

Peyman Shabani

CURRENT POSITIONS

PHD CANDIDATE

Department of Mechanical and Aerospace Engineering
Carleton University, Ottawa, Canada

Non-Salary Worker

Aerospace Research Center, National Research Council Canada, Ottawa, Canada

EDUCATION

2021 - PRESENT

PHD STUDENT IN AEROSPACE ENGINEERING

Department of Mechanical and Aerospace Engineering
Carleton University, Ottawa, Canada

Thesis Title: Virtual Testing of Aerospace Composite Materials

Supervisors: Jeremy Laliberte and Lucy Li

2016 - 2019

M.SC. IN MECHANICAL ENGINEERING

School of Mechanical Engineering
Iran University of Science and Technology, Tehran, Iran

Thesis Title: Modeling of Matrix Cracking in The Self-Healing Composites

Supervisor: Mahmood M. Shokrieh

2012 - 2016

B.SC. IN MECHANICAL ENGINEERING

School of Mechanical Engineering
K. N. Toosi University of Technology, Tehran, Iran

Supervisor: Mohammad Shariyat

PUBLICATIONS

Google Scholar: <https://scholar.google.com/citations?user=b6J3g58AAAJ&hl=en>

Scopus: <https://www.scopus.com/authid/detail.uri?authorId=57206480467>

ORCID: <https://orcid.org/0000-0002-0308-6853>

JOURNAL PAPERS

1. **P. Shabani**, L. Li, J. Laliberte. "Effects of impactor geometry and multiple impacts on low-velocity impact response and residual compressive strength of fiber-reinforced composite laminates." Composites Part B: Engineering (2025): 112575.
<https://doi.org/10.1016/j.compositesb.2025.112575>
2. **P. Shabani**, L. Li, J. Laliberte. "Low-velocity impact (LVI) and compression after impact (CAI) of Double-Double composite laminates." Composite Structures 351 (2025): 118615.
<https://doi.org/10.1016/j.compstruct.2024.118615>
3. **P. Shabani**, L. Li, J. Laliberte, G. Qi, "Enhanced LaRC05 failure criteria for investigating low-velocity impact on fiber-reinforced composites: an experimental and computational study", Aerospace Science and Technology 155 (2024): 109554.
<https://doi.org/10.1016/j.ast.2024.109554>
4. **P. Shabani**, L. Li, J. Laliberte, G. Qi. "Compression after impact (CAI) failure mechanisms and damage evolution in large composite laminates: High-fidelity simulation and experimental study." Composite Structures 339 (2024): 118143.
<https://doi.org/10.1016/j.compstruct.2024.118143>

5. **P. Shabani**, L. Li, J. Laliberte, G. Qi, D. Rapking, D. Mollenhauer, "High-fidelity simulation of low-velocity impact damage in fiber-reinforced composite laminates using continuum and discrete damage modeling techniques", *Composite Structures*, 313 (2023): 116910.
<https://doi.org/10.1016/j.compstruct.2023.116910>
6. **P. Shabani**, N. Shabani, "Fatigue life prediction of high-speed composite craft under slamming loads using progressive fatigue damage modeling technique", *Engineering Failure Analysis*, 131 (2022): 105818.
<https://doi.org/10.1016/j.engfailanal.2021.105818>
7. X. Wu, P. Kanz, H. Mahmoud, J. Millar, **P. Shabani**, J.M. Torres, "Characterization of the Microstructure and Surface Roughness Effects on Fatigue Life Using the Tanaka–Mura–Wu Model" *Applied Sciences* 11, no. 21 (2021): 9955.
<https://doi.org/10.3390/app11219955>
8. **P. Shabani**, F. Taheri-behrooz, S.S. Samareh-Mousavi, M. M. Shokrieh, "Very high cycle and gigacycle fatigue of fiber-reinforced composites: A review on experimental approaches and fatigue damage mechanisms", *Progress in Materials Science* (2020): 100762.
<https://doi.org/10.1016/j.pmatsci.2020.100762>
9. **P. Shabani**, M. M. Shokrieh, A Saeedi, "A novel model to simulate the formation and healing of cracks in self-healing cross-ply composites under flexural loading", *Composite Structures*, 235 (2020): 111750.
<https://doi.org/10.1016/j.compstruct.2019.111750>
10. **P. Shabani**, M.M. Shokrieh, I Zibaei, "Effect of the conversion degree and multiple healing on the healing efficiency of a thermally reversible self-healing polymer", *Polymers for Advanced Technologies*, 30 (2019), pp. 2906-2917.
<https://doi.org/10.1002/pat.4723>
11. **P. Shabani**, F. Taheri-behrooz, S. Maleki, M. Hasheminasab "Life Prediction of a notched composite ring using progressive fatigue damage models", *Composites Part B: Engineering*, 165 (2019), pp. 754-763.
<https://doi.org/10.1016/j.compositesb.2019.02.031>

BOOK CHAPTERS

1. **P. Shabani**, M. M. Shokrieh. "Modeling of crack self-healing in thermally remendable fiber-reinforced composites." In *Multifunctional Epoxy Resins: Self-Healing, Thermally and Electrically Conductive Resins*, pp. 239-276. Singapore: Springer Nature Singapore, 2023.
https://doi.org/10.1007/978-981-19-6038-3_9

CONFERENCE PAPERS

1. M. Lanzo, **P. Shabani**, L. Li, J. Laliberte, "Structural integrity assessment of type IV hydrogen pressure vessels: Drop testing and fatigue damage modelling", *CSME 2025 – Canadian Society for Mechanical Engineering*, Montreal, Canada.
2. **P. Shabani**, L. Li, J. Laliberte. "Low-velocity impact (LVI) and compression after impact (CAI) of Double-Double composite laminates", *CANCOM2024 – Canadian International Conference on Composite Materials*, Waterloo, Canada, August 2024.
https://www.cacsm.ca/wp-content/uploads/2024/10/CANCOM_2024_paper_89.pdf
3. L Li, J Vallée, **P. Shabani**, J Laliberté, A Dondish, "Understanding the effect of global buckling on composites damage tolerance", *CANCOM2024 – Canadian International Conference on Composite Materials*, Waterloo, Canada, August 2024.
https://www.cacsm.ca/wp-content/uploads/2024/10/CANCOM_2024_paper_90.pdf
4. **P. Shabani**, L. Li, J. Laliberte, G. Qi, "Balancing high-fidelity and model efficiency of damage prediction of composite structures", *20th International Conference on Experimental Mechanics*, Porto, Portugal, July 2023.
https://paginas.fe.up.pt/~icem20/proceedings_icem20/data/papers/19892.pdf
5. **P. Shabani**, L. Li, J. Laliberte, G. Qi, " Low-velocity impact damage simulation using cohesive zone model and LaRC05 criterion with efficient search algorithm", *23rd International Conference on Composite Materials*, Belfast, Northern Ireland, August 2023.

6. L. Li, **P. Shabani**, J. Laliberte, G. Qi, "Virtual testing of low-velocity impact response of a composite laminate - from analytical to high-fidelity modelling". ICAF 2023 – the 38th Conference and 31st Symposium of the International Committee on Aeronautical Fatigue and Structural Integrity, Delft, The Netherlands, July 2023. **(Received Best Poster Award: €500)**
https://www.icafe.aero/icafe2023/proceedings/display_manuscript/126.htm
7. **P. Shabani**, G. Qi, L. Li, J. Laliberte, "Modeling low-velocity impact damage behavior of fiber-reinforced composites using combined continuum and discrete damage modeling techniques". CANCOM2022 – Canadian International Conference on Composite Materials, New Brunswick, Canada, July 2022.
8. **P. Shabani**, L. Li, J. Laliberte, G. Qi, "A benchmarking evaluation of finite element modeling strategies for adhesively-bonded composites using the cohesive zone modeling and virtual crack closure technique". ICFC8 - The 8th International Conference on the Fatigue of Composites, Padua, Italy, June 2021.
9. **P. Shabani**, M.M. Shokrieh, I. Zibaei, "Effect of the conversion degree on the healing efficiency of a novel thermally remendable polymer". CCFA-6 - Composites: Characterization, Fabrication & Application, Tehran, Iran, December 2018.

TECHNICAL REPORTS

1. **P. Shabani**, G. Qi, L. Li, J. Laliberte, "LTR-SMM-2023-0026: An Effective Modelling and Simulation Strategy for Predicting Compression After impact (CAI) Strength of Composite Laminates ", National Research Council Canada, 2023.
2. **P. Shabani**, G. Qi, L. Li, J. Laliberte, "LTR-SMM-2023-0125: Development of an accurate composite laminate damage modelling methodology with improved LaRC05 failure criteria", National Research Council Canada, 2023.
3. **P. Shabani**, G. Qi, L. Li, J. Laliberte, "LTR-SMM-2022-0011: Simulation of low-velocity impact damage behavior of fiber-reinforced composite laminates using discrete and continuum damage modelling techniques", National Research Council Canada, 2022.

HONORS & AWARDS

2025	National Research Council Canada – Aerospace Early Career Network Best Paper Award (Third Place - \$250)
2024	National Research Council Canada – Aerospace Early Career Network Best Paper Award (Second Place - \$350)
2021	J.Y. and E.Y. Wong Award for research excellence (\$6000)
2016	Ranked in the top 1% in the National Graduate Entrance Exam in the field of Mechanical Engineering (exempted from paying tuition for the entire study period)
2012	Ranked in the top 0.5% in the Iranian University Entrance Exam (exempted from paying tuition for the entire study period)

RESEARCH EXPERIENCE

2022 - PRESENT	Non-salary Worker - National Research Council Canada, Ottawa, Canada <ul style="list-style-type: none"> - Virtual testing of composite materials - Development of NCPProCDM user-defined material subroutine for damage prediction in composite materials - Development of the "CompVT: Coupon" Abaqus plugin for the rapid preparation of high-fidelity finite element models. https://compvt.github.io/coupon/
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2016 – 2020

Research Assistant - Composite Research Laboratory, Iran University of Science and Technology, Tehran, Iran

- Fabrication of composite specimens
- Mechanical testing (static and fatigue)
- Developing codes for failure life prediction of fiber-reinforced composites

SKILLS & RELEVANT COURSES

**PROGRAMMING
LANGUAGES**

MATLAB, Python, FORTRAN, C#

**FINITE ELEMENT
ANALYSIS**

Abaqus, ANSYS

**COMPUTER-
AIDED DESIGN**

SolidWorks, CATIA, AutoCAD

**RELEVANT
COURSES TAKEN**

Advanced Composite Materials, Fatigue in Polymer Composites, Damage Mechanics in Composite Materials, Elasticity, Fracture Mechanics, Continuum Mechanics, Finite Element Method, Microstructure and Properties of Materials, Failure Prevention, Additive Manufacturing

TEACHING EXPERIENCE

WINTER 2025

Teaching Assistant – Aviation Management and Certification (AERO 4009)

Department of Mechanical and Aerospace Engineering, Carleton University (Instructor: Dr. J. Day)

- Guest lecturer for a session on “Composites Damage Tolerance”

WINTER 2025

Teaching Assistant – Lightweight Structures (AERO 3101)

Department of Mechanical and Aerospace Engineering, Carleton University (Instructor: Dr. M. El Sayed)

FALL 2024 & FALL
2023

Teaching Assistant – Composite Materials (AERO 4608)

Department of Mechanical and Aerospace Engineering, Carleton University (Instructor: Dr. J. Laliberte)

- Guest lecturer for a session on “Finite element analysis of composite materials”

FALL 2022

Teaching Assistant – Engineering Materials: Strength and Fracture (MAAE 4102)

Department of Mechanical and Aerospace Engineering, Carleton University (Instructor: Dr. A. Artemev)

WINTER 2024 &
WINTER 2023 &
WINTER 2022

Teaching Assistant – Aerospace Design and Practice (MAAE 3002)

Department of Mechanical and Aerospace Engineering, Carleton University (Instructor: Dr. E. Cyr)

FALL 2021	Teaching Assistant – Mechanics of Solids II (MAAE 3202) Department of Mechanical and Aerospace Engineering, Carleton University (Instructor: Dr. R. Liu)
FALL 2019	Teaching Assistant - Continuum Mechanics School of Mechanical Engineering, Iran University of Science and Technology (Instructor: Dr. F Taheri-behrooz)
WINTER 2020 & WINTER 2019	Teaching Assistant - Fatigue in Polymer Composites School of Mechanical Engineering, Iran University of Science and Technology (Instructor: Dr. F Taheri-behrooz)
FALL 2018	Teaching Assistant - Machine Element Design I School of Mechanical Engineering, Iran University of Science and Technology (Instructor: Dr. F Taheri-behrooz)

CONTACT & LINKS

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LinkedIn: <https://ca.linkedin.com/in/peyman-shabani>

ResearchGate: <https://www.researchgate.net/profile/Peyman-Shabani-2>