OCI Group

Paul Emadi

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Operations Manager British Columbia
Materials and Mechanical Engineer

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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.

Paul 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 25 technical publications and presentations.

EDUCATION

Toronto Metropolitan University
Ph.D. - Mechanical Engineering, Specialization in Materials Science and Engineering
Toronto, Ontario, Canada
2022

Toronto Metropolitan University
MASc - Mechanical Engineering, Specialization in Materials Science and Engineering
Toronto, Ontario, Canada
2017

Toronto Metropolitan University
B. Eng. - Mechanical Engineering
Toronto, Ontario, Canada
2014

PROFESSIONAL REGISTRATION & LICENSING

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

TECHNICAL AFFILIATIONS

- American Society for Metals (ASM)
- Society of Automotive Engineers (SAE)
- National Fire Protection Association (NFPA)
- National Association of Fire Investigators (NAFI)
- 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

Forensic Mechanical and Materials Engineer

OCI Group (Formerly Origin and Cause Incorporated)
Vancouver, British Columbia
May 2023 – Present

- 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

Forensic Materials Failure Analysis Engineer

Rimkus Consulting Group
Vancouver, British Columbia
September 2022 – February 2023

- 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

Research Assistant
TMU – Centre for Near-net-shape Processing of Materials
Toronto, Ontario
September 2015 – August 2022

- 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 instruments
- Installation, inspections and maintenance, inventory and database management
- Course and labs taught: Materials Science Fundamentals, Materials Science II, Biomaterials

Project Engineering
Power Systems, MAGNA
Toronto, Ontario
April 2014 – September 2015

- 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

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SELECTED PUBLICATIONS – JOURNAL PAPERS

Andilab, B., **Emadi, P.**, Roy, R. and Ravindran, C., "Ultrasonic processing of lightweight alloys: A critical review", International Materials Reviews, 2025. doi:10.1177/09506608251369176

Andilab, B., **Emadi, P.**, Sydorenko, M. and Ravindran, C., "Influence of GNP Additions on the Microstructure, Mechanical Properties, and Electrical Conductivity of Cast A319 Aluminum Alloy", International Journal of Metalcasting, 2023. doi: 10.1007/s40962-023-01235-y

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

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. "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., Elsayed, A., D’Elia, F., **Emadi, P.**, Sediako, D., and Ravindran, C., “Crystalline-Phase Solidification Analysis Using In Situ Neutron Diffraction,” Transactions of the Indian Institute of Metals, vol. 71, pp. 2777–2781, 2018. DOI: 10.1007/s12666-018-1418-5

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

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

CONFERENCES & PRESENTATIONS

Emadi, P., Mari, E., (2025) “Forensic Engineering and Its Role in Fire Protection: Case Studies and Examples” NFPA Conference and Expo 2025.

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.

FURTHER TRAINING & EDUCATION

Fire Sprinkler Inspection Training & Certification Program, Oklahoma State University, Stillwater, Oklahoma (2025)

Plastic Part Failure: Analysis, Design & Prevention, University of Wisconsin-Milwaukee, Wisconsin (2024)

Fire Investigation Training Program, National Association of Fire Investigators International, Seattle, Washington (2024)

Design Failure Mode and Effects Analysis – DFMEA, Magna International,Toronto, Ontario

RED X Technical Problem Solving, General Motors, Toronto, Ontario

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HONORS & AWARDS

ASM International - Best Technical Paper (2021)

Toronto Metropolitan University Research Seminar Award 1st Place (2021)

Natural Sciences and Engineering Research Council of Canada – MSFSS (2020)

Toronto Metropolitan University MIE Graduate Excellence Award (2020)

Natural Sciences and Engineering Research Council of Canada – Canada Graduate Scholarship (2019 – 2022)

Faculty of Engineering and Architectural Science Graduate Award (2019 – 2020)

Toronto Metropolitan University Graduate Development Award (2019 – 2020)

Queen Elizabeth II Scholarship in Science and Technology (2018 – 2019)

Ontario Graduate Scholarship (2017 – 2018)

Toronto Metropolitan University Graduate Fellowship (2017 – 2018, 2020 – 2021)

Queen Elizabeth II Scholarship in Science and Technology (2016 – 2017)

American Foundry Society Merit Award (AFS) (2016)

FEF Award for Research Excellence in the Field of Non-Ferrous Alloys (2016)

Toronto Metropolitan University Dean's List – 1st, 2nd, 3rd, and 4th Year

Toronto Metropolitan University Capstone Project Design Award (2014)

Toronto Metropolitan University Undergraduate Research Opportunities (URO) award (2012)

Department of Mechanical and Industrial Engineering Achievement Award (2011)

Canadian Society of Applied Mechanics award for Academic Achievement (2010)

Canadian Congress of Applied Mechanics Award (2010)