j.jallcom.2022.166243

- Andilab, B., **Emadi, P.**, Ravindran, C., “Casting and Characterization of A319 Aluminum Alloy Reinforced with Graphene Using Hybrid Semi-Solid Stirring and Ultrasonic Processing”, Materials, 2022. https://doi.org/10.3390/ma15207232

- **Emadi, P.**, Andilab, B., and Ravindran, C., “Engineering Lightweight Aluminum and Magnesium Alloys for a Sustainable Future,” Journal of the Indian Institute of Science, 2022. https://doi.org/10.1007/s41745-021-00267-9

- Andilab, B., Vandersluis, E., **Emadi, P.**, Ravindran, C., Byczynski, G., and Gutiérrez, R., “Characterization of a cast Al-Cu alloy for automotive cylinder head applications,” Journal of Materials Engineering and Performance, 2022. https://doi.org/10.1007/s11665-022-06632-8, Collab. between Ryerson University, Canada – Nemak Linz, Austria

- **Emadi, P.**, Andilab, B., Ravindran, C., “Preparation and Characterization of AZ91E/Al2O3 Composites Using Hybrid Mechanical and Ultrasonic Particle Dispersion,” Materials Science & Engineering A, vol. 819, pp. 141505, 2021. https://doi.org/10.1016/j.msea.2021.141505

- **Emadi, P.**, Rinaldi, M., Ravindran, C., “Grain Refinement and Fading Behavior of MgB2-Inoculated Magnesium”. Metallography, Microstructure, and Analysis, Vol. 10, pp. 367-376, 2021. https://doi.org/10.1007/s13632-021-00755-5

- **Emadi, P.**, Ravindran, C., “The Influence of High Temperature Ultrasonic Processing Time on the Microstructure and Mechanical Properties AZ91E Magnesium Alloy,” Journal of Materials Engineering and Performance, vol. 30, pp. 1188-1199, 2021. https://doi.org/10.1007/s11665-020-05419-z

- **Emadi, P.**, Vandersluis, E., Andilab, B., Rinaldi, M., Ravindran, C., “Ultrasonic Processing of Magnesium Alloy for Property Enhancement,” Materials Science Forum, vol. 1016, pp. 200-205, 2021. https://doi.org/10.4028/www.scientific.net/MSF.1016.200

- Vandersluis, E., **Emadi, P.**, Andilab, B., Ravindran, C., “The Role of Silicon Morphology in the Electrical Conductivity and Mechanical Properties of As-Cast B319 Aluminum Alloy,” Metallurgical and Materials Transactions A, vol. 51A, pp. 1874-1886, 2020. https://doi.org/10.1007/s11661-020-05650-2

- **Emadi, P.**, Vandersluis, E., Ravindran, C., “Prediction and Verification of Effective Grain Refiners for Magnesium Alloys,” Transactions of the Indian Institute of Metals, vol. 71, no. 11, p. 2771-2775, 2018. https://doi.org/10.1007/s12666-018-1435-4

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- Vandersluis, E., Sediako, D., **Emadi, P.**, Ravindran, C., Elsayed, A., Byczynski, G., "Determination of Temperature-Dependent Crystallographic Parameters of Al-Si Alloys Using In-Situ Neutron Diffraction," Journal of Applied Crystallography, vol. 51, no. 4, pp. 1141-1150, 2018. https://doi.org/10.1107/S1600576718008737 Collaboration between Ryerson University, Canada – University of British Columbia, Canada – Nemak of Canada

CONFERENCES & PRESENTATIONS

- **Emadi, P.**, Andilab, B., and Ravindran, C., (2022) "Processing, Properties and Applications of Lightweight Al and Mg Alloys" COM 2022: Conference of Metallurgists.

- **Emadi, P.**, Vandersluis, E., Andilab, B., Rinaldi, M., Ravindran, C., (2021) "Ultrasonic Processing of Magnesium Alloy for Property Enhancement", THERMEC 2021: Intl. Conference on Processing and Manufacturing of Advanced Materials.

- **Emadi, P.**, Vandersluis, E., Ravindran, C., (2018) "Grain Refinement of Magnesium Castings with MgB2", Mg2018: The 11th International Conference on Magnesium Alloys and their Applications, Old Windsor, U.K.

- **Emadi, P.**, Vandersluis, E., Ravindran, C., (2018) "Preparation and Analysis of Nano-Particles for Grain Refinement Applications", THERMEC 2018: International Conference on Processing and Manufacturing of Advanced Materials, Paris, France.

- **Emadi, P.**, Vandersluis, E., Ravindran, C., (2017) "Understanding and Mitigating Defects in Light Structural Alloys", ADMAT-2017: International Conference on Advanced Materials and Processes, Thiruvananthapuram, India.

- Ravindran, C.*, Lombardi, A., Vandersluis, E., and **Emadi, P.** (2016) Processing of Light Alloys for Automotive Engine Applications, ASM International-India Chapter MET & HTS 2016, Mumbai, India.

- **Emadi, P.**, Ravindran, C., and Lombardi, A. (2016) "Magnesium Alloy Castings Revitalizing the Automotive Sector", iMagCon 2016: International Conference and Expo on Magnesium, February 4, Chennai, India.